# Interstate 880 Southbound HOV Lane Extension
# Marina Boulevard to Hegenberger Road

Oakland and San Leandro, California
04-ALA-880 (PM 22.5/25.5)
04-248-3A9200

## Initial Study with Proposed Negative Declaration/ Environmental Assessment

**Prepared for the**
**State of California Department of Transportation**
**and the**
**U.S. Department of Transportation**
**Federal Highway Administration**

**November 2009**

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## General Information About This Document

### *What's in this document?*

This Initial Study/Environmental Assessment (IS/EA) has been prepared for the California Department of Transportation (Department) and the Federal Highway Administration (FHWA). The IS/EA examines the potential environmental impacts of the alternatives being considered for the proposed project located in Alameda County, California. The document tells you why the project is being proposed, what alternatives we have considered for the project, how the existing environment could be affected by the project, the potential impacts of each of the alternatives, and the proposed avoidance, minimization, and/or mitigation measures.

### *What should you do?*

- Please read this Initial Study/Environmental Assessment.
- Additional copies of this document, as well as the technical studies, are available for review at the Caltrans District 04 Office at 111 Grand Avenue, Oakland, CA 94612 and the following locations:
  - Alameda County Congestion Management Agency (ACCMA) offices at 1333 Broadway, Suite 220, Oakland, California 94612, or website at www.accma.ca.gov
  - Oakland Public Library, 125 14th Street, Oakland, California 94612
  - San Leandro Public Library, 300 Estudillo Avenue, San Leandro, CA 94577
- Attend the public hearing, scheduled on November 19, 2009 at the Woodrow Wilson Elementary School, located at 1300 Williams Street in San Leandro, between 6:30 p.m. and 8:30 p.m.
- We'd like to hear what you think. If you have any comments regarding the proposed project, please attend the public hearing and/or send your written comments to the Department by the deadline.
  - Submit comments via U.S. mail to the Department at the following address:
    Ed Pang, Environmental Branch Chief
    California Department of Transportation, Office of Environmental Analysis
    PO Box 23660
    Oakland, CA 94623-0660
  - Submit Comments via email to: ed_pang@dot.ca.gov
- Be sure to submit comments by the deadline: December 4, 2009 at 5:00 p.m.

### *What happens next?*

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

For individuals with sensory disabilities, this document can be made available in Braille, in large print, on audiocassette, or on computer disk. To obtain a copy in one of these alternate formats, please call or write to Department of Transportation, District 4 Office of Public Affairs, PO Box 23440, Oakland, CA 94623-0660; (510) 286-4444 Voice, or use the California Relay Service 1 (800) 735-2929 (TTY), 1 (800) 735-2929 (Voice) or 711.

04-ALA-880 (PM 22.5/25.5)
04-248-3A9200

Extend the existing southbound high-occupancy vehicle lane along Interstate 880 (I-880) from approximately 1700 feet south of the Marina Boulevard overcrossing in the City of San Leandro (PM 22.5) to Hegenberger Road in the City of Oakland (PM 25.5)

# INITIAL STUDY with Proposed Negative Declaration/ ENVIRONMENTAL ASSESSMENT

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

US DEPARTMENT OF TRANSPORTATION
Federal Highway Administration, and

THE STATE OF CALIFORNIA
Department of Transportation

10/29/09
Date of Approval

Melanie Brent
MELANIE BRENT, Chief
Office of Environmental Analysis
California Department of Transportation

10/29/09
Date of Approval

for WALTER C. WAIDELICH JR.
Division Administrator
Federal Highway Administration

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# PROPOSED NEGATIVE DECLARATION

Pursuant to: Division 13, Public Resources Code

### *Project Description*

The California Department of Transportation (Department) and the Federal Highway Administration (FHWA), in cooperation with the Alameda County Congestion Management Agency (ACCMA), propose to extend the existing Interstate 880 (I-880) southbound High Occupancy Vehicle (HOV) lane from its current begin point at approximately 1,700 feet south of the Marina Boulevard overcrossing (PM 22.5) to the Hegenberger Road on-ramp (PM 25.5).

### *Determination*

This proposed Negative Declaration (ND) is included to give notice to interested agencies and the public that it is the Department's intent to adopt an ND for this project. This does not mean that the Department's decision regarding the project is final. This ND is subject to modification based on comments received from interested agencies and the public.

An Initial Study has been prepared for this project, and pending public review, the Department expects to determine from this study that the proposed project would not have a significant effect on the environment for the following reasons:

The proposed project would have no effects associated with Land Use, Farmlands/Timberlands, Community Impacts, Relocations, Growth, Environmental Justice, and Natural Communities. In addition, the proposed project would have no significant effects associated with Parks and Recreation Facilities, Utilities and Emergency Services, Traffic and Transportation, Visual Resources, Cultural Resources, Geology and Soils, Paleontology, Hazardous Waste and Materials, Hydrology and Floodplain, Water Quality and Stormwater Runoff, Air Quality, Wetlands and Other Waters, Plant and Animal Species, Threatened and Endangered Species, Invasive Species, and Climate Change. Avoidance and minimization measures would reduce any potential Water Quality, Hazardous Waste and Materials, Air Quality, Noise, Wetlands and Other Waters, and Threatened and Endangered Species effects of the project.

_____ _____

James B. Richards Date
Deputy District Director
District 4 Division of Environmental Planning and Engineering
California Department of Transportation

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# Chapter 1 Proposed Project

## 1.1 Introduction

The California Department of Transportation (Department) and the Federal Highway Administration (FHWA), in cooperation with the Alameda County Congestion Management Agency (ACCMA), propose to extend the existing southbound high-occupancy vehicle (HOV) lane along Interstate 880 (I-880) from approximately 1700 feet south of the Marina Boulevard overcrossing in the City of San Leandro to Hegenberger Road in the City of Oakland. The proposed improvements include widening the southbound mainline to the outside to provide the additional width for a standard HOV lane; re-striping the traffic lanes; reconstructing the Davis Street and Marina Boulevard overcrossings to increase lateral clearance and provide standard vertical clearance over the freeway; widening the bridge over the Union Pacific Railroad (UPRR) and San Leandro Creek; reconstructing the on- and off-ramps at the Hegenberger Road and 98th Avenue interchanges to conform to the mainline alignment; and reconstructing the on- and off-ramps at Davis Street and Marina Boulevard interchanges to conform to new elevations. Existing ramp-metering equipment on all on-ramps would be relocated. The total length of the project is 3.0 miles, from Post Mile (PM) 22.5 to PM 25.5. The project location is shown in Figure 1.1.1-1. The I-880 Southbound HOV Lane Project is described in greater detail in Section 1.4.1, Proposed Build Alternative.

### 1.1.1 Project Background

The I-880 Southbound HOV Lane Project includes all or portions of the following three Metropolitan Transportation Commission (MTC) projects, as listed in the *Transportation 2035 Plan for the San Francisco Bay Area* dated April 2009:

- 22100 – Replace I-880/Davis Street interchange and add additional travel lanes on Davis Street
- 230066 – Improve I-880/Marina Boulevard interchange (includes on- and off-ramp improvements, overcrossing modification, and street improvements)
- 22670 – Construct HOV Lane for southbound I-880 from Hegenberger Road to Marina Boulevard (includes reconstructing bridges at Davis Street and Marina Boulevard)

In November 2006, the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, was approved by the voters as Proposition 1B. The proposition includes a program of funding for $4.5 billion to be deposited in the Corridor Mobility Improvement Account (CMIA). The funds in the CMIA are to be available to the California Transportation Commission to allocate for performance improvements on the state highway system or major access routes to the state highway system. The I-880 Southbound HOV Lane Extension Project is one of the projects that will be funded by the CMIA.

The project will be programmed for construction capital consideration in the 2011/2012 fiscal year. Estimated construction cost in 2009 dollars for the project is shown in the table below:

**Table 1.1.1-1. Construction Cost Estimates – Build Alternative**

| Alternative | Roadway Items | Structure Items | Right of Way & Utilities | TOTAL COST |
|---|---|---|---|---|
| Build | $49,649,000 | $30,155,000 | $1,813,645 | **$81,617,645** |

## 1.2 Purpose and Need

### 1.2.1 Purpose

The purpose of the proposed project is to:

- Reduce travel time on southbound Interstate 880; and,
- Encourage additional High Occupancy Vehicle (HOV) usage in the Interstate 880 corridor by extending the existing HOV lane south of Marina Boulevard.

### 1.2.2 Need

#### 1.2.2.1 CAPACITY AND TRANSPORTATION DEMAND

Traffic counts included in the Traffic Forecast Memorandum prepared by Dowling Associates, Inc. (November 2008) reflect that the number of vehicles using the I-880 corridor within the project limits will increase by 30 percent by the year 2035. There is no existing HOV lane in the southbound direction of I-880 between Hegenberger Road and Marina Boulevard. This stretch of highway is heavily congested during peak morning and evening commute hours due in part to merging traffic downstream of the project limits at Washington Avenue and State Route (SR) 238. This backup at times extends north to the Hegenberger Road interchange. The extension of the southbound HOV lane to Hegenberger Road would improve traffic conditions by facilitating the movement of high-occupancy vehicles around this queue. This in turn would reduce congestion in this section of the freeway and decrease travel time for HOV traffic, especially during the morning and evening peak hours.

According to available traffic data and the initial traffic forecasts prepared by Dowling Associates, Inc. (November 2008), average daily traffic volumes in the project area exceed 200,000 vehicles/day, with southbound volumes exceeding 12,000 vehicles in both the AM and PM peak travel hours combined.

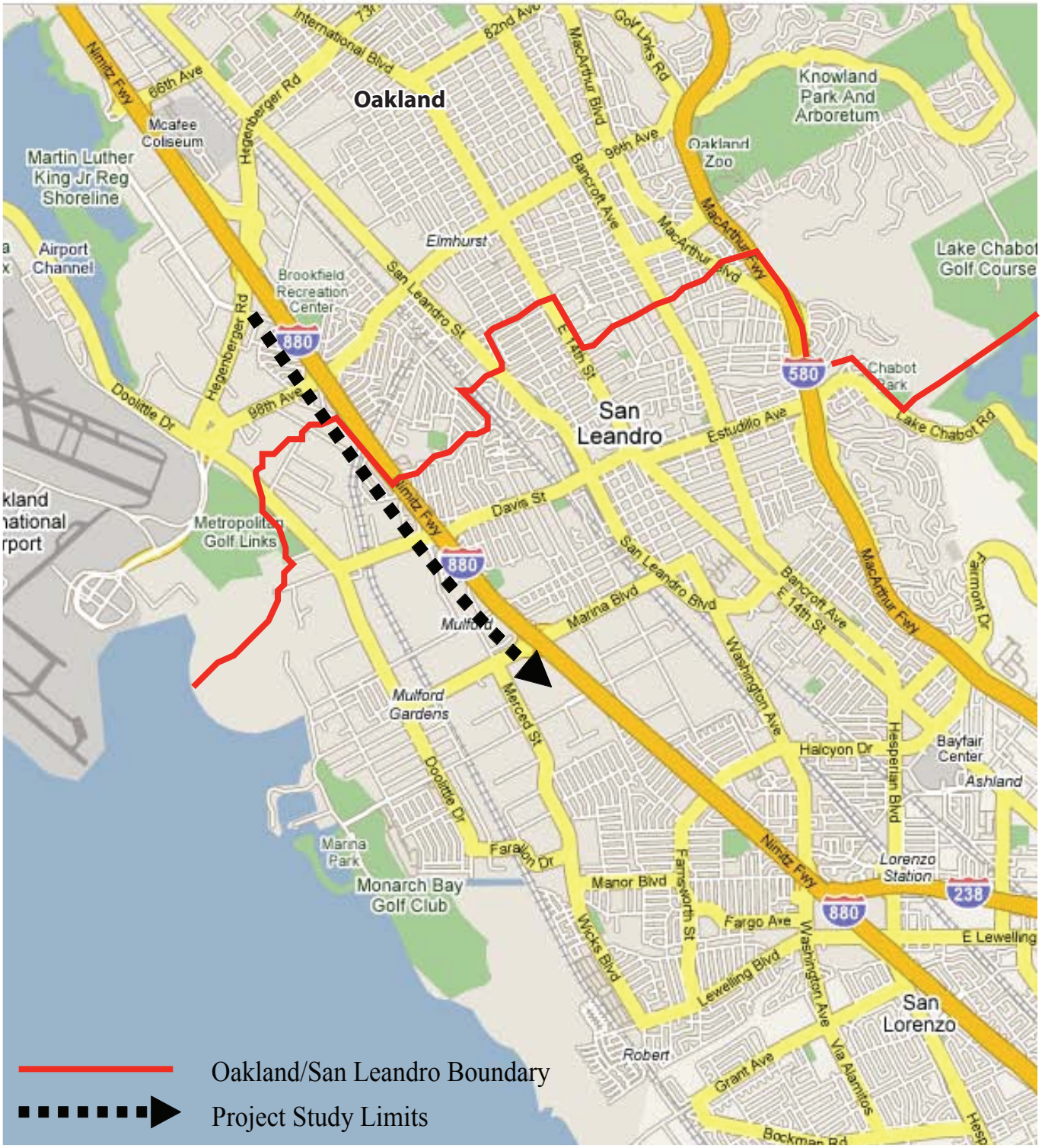


FIGURE 1.1.1-1

*I-880 Southbound HOV Lane Extension*
Project Vicinity Map

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Tables 1.2.2-1 and 1.2.2-2 show the comparison of individual travel time between the 2012 and 2035 Build (With Project) and No-Build (No Project) Alternatives. Addition of the HOV lane in the Build Alternative increases the capacity of the freeway for high-occupancy vehicles, and as a result of these vehicles traveling in the new lane, both mainline congestion and freeway travel time are reduced. Year 2012 results show that the Build condition travel times would generally result in slight improvements when compared to the No-Build condition. Under Year 2035 conditions, the modeling shows similar travel time improvements for AM peak period HOV lane users, and a slight degradation of travel time for mixed-flow lane users. However, the slight degradation of travel time (most changes are less than two minutes) is such that a reasonable interpretation for both is that the travel time would be about the same. Under Year 2035 PM peak period conditions, there would be a significant improvement in travel time for both HOV and mixed-flow lane users. The improvement in travel time for HOV lane users would be up to 30 minutes, while travel time improvement for mixed-flow lane users would exceed 30 minutes. The AM peak hour period would experience minor to negligible benefits under the Build condition when compared to the PM peak hour period because it is typically less congested than the PM peak hour period. Forecast volumes for the PM peak hour are approximately 20% higher than for the AM peak hour. Favorable results are more readily observed for the PM peak hour period due to the heavier demand and the significantly higher baseline (No Project) traffic volumes when compared to the AM peak hour period.

A 2001 survey showed that more than 8,300 people carpooled south between Marina Boulevard and Whipple Road in Union City, up from 4,000 in 1996.

In Alameda County, the current southbound HOV lane extends from Marina Boulevard to Mission Boulevard (SR-262), for a total length of 20.5 miles. This HOV lane opened in September 1991 and was from A Street to north of Tennyson Road before being extended in December 1991 to Industrial Parkway. In 1992, they were extended from SR-238 to A Street, and in 1993, they were extended to Whipple Road. In 1995, they were extended from Marina Boulevard to SR-238, and then extended to Mission Boulevard in 2002. In the northbound direction, the HOV lane extends from Mission Boulevard to 1 mile south of SR-238, for a total length of 17.7 miles. This HOV lane opened in 1991 from north of Tennyson Road to A Street, and extended to Industrial Parkway later that year. The HOV lane was extended to Route 238 in 1992, and to Whipple Road in 1993. The HOV lane was shortened from Whipple Road to 1 mile south of Route 238 in 1996. In 2002, the HOV lane was extended to north of Mission Boulevard. These HOV lanes require two or more occupants, and operate weekdays 5:00 a.m. - 9:00 a.m. and 3:00 p.m. - 7:00 p.m.

## Table 1.2.2-1. Travel Time for 2012 and 2035 Build and No-Build Conditions (AM Peak)

| Peak Period | Vehicles (travel lane) | 15 Minute Time Slice | Existing (Calibration runs) | Year 2012 Individual Travel Time[1] | | | Year 2035 Individual Travel Time | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | No Build | Build | Change | No Build | Build | Change |
| | | -- | minutes | minutes | minutes | minutes | minutes | minutes | minutes |
| AM | HOV | 1 | 6.9 | 7.0 | 6.9 | 0.0 | 7.0 | 6.9 | 0.0 |
| | | 2 | 6.9 | 7.0 | 6.9 | 0.0 | 7.0 | 6.9 | **-0.1** |
| | | 3 | 7.0 | 7.0 | 6.9 | **-0.1** | 7.1 | 7.0 | **-0.1** |
| | | 4 | 7.0 | 7.0 | 7.0 | **-0.1** | 7.1 | 7.0 | **-0.1** |
| | | 5 | 7.0 | 7.0 | 7.0 | **-0.1** | 7.2 | 7.0 | **-0.2** |
| | | 6 | 7.0 | 7.1 | 7.0 | **-0.1** | 7.5 | 7.1 | **-0.4** |
| | | 7 | 7.0 | 7.1 | 7.0 | **-0.2** | 8.4 | 7.1 | **-1.4** |
| | | 8 | 7.0 | 7.1 | 7.0 | **-0.1** | 9.3 | 7.0 | **-2.3** |
| | | 9 | 6.9 | 7.0 | 7.0 | 0.0 | 9.5 | 7.0 | **-2.5** |
| | | 10 | 7.0 | 6.9 | 6.9 | 0.0 | 9.0 | 7.0 | **-2.1** |
| | | 11 | 7.0 | 6.9 | 6.9 | 0.0 | 8.0 | 7.0 | **-1.0** |
| | | 12 | 7.0 | 6.9 | 6.9 | 0.0 | 7.2 | 7.0 | **-0.2** |
| | | 13 | 6.9 | 6.9 | 6.9 | 0.0 | 7.1 | 7.0 | **-0.1** |
| | | 14 | 6.9 | 6.9 | 6.9 | 0.0 | 7.0 | 7.0 | **-0.1** |
| | | 15 | 7.0 | 6.9 | 6.9 | 0.0 | 7.1 | 7.0 | **-0.1** |
| | | 16 | 6.9 | 6.9 | 6.9 | 0.0 | 7.1 | 7.0 | **-0.1** |
| | | | | | | | | | |
| | Non-HOV | 1 | 6.9 | 7.0 | 6.8 | **-0.2** | 7.0 | 7.1 | **0.2** |
| | | 2 | 6.9 | 7.0 | 6.8 | **-0.2** | 7.0 | 7.5 | **0.4** |
| | | 3 | 7.0 | 7.0 | 6.8 | **-0.2** | 7.2 | 8.3 | **1.2** |
| | | 4 | 7.0 | 7.0 | 6.8 | **-0.2** | 7.1 | 8.4 | **1.3** |
| | | 5 | 7.0 | 7.0 | 6.8 | **-0.2** | 7.3 | 8.5 | **1.3** |
| | | 6 | 7.1 | 7.1 | 6.8 | **-0.3** | 7.6 | 9.9 | **2.4** |
| | | 7 | 7.1 | 7.1 | 6.8 | **-0.3** | 8.5 | 10.5 | **2.0** |
| | | 8 | 7.0 | 7.1 | 6.8 | **-0.3** | 9.3 | 10.7 | **1.3** |
| | | 9 | 6.9 | 7.0 | 6.8 | **-0.2** | 9.5 | 9.8 | **0.3** |
| | | 10 | 7.0 | 7.0 | 6.8 | **-0.2** | 9.0 | 8.5 | **-0.6** |
| | | 11 | 7.0 | 7.0 | 6.8 | **-0.2** | 8.0 | 7.9 | **-0.1** |
| | | 12 | 7.0 | 7.0 | 6.8 | **-0.2** | 7.3 | 8.4 | **1.2** |
| | | 13 | 6.9 | 7.0 | 6.8 | **-0.2** | 7.1 | 8.4 | **1.3** |
| | | 14 | 6.9 | 6.9 | 6.8 | **-0.2** | 7.0 | 7.7 | **0.7** |
| | | 15 | 7.0 | 7.0 | 6.8 | **-0.2** | 7.1 | 7.2 | **0.1** |
| | | 16 | 6.9 | 7.0 | 6.8 | **-0.2** | 7.1 | 7.0 | **-0.1** |

Source: Dowling Associates, Inc. August 2009
[1] Time taken to travel 7.52 miles

## Table 1.2.2-2. Travel Time for 2012 and 2035 Build and No-Build Conditions (PM Peak)

| Peak Period | Vehicles (travel lane) | 15 Minute Time Slice | Existing (Calibration runs) | Year 2012 Individual Travel Time | | | Year 2035 Individual Travel Time | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | No Build | Build | Change | No Build | Build | Change |
| | | -- | minutes | minutes | minutes | minutes | minutes | minutes | minutes |
| PM | HOV | 1 | 7.0 | 7.1 | 7.0 | **-0.1** | 8.0 | 7.0 | **-1.0** |
| | | 2 | 7.5 | 7.2 | 7.0 | **-0.2** | 10.0 | 7.2 | **-2.8** |
| | | 3 | 8.1 | 7.3 | 7.0 | **-0.3** | 13.6 | 7.1 | **-6.5** |
| | | 4 | 8.4 | 7.2 | 7.0 | **-0.2** | 17.5 | 7.0 | **-10.5** |
| | | 5 | 8.4 | 7.1 | 7.0 | **-0.1** | 20.2 | 7.0 | **-13.2** |
| | | 6 | 8.7 | 7.2 | 7.0 | **-0.3** | 21.2 | 7.0 | **-14.1** |
| | | 7 | 9.2 | 7.2 | 7.0 | **-0.2** | 20.5 | 7.0 | **-13.5** |
| | | 8 | 10.3 | 7.5 | 7.0 | **-0.5** | 23.5 | 7.1 | **-16.5** |
| | | 9 | 12.7 | 8.0 | 7.0 | **-1.1** | 27.5 | 7.1 | **-20.4** |
| | | 10 | 14.8 | 8.6 | 7.0 | **-1.6** | 29.4 | 7.3 | **-22.0** |
| | | 11 | 15.4 | 8.9 | 7.0 | **-1.9** | 35.5 | 7.1 | **-28.4** |
| | | 12 | 14.4 | 8.0 | 7.0 | **-1.1** | 29.9 | 7.2 | **-22.7** |
| | | 13 | 14.1 | 7.1 | 7.0 | **-0.2** | 29.1 | 7.0 | **-22.0** |
| | | 14 | 13.2 | 7.1 | 7.0 | **-0.1** | 26.5 | 7.2 | **-19.3** |
| | | 15 | 10.6 | 7.0 | 6.9 | 0.0 | 24.9 | 7.0 | **-17.9** |
| | | 16 | 8.3 | 7.0 | 6.9 | 0.0 | 23.4 | 7.0 | **-16.4** |
| | | | | | | | | | |
| | Non-HOV | 1 | 7.1 | 7.2 | 6.9 | **-0.3** | 8.2 | 7.1 | **-1.1** |
| | | 2 | 7.6 | 7.4 | 6.9 | **-0.4** | 11.1 | 7.3 | **-3.8** |
| | | 3 | 8.3 | 7.6 | 7.1 | **-0.5** | 17.3 | 7.7 | **-9.6** |
| | | 4 | 8.5 | 7.3 | 7.0 | **-0.4** | 22.8 | 8.5 | **-14.3** |
| | | 5 | 8.6 | 7.3 | 6.9 | **-0.3** | 27.4 | 8.9 | **-18.5** |
| | | 6 | 8.8 | 7.4 | 6.9 | **-0.5** | 29.2 | 9.2 | **-20.0** |
| | | 7 | 9.3 | 7.4 | 7.0 | **-0.4** | 31.3 | 9.6 | **-21.7** |
| | | 8 | 10.5 | 7.7 | 7.1 | **-0.6** | 36.5 | 10.7 | **-25.9** |
| | | 9 | 12.9 | 8.4 | 7.3 | **-1.1** | 38.8 | 12.8 | **-25.9** |
| | | 10 | 15.0 | 9.0 | 7.3 | **-1.7** | 40.6 | 14.1 | **-26.5** |
| | | 11 | 15.5 | 9.2 | 7.1 | **-2.0** | 46.2 | 15.2 | **-31.0** |
| | | 12 | 14.6 | 8.2 | 6.9 | **-1.4** | 39.1 | 15.3 | **-23.9** |
| | | 13 | 14.2 | 7.2 | 6.9 | **-0.3** | 38.0 | 15.6 | **-22.4** |
| | | 14 | 13.3 | 7.2 | 6.9 | **-0.4** | 34.8 | 15.9 | **-18.9** |
| | | 15 | 10.7 | 7.0 | 6.8 | **-0.2** | 32.9 | 12.5 | **-20.3** |
| | | 16 | 8.3 | 7.0 | 6.8 | **-0.2** | 29.4 | 9.8 | **-19.7** |

Source: Dowling Associates, Inc. August 2009
[1] Time taken to travel 7.52 miles

Currently, transit, carpool, and vanpool users share mixed-flow traffic lanes within the project limits, thereby increasing HOV travel times and reducing incentives for HOV use north and south of the proposed project. The proposed project would better serve the existing and future HOV demand within the I-880 corridor by extending existing HOV facilities.

### 1.2.3 Independent Utility and Logical Termini

As discussed earlier in this document, this area of I-880 currently experiences downstream congestion and traffic delays extending back to the Hegenberger Road Interchange. Therefore, it makes sense to extend the existing southbound HOV lane from its current beginning point south of the Marina Boulevard Interchange to the Hegenberger Road Interchange as the logical terminus. This extension of three miles is of sufficient length to address project environmental matters on a broad scope.

The project would improve current traffic conditions along the I-880 corridor without the need for any additional transportation improvements and as such, the project has independent utility and would not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

## 1.3 Project Description

The project is located in Alameda County on I-880 and proposes to extend the existing southbound high-occupancy vehicle lane from its current beginning point approximately 1700 feet south of the Marina Boulevard overcrossing to the Hegenberger Road on-ramp.

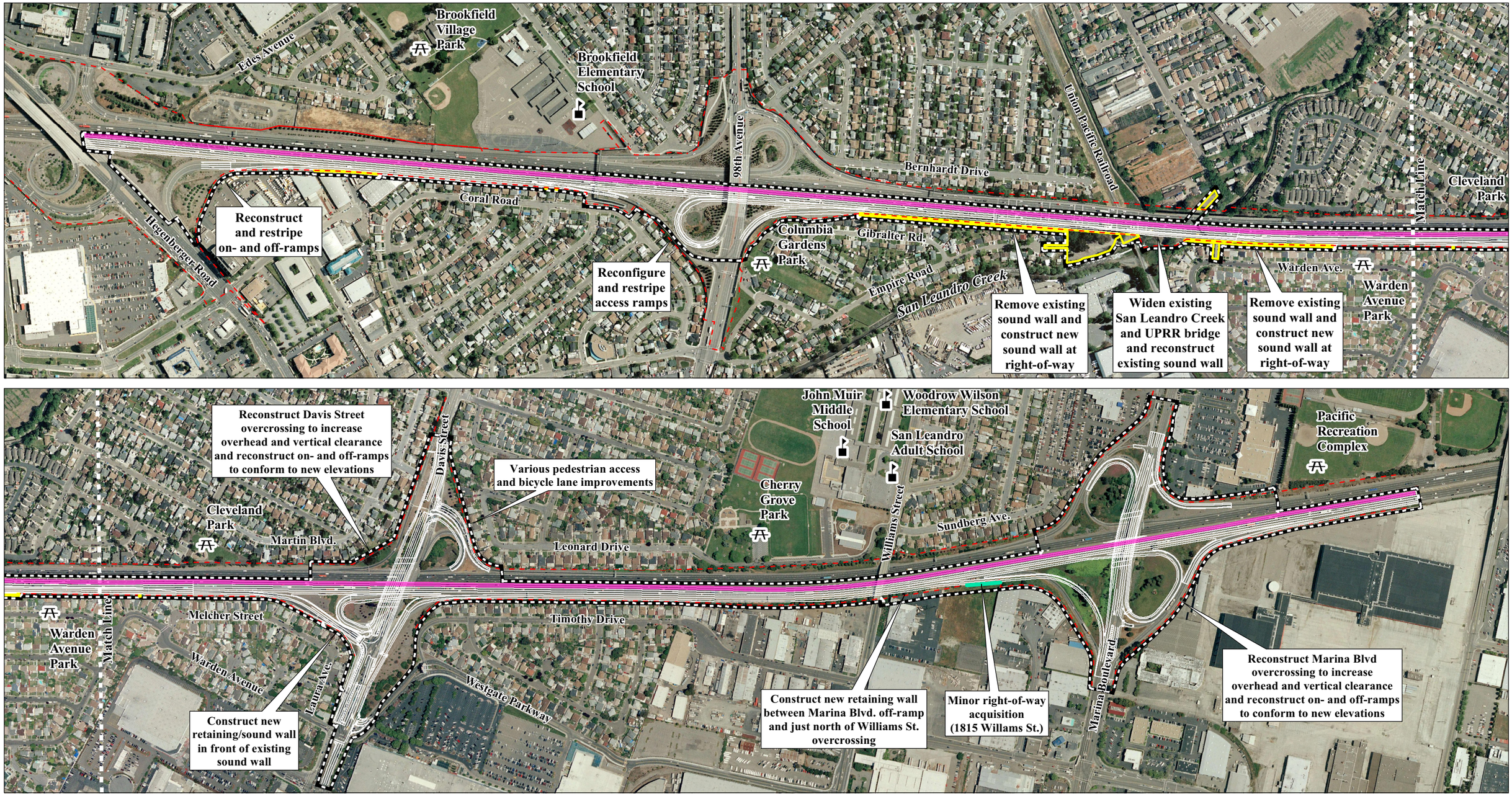
The purpose of the project is to reduce travel time on southbound Interstate 880 and to encourage additional High Occupancy Vehicle usage in the Interstate 880 corridor by extending the existing HOV lane.

## 1.4 Alternatives

The alternatives considered in this document are the Build Alternative and the No Build Alternative. The Build Alternative would construct a southbound HOV lane on I-880 between Hegenberger Road in the City of Oakland to approximately 1,700 feet south of the Marina Boulevard overcrossing in the City of San Leandro. The No Build Alternative, which offers a basis for comparison with the Build Alternative, does not address the project purpose and need, but includes all transportation improvements that are proposed and planned for in the project corridor, with the exception of the southbound HOV lane project itself. These include improvements to the Marina Boulevard interchange (new ramp configuration and associated ramp-metering modifications) and widening of I-238 between I-580 and I-880.

### 1.4.1 Proposed Build Alternative

The proposed I-880 Southbound HOV Lane Project would construct an HOV lane southbound from Hegenberger Road at PM 25.5 to approximately 1,700 feet south of the Marina Boulevard interchange at PM 22.5. The total distance between the project limits is 3 miles. The locations of overall project improvements are depicted in Figure 1.4.1-1.




Project Area
Project Footprint
Temporary Construction Easement
Right-of-Way
Proposed Right-of-Way
Extension of Existing HOV Lane*
School
Park
Match Line

* Freeway widening will occur to the outside of southbound I-880 to accomodate the HOV lane.

0 275 550
FEET

Source: Rajappan and Meyer Consulting Engineers, Inc. (Jan 2009); WMH Corporation (April 2009); DigitalGlobe Inc., Aerial Photographs (April 2007)

FIGURE 1.4.1-1

*I-880 Southbound HOV Lane Extension*

Proposed Project Improvements

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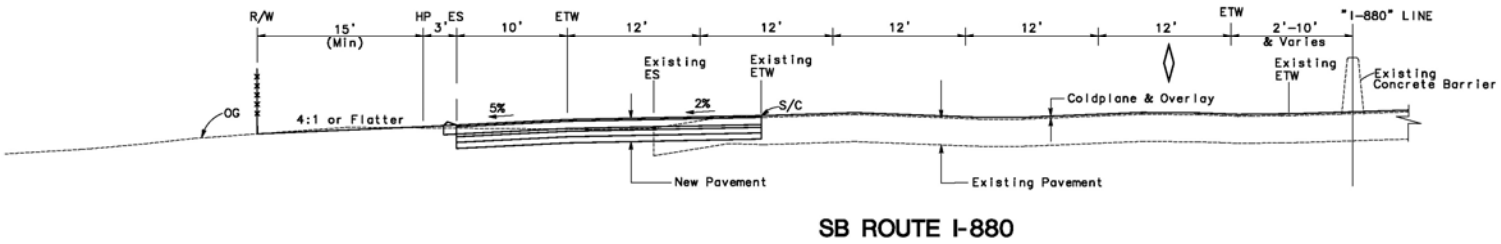
Figure 1.4.1-2 shows a schematic typical cross section of the proposed widening for the HOV lane. The proposed improvements would also re-stripe the mainline traffic lanes; reconstruct the Davis Street and Marina Boulevard overcrossings to increase lateral clearance and provide standard vertical clearance over the freeway; widen the bridge over the UPRR and San Leandro Creek; reconstruct the on- and off-ramps at the Hegenberger Road, and 98th Avenue interchanges to conform to the mainline alignment; and reconstruct the on- and off-ramps at Davis Street and Marina Boulevard interchanges to conform to the new elevations. Ramp meters at the Marina Boulevard, Davis Street, 98th Avenue, and Hegenberger Road on-ramps would be relocated. Standard right shoulder widths of 10 feet would be provided within the project limits. To accommodate the HOV lane and standard shoulder width, the pavement would be reconstructed and widened on the outside of the freeway in the southbound direction.

**Figure 1.4.1-2. I-880 Southbound HOV Lane Improvements (Typical Cross Section)**




### 1.4.1.1 Marina Boulevard Overcrossing

To accommodate the new HOV lane, the Marina Boulevard overcrossing would need to be reconstructed. The structure would be widened from 72.33 feet to 114 feet to accommodate future interchange improvement work. The bridge width takes into consideration the construction period when two lanes of traffic would be maintained in the eastbound and westbound direction. At the same time, the elevation of the bridge would be raised to provide standard vertical clearance over I-880. As a result, the ramps leading to and from the bridge would need to be reconstructed to tie-in with the new elevations. The bridge structure type would be a cast-in-place, prestressed concrete box girder. The pile type for this structure is Class 140. Additional ramp and local street improvements would be a separate project. Conceptual plans for the interchange improvements have been developed by the City of San Leandro as part of a Kaiser Hospital project in the vicinity of the interchange.

### 1.4.1.2 Davis Street Overcrossing

The Davis Street overcrossing would be reconstructed to accommodate the new HOV lane. The structure would be widened from 67.17 feet to 110 feet to enable it to conform to interchange improvements that would be a separate project. Similar to the Marina Boulevard overcrossing, the bridge width takes into consideration the construction

period, when two lanes of traffic would be maintained in the eastbound and westbound direction. The overcrossing elevation would also be raised to provide standard vertical clearance over I-880. On- and off-ramps connected to the bridge would be reconstructed to conform to the new elevations. The structure type for this bridge would consist of a cast-in-place, prestressed concrete box girder. The pile type assumption for this structure is Class 140. The City of San Leandro has also been working on preparing a Project Study Report (PSR) for additional Davis Street interchange improvements.

#### 1.4.1.3 Union Pacific Railroad and San Leandro Creek Overcrossing

Widening the right shoulder to accommodate the new HOV lane would impact the existing I-880 southbound bridge over the UPRR and San Leandro Creek, located between the Davis Street interchange and the 98th Avenue interchange. On the southbound side, this bridge would be widened from 65 feet to 81.42 feet from the center. The length of this bridge is 0.27 mile (1,411 feet). An existing overhead sign located on this bridge would be removed and reconstructed. The structure type would be structural steel I-girder. The pile type assumption for this structure is Class 70. The sound walls located on the bridge would be relocated along with the widening.

Coordination with the UPRR has been established and will be continued accordingly for the duration of the project. A coordination meeting with the UPRR was held on June 18, 2009, which was followed by a site visit on the same day. Based on input received from the UPRR during the meeting and site visit, conceptual drawings were prepared and submitted to the UPRR on July 24, 2009, and they responded with their comments on September 29, 2009. Caltrans is currently responding to these comments and anticipates an executed construction and maintenance agreement prior to commencement of any project work.

The widening of the bridge would be implemented without introducing new columns within the San Leandro Creek. The existing banks of the creek are concrete-lined. Based on plans prepared to date, the bridge widening would be constructed without impacting the creek.

#### 1.4.1.4 Other Improvements to Accommodate the HOV Lane and Address the Purpose and Need

A 1,685-foot-long Type I retaining wall would be constructed along I-880 adjacent to the Williams Street overcrossing abutment to provide room for the new HOV lane. Retaining walls would be constructed between Davis Street and diagonal on-ramps on both northbound and southbound sides of the Davis Street interchange. Combined retaining walls and sound walls would also be reconstructed on the north and south side of the UPRR bridge, with a length totaling approximately 980 feet. The new HOV lane would impact the existing sound wall located between the Davis Street interchange and the 98th Avenue interchange. A 510-foot section of sound wall would also be reconstructed at the corner of Davis Street and the southbound off-ramp. Where feasible, retaining walls and sound walls would be relocated to the right-of-way line. No permanent right-of-way acquisition is required to construct these walls.

Three overhead signs located beyond the right shoulder of the freeway would be relocated laterally, whereas three others would need to be modified. The signs to be modified may need to be replaced with signs meeting current standards. One bridge-

mounted overhead sign on Williams Street overcrossing would also need to be relocated.

The ramp meter equipment and ramp meter limit lines at the Marina Boulevard, westbound and eastbound Davis Street, westbound and eastbound 98th Avenue, and eastbound Hegenberger Road on-ramps would be modified as part of the proposed project.

The following on- and off-ramps would be reconstructed to conform to mainline alignment and/or new elevations, and re-striped: Marina Boulevard on-ramp, westbound Marina Boulevard off-ramp, eastbound and westbound Davis Street on-ramps, Davis Street off-ramp, eastbound 98th Avenue on-ramp, 98th Avenue off-ramp, and eastbound Hegenberger Road on-ramp. A sliver of additional right-of-way, approximately 6,000 square feet, would be required from a private property located at 1815 Williams Street in order to accommodate the proposed Marina Boulevard off-ramp improvements along southbound I-880. The linear right-of-way acquisition is minimal and is adjacent to the mainline. The proposed acquisition area is currently vacant, and would not result in any loss of parking capacity or impacts to operations of the distribution facility located adjacent to the vacant lot.

The I-880 mainline would be re-striped within the project limits to accommodate the new HOV lane. The project would also include selected Traffic Operations System elements within the project limits such as changeable message signs, and fiber optic or wireless equipment connecting to the District 4 Traffic Management Center.

As described above, a sliver right-of-way take would be required from Williams Street in order to accommodate the proposed Marina Boulevard off-ramp improvements along southbound I-880. Temporary construction easements may be needed for construction in selected locations.

### 1.4.2 No-Build Alternative

The No-Build Alternative was examined as a baseline for comparison between the Build Alternative and not building the project. If the No Build Alternative is chosen, no improvements to the freeway would be implemented except for the Marina Boulevard interchange improvements mentioned earlier (Section 1.4.1.1) and which would be a separate project. It is anticipated that congestion would continue to increase significantly if the project is not built.

### 1.4.3 Alternatives Considered But Eliminated From Further Discussion

The proposed Build Alternative requires approval of various exceptions to the Department's design standards. These exceptions would be consistent with those already approved and in place on adjacent sections of I-880. A full standard alternative that meets all the current Mandatory and Advisory design standards was not formally presented in the Project Study Report prepared for this project. This "full standard" alternative would require significant right-of-way acquisitions; reconstruction of a major portion of the highway, including the northbound side; reconstruction of interchanges between project limits; significant environmental mitigations; and relocation of businesses and residences.

## 1.5 Permits and Approvals Needed

The proposed project would be constructed almost entirely within the existing state right-of-way, and without impacting San Leandro Creek. The following permits, reviews, and approvals are anticipated to be required for project construction.

**Table 1.5-1. Anticipated Permits and Approvals Required**

| Agency | Permit or Approval |
|---|---|
| California Department of Fish and Game (CDFG) | Concurrence that the project is not likely to adversely affect state species of concern (steelhead) and that a Streambed Alteration Agreement is not necessary. |
| Regional Water Quality Control Board (RWQCB) | Prior to construction, the project will require a Storm Water Pollution Prevention Plan (SWPPP) in conformance with the National Pollutant Discharge Elimination System (NPDES). |
| NOAA Fisheries | Section 7 informal consultation for Threatened and Endangered Species (steelhead) to get concurrence on Not Likely to Adversely Affect. |
| City of Oakland Encroachment Permit | For construction of improvements on local roadways within the City of Oakland. |
| City of San Leandro Encroachment Permit | For construction of improvements on local roadways within the City of San Leandro. |

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

This chapter describes the impacts that the project would have on the human, physical, and biological environments in the project area. It describes the existing environment that could be affected by the project, potential impacts from each of the alternatives, and proposed avoidance, minimization, and/or mitigation measures. Any indirect impacts are included in the general impacts analysis and discussions that follow.

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:

- Existing and Future Land Use – Construction of the project would occur primarily within the existing freeway right-of-way for I-880. Residential, commercial, or other land uses would not be directly affected or displaced by the project.
- Coastal Zone – The project area is not in a coastal zone.
- Wild and Scenic Rivers – There are no wild or scenic rivers within or adjacent to the project area.
- Growth – This project is not anticipated to encourage unplanned growth. The purpose of the project is to relieve traffic congestion by improving traffic operation and enhancing safety. It would have little influence on growth because future growth in the region is highly constrained. The project would not result in the conversion of adjacent land uses or provide access to areas previously inaccessible or improve access in ways that would foster local development beyond that which is already planned.
- Farmlands/Timberlands – There is no farmland or timberland in the project area.
- Community Character and Cohesion – The proposed project would not alter the character or cohesiveness of existing communities. The project would be largely constructed within the I-880 right-of-way, and would not divide any neighborhoods, separate residences from community facilities, increase urbanization, or significantly change existing access.
- Relocations – No residence or business relocations are proposed as part of the project. A sliver of additional right-of-way, approximately 6,000 square feet, would be required from a private property located at 1815 Williams Street in order to accommodate the proposed Marina Boulevard off-ramp improvements along southbound I-880. The linear right-of-way acquisition is minimal and is adjacent to the mainline. The proposed acquisition area is currently vacant and would not result in any loss of parking capacity or impacts to operations of the distribution facility

located adjacent to the vacant lot. Temporary construction easements may be necessary for a limited duration.

- Environmental Justice – No minority or low-income populations that would be adversely affected by the proposed project have been identified. Therefore, this project is not subject to the provisions of E.O. 12898.
- Natural Communities – The project site is heavily urbanized and includes ornamental landscaping and ruderal areas. No natural communities would be impacted by the proposed project.

# 2.1 HUMAN ENVIRONMENT

## 2.1.1 Consistency with State, Regional, and Local Plans and Programs

### *Affected Environment*

Interstate I-880 is an interstate freeway in the San Francisco Bay Area connecting the cities of San Jose and Oakland, running parallel to the southeastern shore of San Francisco Bay. The proposed project would add a southbound HOV lane to a section of the Interstate within the City of San Leandro and the City of Oakland as well as reconstruct several existing interchanges.

### *Environmental Consequences*

The I-880 Southbound HOV Lane Project includes all or portions of the following three Metropolitan Transportation Commission (MTC) projects, as listed in the *Transportation 2035 Plan for the San Francisco Bay Area* dated April 2009:

- 22100 – Replace I-880/Davis Street interchange and add additional travel lanes on Davis Street
- 230066 – Improve I-880/Marina Boulevard interchange (includes on- and off-ramp improvements, overcrossing modification, and street improvements)
- 22670 – Construct HOV Lane for southbound I-880 from Hegenberger Road to Marina Boulevard (includes reconstructing bridges at Davis Street and Marina Boulevard)

In addition, the proposed project is consistent with the following relevant local plans and policies.

#### City of Oakland General Plan

The City of Oakland General Plan (1998) includes the following direction in the Land Use and Transportation Element under Regional Access:

“Because of the importance of the I-880 corridor in the support of economic development and providing opportunities to reconnect the City’s neighborhoods with the waterfront, improvements in the I-880 Corridor from I-980 to 98th Avenue are the City’s highest priority for improvement to the Regional system.”

The City of Oakland General Plan also states:

"Another candidate project in the I-880 Corridor is the construction of carpool lanes between I-980 and 98th Avenue to close the gap in the carpool lane system created when the Cypress Replacement was completed. The CMA recommends I-880 widening for addition of HOV lanes from Marina Boulevard in San Leandro to 98th Avenue."

Additionally, the proposed project is consistent with the following relevant transportation policies contained in the City of Oakland General Plan:

> Policy W6-3: Enhancing Intermodal Transportation: Transportation corridors which serve the harbor/airport terminals should be preserved and enhanced to accommodate higher capacities, service and safety levels, and intermodal connections.
>
> Policy CO-12.3 Transportation Systems Management: Expand existing transportation systems management and transportation demand management strategies which reduce congestion, vehicle idling, and travel in single passenger autos.

**City of San Leandro General Plan**

The proposed project is consistent with the following relevant policies and actions contained in the City of San Leandro General Plan (2002):

> 13.02 Keeping Pace with Growth: Improve transportation infrastructure at a rate that keeps pace with growth.
>
> 14.04 Accommodation of Bicycles and Pedestrians: Require new development to incorporate design features that make walking, cycling, and other forms of non-motorized transportation more convenient and attractive.
>
> 14.08 Linkage to Road Improvements: Consider opportunities for concurrent pedestrian and bicycle improvements whenever improvements to roadways are made.

One of the primary goals stated in the Transportation Element of the San Leandro General Plan is to reduce dependence on single occupancy vehicles. The proposed project supports the City's goals, as listed above and detailed in subsequent sections of this environmental document. The provision of an HOV lane on southbound I-880 would reduce congestion on I-880 and support the implementation of multi-modal transportation systems because buses would be able to utilize the HOV lane to reduce travel time through the I-880 corridor. In addition, the HOV lane would encourage vehicle trip reduction and transit usage by reducing travel times through the I-880 corridor for transit and rideshare users.

Furthermore, the widening of Davis Street and Marina Boulevard would accommodate Class III bicycle access in each direction, as recommended by the City of San Leandro Bicycle Master Plan (1997). At Davis Street, the Class III bicycle lanes would connect existing Class II bicycle lanes that are west and east of the project area. Bicycle signal detection would be provided at signalized intersections. Davis Street would include continuous sidewalks on both sides of the street. Marina Boulevard would include a continuous sidewalk on the south side of the street and the overcrossing would include a

sidewalk on the north side for future use. Count-down pedestrian signal devices and ADA-audible crossing equipment would be considered at signalized intersections adjacent to the Davis Street interchange.

### *Avoidance, Minimization, and/or Mitigation Measures*

The proposed project is consistent with the stated objectives of local jurisdictions. No avoidance, minimization, or mitigation measures are required.

## 2.1.2 Parks and Recreational Facilities

### *Affected Environment*

The proposed project is located within the cities of Oakland and San Leandro. Several parks are located within or adjacent to the project area including the Brookfield Village Park, Columbia Gardens Park, Warden Avenue Park, Cleveland Park, Cherry Grove Park, and the Pacific Recreation Complex. Several parks are located directly adjacent to Interstate 880.

### *Environmental Consequences*

The addition of a southbound HOV lane and reconstruction of interchanges would not directly impact parks or recreational facilities. Although several parks are located directly adjacent to the existing interstate, no new right-of-way acquisitions from the park facilities are needed for this project. Temporary construction easements may be needed to construct the project, but the easements would not require the use of any parklands. The proposed project would not require permanent acquisition of any parklands.

Potential noise impacts associated with the project are discussed in Section 2.2.7. The Pacific Recreation Complex, located on the northbound side of I-880 south of Marina Boulevard, was the only modeled park receptor in the noise analysis that would experience a severe noise impact or exceed the noise abatement criteria outlined in 23 CFR 772 of the federal-Aid Highway Act of 1970. Currently, no existing sound wall shields the recreation area. Based on the Traffic Noise Analysis Protocol (August 2006), this receptor would experience a permanent severe noise impact of 76 dBA $L_{eq}$ according to the noise modeling that was conducted for the project. The future No Build alternative would have a projected noise level of 75 dBA $L_{eq}$ at this location. As described in Table 2.2.7-2, Noise Levels of Common Activities, a noise level of 75 or 76 dBA $L_{eq}$ would be similar in noise level to a noisy urban area in the daytime, a gas lawn mower at 100 feet, or a vacuum cleaner at 10 feet.

According to the Section 4(f) of the Department of Transportation Act, which addresses the use of publicly-owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites, “proximity impacts” must be evaluated for each Section 4(f) property along the project alignment. Noise is considered a proximity or indirect impact on a Section 4(f) property. Constructive use (23 CFR 774.15) involves the evaluation of proximity impacts to a 4(f) resource. According to the regulations, constructive use occurs when the proximity impacts are so severe that protected activities, features or attributes that qualify the resource for protection under Section 4(f) are “substantially impaired.” Substantial impairment occurs only when the protected activities, features, or attributes are substantially diminished by the proposed project. The Section 4(f) regulations state that constructive use may occur when:

> *The projected noise level increase attributable to the project substantially interferes with the use and enjoyment of a noise-sensitive facility of a resource protected by Section 4(f), such as hearing the performances at an outdoor amphitheater, sleeping in a campground area, enjoyment of a historic site where a quiet setting is a generally recognized feature or attribute of the site's significance, enjoyment of an urban park where serenity and quiet are significant attributes, or viewing wildlife in an area of a wildlife and waterfowl refuge intended for such viewing.* [23 CFR 774.15(e)(1)]

Furthermore, the Section 4(f) regulations state that a constructive use does not occur when:

> *The projected noise levels exceed the noise abatement criteria because of high existing noise, but the increase in the projected noise levels if the proposed project is constructed, when compared with the projected noise levels if the project is not constructed, is barely perceptible (3 dBA or less)* [23 CFR 774.15(f)(3)]

The Pacific Recreation Complex provides opportunities for organized sporting activities, such as softball, baseball, football, and soccer. These activities do not constitute uses associated with a noise-sensitive facility, as game play and spectator participation and enjoyment are not contingent on low ambient noise levels. Furthermore, the existing modeled peak noise level at this receptor location is 73 dBA $L_{eq}$. As noted above, the future No Build noise level is modeled at 75 dBA $L_{eq}$ and the future Build Alternative noise level is modeled at 76 dBA $L_{eq}$, which represents a 1 dBA increase over the future No Build condition and a 3 dBA increase over existing noise levels. A 3 dBA increase in noise level is not perceptible to the human ear in an outdoor environment. The increase in noise level at the Pacific Recreation Complex does not constitute a "constructive use" as defined by Section 4(f) of the Department of Transportation Act.

### *Avoidance, Minimization, and/or Mitigation Measures*

The project would be constructed predominately within the existing I-880 freeway right-of-way and would not physically impact any of the existing parks within the project vicinity. Noise abatement measures must be considered as a result of the identified severe noise impact associated with the Pacific Recreation Complex, as described in Section 2.2.7. No other avoidance, minimization, or mitigation measures are required.

## 2.1.3 Utilities/Emergency Services

### *Affected Environment*

Utilities in the area include electric and gas lines (PG&E), telephone lines (AT&T), internet/telephone/cable TV lines (Comcast), fiber optic lines (MCI), petroleum pipelines, (Kinder-Morgan), and water lines (EBMUD).

Several agencies within the region provide emergency services. These services include police, fire and ambulance/medical service.

Police protection and traffic enforcement in the project area are provided by the City of Oakland Police Department, City of San Leandro Police Department, Alameda County Sheriff's Department, and the CHP.

Fire protection services are provided by the City of Oakland Fire Department and the Alameda County Fire Department. The Alameda County Fire Department, through a contract for services, provides services to the City of San Leandro. The fire departments also provide emergency medical services.

### *Environmental Consequences*

Underground and/or overhead utility relocations may be required as a result of the proposed project. As necessary, overhead utilities would be relocated to the edge of the mainline right-of-way where the HOV lane expands the mainline footprint. Utility conflicts may occur where retaining walls are proposed, depending on the location of the utility line in relation to the retaining wall footings. No disruption of any utility service(s) for an extended period of time (i.e., more than 24 hours) is expected to be necessary.

Temporary impacts to emergency services could occur during the construction phase as a result of any temporary lane closures or detour routes necessary to construct the overcrossings and highway on- and off-ramps. However, once construction is complete, the congestion would lessen, and level of service would improve and result in an overall benefit in emergency services response times.

### *Avoidance, Minimization, and/or Mitigation Measures*

Design, construction, and inspection of any required utility work shall be completed in accordance with the Department's standards and procedures. Where feasible, relocations shall be undertaken in advance of project construction. The Department and ACCMA shall coordinate with any affected service provider to ensure minimum disruption of utility services or operations and that all utility work is performed in accordance with appropriate requirements and criteria.

The following measures are proposed to reduce temporary, construction-related impacts to area public services and facilities:

- The contractor shall coordinate with local emergency service providers to develop detour plans; and
- Emergency service providers shall be provided advance notice of any ramp closures and detour routes.

## 2.1.4 Traffic and Transportation/Pedestrian and Bicycle Facilities

### *Regulatory Setting*

The Department, as assigned by FHWA, directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 CFR 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic

presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

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

### *Affected Environment*

The project area includes the southbound I-880 corridor, from the Hegenberger Road interchange (PM 25.5) to approximately 1,700 feet south of the Marina Boulevard overcrossing (PM 22.5). From north to south, the following interchanges are within the project area: I-880/Hegenberger Road, I-880/98th Avenue, I-880/Davis Street, and I-880/Marina Boulevard. However, for the purposes of the traffic and transportation analysis, the study area extends north from Hegenberger Road approximately one mile to 66th Avenue and extends south from Marina Boulevard approximately two miles to the intersection of I-880 with Beatrice Street, Washington Avenue, I-238, and Lewelling Boulevard.

#### Existing Freeway Operations

Table 2.1.4-1 shows 2008 traffic volumes for the I-880 project area.

**Table 2.1.4-1. I-880 Traffic Volumes for Year 2008**

| PM | Interchange | South of Interchange | | North of Interchange | |
|---|---|---|---|---|---|
| | | Peak Hour | AADT | Peak Hour | AADT |
| 22.84 | San Leandro – Marina Boulevard | 15,000 | 222,000 | 14,800 | 219,000 |
| 23.64 | San Leandro – State Route 112 (Davis Street) | 14,800 | 219,000 | 14,300 | 216,000 |
| 24.77 | Oakland – 98th Avenue | 14,300 | 216,000 | 13,300 | 201,000 |
| 25.5 | Oakland – Hegenberger Road | 13,300 | 201,000 | 14,100 | 213,000 |

Source: Caltrans Website: http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2008all/r505980i.htm
AADT: Annual Average Daily Traffic

#### Existing Pedestrian and Bicycle Facilities

Bicycle and pedestrian facilities are restricted on interstate freeways. However, the four major interchanges within the project area—Hegenberger Road, 98th Avenue, Davis Street, and Marina Boulevard—all provide pedestrian access via sidewalks. Access is only provided in the westbound direction on 98th Avenue and in the eastbound direction on Marina Boulevard. All other intersections provide sidewalks in both directions of the overcrossings. There is an existing pedestrian overcrossing located on Jones Avenue, just north of the 98th Avenue overcrossing. Designated bike lanes are not currently

provided along the Hegenberger Road, 98th Avenue, and Marina Boulevard overcrossings. The City of San Leandro Bicycle Master Plan designates Davis Street as a proposed Class III bicycle route in the project area connecting sections of Davis Street west and east of the project area that are existing Class II bike lanes.

## *Environmental Consequences*

This section summarizes the results of the *Traffic Operations Analysis Report* (Dowling Associates, Inc. August 2009) prepared for the project to define the existing traffic setting within the project area and to provide traffic forecast information for the Build and No Build Alternatives. The study includes an evaluation of existing traffic volumes and Years 2012 and 2035 traffic volumes for the Build and No Build Alternatives. Traffic models were used to interpret the existing count data and generate traffic congestion and delay information for the morning and evening peak commute travel times. The future Build and No Build conditions for Years 2012 and 2035 are presented in tables contained within the *Traffic Operations Analysis Report*. The projected traffic volumes demonstrate the anticipated increase in demand for the HOV lane if it is extended.

### Freeway Operations

The project includes improvements to the mainline, overcrossings, and ramps to accommodate expected growth between now and 2012 and 2035. As demonstrated in the *Traffic Operations Analysis Report*, the proposed project would have the following overall benefits:

- The average speed of southbound freeway traffic and the level of service would be significantly improved for the 2012 PM peak hour. The HOV lane would experience the most benefit as a result of the project; however, mixed flow lanes would also experience noticeable benefits.
  - The 2012 AM period would experience minor to negligible benefits because it is typically less congested.
- In 2035, the project would provide significant average travel speed benefits in the southbound direction of the freeway for HOV and general purpose lanes during both the AM and PM peak hours.
  - In 2035, the LOS worsens for the HOV lane at its most congested sections because of the increased use of the extended HOV lane but would not significantly affect the mean speed for the HOV lane. This level of service (LOS) difference for the HOV lane would not be considerable.
- Overall vehicle delay in the southbound direction of the freeway would be significantly reduced by the project in the 2012 and 2035 PM peak hour periods.
- An evaluation of the southbound freeway ramp merge/diverges revealed that LOS would be worsened at only one location, the 98th Avenue eastbound on-ramp, but the LOS would still be satisfactory at LOS C.

Table 2.1.4-2 compares the basic measures of project effectiveness for the 2012 and 2035 Build and No Build conditions.

## Table 2.1.4-2. Comparison of Basic Measures of Effectiveness

| Condition | Lanes | Average Speed (mph) | | Avg. Density (veh/lane/mile) | | Highest V/C[1] Ratio | | Worst Level of Service (LOS)[2] | |
|---|---|---|---|---|---|---|---|---|---|
| | | No Build | Build | No Build | Build | No Build | Build | No Build | Build |
| 2012 AM | Gen. Purp. | 64 | 65 | 20 | 19 | 0.95 | 0.90 | D | D |
| | HOV | 65 | 65 | 11 | 14 | 0.42 | 0.58 | B | C |
| 2012 PM | Gen. Purp. | 59 | 63 | 26 | 23 | 1.00 | 0.99 | F | E |
| | HOV | 65 | 65 | 12 | 17 | 0.44 | 0.70 | B | C |
| 2035 AM | Gen. Purp. | 23 | 53 | 24 | 30 | 1.00 | 1.00 | F | F |
| | HOV | 65 | 65 | 13 | 20 | 0.50 | 0.80 | B | D |
| 2035 PM | Gen. Purp. | 12 | 42 | 87 | 38 | 1.00 | 1.00 | F | F |
| | HOV | 65 | 64 | 17 | 20 | 0.63 | 0.87 | C | D |

Source: Dowling Associates, Inc. August 2009

[1] Vehicle-to-capacity ratio (V/C): is the ratio of the expected or actual volume of traffic on the freeway segment (usually expressed in vehicles per hour) to the capacity of that freeway segment. For example, if it is determined that a four-lane freeway has (because of its geometric characteristics) a capacity of 2,000 vehicles per hour per lane, then the total capacity would be 8,000 vehicles per hour. If the volume is 6,000 vehicles per hour, then the v/c ratio is 0.75.

[2] Level of Service (LOS): is a qualitative measure used to describe operational conditions within a traffic stream, generally in terms of service measures such as speed and travel time, freedom to maneuver, traffic interruptions and delay, and comfort and convenience. Six levels of service are defined by the 2000 Highway Capacity Manual (HCM). A letter designates each level of service—from LOS A (indicating traffic flows with little or no delay) to LOS F (indicating oversaturated conditions where traffic flow exceeds freeway capacity, generally resulting in long queues and delays).

In addition, travel time data, summarized in Tables 1.2.2-1 and 1.2.2-2 (Chapter 1), show that the Build Alternative would result in overall improvements in travel time. The average time to travel the entire length of the project for single-occupant vehicles would be approximately 9 minutes. If the project is constructed, this travel time would improve to 7.3 minutes, or 1.7 minutes less than without the project.

### Intersection Operations

The *Traffic Operations Analysis Report* evaluated thirteen intersections using the Highway Capacity Manual methodology. Existing traffic counts were provided by the Alameda County Congestion Management Agency and future volumes were extracted from the traffic model. For the future conditions, all of the intersection characteristics were assumed to remain the same as existing conditions, except for the ramp terminal intersections at Marina Boulevard where there is a study underway to reconfigure the ramps. The detailed results of the intersection analysis are included in the *Traffic Operations Report*.

The analysis concluded that three intersections would experience impacts with the introduction of the project:

- At the NB I-880 Ramps/66$^{th}$ Avenue intersection, the LOS would worsen from LOS E to LOS F under Year 2035 AM peak hour conditions. Also, in the PM peak hour, the

level of service would be LOS F both with and without the project, but the calculated delay would increase by approximately 25 percent with the introduction of the project.

- The SB I-880 Ramps/98th Avenue intersection would experience a worsening of level of service from LOS D to LOS E with the project under the Year 2035 AM peak hour conditions.
- The SB I-880 Ramps/Beatrice Avenue intersection, which is controlled by all-way stop-control, would experience LOS F conditions under all future scenarios with the project, with notable increases in delay.

### Weaving Section Analysis

Three weaving sections in the study area include Hegenberger Road to 98th Avenue, Davis Street to Marina Boulevard, and Washington Avenue to Lewelling Boulevard. These sections were evaluated to identify the LOS during the Year 2012 and Year 2035 peak hour travel periods for the Build and No Build alternatives. The detailed results of the weaving section analysis are included in the *Traffic Operations Analysis Report*. The evaluation determined that the Build LOS is the same or better for each of the three weaving sections when compared with the No Build LOS, as summarized in Table 2.1.4-3.

**Table 2.1.4-3. Weaving Section Analysis Results**

| | AM Peak Hour | | | | | PM Peak Hour | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Year 2012 | | Year 2035 | | | Year 2012 | | Year 2035 | |
| | Existing | No Build | Build | No Build | Build | Existing | No Build | Build | No Build | Build |
| **Weaving Section** | ***LOS*** | ***LOS*** | ***LOS*** | ***LOS*** | ***LOS*** | ***LOS*** | ***LOS*** | ***LOS*** | ***LOS*** | ***LOS*** |
| Hegenberger Rd. to 98th Ave. | B | C | B | D | D | C | D | D | E | E |
| Davis St. to Marina Blvd. | B | D | D | F | F | C | E | E | F | F |
| Washington Ave. to Lewelling Blvd.[1] (HOV Lane Included) | B | C | C | E | E | B | D | D | F | F |
| Washington Ave. to Lewelling Blvd. (HOV Lane Excluded) | B | D | D | F | F | C | E | E | F | F |

Source: Dowling Associates, Inc. August 2009

[1] The Washington Avenue to Lewelling Boulevard weaving section was analyzed both with and without the HOV lane included because this section already has an HOV lane under No Build conditions. It does not exceed the maximum number of mainline lanes entering the weaving section, but it was analyzed with the methodology consistent with the other weaving sections.

### Traffic Patterns for Local Residents and Businesses

Traffic patterns for local residents and businesses generally consist of two components: local circulation not related to freeway travel (e.g., someone making a shopping trip from their home near the project to a business near the project), and trips between a local household or local business and another location further away that utilizes the freeway (e.g., a person leaving their home near the project and traveling to work outside the study area).

For the completed project, freeway congestion will generally be reduced by the project, so travel utilizing the freeway as noted above would be improved. If freeway congestion was worsened by the project, it could impact the other type of traffic pattern noted above (local, not utilizing the freeway) because some travelers could decide to leave the freeway and travel along local surface streets, thereby adding congestion to the local streets. But because this project is expected to reduce congestion, these kinds of diverted trips are less likely to occur under the Build Alternative than under the No Build Alternative.

During construction of the project, there will be periods of time in which detours are in place, and traffic patterns will be negatively affected. This scenario will usually occur during the night. For example, a typical partial or full closure of either the freeway or a ramp might occur between midnight and 5 a.m. During these times, some volume (varying from a few dozen per hour to a few thousand per hour) will travel on local streets, potentially making travel difficult on local streets. An example of a trip that would be impacted would be a person leaving their home at 4 a.m. to travel to work—that person would have difficulty entering a street that is part of a detour route because of high traffic volume that ordinarily would be on the freeway or other facility.

### Pedestrian and Bicycle Facilities

Construction of the north section of the project (i.e., from Hegenberger Road to just north of Davis Street) is not expected to result in any short-term or long-term impacts to bike lanes or pedestrian facilities.

Compared to existing/No Build conditions, the proposed project/Build Alternative would improve pedestrian and bicycle access at the Davis Street and Marina Boulevard interchanges. The widening of Davis Street and Marina Boulevard would accommodate Class III bicycle access in each direction. Bicycle signal detection would be provided at signalized intersections. Davis Street would include continuous sidewalks on both sides of the street. Marina Boulevard would include a continuous sidewalk on the south side of the street and the overcrossing would include a sidewalk on the north side. All new pedestrian facilities within the project limits would comply with ADA requirements. Count-down pedestrian signal devices and ADA-audible crossing equipment would be considered at signalized intersections adjacent to the Davis Street interchange.

For safety reasons, pedestrian access would be limited to one side of Davis Street and Marina Boulevard within the interchange areas while construction takes place on the other side of these streets. Pedestrian access through the construction zone would be clearly signed and pedestrian crossing facilities maintained to provide continuous access along these streets. The Jones Avenue pedestrian overcrossing, located just north of the 98$^{th}$ Avenue overcrossing, would not be impacted by the project and is expected to

be functional at all times during construction. Bicycle access would be detoured to Williams Street during construction because lane widths would need to be narrowed along portions of Davis Street and Marina Boulevard.

### Temporary Construction Impacts

Except for temporary off-peak lane closures, the same number of traffic lanes would be maintained on mainline I-880, ramps and local streets during the construction period. Lane and street closures would be performed in accordance with City of San Leandro and City of Oakland requirements and per the Department's District Highway Operation Branch's review and recommendations. Narrowed lanes on I-880, Davis Street, and Marina Boulevard through the construction zone would be likely. On rare occasions, such as bridge removal works and installation of girders at the San Leandro Creek bridge, portions of southbound I-880 would need to be shut down entirely. Similarly, closures of Davis Street and Marina Boulevard would be required during overcrossing construction. Such closures would receive advance warning and would be limited to off-peak period when traffic volumes are light (e.g., midnight to 5 a.m.). Temporary detours (with signage) would be provided for these closures. Freeway traffic would have higher priority at local intersections when detours are in effect. This may be achieved by posting CHP or traffic control officers at critical intersections.

A Traffic Management Plan (TMP) would be prepared during project design. The TMP would address all traffic-related aspects of construction including, but not limited to, the following: detours, traffic handling in each stage of construction, pedestrian safety/access, and bicycle safety/access. A component of the TMP would involve public dissemination of construction-related information through notices to the neighborhoods, press releases, and the use of changeable message signs. The major objectives of the TMP are to maintain efficient and safe movement of vehicles through the construction zone and to provide intensive public awareness of potential impacts on I-880 and adjacent local streets.

No roadway or driveway access to businesses is expected to be blocked during the construction of the project. Temporary detours on local streets may, however, be utilized, with advance warning provided to affected properties.

## *Avoidance, Minimization, and/or Mitigation Measures*

Construction of the Build Alternative would provide overall positive impacts (i.e., reduce congestion and traffic delay) along I-880 within the project limits. The addition of the HOV lane in the Build Alternative increases the capacity of the freeway for high-occupancy vehicles, and as a result, reduces mainline congestion and freeway travel time, particularly for the PM peak period.

As described in the previous section, three intersections would experience impacts with the introduction of the project. The level of service at the 66$^{th}$ Avenue and 98$^{th}$ Avenue intersections would be considerably improved (LOS D or better) by restriping a left-turn lane to be a shared left-turn/right-turn lane. Signalization of the Beatrice Street intersection would improve to LOS D in 2012, but would not be sufficient to maintain that level of service through 2035.

As described above, a Traffic Management Plan would be prepared to provide a program of public and driver information dissemination and incident detection and response. Specifically, the public information program would consist of media notification, a telephone hotline, press releases, and a traveler information system such as the Internet. The driver information program would notify drivers of freeway closures and detours using variable messages. The incident management would alert the California Highway Patrol to accidents under the Construction Zone Enhanced Enforcement Program (COZEEP).

### 2.1.5 Visual/Aesthetics

#### *Regulatory Setting*

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

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

#### *Affected Environment*

Interstate 880 traverses through the cities of Oakland and San Leandro in Alameda County. The roadway corridor is very urbanized and developed, characterized by residential, commercial, and light industrial uses adjacent to the thoroughfare. Interchanges within the project area are landscaped, although little other vegetation is present within the project limits. The land uses directly adjacent to the Marina Boulevard interchange are predominantly commercial and light-industrial, with the exception of an area adjacent to the northbound I-880 on-ramp (northeast quadrant of the interchange), where there is a single-family residential area located behind a sound barrier. Single-family residential homes, separated from the highway by sound barriers, dominate the land uses around the Davis Street interchange. Commercial and light-industrial uses are predominant adjacent to the Hegenberger Road interchange and single-family residences located behind sound barriers exist adjacent to the 98$^{th}$ Avenue interchange.

San Leandro Creek bisects the I-880 corridor near the UPRR between the Davis Street interchange and the 98th Avenue interchange. However, the creek is not visible from the raised roadway and bridge and is not a significant visual resource. Sound walls are present adjacent to the Interstate throughout most of the project area, resulting in a "walled-in" feeling for motorists traveling the alignment. The predominantly flat topography of the project area, in combination with the existing walls, ornamental landscaping, and/or industrial and commercial complexes located along both sides of the alignment, restrict views beyond the interstate corridor for drivers. Views from the adjacent residences are of sound walls, some vine-covered, and/or ornamental landscaping. Interstate I-880 is not designated as a scenic highway.

No scenic resources (ancestral or heritage trees, rock outcroppings, or historic buildings) are located within the project area.

### *Environmental Consequences*

The proposed southbound I-880 widening and Davis Street and Marina Boulevard interchange improvements would occur almost entirely within the existing roadway right-of-way. The widening would require the limited removal of ornamental landscaping and trees along the mainline, as described below. In addition, a mix of new and reconstructed retaining walls and sound barriers are proposed within the project area to accommodate the proposed roadway and interchange design and reduce noise levels for residences along the alignment. The Marina Boulevard and Davis Street interchanges would be modified to accommodate the raised elevation of the bridge overcrossings.

No major changes to the overall visual appearance of the project area are anticipated as a result of project implementation since the roadway is already an existing raised roadway. Grading would conform to the existing topography to allow for a natural appearing transition with the existing landscape. Transition cuts would be rounded where cut slopes meet existing grade.

The elimination of trees and shrubs adjacent to the freeway would occur in a few locations within the Department's right-of-way to accommodate the widening of the mainline or the overcrossing reconstruction at Davis Street. Specifically, the project would result in the removal of approximately 40 trees, including four western redbuds, two cyanotis, six coast live oaks, one cottonwood, one myoporum, four blue gums, two plums, five coast redwoods, and 15 acacias. Tree removal would primarily occur within the Davis Street and Marina Boulevard interchanges, adjacent to the new retaining wall on each side of the Williams Street overcrossing, and just north and south of the San Leandro Creek bridge in front of existing sound barriers. The removal of these trees would minimally degrade the existing visual setting. Furthermore, trees and shrubs would be replaced as part of a landscaping plan. Ornamental landscaping would be minimally affected along the I-880 corridor.

New retaining walls or sound barriers are proposed as part of the project. However, the majority of these walls would be constructed in locations where: 1) there are existing retaining walls or sound barriers, or 2) there are no scenic views in or out of the project corridor due to existing commercial and industrial complexes and/or ornamental landscaping. See Table 2.1.5-1 below for a summary of the new or reconstructed walls. Reconstructed walls would generally be constructed at the same height as the existing walls (e.g., north and south of the San Leandro Creek bridge along southbound I-880). A new approximately 1,685-foot long retaining wall with a maximum height of 20 feet would be constructed along I-880 adjacent to the Williams Street overcrossing abutment to provide room for the new HOV lane. Although there is no existing wall in this location, ornamental trees and shrubs block views of or from the commercial and industrial businesses located adjacent to the highway.

A new, 315-foot long retaining wall is proposed just south of the 98$^{th}$ Avenue interchange on the inside of the southbound I-880 on-ramp. Existing sound barriers shield residential land uses in this area, would also shield views of the new retaining wall, and thus, the

visual setting for passing drivers would be largely unchanged. Short retaining walls would be required on the north and south sides of Davis Street, adjacent to the east and west ends of the new Davis Street overcrossing. Reconstruction of area interchanges would include landscaping to enhance local aesthetics.

The elevation of the Davis Street and Marina Boulevard overcrossings would be raised between 5 and 10 feet to provide standard vertical clearance over I-880. As a result, the on- and off-ramps leading to the bridges would be reconstructed to conform to the new elevations. Although the Davis Street and Marina Boulevard overcrossings would be raised a small amount as part of the project, the change in elevation would be negligible and visually undetectable. The land uses directly adjacent to the Marina Boulevard interchange are predominantly commercial and light-industrial. Along a portion of the southbound I-880/Davis Street diagonal off-ramp and westbound Davis Street, a new approximately 510-foot long combination retaining wall and masonry block sound barrier would be constructed within existing State right-of-way. An existing approximately 10- to 12-foot-high sound barrier is located in this area behind the rear of residences accessed by Melcher Street and Laura Avenue. The new, approximately 12- to 20-foot-high combination retaining wall and sound barrier would be constructed 2 to 3 feet in front of the existing sound barrier, as preferred by the local residents who have commented on the project to date. The wall is required to conform to the raised elevation of the overcrossing and block exhaust stacks on trucks exiting I-880 to Davis Street, and in this sense, would provide a beneficial impact for these residences. However, the new wall would vary in height from 12 to 20 feet, with the tallest segment being in the center of the wall. This would result in an approximately 8-foot-high increase over the existing wall height behind one or two properties. Figure 2.1.5-1 shows the location of the proposed retaining wall/sound barrier and provides a comparison of the existing wall height with the proposed wall height for residences located in this area. Figure 2.1.5-2 shows a photo simulation of the change in the visual setting for the most-impacted location along the new wall (i.e., greatest increase in new wall height). Vine growth could spread over to the new wall in the future as a result of its proximity to the existing wall, which is currently covered with vines. The visual impact on passing motorists would be limited due to their brief exposure, but the new wall would reduce the amount of light received by the residences along Melcher Street and Laura Avenue to varying degrees as a result of the increase in wall height.

### *Avoidance, Minimization, and/or Mitigation Measures*

Construction-related nuisances are short-term and would cease upon project completion. Therefore, construction-related visual impacts are not considered to be substantial. Effects to existing landscaping that would be removed would be minimized by replacement planting within the project area, including the affected interchanges.

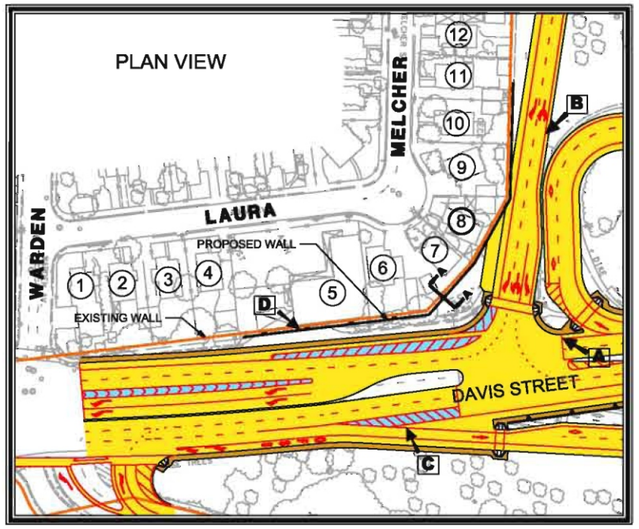
To minimize potential impacts caused by sound walls and retaining walls, aesthetic treatments shall be considered for the walls or areas immediately surrounding them (i.e., tree planting and/or a terraced block wall with vegetation) to decrease the dominance and scale of hardscape features and to minimize glare. To maintain consistency with the existing infrastructure (i.e., bridges, roadways, walls, and sidewalks, etc.) in the project area, architectural treatments for the structural elements of the project shall be determined in consultation with the Department's District 4 Landscape Architect during the design phase.

## Table 2.1.5-1. Summary of Proposed Retaining Walls and Sound Barriers

| Location | Wall Type (RW/SB)[1] | New or Reconstruction | Length (ft) | Existing Wall Height (ft) | Proposed Wall Height Above Ground (ft) |
|---|---|---|---|---|---|
| Along southbound I-880 between Marina Blvd westbound diagonal off-ramp and just north of the Williams Street overcrossing | RW | New | 1,685 | — | 4 - 20 |
| Along south side of Davis Street, between southbound I-880/Davis Street diagonal on-ramp and west end of new Davis Street overcrossing | RW | New | 190 | — | 6 - 8 |
| Along north side of Davis Street, between northbound I-880/Davis Street diagonal on-ramp and east end of new Davis Street overcrossing | RW | New | 200 | — | 10 - 20 |
| Along a portion of Davis Street, west of the new overcrossing and along a portion of the southbound I-880/Davis Street diagonal off-ramp approaching Davis Street | RW/SB | New[2] | 510 | 10 - 12[2] | 12 - 20 |
| Along southbound I-880, immediately south of San Leandro Creek Bridge | RW/SB | Reconstruction | 533 | 12 | 6 - 20[3] |
| Immediately north of San Leandro Creek Bridge | RW/SB | Reconstruction | 446 | 12 - 16 | 8 -16[3] |
| South of 98th Avenue overcrossing between southbound I-880 and on-ramp from 98th Avenue | RW | New | 315 | — | 4 - 12 |

Source: Rajappan and Meyer Consulting Engineers, Inc. and WMH Corporation, May 2009

Notes:
[1] RW: Retaining Wall, SB: Sound Barrier
[2] This combined retaining wall and sound barrier would be constructed approximately 2 to 3 feet in front of the existing sound barrier abutting residential development (existing sound barrier is 10 to 12 feet high).
[3] The existing sound barrier on the southbound side of the San Leandro Creek Bridge and just north and south of the bridge would be replaced at a height of at least 12 feet, which is the lowest existing height of the sound barrier. The Noise Abatement Decision Report (See Section 2.2.7) concluded that the wall should be constructed at a height of 14 feet.





EXISTING WALL AT DAVIS/SB OFF-RAMP INTERSECTION

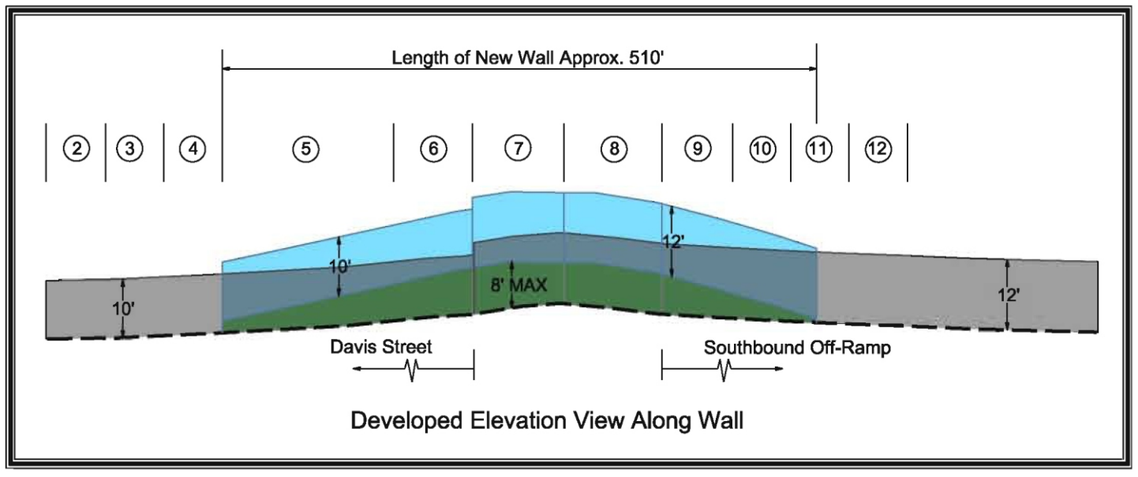

EXISTING WALL AT DAVIS SB OFF-RAMP


EXISTING WALL AT DAVIS

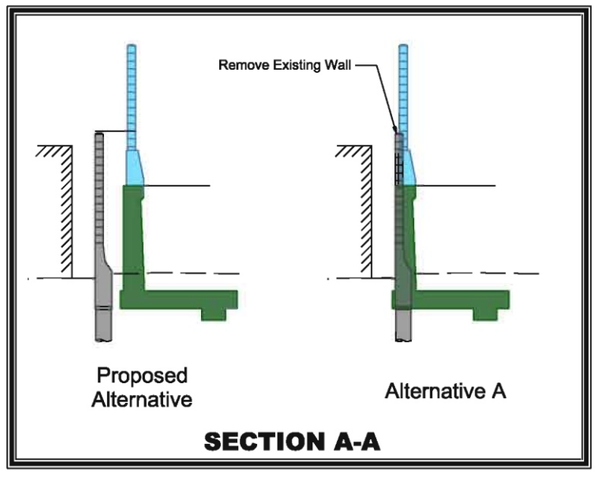

EXAMPLE OF PROXIMITY OF WALL TO BUILDINGS

LEGEND:

- EXISTING SOUND WALL (10' TO 12' HIGH)
- NEW RETAINING WALL (2' TO 8' HIGH)
- NEW MASONRY BLOCK SOUND WALL (10' TO 12' HIGH)
- (2) PROPERTY REFERENCE




Developed Elevation View Along Wall




SECTION A-A

FIGURE 2.1.5-1

NO SCALE

SOURCE: WMH (MAY 2009)

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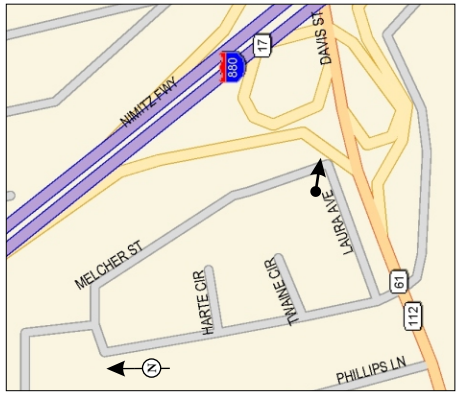
No Build View Showing Existing Wall

Build View Showing Additional Wall

Build View Showing Additional Wall with Potential Future Vine Growth




KEY MAP - Base photo was taken of the view to the east from the junction of Laura Avenue and Melcher Street. The proposed sound barrier will be the highest (20 feet maximum) at this approximate location.

FIGURE 2.1.5-2

SOURCE: POITRA VISUAL (JUNE 2009)

*I-880 Southbound HOV Lane Extension*

Davis Street (West)

Proposed Retaining Wall/Sound Barrier Photosimulations

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### 2.1.6 Cultural Resources

#### *Regulatory Setting*

"Cultural resources" as used in this document refers to all historical and archaeological resources, regardless of significance. Laws and regulations dealing with cultural resources include:

The National Historic Preservation Act of 1966, as amended, (NHPA) sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places. Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation the opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation (36 CFR 800). On January 1, 2004, a Section 106 Programmatic Agreement (PA) between the Advisory Council, FHWA, State Historic Preservation Officer (SHPO), and Caltrans went into effect for Department projects, both state and local, with FHWA involvement. The PA implements the Advisory Council's regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans. The FHWA's responsibilities under the PA have been assigned to Caltrans as part of the Surface Transportation Project Delivery Pilot Program (23 CFR 773) (July 1, 2007).

Historic properties may also be covered under Section 4(f) of the U.S. Department of Transportation Act, which regulates the "use" of land from historic properties.

Historical resources are considered under the California Environmental Quality Act (CEQA), as well as California 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 Caltrans to inventory state-owned structures in its rights-of-way.

#### *Affected Environment*

This section reports the results of the *Historic Property Survey Report* (LSA Associates, Inc. May 2009) prepared for the project. The report followed the requirements of the January 2004 *Programmatic Agreement Among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act, as it Pertains to the Administration of the Federal-Aid Highway Program in California* (PA).

An approximately 81-acre study area, or Area of Potential Effect (APE), was established to encompass the area of the widening improvements along southbound I-880 from the Hegenberger Road overcrossing in Oakland to 1,700 feet south of the Marina Boulevard overcrossing in San Leandro. The APE was established to encompass the maximum extent of construction effects, including highway improvements, interchange and overcrossing improvements, and staging and storage areas.

The APE is mostly comprised of asphalt/concrete and landscaped artificial fill. Previously-disturbed areas in the APE are a result of construction (including sound walls and utilities), landscaping, and maintenance of I-880, construction and maintenance of the Union Pacific Railroad (UPRR), San Leandro Creek channelization, and neighborhood development. An intensive pedestrian survey of the APE was performed on June 16, 2008.

A records search was conducted of the Northwest Information Center (NWIC) and the California Historic Bridge Inventory to identify existing cultural resources within and directly adjacent to the APE. Review of publications and maps for archaeological, ethnographic, historical, and environmental information about the Area of Potential Effect (APE) and its vicinity were also conducted. Native American and Historical Organizations consultations were performed as well. The records search and literature review indicated no recorded or otherwise known archaeological sites or ethnographic villages within or directly adjacent to the APE.

An architectural historian reviewed the APE to identify potentially impacted architectural resources. No properties requiring evaluation are present within the APE. The *State Historic Bridge Inventory Update of 2006* (Caltrans 2006) lists six bridges and overcrossings, within the APE. All of these structures are listed as Category 5 ("not eligible for the National Register of Historic Places") and are exempted from further evaluation under the Section 106 PA.

If cultural materials are discovered during construction, all earth-moving activity within and around the immediate discovery area would 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 Public Resources Code Section 5097.98, if the remains are thought to be Native American, the coroner shall 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 shall contact the District 4 Heritage Resources Coordinator so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 would be followed as applicable.

### *Environmental Consequences*

Although no known historical or archaeological resources were identified in or adjacent to the APE, construction activities could unearth previously unidentified resources. If previously unidentified cultural materials are unearthed during the project, it is the Department's policy that work be halted in that area until a qualified archaeologist can assess the significance of the find.

### *Avoidance, Minimization, and/or Mitigation Measures*

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

# 2.2 PHYSICAL ENVIRONMENT

## 2.2.1 Hydrology and Floodplain

### *Regulatory Setting*

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

In order to comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments
- Risks of the action
- Impacts on natural and beneficial floodplain values
- Support of incompatible floodplain development
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project

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

### *Affected Environment*

This section reports the results of the *Location Hydraulic Study Report* (Schaaf & Wheeler, August 2008) and *Hydraulic Study Report of the San Leandro Creek Bridge* (Schaaf & Wheeler, March 2009) prepared for the project.

The project will pass over San Leandro Creek and Stonehurst Creek at the San Leandro Creek Bridge. San Leandro Creek Bridge is located near the confluence of San Leandro Creek and Stonehurst Creek at the border between the cities of San Leandro and Oakland. Near the I-880 project area, San Leandro Creek is also known as Line P, and Stonehurst Creek as Line N, for stormwater drainage and flood control purposes. These creeks are within the jurisdiction of the Alameda County Flood Control and Water Conservation District (Flood District), which helps protect western Alameda County residents and property from flooding while preserving the natural environment. Specifically, San Leandro Creek and Stonehurst Creek are within Zone 12 of the Flood District.

San Leandro Creek forms a border between the City of Oakland to the north and the City of San Leandro to the south, with an approximately 10 square mile drainage area to the bridge. The creek's entire watershed extends from the Oakland Hills east of Oakland to San Francisco Bay. Lake Chabot and its dam also influence the hydrology along San Leandro Creek. Constructed in 1875 far upstream in the Oakland Hills, Lake Chabot was created not as a flood control reservoir per se, but for water supply storage. Lake

Chabot's storage, however, serves to regulate discharge into the downstream portions of San Leandro Creek, including the project area. Lake Chabot and its antecedent storage have an effect on downstream flooding during any particular storm event.

Stonehurst Creek is the nearest tributary to the I-880 project area and originates near San Leandro Street. Stonehurst Creek then flows southwesterly to its confluence with San Leandro Creek near I-880, about 1.7 miles upstream of the mouth of San Leandro Creek at San Francisco Bay. Stonehurst Creek drains approximately 0.7 square miles at I-880.

The floodplain of San Leandro Creek in the City of San Leandro near the project site is located on Panel 1C of 3 from the effective Flood Insurance Rate Map (FIRM) for the City of San Leandro, dated February 9, 2000. The floodplains of San Leandro Creek (Line P) and Stonehurst Creek (Line N) in the City of Oakland are shown on Panel 25B of 45 from the FIRM for the City of Oakland. The 100-year floodplain of San Leandro Creek is shown as Zone AE with determined base flood elevations in San Leandro. Within Oakland, the 100-year floodplain of San Leandro Creek is shown as Zone A8, and that for Stonehurst Creek is shown as Zone A7. These zone designations indicate the flood hazard factors of the floodplains, with the actual calculated WSELs shown on the FIRMs. Portions of these mapped 100-year floodplains in the vicinity of I-880 are confined to the channels, although there are places where flood waters overtop the banks of the channels. The floodplain of Stonehurst Creek is confined to the northwest by a railroad embankment.

### *Environmental Consequences*

The project elements that would potentially encroach on the floodplain would be the addition of piers to several supporting bents of the San Leandro Creek/UPRR Bridge and their footings. The project would include the addition of one column to most bents to support the widened San Leandro Creek bridge roadway. The structure type would be a structural steel I-girder with most likely a Class 70 pile type. The widening of the bridge would include free span girders over San Leandro Creek, thereby eliminating the need for piers/columns in the creek.

The addition of an HOV lane to I-880 and consequent widening of San Leandro Creek Bridge would have no impact to water surface elevations or the floodplain at San Leandro Creek/UPRR Bridge, since the only work within the floodplain would be the addition of a few columns that would not affect the 100-year WSEL, and thereby would not affect flood flows or flooding. There would be no change to the 100-year backwater in either San Leandro Creek or Stonehurst Creek. There would not be long-term risk associated with implementation of the proposed action. The project would not be expected to have considerable impacts to the floodplain values.

### *Avoidance, Minimization, and/or Mitigation Measures*

Project construction would occur during low-flow times in the channels to avoid impacts and encroachment of the floodplain.

### 2.2.2 Water Quality and Storm Water Runoff

#### *Regulatory Setting*

Section 401 of the Clean Water Act requires water quality certification from the State Water Resource Control Board (SWRCB) or a Regional Water Quality Control Board (RWQCB) when the project requires a Federal permit. Typically this means a Clean Water Act Section 404 permit to discharge dredge or fill into a water of the United States, or a permit from the Coast Guard to construct a bridge or causeway over a navigable water of the United States under the Rivers and Harbors Act.

Along with Clean Water Act Section 401, Section 402 establishes the National Pollutant Discharge Elimination System (NPDES) for the discharge of any pollutant into waters of the United States. The federal Environmental Protection Agency has delegated administration of the NPDES program to the SWRCB and the nine RWQCBs. To ensure compliance with Section 402, the SWRCB has developed and issued the Department an NPDES Statewide Storm Water Permit to regulate storm water and non-storm water discharges from the Department's right-of-way, properties and facilities. This same permit also allows storm water and non-storm water discharges into waters of the State pursuant to the Porter-Cologne Water Quality Act.

Storm water discharges from the Department's construction activities disturbing one acre or more of soil are permitted under the Department's Statewide Storm Water NPDES permit. These discharges must also comply with the substantive provisions of the SWRCB's Statewide General Construction Permit. Non-Departmental construction projects (encroachments) are permitted and regulated by the SWRCB's Statewide General Construction Permit. All construction projects exceeding one acre or more of disturbed soil require a Storm Water Pollution Prevention Plan (SWPPP) to be prepared and implemented during construction. The SWPPP, which identifies construction activities that may cause discharges of pollutants or waste into waters of the United States or waters of the State, as well as measures to control these pollutants, is prepared by the construction contractor and is subject to Department review and approval.

Finally, the SWRCB and the RWQCBs have jurisdiction to enforce the Porter-Cologne Act to protect groundwater quality. Groundwater is not regulated by Federal law, but is regulated under the state's Porter-Cologne Act. Some projects may involve placement or replacement of on-site treatment systems (OWTS) such as leach fields or septic systems or propose implementation of infiltration or detention treatment systems which may pose a threat to groundwater quality. Currently the OWTS program is without SWRCB regulation but you should be aware of threats to groundwater quality on the project site and evaluate and address accordingly in the environmental document. Design standards for installation and operation of infiltration and detention treatment systems should protect groundwater quality and those protections should also be addressed in the environmental document.

## *Affected Environment*

### Water Quality

This section reports the results of the *Water Quality Assessment Report* (Schaaf & Wheeler, November 2008) prepared for the project.

The project is located mostly within the watershed of the San Leandro Creek, which serves as the border between the City of San Leandro and the City of Oakland, and its tributaries. The San Leandro Creek ultimately discharges into the San Leandro Bay, which then flows into the lower part of San Francisco Bay south of Alameda Island.

**Surface Water Quality and the 303(d) List of Impaired Waters.** Much of the San Francisco Bay Area surface waters, including the Bay itself, are considered impaired due to a variety of historical and current point and nonpoint sources. The 303(d) List of Impaired Waters implicates various pollutants. San Leandro Creek, San Leandro Bay, and the San Francisco Bay, to which the project drainage would flow, are all designated by the San Francisco Regional Water Quality Control Board (SFRWQCB) as impaired. San Leandro Creek is listed as impaired for diazinon and has a USEPA-approved Total Maximum Daily Load (TMDL). San Leandro Bay is listed for various compounds, as is the lower San Francisco Bay.

**Groundwater Quality.** The East Bay Plain Groundwater Basin, at 77,400 acres, underlies much of the eastern San Francisco Bay Area, including the western, bayside parts of Contra Costa and Alameda Counties. The project area, located in the Cities of Oakland and San Leandro, is not located in or near any of the existing or proposed sole-source aquifers in California; these aquifers are located in Fresno, Santa Cruz, Imperial, and San Diego Counties. The East Bay Plain basin is noted in the San Francisco RWQCB's Basin Plan as having Total Dissolved Solids (TDS) levels in the range of 374 - 1,420 mg/L with an average of 638 mg/L. The *Water Quality Assessment Report* summarizes the detailed water quality data collected from U.S. Geological Service (USGS) sampling sites located near the project area in 1998 and 2000.

### Drainage

This section reports the results of the *Conceptual Drainage Report* (Schaaf & Wheeler, January 2009) prepared for the project.

Twelve distinct drainage systems serve the project area. The project storm drain system outfalls to various locations. All of the systems located in the City of Oakland eventually outfall to San Leandro Creek, with some first entering a City storm drain system. Most of them have a direct Caltrans outlet to the creek. One system in the City of San Leandro, which is south of the creek, outfalls directly to San Leandro Creek. The other project area drainage systems in San Leandro contribute generally to larger City-operated systems with various outlets.

## *Environmental Consequences*

### Water Quality

**Short-term Impacts to Surface Waters.** The construction of an HOV lane for I-880 would result in demolition and construction activities that have a potential to cause erosion, sedimentation, and the discharge of non-storm water runoff from the project site. Clearing of vegetation and grading could lead to exposed or stockpiled soils susceptible to peak stormwater runoff flows. Also, the compaction of soils by heavy construction machinery may reduce the infiltration capacity of soils (exposed during construction) and increase runoff and erosion potential. Demolition activities and the presence of significant amounts of raw materials for bridge construction, including concrete, asphalt, and slurry, may lead to stormwater runoff contamination. If uncontrolled, these materials could lead to water quality problems including sediment-laden runoff, prohibited non-storm water discharges, and ultimately the degradation of downstream receiving waters.

The current drainage systems that would be affected by the project drain approximately 198 acres of area, at a 55 percent impervious level, or 109 acres of impervious surfaces. Construction activities for the project would disturb an estimated 23.3 acres of soil. The San Leandro Creek/UPRR Bridge widening would require specific BMPs to prevent construction pollutants from entering the San Leandro Creek. Under the Statewide Construction NPDES permit, the project proponent is required to implement BMPs to prevent the degradation of existing water quality. If construction BMPs are properly designed, implemented, and maintained as required by the NPDES permit, then no adverse water quality impacts would occur during construction of the project.

**Long-term Impacts to Surface Waters.** The proposed project would add approximately 3.6 acres of impervious surface to the project area. The project would not involve a change in land use, with the exception of converting some pervious shoulder and roadway landscaping to roadway. It is estimated, as detailed in the *Conceptual Drainage Report*, that the project would add a minimal amount of impervious surfaces. Therefore, the effect of the project on the velocity or volume of downstream flow would be negligible, and no substantial hydraulic changes or erosion would occur.

The project would not substantially change the area of impervious surfaces or the existing drainage patterns within the project area. Hence, the project would not generally contribute runoff that would exceed the capacity of the existing drainage systems. A few of the existing drainage systems, as detailed in the *Conceptual Drainage Report*, already have design flows that exceed their existing capacity, and the project would slightly impact these at-capacity systems. The *Conceptual Drainage Report* suggests storm drain system improvements to mitigate the impacts of the Project on the existing storm drain systems. These suggested improvements, however, do not include any specific measures for water quality BMPs.

The project would increase traffic capacity, which could increase the levels of nonpoint source pollutants. A few of the existing drainage systems, to which stormwater from the existing and expanded freeway would drain have some vegetated areas prior to outfalling to the San Leandro Creek. Most of these drainage systems convey stormwater directly from the roadway to the creek. Therefore, the increased traffic and pollutant loading could decrease the surface water quality of waters receiving the project's storm drainage.

The long-term impacts of the project to surface can be mitigated by treatment control BMPs. If these permanent BMPs are properly designed, implemented, and maintained as required by the Department's Stormwater Management Plan (SWMP) and NPDES permit, then no adverse water quality impacts would occur during operation of the project.

**Short-term Impacts to Groundwater.** The project would not use substantial amounts of groundwater during construction; thus, it would not substantially deplete groundwater supplies. Likewise, construction of the project would not substantially interfere with groundwater recharge such that the local groundwater table would be lowered.

Although the project is located above the East Bay Plain aquifer, it would not considerably expand impervious surfaces as compared to the existing roadway. Therefore, the project construction would not hinder groundwater recharge.

There is, however, a possibility for mobilized pollutants to enter the groundwater through recharge. Short-term impacts to groundwater may occur during construction activities, but these impacts can be mitigated by construction BMPs. If construction BMPs are properly designed, implemented, and maintained as required by the NPDES permit, then no adverse water quality impacts would occur during construction of the project.

**Long-Term Impacts to Groundwater.** The project would not use substantial amounts of groundwater during operation; thus, it would not substantially deplete groundwater supplies. Likewise construction of the project would not substantially interfere with groundwater recharge such that the local groundwater table would be lowered.

Although the project is located above the East Bay Plain aquifer, the project would not considerably expand impervious surfaces compared to the current roadway. Therefore, the project would not hinder groundwater recharge.

## Drainage

No new sag points (i.e., low points in the roadway) are estimated to be created by the project construction and resurfacing, so no new inlets would be required to pick up new sag points. Most of the existing storm drain systems in the project area have sufficient capacity to convey a 25-year or 50-year design storm. Furthermore, the project changes to any one drainage system would be relatively minor. The project would require some storm drain improvements, mainly because existing inlets would need to be moved further out of the new travel way and shoulder to adequately collect stormwater drainage. Infrastructure improvements are detailed in the *Conceptual Drainage Report*. Overall, these improvements would minimize the storm drainage effects of the project under a design storm.

### *Avoidance, Minimization, and/or Mitigation Measures*

The Department shall comply with the provisions of the Statewide National Pollutant Discharge Elimination System General Construction Activity Permit (NPDES Permit No. CAS000002) and any subsequent permit or individual permit if required by the San Francisco Regional Water Quality Control Board as it relates to construction activities for the project, including dewatering. This compliance shall include a Notice of Intent (NOI) to the State Water Resources Control Board prior to the start of construction. Upon

completion of work and the stabilization of all disturbed areas, a Notice of Termination (NOT) shall be submitted to the SFRWQCB.

As an operating roadway, the Department shall consider incorporation of treatment BMPs, including those for erosion control and structural treatments, such as detention/infiltration basins.

BMPs would be incorporated in accordance with the Department's SWMP. Care would be taken in designing and implementing BMPs for the project to ensure that the BMPs can be effectively and properly maintained throughout the lifetime of the roadway. Maintenance for structural BMPs generally includes trash and sediment removal. Maintenance for vegetated BMPs generally includes mowing, watering, fertilizing, and pest management.

In addition, implementation of the avoidance and minimization measures included in Section 2.3.1, *Wetlands and Other Waters*, would facilitate minimizing water quality impacts.

### 2.2.3 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.

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

#### *Affected Environment*

This section reports the results of the *Geotechnical Design and Material Report* (Parikh Consultants, Inc. January 2009) prepared for the project.

The topography along the project alignment is relatively flat and decreases from south to north. Some grade differences occur due to roadway crossings and bridge embankments along the alignment. I-880 was mostly built at-grade or on fill with an approximate elevation of 30 feet above mean sea level (amsl) near the Marina Boulevard overcrossing and decreasing to an elevation of 11 feet amsl near the Hegenberger Road overcrossing at I-880.

The site drainage is generally by sheet flow toward the southwest, or collected by local drainage systems. In general, groundwater was encountered between the depths of 8 feet and 23 feet. It is anticipated that groundwater level will vary with the passage of time due to seasonal groundwater fluctuations, surface and subsurface flow, ground

surface run-off, and water levels in the adjacent San Leandro Creek and/or other creeks in the area.

### Regional Geology and Seismicity

The regional structure of the project area is similar to other portions of the Northern California Coast Ranges, consisting of a complex series of northwest-trending synclines and anticlines (folded rock layers) with a number of northwest-trending faults. The one major stream in the project area is San Leandro Creek.

In the general project area, the geologic unit comprises the alluvial fan and fluvial deposits from the Holocene period. The deposits generally consist of clay, sand and gravel. Faults in the vicinity of the project site include the Hayward Fault, Calaveras-Pacines-San Benito Fault, and the San Andreas/N Fault. Significant earthquakes, which have occurred in this area, are generally associated with crustal movements along well-defined active fault zones.

### Site Geology

General geologic features pertaining to the site were evaluated by reference to the "Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California" by R.W. Graymer, 2000 (USGS Map, MF-2342). Based on the geologic map, the subsoils of the site consist of Alluvial fan and fluvial deposits (Holocene [10,000 years B.P. to present], Qhaf), Basin Deposits (Holocene, Qhb), and Natural Levee Deposits (Holocene, Qhl).

- **Alluvial fan and fluvial deposits (Holocene, Qhaf)** – Alluvial fan deposits are brown or tan, medium dense to dense, gravely sand or sandy gravel that generally grades upward, to sandy or silty clay.
- **Basin Deposits (Holocene, Qhb)** – Very fine silty clay to clay deposits occupying flat-floored basins at the distal edge of alluvial fans adjacent to the bay mud (Qhbm).
- **Natural Levee Deposits (Holocene, Qhl)** – Loose, moderately to well-sorted sandy or clayey silt grading to sandy or silty clay. Levee deposits border stream channels, usually both banks, and slope away to flatter floodplains and basins.

The slopes at the project site consist of man-made embankment slope at the existing bridges abutments and the interchanges. No other major slopes are present within the project limits.

## *Environmental Consequences*

### Liquefaction

Liquefaction occurs when saturated cohesionless soils are subject to a temporary but essentially total loss of shear strength under the reversing, cyclic shear stresses associated with earthquake shaking. Submerged cohesionless sands and silts of low relative density are the type of soils that are usually susceptible to liquefaction. Clays are generally not susceptible to liquefaction.

According to Association of Bay Area Governments mapping (2007), the liquefaction potential in the project area is generally considered to be moderate to high. Based on

the geotechnical report, the majority of the soils encountered during the geotechnical investigation are mainly soft to very stiff lean/fat clay and medium dense to very dense clayey sand. Global failure due to these conditions is not anticipated, and, according to the *Geotechnical Design and Material Report*, the liquefaction potential within the project site is relatively low to moderate. Based on the project soils evaluation, the impact of any post-liquefaction settlement on the roadway should be relatively small because:

- The potentially liquefiable soil layers are generally covered by predominantly cohesive soils, which tend to serve as a "soil mat" and should reduce the potential impact of liquefaction.
- The post-liquefaction settlement probably would be random and localized and could spread out over some distance/area.

Localized settlement could be mitigated through standard foundation design and construction methods.

**Fault Rupture and Ground Shaking**

The project is located in a seismically active part of northern California. The U.S. Geological Survey's Working Group on California Earthquake Probabilities estimates that there is a 62 percent probability that a major earthquake will occur in the San Francisco Bay Area by the year 2031. Many faults exist in the San Francisco Bay Area that are capable of producing earthquakes and which may cause strong ground shaking at the site. MCE magnitudes for some of the major faults in the area determined by Mualchin (California Seismic Hazard Map 1996) are summarized in Table 2.2.3-1 below. These MCE magnitudes represent the largest earthquakes that could occur on the given fault based on the current understanding of the regional tectonic structure. Since no active faults pass through the project site, the potential for fault rupture is low, but strong ground shaking can be expected during the life of the project. The intensity of the shaking depends on the distance from the earthquake to the site, magnitude of the earthquake, and response of the structure to the underlying soil and rock. Without proper seismic engineering, this could result in damage or collapse of proposed structures (e.g., culverts, retaining and sound walls).

**Table 2.2.3-1. Earthquake Data**

| Fault | Estimated Closest Distance to the Project Area (mi/km) | Maximum Credible Earthquake | Peak Bedrock Acceleration (g) |
|---|---|---|---|
| Hayward (strike-slip) | 1.9/3.0 | 7.5 | 0.6 |
| Calaveras-Pacines-San Benito (strike-slip) | 11.0/17.7 | 7.5 | 0.3 |
| San Andreas (strike-slip) | 17.3/27.8 | 8.0 | 0.3 |

Source: Parikh Consultants, Inc. 2009

### *Avoidance, Minimization, and/or Mitigation Measures*

Geotechnical considerations within the project area shall be addressed using the Department's standard design and construction techniques. All recommendations

included in the *Geotechnical Design and Material Report*, including recommended materials specifications, shall be implemented as part of the project.

### 2.2.4 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 or funded projects. (e.g., Antiquities Act of 1906 [16 USC 431-433], Federal-Aid Highway Act of 1935 [20 USC 78]). Under California law, paleontological resources are protected by the California Environmental Quality Act, the California Code of Regulations, Title 14, Division 3, Chapter 1, Sections 4307 and 4309, and Public Resources Code Section 5097.5.

#### *Affected Environment*

The project area is near the eastern shore of San Francisco Bay. The Hayward Fault runs northwest to southeast a few miles east of the project area. East of the Hayward Fault, the Mesozoic (251,000,000 to 65,000,000 years B.P. [1]) rocks of the Great Valley Sequence and undivided Upper Tertiary (65,000,000 to 1,800,000 years B.P.) sedimentary rocks form the East Bay Hills. Quaternary alluvium eroded from these hills formed the plains along eastern San Francisco Bay. From the base of the East Bay Hills, sediments are progressively younger toward the bay, and much of the earth above sea level along the bay margin consists of recent artificial fill.

Geologically, the majority of the project area lies on fine-, medium-, and coarse-grained Holocene (10,000 years B.P. to present) alluvium extending to approximately 12 feet below ground surface, deposited in and around the project area by San Leandro Creek and Arroyo Viejo. The I-880/Hegenberger interchange is on artificial fill underlain by Holocene estuarine deposits of bay mud. Underlying the Holocene bay mud and alluvium at a depth of approximately 12 feet are Pleistocene (1,800,000 to 10,000 years B.P.) alluvial deposits extending to an unknown depth. Late Pleistocene sediments in this region are known to contain such significant Rancholabrean land mammal (300,000 to 10,000 years B.P.) vertebrate fossils, as ground sloth, dire wolf, saber-toothed cat, camel, bison, mammoth, horse, rodent, bird, reptile, and amphibian fossils. Underlying the Holocene and Pleistocene deposits, at an unknown depth, is the Mesozoic (251,000,000 to 65,000,000 years B.P.) Great Valley Sequence of sedimentary marine rock.

Within the project area, the soils include artificial fill, Clear Lake Clay, Laugenour Loam, and Danville Silty Clay Loam of the Clear Lake-Wright-Haire and Danville-Botella-Urban Land complexes. Artificial fill is soil or gravel manufactured or deposited by humans to grade surfaces or increase an area's construction suitability. Clear Lake Clay is a poorly-developed soil approximately 5 feet deep and is formed from alluvium derived from sedimentary rock. Laugenour Loam is a well-developed soil approximately 5 feet deep and is derived from calcareous residuum. Danville Silty Clay Loam is a moderately-developed soil approximately 7 feet deep and is derived from residuum from sedimentary rock.

[1] Before Present (B.P.)

The project area consists of the following geological units, described in stratigraphic sequence from youngest (top) to oldest (bottom):

### Artificial Fill

The I-880/Hegenberger interchange is on Artificial Fill, which in turn overlies Quaternary alluvium. This fill, which is mostly unconsolidated earth, is highly unlikely to contain significant fossil resources. The thickness of this fill is undetermined in the project area.

### Holocene Bay Mud

The bay mud underlying the I-880/Hegenberger interchange is described as unconsolidated, dark plastic clay, which locally contains Holocene molluscan fossils that are generally not considered paleontologically significant. These deposits range from 1 to 10 feet thick at the bay margin.

### Holocene Alluvium

Holocene alluvium consists of moderately poorly sorted silty and sandy clay. Older portions of this alluvium may also be bedded medium-to-fine-grained sand. These alluvial deposits contain vertebrate and invertebrate fossils of extant, modern taxa that are generally not considered paleontologically significant. These deposits are generally as much as 10 feet thick.

### Pleistocene Alluvium

Underlying the younger Holocene alluvium in the project area are Late Pleistocene (126,000 to 10,000 years B.P.) alluvial sedimentary deposits. Locally, these sediments contain invertebrate and extinct vertebrate fossils, many of which are representative of the Rancholabrean land mammal age. Fossils found in alluvium of this age include, but are not limited to, bison, mammoth, ground sloths, saber-toothed cats, dire wolves, cave bears, rodents, birds, reptiles and amphibians. Late Pleistocene alluvium may, however, lie directly under local soils, artificial fill, or be at the ground surface.

### Upper Tertiary Sedimentary Rocks

Underlying Pleistocene alluvium at an unknown depth in the project area is a sequence of Upper Tertiary (65,000,000 to 1,800,000 years B.P.) sedimentary rock. This sequence of sedimentary rock contains fossilized mollusks.

### Great Valley Sequence

Underlying the Upper Tertiary Sedimentary Rock at an unknown depth in the project area is the Mesozoic (251,000,000 to 65,000,000 years B.P.) Great Valley Sequence of marine sedimentary rock including sandstone, shale and conglomerate.

## *Environmental Consequences*

The presence of Late Pleistocene alluvial deposits underlying Holocene alluvium in the project area indicates paleontological sensitivity. However, due to the fill and disturbance that has previously occurred in the project area, the possibility of encountering significant paleontological resources during construction activities is low.

### *Avoidance, Minimization, and/or Mitigation Measures*

Ground-disturbance in the Late Pleistocene alluvium below the artificial fill, bay mud, and Holocene alluvium may encounter paleontological resources. If paleontological remains are discovered during the course of the project, all work shall halt and the resources shall be avoided by project activities. A qualified paleontologist shall be contacted to assess the situation. Upon completion of an assessment, the paleontologist shall prepare a report documenting the methods and results, and provide recommendations for the curation of paleontological materials.

Project personnel shall not collect or move any paleontological materials. Fill soils used for construction purposes shall not contain paleontological materials.

## 2.2.5 Hazardous Waste/Materials

### *Regulatory Setting*

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

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

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

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

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

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

### Hazardous Waste Determination Criteria

Regulatory criteria to classify a waste as California hazardous for handling and disposal purposes are contained in the California Code of Regulations (CCR), Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as RCRA hazardous waste are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For waste containing metals, the waste is classified as California hazardous when: 1) the total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test (WET). A material is classified as RCRA hazardous, or federal hazardous, when the soluble metal content exceeds the federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP). Waste classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

The Department of Toxic Substances Control (DTSC) regulates and interprets hazardous waste laws in California. The DTSC generally considers excavated or transported materials that exhibit "hazardous waste" characteristics to be a "waste" requiring proper management, treatment and disposal. The DTSC issued a variance on June 30, 2009 for Caltrans regarding the disposition of lead-impacted soils within Caltrans projects. The Variance contains stipulations regarding the reuse and management of lead-impacted soil as fill material for construction and maintenance operations in Caltrans right-of-way.

The Code of Federal Regulations *(CFR),* 40 CFR 61, Subpart M, National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Federal Occupational Safety and Health Administration (FED OSHA) classify asbestos-containing material (ACM) as any material or product that contains more than 1 percent asbestos. Activities that disturb materials containing any amount of asbestos are subject to certain requirements of the Cal/OSHA asbestos standard contained in Title 8, CCR Section 1529. Materials containing more than 1 percent asbestos are also subject to NESHAP regulations (40 CFR Part 61, Subpart M).

Construction activities (including demolition) that disturb materials or paints containing any amount of lead are subject to certain requirements of the Cal/OSHA lead standard contained in Title 8, CCR, Section 1532.1. Deteriorated paint is defined by Title 17, CCR, Division 1, Chapter 8, §35022 as a surface coating that is cracking, chalking, flaking, chipping, peeling, non-intact, failed, or otherwise separating from a component. Demolition of a deteriorated lead-containing paint (LCP) component would require waste characterization and appropriate disposal.

### Environmental Screening Levels

The San Francisco Bay Regional Water Quality Control Board (SFRWQCB) has prepared a technical report entitled *Screening For Environmental Concerns at Sites With*

*Contaminated Soil and Groundwater, Interim Final* (November 2007), which presents Environmental Screening Levels (ESLs) for soil, groundwater, soil gas, and surface water to assist in evaluating sites impacted by releases of hazardous chemicals. The ESLs are conservative values for more than 100 commonly detected contaminants, which may be used to compare with environmental data collected at a site. ESLs are strictly risk assessment tools and "not regulatory clean up standards." The presence of a chemical at concentrations in excess of an ESL does not necessarily indicate that adverse impacts to human health or the environment are occurring; it simply indicates that a potential for adverse risk may exist and that additional evaluation is or may be warranted.

## *Affected Environment*

This section reports the results of the *Phase I Initial Site Assessment (ISA)* (Parikh Consultants, Inc. November 2006), *Limited Site Investigation Report* (Geocon Consultants, Inc. December 2008), and *Asbestos and Lead Containing Paint Survey* (Geocon Consultants, Inc. December 2008) prepared for the project.

The purpose of the ISA investigation was to identify and evaluate potential hazardous waste sites that may have affected the soil and groundwater quality in the project vicinity due to past and present environmental and commercial activities. The ISA studies were performed between October and November of 2006, and generally included a visual inspection of the project area and aerial photography, review of previous environmental reports prepared for properties in the project vicinity, and a government records search for hazardous waste sites in the project vicinity. Subsequent studies were conducted in 2008 based on the findings of the ISA, as described briefly below.

A limited site investigation for metals, petroleum hydrocarbons, and volatile organic compounds (VOCs) in shallow soil and groundwater within the project area was conducted in November and December of 2008. The purpose of this study was to evaluate whether impacts due to metals, including aerially deposited lead (ADL) and petroleum hydrocarbon compounds, including benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl-tert-butyl ether (MTBE), exist in the surface and near surface soil within the project area, associated with historical automobile emissions from the use of leaded gasoline. Groundwater samples were also collected at locations where groundwater may be encountered during proposed project construction activities. Groundwater samples were analyzed for metals, total petroleum hydrocarbons (TPH), and VOCs, including BTEX and MTBE.

An asbestos and lead-containing paint (LCP) study of the project area was conducted in November and December of 2008. The study included the survey of three bridge structures and associated sound walls for asbestos-containing materials (ACM) and LCP and the collection bulk samples for laboratory analysis.

### Existing Setting

Based on historical aerial photographs reviewed, the project vicinity has been in residential and commercial use since the early 1900s. Agricultural properties in San Leandro gradually turned into residential properties on the eastern side of the corridor. To the west of the corridor, vacant properties gradually turned into residential and commercial properties. The surrounding area on both sides of I-880 has been developed with residential and commercial properties through time. Photographs from

the 1960s – 1990s show improvement of I-880 and the construction of the Davis Street, Marina Boulevard, and 98th Avenue interchanges.

**Database and Regulatory Reviews**

As part of the ISA, a search of environmental regulatory databases was conducted for the I-880 corridor and surrounding properties in order to indicate the likelihood of encountering contamination from hazardous materials during construction. The database search was conducted by Environmental Data Resources, Inc. (EDR). The sites identified in the EDR search were evaluated with respect to their potential to impact the project adversely. Three main criteria were used to evaluate whether the EDR listed sites warranted further consideration: (1) proximity to I-880 (less than 200 meters from edge of existing right-of-way); (2) hydraulically upgradient with respect to groundwater flow; and (3) hydraulically upgradient with respect to surface water flow/stormwater runoff. A site reconnaissance of the project area was conducted in November 2006 to further identify nearby sites or land uses that may contain hazardous materials that could adversely affect the project.

The majority of properties identified by the EDR database search were located hydrologically downgradient and/or more than 200 meters from the project area. These sites were not considered to present an environmental concern associated with hazardous materials. The following seven sites, which are located upgradient (to the east and south) of the project area, were evaluated for project area contamination risk:

1. Gerber Products Company, 801 98th Avenue, Oakland, CA .

Listed with site ID No. 50, this site was cited for the discovery of the release of petroleum hydrocarbons during underground storage tank (UST) removal in the early 1990s. The release was to the surface soil only and the case has been closed.

*Assessment*: During the site visit, evidence of groundwater monitoring wells was not observed on the property. This site should not pose an environmental concern.

2. Mayer Development, 344-105th Avenue, Oakland, CA.

Listed with site ID No. 65, this site was cited for the release of petroleum hydrocarbons to groundwater, discovered during UST closure activities. This site case has been closed.

*Assessment*: This site case is closed and should not pose an environmental concern.

3. Unocal, 1300 Davis Street, San Leandro, CA.

Listed with site ID No. 83, this site was listed for the release of gasoline to soil and groundwater discovered during tank closure activities.

*Assessment*: This site is too far upgradient from the project area to pose an environmental concern.

4. GM Training Center, 1444 Marina Blvd, San Leandro, CA.

Listed with site ID No.101, this site was listed on the Leaking Underground Storage Tank (LUST) database for releases of petroleum hydrocarbons to soil and groundwater in the early 1990s. This site case is now closed.

*Assessment*: This site is located upgradient from the project area. However, because the case is closed and is located too far upgradient, it should not pose an environmental concern.

5. San Leandro Honda 1302 Marina Blvd., San Leandro,, CA.

Listed as site ID No. 101, this site is listed as a Hazardous Waste Information System (HAZNET), Facility Index System/Facility Identification Initiative Program Summary Report (FINDS), and Small Quantity Generator (SQG) site. This site is adjacent to the right-of-way and upgradient from the project area.

*Assessment*: This site is upgradient from the project area. However, during site inspection, no evidence of on-going environmental investigation was observed. This site should not pose an environmental concern.

6. Wells Fargo Bank, 1188 Montague Avenue, San Leandro, CA.

Listed with ID No. 118, this site is listed on the LUST and Cortese Hazardous Material Incident Report System (CORTESE) databases for the release of gasoline to soil and groundwater. This site case has been closed.

*Assessment*: This site case is closed and should not pose an environmental concern.

7. Wells Fargo Bank, 2500 Teagarden Street, San Leandro, CA.

Identified with ID No. 118, this site is listed as on the LUST and CORTESE databases for the release of gasoline to soil. The site case has been closed.

*Assessment*: This site case is closed and should not pose an environmental concern.

**Soil and Groundwater Contamination Testing**

The I-880 corridor is a major traffic-bearing roadway system in Alameda County. Historical aerial photographs show that I-880 has supported vehicular traffic from the early 1940s. Due to this vehicular activity, the ISA determined that soils along I-880 are likely contaminated with lead from exhaust of cars burning leaded gasoline. The lead levels in surface soils along highways can reach concentrations in excess of the hazardous waste threshold, requiring disposal at either a Class I landfill or reuse under the DTSC variance.

The UPRR crosses underneath I-880 between Davis Street and 98th Avenue. Soils adjacent to railroad tracks have typically been impacted with heavy metals, TPH as diesel, fuel oil, and polychlorinated biphenyls (PCBs). Soils along railroad tracks may be impacted from locomotives (TPH as diesel), railroad ties (polynuclear aromatics) or slag ballast used to set the ties (heavy metals).

In response to recommendations in the ISA, a *Limited Site Investigation Report* was prepared, which included the collection of soil and groundwater samples along the project alignment, laboratory analysis of the samples, statistical analysis of laboratory results, and the presentation of conclusions and recommendations based on the results. A total of 263 soil samples were collected from 77 soil borings from depths ranging from 0 to 5.5 feet in November of 2008. The soil and groundwater samples were then analyzed in a laboratory for metals, petroleum hydrocarbons, and VOCs using quality assurance to ensure accuracy of results. The results of the investigation are summarized below. Refer to the *Limited Site Investigation Report* for specific sampling methodology and detailed test results.

**Aerially Deposited Lead.** Aerially-deposited lead were detected at the following locations:

Southbound Shoulder between Hegenberger Road and 98th Avenue
The top two feet of soil would be classified as California hazardous waste based on lead content. Soils deeper than 2 feet would be classified as non-hazardous for lead content.

98th Avenue Interchange
The soil excavated from the surface to a depth of 2.5 feet would not be classified as a California hazardous waste based on lead content.

Southbound Shoulder south of 98th Avenue
Samples could not be collected in this section due to the presence of existing pavement and a viaduct. If shoulder soil is to be excavated in this segment, the top 2 feet of soil should be assumed as California hazardous waste for lead content.

Southbound Shoulder north of Davis Street
If excavated as a whole, soil from the surface to a depth of 2.5 feet would be classified as a California hazardous waste for lead content. If excavated separately, soil between the surface and a depth of 1.0 foot would not be classified as a California hazardous waste. Underlying soil excavated to a depth of 2.5 feet would be classified as a California hazardous waste for lead content.

Davis Street Interchange and Southbound Shoulder south of Davis Street
The soil excavated from the surface to a depth of 2.5 feet would not be classified as a California hazardous waste for lead content.

Marina Boulevard Interchange and Southbound Shoulder north and south of Marina Boulevard
The soil excavated from the surface to a depth of 2.5 feet would be classified as a California hazardous waste for lead content.

None of the soils tested within the project area would be classified as a RCRA hazardous waste.

**Soil Testing Results**. Soil testing identified the following pollutants:

Priority Pollutant Metals
In addition to testing for aerially deposited lead, testing and laboratory analysis was completed for the following additional pollutant metals: antimony, arsenic, barium,

beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc. The metal concentrations in soil were compared to established ESLs. Reported arsenic concentrations exceeded the residential and commercial/industrial land use ESLs. Reported vanadium concentrations exceeded the residential land use ESL. Two samples had mercury concentrations that exceeded the residential ESL.

Petroleum Hydrocarbons and Volatile Organic Compounds
TPH as gasoline, BTEX, MTBE, VOCs or semi-VOCs were not detected above the laboratory reporting limit in the soil samples. TPH as diesel was detected above the laboratory reporting limit in the soil samples, with four samples exceeding the residential and commercial/industrial land use ESL. TPH as motor oil was reported in the soil samples that exceeded the residential and commercial/industrial land use ESLs for residual fuels in shallow soil.

**Groundwater Testing Results.** The results of groundwater testing are described below.

Priority Pollutant Metals
Priority pollutant metals were reported in the groundwater samples collected within the project area at concentrations exceeding applicable standards. Specifically, barium, beryllium, cadmium, chromium, nickel, and vanadium were reported above their respective ESLs for Groundwater that is a Potential Drinking Water Source and Freshwater (SFRWQCB, November 2007), Department of Health Services Maximum Contaminant Levels (DHS MCLs, Title 22, CCR, Division 4, Chapter 15, Article 4, September 12, 2003), and Water Quality Objectives (WQOs) for Municipal and Agricultural Supply (SFRWQCB Basin Plan, January 2007). The following priority pollutant metals were reported in the groundwater samples at concentrations below their respective ESLs, MCLs, and WQOs: antimony, arsenic, cobalt, copper, lead, mercury, molybdenum, selenium, silver, thallium, and zinc.

Petroleum Hydrocarbons and Volatile Organic Compounds
TPH as gasoline, BTEX, MTBE, and semi-VOCs were not detected above laboratory reporting limits in any of the groundwater samples. Reported concentrations of TPH as diesel and TPH as motor oil in the groundwater samples were below their respective ESLs, MCLs, and WQOs.

VOCs were reported in the groundwater samples at concentrations exceeding their respective ESLs, MCLs, and WQOs. Specifically, tetrachloroethene (PCE) and trichloroethylene (TCE) were reported in sampling locations with values exceeding the ESLs for Groundwater That is a Current/Potential Source of Drinking Water (SFRWQCB, November 2007), MCLs (Title 22, CCR, Division 4, Chapter 15, Article 4, September 12, 2003), and WQOs for Municipal Supply (SFRWQCB Basin Plan, January 2007). According to the study, the detection of these compounds in the groundwater samples is likely attributable to a well-documented regional plume of VOC-impacted groundwater.

### Asbestos Containing Materials and Lead-based Paint

There are freeway overcrossings and interchanges within the proposed project right-of-way. Due to the age of these structures, there is a potential for presence of asbestos-containing materials (ACM) and lead-based paint.

In response to the ISA recommendation that surveys for ACM and lead-based paint be conducted by a certified inspector, an *Asbestos and Lead-Containing Paint Survey* was conducted in November and December 2008. The results of the surveys are summarized below. Refer to the *Asbestos and Lead-Containing Paint Survey* for specific sampling methodology and detailed test results.

A total of 19 bulk asbestos samples were collected from suspect ACM at the project site and sent to a licensed laboratory for analysis. Chrysotile asbestos at concentrations of 5 percent and 6 percent was detected in samples from the guard rail system of the Marina Boulevard overcrossing. Chrysotile asbestos at a concentration of 40 percent was detected in samples from the guard rail system of the Marina Boulevard overcrossing. No asbestos fibers were observed in samples obtained from the remaining suspect ACM at the project site.

A total of 7 bulk paint samples were collected at the project site by a Certified Lead Paint Inspector and sent to a licensed laboratory for analysis. Samples were obtained of the intact green paint used on the bridge girder system at the Marina Boulevard, Davis Street, and San Leandro Creek Bridge overcrossings and of the intact white paint used on the bridge bents of the Davis Street overcrossing. The samples contained total lead concentrations ranging from 32 mg/kg and 300,000 mg/kg. Soluble lead concentrations ranged from 0.25 mg/l and 830 mg/l.

### *Environmental Consequences*

Soil and groundwater contaminants, including aerially deposited lead, other priority pollutant metals, petroleum hydrocarbons, and volatile organic compounds were identified in the project area, as summarized above and described in the *Limited Site Investigation Report* prepared for the project. These soil contaminants could pose a hazard to worker safety or the environment during construction activities. Excavation, reuse, or disposal of ADL-contaminated soils would be subject to the DTSC Variance for Caltrans. Based on the identified concentrations of arsenic, mercury, and vanadium and comparisons to ESLs and published background soil concentrations, offsite disposal of soil may be restricted based on metals content, depending on proposed use. Offsite disposal of soil may also be restricted based on petroleum hydrocarbon content and depending on the proposed use. Groundwater handling restrictions may be required as a result of identified petroleum hydrocarbon concentrations and volatile organic compounds.

Asbestos-containing materials and lead-containing paint identified in the *Asbestos and Lead Containing Paint Survey* have the potential to pose a hazard to workers or the environment during disturbance related to construction activities. NESHAP regulations do not require that asbestos-containing bolt thread compound or rail shims (Category nonfriable/nonhazardous materials) identified in the guard rail system of the Marina Boulevard overcrossing be removed prior to renovation or demolition or treated as hazardous waste. However, the disturbance of these materials is still covered by the Cal/OSHA asbestos standard. Intact lead-containing paint identified during the survey would be considered a California and federal hazardous waste based on lead content if it were stripped, blasted, or otherwise separated from the substrate.

Other than those noted above, additional environmental areas of concern were not identified by the ISA, the *Limited Site Investigation Report*, or the *Asbestos and Lead-Containing Paint Survey* prepared for this project.

## *Avoidance, Minimization, and/or Mitigation Measures*

### Soil and Groundwater Contamination

Per the Department's requirements, the contractor(s) shall prepare a project-specific lead compliance plan (CCR Title 8, Section 1532.1, the "Lead in Construction" standard) to minimize worker exposure to lead-impacted soil. The plan shall include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of lead-impacted soil.

The contractor(s) shall prepare a project-specific health and safety plan (HSP) for work involving handling soil and groundwater impacted by petroleum hydrocarbons, volatile organic compounds (VOCs), and metals. The HSP must comply with the Safety and Health Program requirements outlined in Title 8 California Code of Regulations (T8 CCR) §5192(b) Hazardous Waste Operations and Emergency Response, and worker training requirements of T8 CCR §5194 Hazard Communication. The HSP shall include protocols for environmental and personnel monitoring requirements, personal protective equipment, and other health and safety practices and procedures required to minimize worker exposures during work involving soil and groundwater impacted by petroleum hydrocarbons, VOCs, and metals.

### Asbestos Containing Materials and Lead-based Paint

The following recommendations contained in the *Asbestos and Lead Containing Paint Survey* shall be adhered to:

- A licensed contractor registered with Cal/OSHA for asbestos-related work shall perform any activities that would disturb the barrier rail shims or thread compound located on the Marina Boulevard overcrossing guard rail system. Contractors shall be responsible for segregating and characterizing waste streams prior to disposal. Contractors shall be responsible for informing the landfill of the contractor's intent to dispose of asbestos-containing waste.
- Contractors (that will be conducting demolition, or related activities) shall be notified of the presence of asbestos in their areas (i.e., provided with a copy of the *Asbestos and Lead Containing Paint Survey* and a list of asbestos removed during subsequent activities). Contractors who are not trained for asbestos-related work shall be instructed not to disturb asbestos.
- In accordance with Bay Area Air Quality Management District (BAAQMD) Regulation 11, Rule 2, written notification shall be provided ten working days prior to commencement of *any* demolition activity (whether asbestos is present or not). In accordance with Title 8, CCR 341.9, written notification to the nearest Cal/OSHA district office shall be provided at least 24 hours prior to certain asbestos-related work.
- All paints at the project location shall be treated as lead-containing for purposes of determining the applicability of the Cal/OSHA lead standard during any future maintenance, renovation, and demolition activities. This recommendation is based

on LCP sample results and the fact that lead was a common ingredient of paints manufactured before 1978 and is still an ingredient of some industrial paints.

- In accordance with Title 8, CCR, Section 1532.1(p), written notification shall be provided to the nearest Cal/OSHA district office at least 24 hours prior to certain lead-related work.

### 2.2.6 Air Quality

#### *Regulatory Setting*

The Clean Air Act as amended in 1990 is the federal law that governs air quality. Its counterpart in California is the California Clean Air Act of 1988. These laws set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). Standards have been established for six criteria pollutants that have been linked to potential health concerns; the criteria pollutants are: carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3), particulate matter (PM), lead (Pb), and sulfur dioxide (SO2).

Under the 1990 Clean Air Act Amendments, the U.S. Department of Transportation cannot fund, authorize, or approve Federal actions to support programs or projects that are not first found to conform to the State Implementation Plan for achieving the goals of the Clean Air Act requirements. Conformity with the Clean Air Act takes place on two levels—first, at the regional level and second, at the project level. The proposed project must conform at both levels to be approved.

Regional level conformity in California is concerned with how well the region is meeting the standards set for carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3), and particulate matter (PM). California is in attainment for the other criteria pollutants. At the regional level, Regional Transportation Plans (RTP) are developed that include all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, an air quality model is run to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization, such as the Bay Area Air Quality Management District (BAAQMD) and the appropriate federal agencies, such as the Federal Highway Administration, make the determination that the RTP is in conformity with the State Implementation Plan for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as described in the RTP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Conformity at the project-level also requires “hot spot” analysis if an area is “nonattainment” or “maintenance” for carbon monoxide (CO) and/or particulate matter. A region is a “nonattainment” area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas but have recently met the standard are called “maintenance” areas. “Hot spot” analysis is essentially the same, for technical purposes, as CO or particulate matter analysis performed for NEPA purposes. Conformity does include some specific standards for projects that require a hot spot analysis. In general, projects must not cause the CO standard to be violated, and in “nonattainment” areas the project must not

cause any increase in the number and severity of violations. If a known CO or particulate matter violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

## *Affected Environment*

This section reports the results of the *Air Quality Assessment Report* (LSA Associates, Inc. June 2009) prepared for the project.

### Meteorology

The project site is located in Alameda County, an area within the San Francisco Bay Air Basin (SFBAB). The climate of the San Francisco Bay Area has mild, wet winters and relatively warm, dry summers. The major climatic controls are the Pacific high-pressure over the eastern Pacific Ocean, the Pacific Ocean, and the local topography. The formation of a high-pressure area over the Great Basin Region to the east also affects the meteorology of the Bay Area, primarily during the winter months. Daytime temperatures in the summer average near 80 degrees Fahrenheit (°F), with temperatures dropping into the 50s by morning. Sunshine is plentiful in the summer, with clear skies most of the time. In winter, temperatures vary little, with high temperatures in the mid 50's. Winter lows drop to the low 30's.

Air quality in the project area is not only affected by various emissions sources (e.g., mobile, industry) but is also affected by atmospheric conditions such as wind speed, wind direction, temperature, and rainfall. Air quality standards are exceeded primarily during meteorological conditions conducive to high pollution levels such as cold, windless winter nights; or hot, sunny summer afternoons. Two meteorological factors affect air quality in the vicinity of the project. Winds direct the transport of air pollution emissions and control the volume of air that pollution is mixed into at any given time. Temperature inversions determine the vertical mixing depth of air pollutants.

The dispersion of pollutants in the project area is governed by the local winds, which control the rate of dilution of transport. The prevailing wind distribution results in rapidly ventilating the area in the daytime with clean marine air and corresponding good air quality. Temperature inversions also have an effect on air quality, as they limit the vertical dispersion of pollutants. Low inversion heights limit the volume of air exchange available to adequately dilute atmospheric pollutants.

The air pollution potential is lowest for the parts of the subregion that are closest to the Bay due largely to good ventilation and less influx of pollutants from upwind sources. The occurrence of light winds in the evenings and early mornings occasionally causes elevated pollutant levels. Due to the lower frequency of strong winds, the air pollution potential in the northern (Richmond) and southern (Oakland, San Leandro) parts of this subregion is marginally higher than in communities directly east of the Golden Gate.

### Air Quality Attainment Status

Pursuant to the federal Clean Air Act (CAA) of 1970, the EPA established National Ambient Air Quality Standards (NAAQS). The NAAQS were established for six major pollutants, termed criteria pollutants. Criteria pollutants are defined as those pollutants for which the federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations in order to protect public health. The

NAAQS are two-tiered: primary, to protect public health; and secondary, to prevent degradation to the environment (e.g., impairment of visibility, damage to vegetation and property).

The six criteria pollutants are $O_3$, CO, particulate matter (PM), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), and lead. PM includes PM2.5 and PM10. The primary standards and health and atmospheric effects for these pollutants are shown in Table 2.2.6-1.

**Table 2.2.6-1. National and California Ambient Air Quality Standards**

| Pollutant | Averaging Time | State Standard | Federal Standard | Health and Atmospheric Effects | Typical Sources |
|---|---|---|---|---|---|
| Ozone ($O_3$)[a] | 1 hour<br>8 hours | 0.09 ppm<br>0.070 ppm | –[b]<br>0.08 ppm | High concentrations irritate lungs. Long-term exposure may cause lung tissue damage. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include a number of known toxic air contaminants. | Low-altitude ozone is almost entirely formed from reactive organic gases (ROG) and nitrogen oxides ($NO_x$) in the presence of sunlight and heat. Major sources include motor vehicles and other mobile sources, solvent evaporation, and industrial and other combustion processes. Biologically-produced ROG may also contribute. |
| Carbon Monoxide (CO) | 1 hour<br>8 hours<br>8 hours (Lake Tahoe) | 20 ppm<br>9.0 ppm[c]<br>6 ppm | 35 ppm<br>9 ppm<br>– | Asphyxiant. CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. | Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale. |
| Respirable Particulate Matter (PM10)[a] | 24 hours<br>Annual | 50 µg/m$^3$<br>20 µg/m$^3$ | 150 µg/m$^3$<br>– | Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many aerosol and solid compounds are part of PM10. | Dust- and fume-producing industrial and agricultural operations; combustion smoke; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources (wind-blown dust, ocean spray). |
| Fine Particulate Matter (PM2.5)[a] | 24 hours<br>Annual | –<br>12 µg/m$^3$ | 35 µg/m$^3$<br>15 µg/m$^3$ | Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – considered a toxic air contaminant – is in the PM2.5 size range. Many aerosol and solid compounds are part of PM2.5. | Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical (including photochemical) reactions involving other pollutants including $NO_x$, sulfur oxides ($SO_x$), ammonia, and ROG. |
| Nitrogen Dioxide ($NO_2$) | 1 hour<br>Annual | 0.25 ppm<br>– | –<br>0.053 ppm | Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain. | Motor vehicles and other mobile sources; refineries; industrial operations. |
| Sulfur Dioxide ($SO_2$) | 1 hour<br>3 hours<br>24 hours<br>Annual | 0.25 ppm<br>–<br>0.04 ppm<br>– | –<br>0.5 ppm<br>0.14 ppm<br>0.030 ppm | Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility. | Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing. |

| Pollutant | Averaging Time | State Standard | Federal Standard | Health and Atmospheric Effects | Typical Sources |
|---|---|---|---|---|---|
| Lead (Pb)[d] | Monthly<br>Quarterly | 1.5 µg/m$^3$<br>– | –<br>1.5 µg/m$^3$ | Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also considered a toxic air contaminant. | Primary: lead-based industrial process like batter production and smelters. Past: lead paint, leaded gasoline. Moderate to high levels of aerially deposited lead from gasoline may still be present in soils along major roads, and can be a problem if large amounts of soil are disturbed. |

*Sources:* California Air Resources Board Ambient Air Quality Standards chart, 05/17/2006 (http://www.arb.ca.gov/aqs/aaqs2.pdf)
Sonoma-Marin Area Rail Transit Draft Air Pollutant Standards and Effects table, November 2005, page 3-52.
U.S. EPA and California Air Resources Board air toxics websites, 05/17/2006

*Notes:* ppm = parts per million; µg/m$^3$ = micrograms per cubic meter

[a] Annual PM10 NAAQS revoked October 2006; was 50 µg/m$^3$. 24-hr. PM2.5 NAAQS tightened October 2006; was 65 µg/m$^3$.

[b] 12/22/2006 Federal court decision may affect applicability of Federal 1-hour ozone standard. Prior to 6/2005, the 1-hour standard was 0.12 ppm. Case is still in litigation.

[c] Rounding to an integer value is not allowed for the State 8-hour CO standard. A violation occurs at or above 9.05 ppm.

[d] The CARB has identified lead, vinyl chloride, and the particulate matter fraction of diesel exhaust as toxic air contaminants. Diesel exhaust particulate matter is part of PM10 and, in larger proportion, PM2.5. Both the CARB and U.S. EPA have identified various organic compounds that are precursors to ozone and PM2.5 as toxic air contaminants. There is no threshold level of exposure for adverse health effect determined for toxic air contaminants, and control measures may apply at ambient concentrations below any criteria levels specified for these pollutants or the general categories of pollutants to which they belong.

Air quality monitoring stations are located throughout the nation and maintained by the local air districts and State air quality regulating agencies. Data collected at permanent monitoring stations are used by the EPA to identify regions as “attainment” or “nonattainment,” depending on whether the regions met the requirements stated in the primary NAAQS. Nonattainment areas are imposed with additional restrictions as required by the EPA. In addition, different classifications of attainment, such as marginal, moderate, serious, severe, and extreme, are used to classify each air basin in the State on a pollutant-by-pollutant basis. The classifications are used as a foundation to create air quality management strategies to improve air quality and comply with the NAAQS. The SFBAB’s attainment status for each of the criteria pollutants is listed in Table 2.2.6-2.

## Table 2.2.6-2. Attainment Status of Criteria Pollutants in the San Francisco Bay Air Basin

| Pollutant | State | Federal |
|---|---|---|
| $O_3$ (1-hour) | Nonattainment | Revoked June 2005[1] |
| $O_3$ (8-hour) | Nonattainment | Marginal Nonattainment[2] |
| $PM_{10}$ | Nonattainment | Attainment/Unclassified |
| $PM_{2.5}$ | Nonattainment | Nonattainment[3] |
| CO | Attainment | Attainment/Maintenance |
| $NO_2$ | Attainment | Attainment |
| All others | Attainment/Unclassified | Attainment/Unclassified |

Source: California Air Resources Board, 2008 (http://www.arb.ca.gov/desig/desig.htm).
CO = Carbon monoxide
$NO_2$ = Nitrogen dioxide
$O_3$ = Ozone
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter
$PM_{10}$ = Particulate matter less than 10 microns in diameter

1 The federal standard for one-hour $O_3$ was revoked as of June 5, 2005, and therefore no longer applies. Federal ozone attainment is now based on the 8-hour standard.

2 In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard. US EPA lowered the national 8-hour ozone standard from 0.80 to 0.75 ppm (ie.e. 75 ppb) effective May 27, 2008. EPA will issue final designations based upon the new 0.75 ppm ozone standard by March 2010.

3 U.S EPA lowered the 24-hour PM2.5 standard from 65 µg/$m^3$ to 35 µg/$m^3$ in 2006. EPA issued attainment status designations for the 35 µg/$m^3$ standard on December 22, 2008. EPA has designated the Bay Area as nonattainment for the 35 µg/$m^3$ PM2.5 standard. The EPA designation will be effective 90 days after publication of the regulation in the Federal Register. President Obama has ordered a freeze on all pending federal rules; therefore, the effective date of the designation is unknown at this time.

### Monitored Air Quality

The BAAQMD operates several air quality monitoring stations within the SFBAB (see Table 2.2.6-3). The closest monitoring station is located in the City of San Leandro. However, this monitoring station only measures one-hour and eight-hour O3 concentrations. Therefore, the CO, NO2, PM2.5, and PM10 concentrations measured at the Fremont station and the SO2 concentrations measured at the Richmond station were used to establish the existing air quality conditions.

## Table 2.2.6-3. Local Air Quality Levels

| Pollutant | Primary Standard | | Year | Maximum Concentration[1] | Number of Days State/Federal Standard Exceeded |
|---|---|---|---|---|---|
| | California | Federal | | | |
| Carbon Monoxide (CO) | 9.0 ppm for 8 hours | 9 ppm for 8 hours | 2005 | 2.0 ppm | 0/0 |
| | | | 2006 | 1.8 ppm | 0/0 |
| | | | 2007 | 1.6 ppm | 0/0 |
| Ozone ($O_3$) (1-Hour) | 0.09 ppm for 1 hour | N/A | 2005 | 0.099 ppm | 1/NA |
| | | | 2006 | 0.088 ppm | 0/NA |
| | | | 2007 | 0.071 ppm | 0/NA |
| Ozone ($O_3$) (8-Hour) | 0.07 ppm for 8 hour | 0.08 ppm for 8 hour | 2005 | 0.061 ppm | NA/0 |
| | | | 2006 | 0.066 ppm | NA/0 |
| | | | 2007 | 0.054 ppm | NA/0 |
| Nitrogen Dioxide ($NO_2$) | 0.25 ppm for 1 hour | N/A | 2005 | 0.069 ppm | 0/NA |
| | | | 2006 | 0.063 ppm | 0/NA |
| | | | 2007 | 0.058 ppm | 0/NA |
| Sulfur Dioxide ($SO_2$) | 0.25 ppm for 1 hour | 0.14 ppm for 24 hours or 0.03 ppm annual arithmetic mean | 2005 | 0.020 ppm | 0/0 |
| | | | 2006 | 0.026 ppm | 0/0 |
| | | | 2007 | 0.037 ppm | 0/0 |
| Particulate Matter ($PM_{10}$) | 50 □g/$m^3$ for 24 hours | 150 □g/$m^3$ for 24 hours | 2005 | 52 ug/$m^3$ | 1/0[2] |
| | | | 2006 | 54 ug/$m^3$ | 1/0 |
| | | | 2007 | 58 ug/$m^3$ | 1/0 |
| Fine Particulate Matter ($PM_{2.5}$) | NA | 65 □g/$m^3$ for 24 hours | 2005 | 33.4 ug/$m^3$ | NA/0[2,3] |
| | | | 2006 | 43.9 ug/$m^3$ | NA/0 |
| | | | 2007 | 51.2 ug/$m^3$ | NA/0 |

Source: California Air Resources Board, ADAM Air Quality Data Statistics, www.arb.ca.gov/adam/welcome.html

[1] Max concentration is measured over the same period as the California Standard.

[2] $PM_{10}$ and $PM_{2.5}$ exceedances are derived from the number of samples exceeded, not days.

[3] $PM_{2.5}$ exceedances are based on the old 65 µg/$m^3$ standard. In 2006, the EPA revised the standard to 35 µg/$m^3$.

ppm Parts per million

□g/$m^3$ Micrograms per cubic meter

$PM_{10}$ Particulate matter 10 microns in diameter or less

$PM_{2.5}$ Particulate matter 2.5 micron or less

NA Not applicable

The following air quality information briefly describes the various types of pollutants monitored within the vicinity of the project study area.

**Carbon Monoxide.** CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. The entire SFBAB is in attainment for the federal and State CO standard. State and federal standards were not exceeded between 2005 and 2007.

**Ozone.** $O_3$, a colorless gas with a sharp odor, is one of a number of substances called photochemical oxidants (highly reactive secondary pollutants). These oxidants are formed when hydrocarbons, $NO_X$, and related compounds interact in the presence of ultraviolet sunlight. The State standard for $O_3$ is 0.09 ppm, averaged over one hour, and 0.07 ppm, averaged over eight hours. Both federal and State standards designate the SFBAB as a nonattainment area. The federal standard for one-hour $O_3$ was revoked as of June 5, 2005, and therefore no longer applies. The State one-hour $O_3$ standard was exceeded once at the closest monitoring station to the proposed project between 2005 and 2007. The federal eight-hour $O_3$ standard was not exceeded between 2005 and 2007.

**Nitrogen Dioxide.** $NO_2$ is a reddish-brown gas with an odor similar to bleach and is the byproduct of fuel combustion, which results from mobile and stationary sources. It has complex diurnal concentrations that are typically higher at night. The SFBAB has relatively low $NO_2$ concentrations. $NO_2$ is itself a regulated pollutant, but it also reacts with hydrocarbons in the presence of sunlight to form $O_3$ and other compounds that make up photochemical smog. $NO_2$ decreases lung function and may reduce resistance to infection. The entire SFBAB has not exceeded either federal or State standards for $NO_2$ between 2005 and 2007 with published monitoring data. It is designated as an attainment area under the federal and State standards.

**Sulfur Dioxide.** $SO_2$ is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous $SO_2$ levels. $SO_2$ irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight. The entire SFBAB is in attainment with both federal and State $SO_2$ standards.

**Coarse Particulate Matter.** $PM_{10}$ refers to suspended particulate matter that is smaller than 10 microns or 10 one-millionths of a meter. $PM_{10}$ occurs from sources such as road dust, diesel soot, combustion products, construction operations, and dust storms. $PM_{10}$ scatters light and significantly reduces visibility. In addition, these particulates penetrate into lungs and can potentially damage the respiratory tract. On June 19, 2003, the CARB adopted amendments to the statewide 24-hour particulate matter standards based on requirements set forth in the Children's Environmental Health Protection Act (Senate Bill 25). The federal 24-hour standard of 150 micrograms per cubic meter ($\mu g/m^3$) was retained. The entire SFBAB is designated as attainment/unclassifed for the federal $PM_{10}$ standard and nonattainment for the State $PM_{10}$ standard. The State 24-hour $PM_{10}$ standard was exceeded once per year at the closest monitoring station to the proposed project between 2005 and 2007. The federal 24-hour $PM_{10}$ standard was not exceeded between 2005 and 2007. Tiny airborne particles or aerosols that are less than 100 micrometers are collectively referred to as total suspended particulate matter (TSP). These particles constantly enter the atmosphere from many natural sources, including

soil, bacteria, viruses, fungi, molds, yeast, and pollen. Manmade sources of TSP also include combustion products from space heating, industrial processes, power generation, and motor vehicle use.

Over 99 percent of inhaled particulate matter is either exhaled or trapped in the upper areas of the respiratory system and expelled. The balance enters the windpipe and lungs, where some particulates cling to protective mucous and are removed. Other mechanisms, such as coughing, also filter out or remove particles. Collectively, these "pulmonary clearance" mechanisms protect the lungs from the majority of inhalable particles.

Irritating odors are often associated with particulates. Some examples of sources are gasoline and diesel engine exhausts, large-scale coffee roasting, paint spraying, street paving, and trash burning.

The EPA replaced TSP as the indicator for both the annual and 24-hour primary (i.e., health-related) standards in 1987. The indicator includes only those particles with an aerodynamic diameter smaller than or equal to a nominal 10 micrometers ($PM_{10}$).

**Fine Particulate Matter.** Due to recent increased concerns over health impacts related to fine particulate matter ($PM_{2.5}$), both State and federal $PM_{2.5}$ standards have been created. Particulate matter impacts primarily affect infants, children, the elderly, and those with preexisting cardiopulmonary disease. In 1997, the EPA announced new $PM_{2.5}$ standards. Industry groups challenged the new standard in court, and implementation of the standard was blocked. However, upon appeal by the EPA, the United States Supreme Court reversed this decision and upheld the EPA's new standards.

On June 20, 2002, CARB adopted amendments for statewide annual ambient particulate matter air quality standards. These standards were revised/established due to increasing concerns by CARB that previous standards were inadequate, as almost everyone in California is exposed to levels at or above the current State standards during some parts of the year, and the statewide potential for significant health impacts associated with particulate matter exposure was determined to be large and wide-ranging. The 65 $\mu g/m^3$ federal standard was not exceeded at the closest monitoring station to the proposed project between 2005 and 2007; however, the new 35 $\mu g/m^3$ federal standard was exceeded in each of the years between 2005 and 2007. On December 22, 2008, the EPA redesignated the SFBAB as nonattainment for the federal $PM_{2.5}$ standard.

**Volatile Organic Compounds or Reactive Organic Gases.** Hydrocarbon compounds are any compounds containing various combinations of hydrogen and carbon atoms that exist in the ambient air. Volatile organic compounds (VOCs) contribute to the formation of smog and/or may themselves be toxic. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints. There are no specific State or federal VOC thresholds, as they are regulated by individual air districts as $O_3$ precursors.

**Lead.** Lead is found in old paints and coatings, plumbing, and a variety of other materials. Once in the bloodstream, lead can cause damage to the brain, nervous system, and other body systems. Children are highly susceptible to the effects of lead. The entire SFBAB is in attainment for federal and State lead standards.

### Regional Air Quality Conformity

The project is in the 2035 Transportation Plan, which was found to conform by the FHWA/Federal Transit Administration (FTA) on April 22, 2009. The project is also in the 2009 Transportation Improvement Program (TIP), which was found to conform by the FHWA/FTA on November 17, 2008 (Project ID: ALA070042; Description: I-880 Corridor: From Marina Boulevard in San Leandro to Hegenberger in Oakland; construct new southbound HOV lanes). The assumptions used in the 2035 Transportation Plan and 2009 TIP are less than 5 years old. The modeling was conducted using current and future population, employment, traffic, and congestion estimates. The traffic data, including the fleet mix data, used in the TIP and Transportation Plan were based on the most recently available vehicle registration data. The design concept, scope, and open to traffic year of the Build Alternative are consistent with those in the TIP listing. The Build Alternative implements a Transportation Control Measure (TCM) identified in the State Implementation Plan (SIP). Therefore, the Build Alternative is in conformance with the SIP. The project will also comply with all BAAQMD requirements.

## Project Level Conformity Analyses

**Carbon Monoxide Hot-Spot Analysis.** Following the methodology outlined in Appendix B of the Department's *Transportation Project-Level Carbon Monoxide Protocol*, a detailed analysis was performed for 197 receptor locations along the northbound and southbound sides of the I-880 project area using the California Line Source Dispersion Model, version 4 (CALINE4) and the emission rates from the California Air Resources Board's (CARB) Emissions Factors Model (EMFAC2007). The results of the detailed emissions analysis are included in Appendix A of the *Air Quality Assessment Report* (LSA Associates, Inc. June 2009) prepared for the project.

CO levels were modeled using traffic volumes, emissions, meteorology, and the roadway/receptor geometry. Forecast operational traffic conditions for the existing and future build conditions were taken from the traffic operations report prepared for the project (Section 2.1.4).

The CO concentrations at the top 10 locations within the project area are listed in Table 2.2.6-4. As shown, the proposed project would not result in any exceedances of the one-hour or eight-hour CO standards.

## Table 2.2.6-4. I-880 Project Area CO Concentrations

| 2012 No Project | | 2012 With Project | | 2035 No Project | | 2035 With Project | | Exceed Standard? | |
|---|---|---|---|---|---|---|---|---|---|
| **1 hr** | **8 hr** | **1 hr** | **8 hr** | **1 hr** | **8 hr** | **1 hr** | **8 hr** | **1 hr** | **8 hr** |
| 4.0 | 2.8 | 4.1 | 2.8 | 3.3 | 2.3 | 3.3 | 2.3 | No | No |
| 4.0 | 2.8 | 4.1 | 2.8 | 3.3 | 2.3 | 3.3 | 2.3 | No | No |
| 3.9 | 2.7 | 3.9 | 2.7 | 3.2 | 2.2 | 3.3 | 2.3 | No | No |
| 3.9 | 2.7 | 3.9 | 2.7 | 3.2 | 2.2 | 3.3 | 2.3 | No | No |
| 3.9 | 2.7 | 4.0 | 2.8 | 3.2 | 2.2 | 3.3 | 2.3 | No | No |
| 3.9 | 2.7 | 4.0 | 2.8 | 3.2 | 2.2 | 3.3 | 2.3 | No | No |
| 3.9 | 2.7 | 4.0 | 2.8 | 3.3 | 2.3 | 3.3 | 2.3 | No | No |
| 3.9 | 2.7 | 4.0 | 2.8 | 3.2 | 2.2 | 3.3 | 2.3 | No | No |
| 3.9 | 2.7 | 4.0 | 2.8 | 3.2 | 2.2 | 3.3 | 2.3 | No | No |
| 3.9 | 2.7 | 3.9 | 2.7 | 3.2 | 2.2 | 3.3 | 2.3 | No | No |

Source: LSA Associates, Inc., June 2009.

**$PM_{2.5}$/$PM_{10}$ Hot-Spot Analysis.** The proposed project is located within an attainment area for the federal $PM_{10}$ standard. On December 22, 2008 the EPA designated the Bay Area as nonattainment for the 35 µg/$m^3$ $PM_{2.5}$ standard. The EPA designation will be effective 90 days after publication of the regulation in the Federal Register, and compliance will be required one year later. However, as of June 2009, the designation had not been published in the Federal Register. Therefore, per 40 CFR Part 93, a $PM_{2.5}$/$PM_{10}$ hot-spot analysis is not required for conformity purposes.

**Mobile Source Air Toxics Analysis.** In addition to the criteria air pollutants for which there are NAAQS, the EPA also regulates air toxics. Most air toxics originate from humanmade sources, including on-road mobile sources, nonroad mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and nonroad equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through an engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The *Air Quality Assessment Report* prepared for the project includes a basic analysis of the likely MSAT emission impacts of the proposed project. Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling to estimate ambient concentrations resulting from the estimated emissions, exposure modeling to estimate

human exposure to the estimated concentrations, and a final determination of health impacts based on the estimated exposure. However, each of these steps is encumbered by technical shortcomings or uncertain science that prevent a more complete determination of the MSAT health impacts of the proposed project. Therefore, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level.

MSAT emissions from vehicles traveling through the project area were estimated using the methodology prepared for the Department by the University of California, Davis (UCD)-Caltrans Air Quality Project (Estimating Mobile Source Air Toxics Emissions: A Step-By-Step Project Analysis Methodology, December, 2006). The three primary steps to the methodology include deriving emission factors, determining the traffic data, and using the emission factors and traffic data to calculate the emissions.

This analysis focuses on six MSAT pollutants identified by the EPA as being the highest-priority MSATs.[1] The six pollutants are: diesel particulate matter (DPM), acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene. EMFAC2007 provides emission factor information for DPM, but does not provide emission factors for the remaining five MSATs. Each of the remaining five MSATs, however, is a constituent of motor vehicle total organic gas (TOG) emissions, and EMFAC2007 provides emission factors for TOG. CARB has supplied the Department with "speciation factors" for each of the remaining five MSATs not directly estimated by EMFAC2007. Each speciation factor represents the portion of TOG emissions that is estimated to be a given MSAT.

The UCD, in cooperation with the Department, developed a spreadsheet tool that incorporates EMFAC2007 emission factors, CARB speciation factors, and project-specific traffic activity data such as peak- and off-peak-hour vehicle miles traveled (VMT), speed, travel times, and traffic volumes. The spreadsheet tool applies the traffic activity data to the emission factors and estimates MSAT emissions for base-case (with "No Build" alternative) and "Build" alternative scenarios. Results were produced for the opening year (2012) and the horizon year (2035). The 2012 and 2035 analyses compared "No Build" conditions to expected conditions resulting from implementation of the project. Results of the analyses are included in Appendix C of the *Air Quality Assessment Report* and summarized in Tables 2.2.6-5 and 2.2.6-6.

[1] U.S. Environmental Protection Agency (2001) Control of Emissions of Hazardous Air Pollutants from Mobile Sources: Final Rule. *Federal Register*, Vol. 66, No. 61, pp. 17230–17273. March 29.

## Table 2.2.6-5. 2012 Changes in Total Project MSAT Emission Rates

| 2012 Toxic Air Contaminant | Existing Emissions (gms/day) | 2012 No Build Emissions (gms/day) | 2012 Build Emissions | | |
|---|---|---|---|---|---|
| | | | gms/day | Δ% from Existing | Δ% from No Build |
| Diesel Particulate Matter | 2,627 | 1,995 | 2,060 | -24.1% | 3.3% |
| Benzene | 1,875 | 1,170 | 1,208 | -37.6% | 3.3% |
| 1,3-Butadiene | 364 | 215 | 222 | -40.9% | 3.3% |
| Acetaldehyde | 569 | 380 | 392 | -33.3% | 3.3% |
| Acrolein | 82 | 49 | 50 | -40.7% | 3.3% |
| Formaldehyde | 1,702 | 1,105 | 1,141 | -35.1% | 3.3% |
| Average Percent Change | | | | -35.3% | 3.3% |

Source: LSA Associates, Inc. (2009)
gms/day = grams per day
MSAT = mobile source air toxics
PM = particulate matter

## Table 2.2.6-6. 2035 Changes in Total Project MSAT Emission Rates

| 2035 Toxic Air Contaminant | Existing Emissions (gms/day) | 2035 No Build Emissions (gms/day) | 2035 Build Emissions | | |
|---|---|---|---|---|---|
| | | | gms/day | Δ% from Existing | Δ% from No Build |
| Diesel PM | 2,627 | 753 | 814 | -71.3% | 8.1% |
| Benzene | 1,875 | 411 | 444 | -78.1% | 8.1% |
| 1,3-Butadiene | 364 | 66 | 72 | -81.8% | 8.1% |
| Acetaldehyde | 569 | 130 | 141 | -77.1% | 8.1% |
| Acrolein | 82 | 15 | 17 | -81.4% | 8.1% |
| Formaldehyde | 1,702 | 378 | 409 | -77.8% | 8.1% |
| Average Percent Change | | | | -77.9% | 8.1% |

Source: LSA Associates, Inc. (2009)
gms/day = grams per day
MSAT = mobile source air toxics
PM = particulate matter

### *Environmental Consequences*

Construction of the proposed project is expected to require two years to complete and is scheduled to begin in December 2010.

During construction, short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and other activities related to construction. Emissions from construction equipment also are anticipated and would include carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOCs), directly-emitted particulate matter (PM10 and PM 2.5), and toxic air contaminants such as diesel exhaust particulate matter. Ozone is a regional pollutant that is derived from NOx and VOCs in the presence of sunlight and heat.

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces.

Construction-related effects on air quality from most highway projects would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate PM10, PM2.5, and small amounts of CO, $SO_2$, NOx, and VOCs. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM10 emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM10 emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Construction activities for large development projects are estimated by the Environmental Protection Agency (EPA) to add 1.09 tonne (1.2 tons) of fugitive dust per acre of soil disturbed per month of activity. If water or other soil stabilizers are used to control dust, the emissions can be reduced by up to 50 percent. Caltrans' Standard Specifications (Section 10) pertaining to dust minimization requirements requires use of water or dust palliative compounds and will reduce potential fugitive dust emissions during construction.

In addition to dust-related PM10 emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, $SO_2$, NOx, VOCs and some soot particulate (PM10 and PM2.5) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

$SO_2$ is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Off-road diesel fuel meeting Federal Standards can contain up to 5,000 parts per million (ppm) of sulfur, whereas on-road diesel is restricted to less than 15 ppm of sulfur. However, under California law and Air Resources Board regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel, so $SO_2$-related issues due to diesel exhaust will be minimal. Some phases of construction, particularly asphalt paving, would result in short-term odors in the immediate area of each paving site(s). Such odors would be quickly dispersed below detectable thresholds as distance from the site(s) increases.

**Carbon Monoxide**

Historical air quality data show that current carbon monoxide levels for the project area and the general vicinity do not exceed either the State or federal ambient air quality standards. The project would help to improve traffic flow and reduce congestion on roadway links in the project vicinity. The project is located in an attainment/maintenance area for federal CO standards. Using the Department’s Transportation Project-Level Carbon Monoxide Protocol, a detailed CO hot-spot analysis was conducted to determine whether the project would result in any CO hot spots. It was determined that the project would not result in any exceedances of the one-hour or eight-hour CO standards. Therefore, the proposed project would be consistent with the regional emission analysis.

### Particulate Matter

Historical air quality data show that the $PM_{2.5}$ and $PM_{10}$ levels for the project area and the general vicinity do not exceed the current federal ambient air quality standards. The project would help to improve traffic flow and reduce congestion on roadway links in the project vicinity. Therefore, the proposed project would help to reduce the future $PM_{2.5}$ and $PM_{10}$ levels in the project vicinity.

Construction activities such as earthmoving, excavation and grading operations, construction vehicle traffic and wind blowing over exposed earth would generate exhaust emissions and fugitive particulate matter emissions that would affect local and regional air quality. The effects of construction activities would be increased dustfall and locally elevated levels of $PM_{10}$ downwind of construction activity. Construction dust has the potential for creating a nuisance at nearby properties, and may constitute a health effect for children or persons with chronic health problems. Standard Caltrans construction management practices are adequate to assure that associated air quality impacts would be minimal. These include requiring emission controls on construction equipment and spraying water on exposed surfaces to minimize dust. The project would implement all feasible $PM_{10}$ construction emissions control measures required by the BAAQMD (see *Avoidance, Minimization, and/or Mitigation Measures* section below).

### Mobile Source Air Toxics

While the project Build Alternative would result in a small increase in localized MSAT emissions in 2012, the EPA's vehicle and fuel regulations, coupled with fleet turnover, would cause substantial reductions over time that will cause regionwide MSAT levels to be substantially lower than they are today.

As shown in Tables 2.2.6-5 and 2.2.6-6, implementation of the proposed project would result in a slight increase in the MSAT emissions. However, the No Build and Build Alternative emissions would be lower than the Existing (2006) emissions for all MSAT pollutants.

In September 2000, CARB adopted the Diesel Risk Reduction Plan, which recommends many control measures to reduce the risks associated with DPM and achieve a goal of 75 percent PM reduction by 2010 and 85 percent by 2020. On April 20, 2006, the Board approved the proposed Emission Reduction Plan for Ports and Goods Movement in California. As all of the reduction measures are not yet reflected in the EMFAC2007 emission factors used in the analysis above, it is expected that future DPM emissions would be reduced even more than modeled. Additionally, the Port of Oakland Commission voted on June 16, 2009 to restrict truck models older than 1994, as well as models from 1994 to 2006 not equipped with soot filters. The Port of Oakland is located just west of I-880, approximately 6 miles north of Hegenberger Road.

### Naturally Occurring Asbestos/Structural Asbestos

Chrysotile and amphibole asbestos (such as tremolite) occurs naturally in certain geologic settings in California, most commonly in association with ultramafic rocks and along associated faults. Asbestos is a known carcinogen, and inhalation of asbestos may result in the development of lung cancer or mesothelioma. The asbestos contents of many manufactured products have been regulated in the United States for a number of years. For example, CARB has regulated the amount of asbestos in crushed

serpentinite used in surfacing applications, such as for gravel on unpaved roads, since 1990. In 1998, new concerns were raised about possible health hazards from activities that disturb rocks and soil containing asbestos and may result in the generation of asbestos-laden dust. These concerns recently led to CARB revising its asbestos limit for crushed serpentinite and ultramafic rock in surfacing applications from 5 percent to less than 0.25 percent and adopting a new rule requiring best practices dust control measures for activities that disturb rock and soil containing naturally occurring asbestos (NOA).

The United States Geological Service (USGS) Geological Map Index was searched for available geological maps that cover the project study area and surrounding areas. These geological maps indicate geological formations that are overlaid on a topographic map. Some maps focus on specific issues (i.e., bedrock, sedimentary rocks) while others may identify artificial fills (including landfills). Geological maps can be effective in estimating permeability and other factors that influence the spread of contamination.

NOA in bedrock is typically associated with serpentine and peridotite deposits. The project is located in Alameda County, which is among the counties listed as containing serpentine and ultramafic rock; however, a general location guide[1] shows no areas of NOA in the project vicinity. Therefore, the potential for NOA to be present within the project limits is considered to be low. Furthermore, prior to the commencement of construction, qualified geologists would further examine the soils and makeup of the existing structure. Should the project geologist encounter asbestos during the analysis, proper steps would be executed to handle the materials.

**Cumulative Impacts Relating to Air Quality**

Cumulative projects include local development as well as general growth within the project area. However, as with most development, the greatest source of emissions is from vehicular traffic that can travel well outside of the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and, when wind patterns are considered, would cover an even larger area. Accordingly, the cumulative analysis for a project's air quality analysis must be regional by nature.

Construction and operation of cumulative projects would further degrade the local air quality, as well as the air quality of the SFBAB. Air quality would be temporarily degraded during construction activities that occur separately or simultaneously. However, the greatest cumulative impact on the quality of regional air would be the incremental addition of pollutants from increased traffic from residential, commercial, and industrial development and the use of heavy equipment and trucks associated with construction of these projects. Note that the Build Alternative is a transportation improvement and not a direct trip generator.

The proposed project is located within an attainment area for the federal PM2.5 and PM 10 standards. Therefore, per 40 CFR Part 93, a PM2.5/PM10 hot-spot analysis is not required for conformity purposes.

[1] A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos, Department of Conservation, Division of Mines and Geology, State of California, August, 2000. (ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/ofr_2000-019.pdf)

A Mobile Source Air Toxics (MSAT) analysis was completed for the project. Implementation of the proposed project would result in a slight increase in the MSAT emissions. However, the No Build and Build Alternative emissions would be lower than the Existing (2006) emissions for all MSAT pollutants. In addition, due to the Build Alternative's relatively small scale, the contribution to the SFBAB air emissions is not "cumulatively considerable."

### *Avoidance, Minimization, and/or Mitigation Measures*

Construction period effects to air quality are short-term in duration and, therefore, will not result in adverse or long-term conditions. Implementation of the following minimization measures would reduce air quality impacts resulting from construction activities.

- The construction contractor shall comply with the Department's Standard Specifications Sections 14-9.01 and 14-9.02 of the Department's Standard Specifications (2006).
    - Section 14-9.01 specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.
    - Section 14-9.02 is directed at controlling dust. If dust palliative materials other than water are to be used, material specifications are contained in Section 18.
- Apply water or dust palliative to the site and equipment as frequently as necessary to control fugitive dust emissions.
- Spread soil binder on any unpaved roads used for construction purposes, and all project construction parking areas.
- Wash off trucks as they leave the right-of-way as necessary to control fugitive dust emissions.
- Properly tune and maintain construction equipment and vehicles. Use low-sulfur fuel in all construction equipment as provided in California Code of Regulations Title 17, Section 93114.
- Develop a dust control plan documenting sprinkling, temporary paving, speed limits, and expedited revegetation of disturbed slopes as needed to minimize construction impacts to existing communities.
- Locate equipment and materials storage sites as far away from residential and park uses as practical. Keep construction areas clean and orderly.
- Establish ESAs for sensitive air receptors within which construction activities involving extended idling of diesel equipment would be prohibited, to the extent that is feasible.
- Use track-out reduction measures such as gravel pads at project access points to minimize dust and mud deposits on roads affected by construction traffic.
- Cover all transported loads of soils and wet materials prior to transport, or provide adequate freeboard (space from the top of the material to the top of the truck) to reduce PM10 and deposition of particulate matter during transportation.

- Remove dust and mud that are deposited on paved, public roads due to construction activity and traffic to decrease particulate matter.
- Route and schedule construction traffic to avoid peak travel times as much as possible, to reduce congestion and related air quality impacts caused by idling vehicles along local roads.
- Install mulch or plant vegetation as soon as practical after grading to reduce windblown particulate in the area.
- Limit traffic speeds on any unpaved roads to 15 m.p.h.
- Where applicable, enforce idling restrictions of 5 minutes for diesel vehicles, as mandated by state law.
- Should the project geologist determine that asbestos-containing materials (ACMs) are present at the project study area during final inspection prior to construction, the appropriate methods would be implemented to remove ACMs.

### 2.2.7 Noise

#### *Regulatory Setting*

The National Environmental Policy Act (NEPA) of 1969 and the California Environmental Quality Act (CEQA) provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

#### California Environmental Quality Act

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

#### National Environmental Policy Act and 23 CFR 772

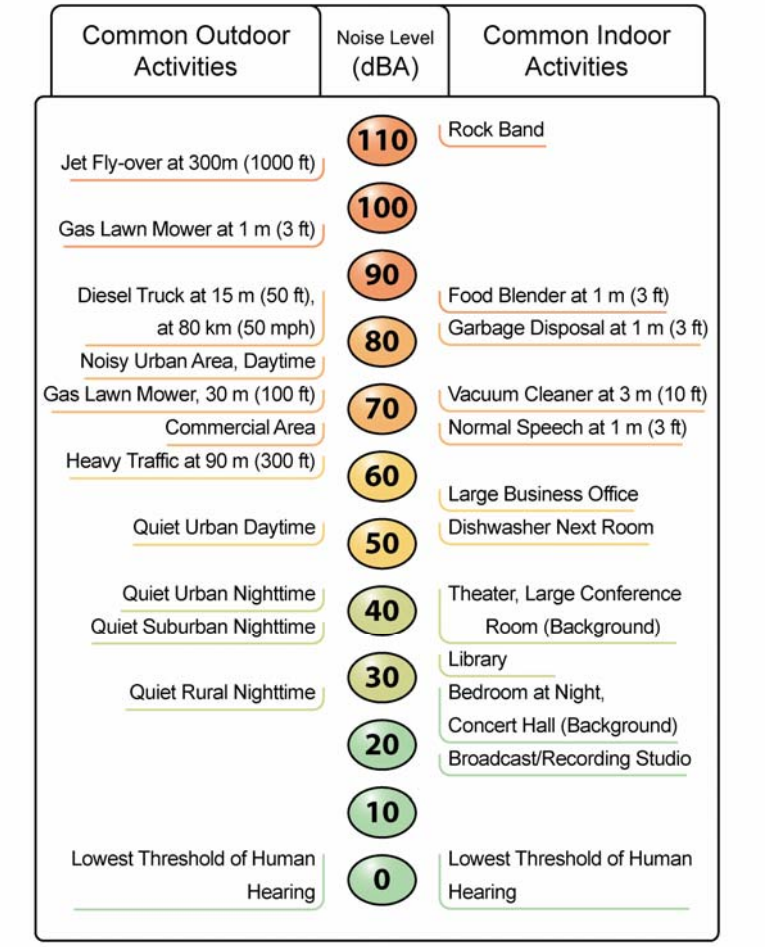
For highway transportation projects with FHWA (and Caltrans, as assigned) involvement, the federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA). The following table lists the noise abatement criteria for use in the NEPA-23 CFR 772 analysis.

## Table 2.2.7-1. Noise Abatement Criteria

| Activity Category | NAC, Hourly A-Weighted Noise Level, dBA $L_{eq}$(h) | Description of Activities |
|---|---|---|
| A | 57 Exterior | Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose |
| B | 67 Exterior | Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals. |
| C | 72 Exterior | Developed lands, properties, or activities not included in Categories A or B above |
| D | – | Undeveloped lands. |
| E | 52 Interior | Residence, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums |

The following table lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise-levels discussed in this section with common activities.

**Table 2.2.7-2. Noise Levels of Common Activities**




In accordance with Department's *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, August 2006* (Protocol), 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 5 dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources and safety

considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include: residents acceptance, the absolute noise level, build versus existing noise, environmental impacts of abatement, public and local agencies input, newly constructed development versus development pre-dating 1978 and the cost per benefited residence.

## *Affected Environment*

This section reports the results of the Noise Study Report (LSA Associates, Inc. May 2009) prepared for the project.

### Existing Land Uses and Sensitive Receptors

Developed and undeveloped land uses in the project vicinity were identified through land use maps, aerial photography, and site inspection. Within each land use category, sensitive receptors were identified. Existing land uses in the project area include single-family residences, schools, a sports park, parks, office, commercial, and light industrial uses. A total of 218 receptor locations were modeled to represent noise-sensitive land uses in the project vicinity. These modeled receptor locations are shown in Figure 2.2.7-1. No receptors were modeled to represent the office, light industrial, and commercial land uses within the project area because they do not have associated outdoor active use areas. Existing land uses in the project area are described below in further detail.

- **East of I-880, south of Marina Boulevard:** Land uses in this area include a sports park and commercial/retail uses that are similar in elevation to I-880. The sports park was evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq}$. No receptors were modeled to represent commercial/retail uses because there are no associated outdoor active use areas.
- **West of I-880, south of Marina Boulevard:** Land uses in this area include industrial uses that are approximately 5 feet lower in elevation than I-880. No receptors were modeled to represent industrial uses because there are no associated outdoor active use areas.
- **East of I-880, between Marina Boulevard and Williams Street:** Land uses in this area include single-family residences uses that are approximately 5–15 feet higher in elevation than I-880. Currently, a 6–12 foot high existing wall along the State ROW shields these residences. Single-family residences were evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq}$.
- **West of I-880, between Marina Boulevard and Williams Street:** Land uses in this area include light industrial uses that are approximately 6–11 feet higher in elevation than I-880. No receptors were modeled to represent light industrial uses because there are no associated outdoor active use areas.


LEGEND

- Receptor Locations
- Modeled Sound Barriers (Feasible)
- Existing Walls
- Proposed Alignment
- Interior Monitoring Location
- Exterior Monitoring Location
- 24-hour monitor
- Monitoring Locations

0 100 200
FEET

SOURCE: Terraserver (02/04)

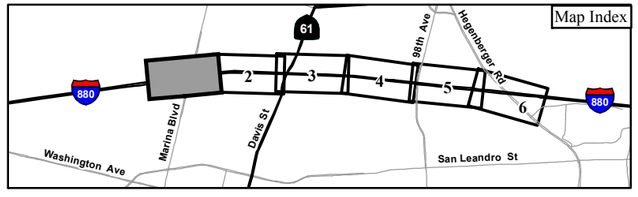



FIGURE 2.2.7-1
Sheet 1 of 6

*I-880 Southbound HOV Lane Extension*

Monitoring Locations and Modeled Sound Barriers and Receptor Locations

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TIMOTHY DR
CHARLOTTE AVE
WALLACE AVE
MAYBELLE AVE
WILLIAMS ST
LEONARD DR
CASTRO ST
VALLEY ST
PEARSON AVE
JOHNSON ST
MARIA DR
GILMORE DR
DAVIS ST
JOYCE AVE
880
EW #1 8-12 ft
EW #2 7-11 ft
EW #3 7-11 ft
EW #4 7-13 ft
SB #3a
SB #3b
347+00
357+30
367+70
369+50

LEGEND

- Receptor Locations
- Modeled Sound Barriers (Feasible)
- Existing Walls
- Proposed Alignment
- Interior Monitoring Location
- Exterior Monitoring Location
- 24-hour monitor
- Monitoring Locations

0 100 200
FEET

SOURCE: Terraserver (02/04)

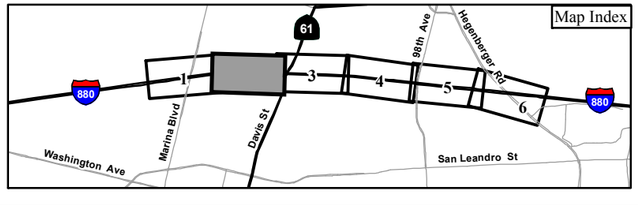


FIGURE 2.2.7-1
Sheet 2 of 6

*I-880 Southbound HOV Lane Extension*

Monitoring Locations and Modeled Sound Barriers and Receptor Locations

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LEGEND

- Receptor Locations
- Modeled Sound Barriers (Feasible)
- Existing Walls
- Proposed Alignment
- Interior Monitoring Location
- Exterior Monitoring Location
- 24-hour monitor
- Monitoring Locations

0 100 200
FEET

SOURCE: Terraserver (02/04)

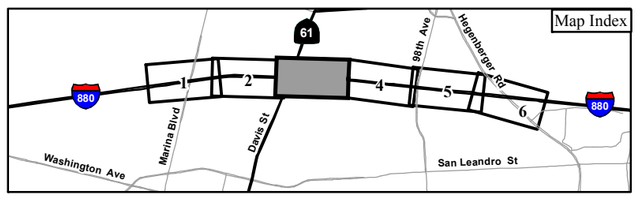


FIGURE 2.2.7-1
Sheet 3 of 6

*I-880 Southbound HOV Lane Extension*

Monitoring Locations and Modeled Sound Barriers and Receptor Locations

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LEGEND

- Receptor Locations
- Modeled Sound Barriers (Feasible)
- Existing Walls
- Proposed Alignment
- Interior Monitoring Location
- Exterior Monitoring Location
- 24-hour monitor
- Monitoring Locations

0 100 200
FEET

SOURCE: Terraserver (02/04)

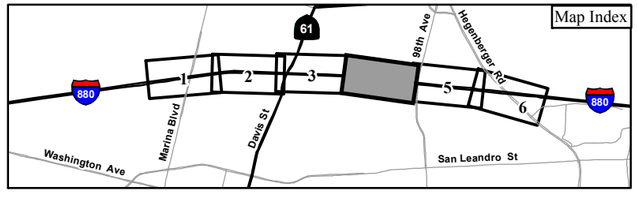


FIGURE 2.2.7-1
Sheet 4 of 6

*I-880 Southbound HOV Lane Extension*

Monitoring Locations and Modeled Sound Barriers and Receptor Locations

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LEGEND

- Receptor Locations
- Modeled Sound Barriers (Feasible)
- Existing Walls
- Proposed Alignment
- Interior Monitoring Location
- Exterior Monitoring Location
- 24-hour monitor
- Monitoring Locations

0 100 200
FEET

SOURCE: Terraserver (02/04)

Map Index

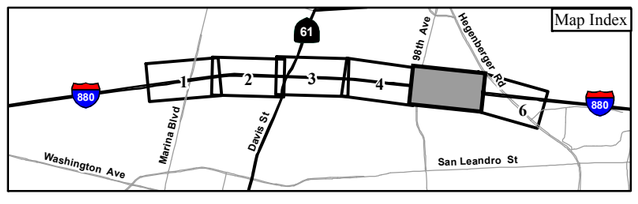


FIGURE 2.2.7-1
Sheet 5 of 6

*I-880 Southbound HOV Lane Extension*

Monitoring Locations and Modeled Sound Barriers and Receptor Locations

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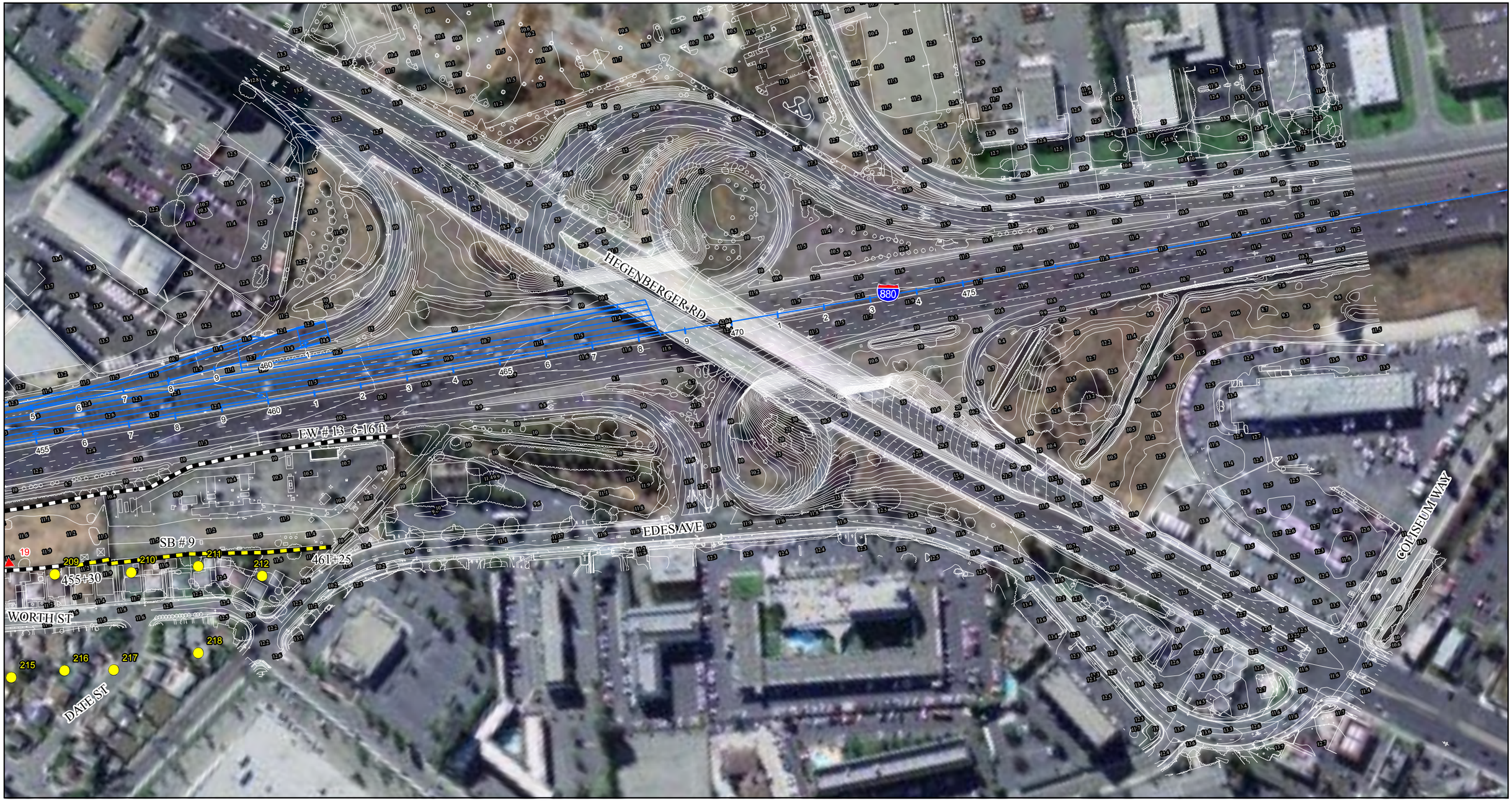


LEGEND

- Receptor Locations
- Modeled Sound Barriers (Feasible)
- Existing Walls
- Proposed Alignment
- Interior Monitoring Location
- Exterior Monitoring Location
- 24-hour monitor
- Monitoring Locations

0 100 200
FEET

SOURCE: Terraserver (02/04)

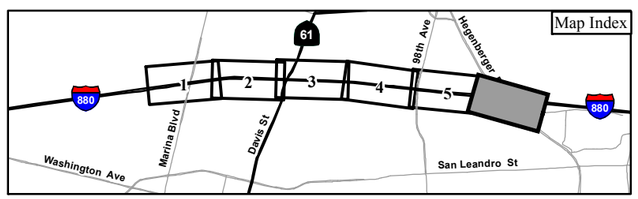


FIGURE 2.2.7-1
Sheet 6 of 6

*I-880 Southbound HOV Lane Extension*

Monitoring Locations and Modeled Sound Barriers and Receptor Locations

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- **East of I-880, between Williams Street and Davis Street:** Land uses in this area include an Adult School, a park, and single-family residences that are approximately 1–15 feet higher in elevation than I-880. Currently, a 7–11 foot high existing wall along the State ROW shields these residences. Single-family residences, a park, and the outdoor area of the adult school were evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq}$. The classroom building associated with the Adult School was evaluated under Activity Category E, which has an exterior NAC of 52 dBA $L_{eq}$.
- **West of I-880, between Williams Street and Davis Street:** Land uses in this area include single-family residences and light industrial uses that are located up to 14 feet higher in elevation than I-880. Currently, a 7–13 foot high existing wall along the State ROW shields these residences. Single-family residences were evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq}$. No receptors were modeled to represent light industrial uses because there are no associated outdoor active use areas.
- **East of I-880 between Davis Street and 98th Avenue:** Land uses in this area include single-family residences and a park that are approximately 2–30 feet lower in elevation than I-880. Currently, a 7–16 foot high existing wall along the State ROW and the edge of shoulder shields these residences. These land uses were evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq}$.
- **West of I-880 between Davis Street and 98th Avenue:** Land uses in this area include single-family residences, two parks, and commercial uses that are approximately 2–30 feet lower in elevation than I-880. Currently, a 6–16 foot high existing wall along the State ROW and the edge of shoulder shields these residences. Single-family residences and the two parks were evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq}$. No receptors were modeled to represent commercial uses because there are no associated outdoor active use areas.
- **East of I-880 between 98th Avenue and Hegenberger Road:** Land uses in this area include single-family residences, hotels, a school, a transfer station, and an abandoned commercial structure that are similar in elevation to I-880. Currently, a 6–16 foot high existing wall along the State ROW shields the residences, school, and transfer station. The single-family residences and the school were evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq}$. No receptors were modeled to represent the hotels, the transfer station, and the abandoned commercial structure because there are no associated outdoor active use areas.
- **West of I-880 between 98th Avenue and Hegenberger Road:** Land uses in this area include single-family residences, commercial, and light industrial uses that are similar in elevation to I-880. Currently, an 8–16 foot high existing wall along the State ROW shields these residences. These land uses were evaluated under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq}$. No receptors were modeled to represent commercial and light industrial uses because there are no associated outdoor active use areas.

### Noise Modeling Methodology

Existing noise levels in the project vicinity were sampled during off-peak traffic hours when traffic was flowing freely. All measurements were made using Larson Davis Model

824 Type 1 (Serial No. 1612), 820 Type 1 (Serial No. 4973), and 720 Type 2 (Serial No. 0519) sound level meters.

### Interior/Exterior Noise Level Measurements

Interior and exterior noise level measurements were conducted at the San Leandro Adult School and the Brookfield Elementary School to evaluate potential interior noise impacts to classroom buildings. Classroom buildings located closest to I-880 were evaluated to ensure that the interior noise standard of 52 dBA $L_{eq}$ NAC is preserved. Table 2.2.7-3 shows the results of the interior and exterior noise level measurements.

**Table 2.2.7-3. Interior/Exterior Noise Monitoring Results**

| Receptor | Exterior (dBA $L_{eq}$) | Interior (dBA $L_{eq}$) | Exterior to Interior Noise Level Reduction | Land Use Description |
|---|---|---|---|---|
| EI-1 | 69.2 | N/A[1] | N/A | 1448 Williams Street, San Leandro Adult School |
| EI-2 | 64.6 | 39.3 | 25.3 | 401 Jones Avenue; Brookfield Village Elementary School; at the portable classroom building (Building P-30). |

Source: LSA Associates, Inc., Noise Study Report, May 2009.
[1] No access to the classroom interior, and exterior-to-interior noise reduction was not calculated.
dBA = A-weighted decibels
$L_{eq}$ = equivalent sound level

### Existing Traffic Noise Levels

Concurrent traffic counts and vehicle speeds measured during the ambient noise monitoring were coded into Traffic Noise Model (TNM) 2.5 with existing roadway conditions to calibrate the modeling result. The detailed results of the existing traffic noise modeling, including the model input and output data, are included in the *Noise Study Report* prepared for the project. In addition, the Sound Barrier Modeling table (Table 2.2.7-6) in the subsequent Avoidance, Minimization, and/or Mitigation Measures section includes the modeled existing peak noise levels in the project area. Of the 218 modeled receptor locations, 46 receptors currently approach or exceed the 67 dBA $L_{eq}$ NAC under the existing peak traffic noise condition.

## *Environmental Consequences*

### Temporary Noise Impacts

**Short-term Construction Noise Impacts.** Two types of short-term noise impacts would occur during project construction. The first type would be from construction crew commutes and the transport of construction equipment and materials to the project site and would incrementally raise noise levels on access roads leading to the site. The pieces of heavy equipment for grading and construction activities would be moved on site, would remain for the duration of each construction phase, and would not add to the daily traffic volume in the project vicinity. A high single-event noise exposure potential at a maximum level of 87 dBA $L_{max}$ from trucks passing at 50 feet would exist. However, the projected construction traffic would be minimal when compared to existing traffic

volumes on I-880 and other affected streets, and its associated long-term noise level change would not be perceptible. Therefore, short-term construction-related worker commutes and equipment transport noise impacts would be less than substantial.

The second type of short-term noise impact is related to noise generated during roadway construction. Construction is performed in discrete steps, each of which has its own mix of equipment and consequently its own noise characteristics. These various sequential phases would change the character of the noise generated and the noise levels as well along the project alignment as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table 2.2.7-4 lists typical construction equipment noise levels ($L_{max}$) recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor.

Typical noise levels at 50 feet from an active construction area range up to 91 dBA $L_{max}$ during the noisiest construction phases. The site preparation phase, which includes grading and paving, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings.

## Table 2.2.7-4. Typical Construction Equipment Noise Levels

| Type of Equipment | Range of Maximum Sound Levels (dBA $L_{max}$ at 50 ft) | Suggested Maximum Sound Levels for Analysis (dBA $L_{max}$ at 50 ft) |
|---|---|---|
| Pile Drivers | 81 to 96 | 93 |
| Rock Drills | 83 to 99 | 96 |
| Jackhammers | 75 to 85 | 82 |
| Pneumatic Tools | 78 to 88 | 85 |
| Pumps | 74 to 84 | 80 |
| Scrapers | 83 to 91 | 87 |
| Haul Trucks | 83 to 94 | 88 |
| Cranes | 79 to 86 | 82 |
| Portable Generators | 71 to 87 | 80 |
| Rollers | 75 to 82 | 80 |
| Dozers | 77 to 90 | 85 |
| Tractors | 77 to 82 | 80 |
| Front-End Loaders | 77 to 90 | 86 |
| Hydraulic Backhoe | 81 to 90 | 86 |
| Hydraulic Excavators | 81 to 90 | 86 |
| Graders | 79 to 89 | 86 |
| Air Compressors | 76 to 89 | 86 |
| Trucks | 81 to 87 | 86 |

Source: *Noise Control for Buildings and Manufacturing Plants*, Bolt, Beranek & Newman, 1987.
dBA = A-weighted decibels
ft = feet
$L_{max}$ = maximum instantaneous noise level

Construction of the proposed project is expected to require the use of earthmovers, bulldozers, water trucks, and pickup trucks. Noise associated with the use of construction equipment is estimated between 79 and 89 dBA $L_{max}$ at a distance of 50 feet from the active construction area for the grading phase. As seen in Table 2.2.7-4, the maximum noise level generated by each earthmover is assumed to be approximately 86 dBA $L_{max}$ at 50 feet from the earthmover in operation. Each bulldozer would generate approximately 85 dBA $L_{max}$ at 50 feet. The maximum noise level generated by water trucks and pickup trucks is approximately 86 dBA $L_{max}$ at 50 feet from these vehicles. Each doubling of the sound source with equal strength increases the noise level by 3 dBA. Each piece of construction equipment operates as an individual point source. The worst-case composite noise level at the nearest residence during this phase of construction would be 91 dBA $L_{max}$ (at a distance of 50 feet from an active construction area). Structural work, which typically lasts longer and involves more equipment than non-structural work, will be required for the new Davis Street and Marina Boulevard overcrossings, for retaining walls, and for sound walls.

In addition to the standard construction equipment, the project would require the use of pile drivers. Pile drivers produce an impact noise each time the hammer strikes the pile (or the temporary cap on the top of the pile). As shown in Table 2.2.7-4, pile-driving

generates noise levels of approximately 93 dBA $L_{max}$ at 50 feet. If pile-driving is conducted concurrently with site preparation, the construction site could potentially generate noise levels of 95 dBA $L_{max}$ at a distance of 50 feet. Pile driving would be used during construction of the new Davis Street and Marina Boulevard overcrossings; however, no residences are located within 100 feet of the pile driving anticipated at these two locations.

The closest sensitive receptor locations are located 50 feet from the project construction areas. Therefore, these receptor locations may be subject to short-term noise reaching 95 dBA $L_{max}$ generated by construction activities along the project alignment.

### Permanent Noise Impacts

**Exterior Traffic Noise Impacts.** The noise study determined the future traffic noise impacts at sensitive receptors along I-880 between Hegenberger Road and south of Marina Boulevard. Potential long-term noise impacts associated with project operations are solely from traffic noise. Traffic noise was evaluated for the future worst-case scenario. Using coordinates obtained from the topographic maps, 218 receptor locations with outdoor active use areas associated with existing residences, schools, a sports park, and parks were evaluated.

The predicted future worst-case traffic noise levels at the representative sensitive receptor locations were determined with existing walls and with no new modeled sound barriers using either the worst-case peak traffic noise hour operations per lane (prior to speed degradation) or the projected future 2035 traffic volumes prepared by Dowling and Associates, Inc. (October 2008), whichever is less, as described in the *Noise Study Report*. The detailed traffic noise model results for existing peak and future worst-case are included in the *Noise Study Report* and are summarized in the Sound Barrier Modeling table (Table 2.2.7-6) in the subsequent Avoidance, Minimization, and/or Mitigation Measures section. The modeled future worst-case noise levels with the project were compared to the modeled existing peak noise levels (after calibration) from TNM 2.5 to determine whether a substantial noise increase would occur. The future worst-case noise levels were also compared to the 67 dBA $L_{eq}$ NAC under Activity Category B to determine whether a traffic noise impact would occur.

Traffic noise impacts occur when either of the following occurs: (1) if the traffic noise level at a sensitive receptor location is predicted to “approach or exceed” the NAC, or (2) if the predicted traffic noise level is 12 dBA or more over the corresponding modeled existing peak noise level at the sensitive receptor locations analyzed. When traffic noise impacts occur, noise abatement measures must be considered. Under the future worst-case traffic condition, 99 of the 218 modeled receptor locations would “approach or exceed” the NAC under Activity Category B, which has an exterior NAC of 67 dBA $L_{eq}$. Of the 218 modeled receptor locations, 1 receptor location would experience a “substantial increase” (12 dBA) over its corresponding modeled existing peak noise levels.

The receptor locations listed below would be or would continue to be exposed to noise levels that approach or exceed the 67 dBA $L_{eq}$ NAC or would experience a “substantial increase” (12 dBA) over their corresponding modeled existing peak noise levels under

Activity Category B for future build conditions. In addition, some of these receptors would experience a severe traffic noise impact:

- **Receptor R-1:** This receptor location represents an existing sports park area on the east side of I-880, south of Marina Avenue. Currently, there is no existing wall that shields the recreation area. Based on the Traffic Noise Analysis Protocol (August 2006), this receptor would experience a severe noise impact of 75 dBA $L_{eq}$ or higher.
- **Receptors R-2 through R-9:** These receptor locations represent existing residences along Sundberg Avenue on the east side of I-880 between Marina Boulevard and Williams Street. An existing 8–12 ft high wall (EW No. 1) along the State ROW currently shields these residences.
- **Receptors R-16 through R-17, R-21 through R-26, R-28, and R-34 through R-36:** These receptor locations represent an existing sports park, park, Adult School, and residences along Leonard Drive, Lucia Court, and Johnson Street on the east side of I-880 between Williams Street and Davis Street. An existing 7–11 ft high wall (EW No. 3) along the State ROW currently shields these residences.
- **Receptors R-38 through R-48:** These receptor locations represent existing residences along Timothy Drive on the west side of I-880 between Williams Street and Davis Street. An existing 7–13 ft high wall (EW No. 4) along the State ROW currently shields these residences.
- **Receptors R-70 through R-81:** These receptor locations represent existing residences along O'Donnell Avenue, Wrin Avenue, Reynolds Street, and White Fir Drive on the east side of I-880 between Davis Avenue and San Leandro Creek. An existing 9–15 ft high wall (EW No. 5) along the State ROW currently shields these residences.
- **Receptors R-82 through R-84:** These receptor locations represent existing residences along 105th Avenue on the east side of I-880 between Leandro Creek and 98th Avenue. Currently, there are no existing walls that shield these residences.
- **Receptors R-132 through R-152:** These receptor locations represent existing residences along Bernhardt Drive, Malta Court, Louvaine Avenue, Kerwin Avenue, Isleton Avenue, Hunter Avenue, Ghormley Avenue, and Foster Avenue on the east side of I-880 between San Leandro Creek and 98th Avenue. An existing 6–16 ft high wall (EW No. 9) along the State ROW/edge of shoulder currently shields these residences.
- **Receptors R-107 through R-112, R-129 through R-130, R-153 through R-162, and R-164 through R-172:** These receptor locations represent existing residences along Warden Avenue, Empire Road, Gibraltar Road, and Hesket Road on the west side of I-880 between Davis Street and 98th Avenue. An existing 6.5–16 ft high wall (EW Nos. 6 and 7) along the State ROW/edge of shoulder currently shields these residences. It should be noted that Receptor R-159 would experience a substantial noise increase of 12 dBA or more over its corresponding existing peak noise level and Receptors R-158 through R-160 would experience a severe traffic noise impact of 75 dBA $L_{eq}$ or higher.
- **Receptor R-182:** This receptor location represents an existing school along Jones Avenue on the east side of I-880 between 98th Avenue and Hegenberger Road. An

existing 6–16 ft high wall (EW Nos. 13) along the State ROW/edge of shoulder currently shields the school.

- **Receptors R-210 through R-212:** These receptor locations represent existing residences along Worth Street on the east side of I-880 between 98th Avenue and Hegenberger Road. An existing 6–16 ft high wall (EW No. 13) along the State ROW/edge of shoulder currently shields these residences.

**Interior Noise Impacts.** Classroom buildings at the San Leandro Adult School and the Brookfield Village Elementary School were modeled for potential long-term interior noise impacts associated with project operations. Potential interior noise impacts were evaluated at these two schools. Figure 2.2.7-1 shows the locations of the interior noise evaluation. As shown in Table 2.2.7-5, the calculated exterior to interior attenuation for the classroom building at the Brookfield Elementary School is 25 dBA. As there was no access to the classroom building to conduct interior noise level measurements at the San Leandro Adult School, the exterior to interior noise level attenuation was assumed to be the same as the Brookfield Elementary School because the classroom building was determined to be a new structure based on the inspection of the building and would have similar or a greater exterior to interior noise attenuation as the classroom building at the Brookfield Village Elementary School. Table 2.2.7-5 shows that the predicted exterior traffic noise levels would be 71 dBA $L_{eq}$ and 67 dBA $L_{eq}$ for EI-1 and EI-2, respectively, under the future worst-case condition.

**Table 2.2.7-5. Predicted Future Interior Noise Levels**

| Receptor | Exterior to Interior Reduction[1] | Future Build | |
|---|---|---|---|
| | | Exterior | Interior |
| **EI-1** | 25[2] | 71 | 46 |
| **EI-2** | 25 | 67 | 42 |

Source: LSA Associates, Inc., Noise Study Report, May 2009.

[1] The exterior to interior reduction was calculated based on the exterior and interior noise level measurements shown in Table 2.2.7-3.

[2] Exterior to interior noise level reduction for EI-1 was assumed to be the same as EI-2 because the classroom building was considered a new structure and would have similar or greater exterior to interior noise level reduction as the classroom building at the Brookfield Village Elementary School.

As shown in Table 2.2.7-5, based on the calculated exterior to interior attenuation, the predicted future classroom interior noise level would be 46 dBA $L_{eq}$ and 42 $L_{eq}$ for EI-1 and EI-2, respectively, under the future worst-case condition. Therefore, the predicted noise interior classroom noise levels would not approach or exceed the 52 dBA $L_{eq}$ NAC under Activity Category E, and no noise abatement measures would be required.

## *Avoidance, Minimization, and/or Mitigation Measures*

### Construction Noise Minimization Measures

The following measures would be implemented by the project for the purpose of avoiding/minimizing temporary construction noise and/or vibration impacts:

Noise from project construction would be regulated through the Department's Standard Specifications and by the local jurisdictions, including the Cities of Oakland and San Leandro. The construction hours specified in the Cities of Oakland and San Leandro Municipal Codes shall be followed. To minimize the construction noise impact for sensitive land adjacent to the project site, construction noise is regulated by Caltrans Standard Specifications in Section 14-8.02, "Noise Control." These provisions shall be adhered to during project construction:

- The noise level from the Contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dBA at a distance of 50 ft.
- All internal combustion engines shall be equipped with the manufacturer-recommended muffler. Internal combustion engines shall not be operated on the construction site without the appropriate muffler.

Where practical and feasible, the following minimization measures shall be explored to further reduce the effects of construction noise:

- If feasible, pile driving shall be limited to the hours of 8 a.m to 7 p.m., Monday through Saturday, with no pile driving on Sundays or holidays. It is anticipated that some nighttime pile driving shall be required due to width restrictions in the I-880 median or for safety reasons where work is in close proximity to traffic. Alternative pile construction methods shall be investigated during the final design phase to avoid nighttime pile driving. If alternate methods are not feasible, then affected residents shall be notified and offered temporary nighttime lodging for those nights when pile driving is occurring.
- Equipment shall use available (i.e., standard) noise suppression devices and properly maintained mufflers. Construction noise can be reduced by using quiet or "new technology" equipment, particularly the quieting of exhaust noises by use of improved mufflers, and the use of such equipment is recommended. All internal combustion engines used at the project site shall be equipped with the type of muffler recommended by the vehicle manufacturer. In addition, all equipment shall be maintained in good mechanical condition so as to minimize noise created by faulty or poorly maintained engine, drive-train, and other components.
- Staging of construction equipment and unnecessary idling of equipment within 200 feet of noise-sensitive land uses shall be avoided whenever feasible. "Feasible", as used here, means that the implementation of this measure would not have a notable effect on construction operations or schedule.
- The project shall provide acoustical enclosures for any pumps, such as groundwater removal pumps, that may need to operate at night.
- Temporary walls/barriers/enclosures shall be erected around stationary construction equipment when such equipment would be operated for an extensive period of time (i.e., more than 2-3 days) and where there are adjacent residences. Noise barrier walls and enclosures shall contain absorptive material in order to prevent impacts upon other land uses due to noise reflection. For example, 'sound curtains' around the pile driving hammer shall be utilized to reduce the noise of hammer strikes.
- During construction, vibration measurements and recording shall be conducted before and during pile driving, hauling of dirt, placing of base material, compaction, and during paving operations or other significant activity when that activity occurs

within 100 feet of properties. When any reading on monitoring instrument equals or exceeds 5 mm per second, work shall immediately cease and the Contractor shall take immediate and necessary actions to reduce and maintain the monitoring instrument reading below a particle velocity of 5 mm per second.

- Notification shall be given to residents within 300 feet alerting them of planned construction activities, including the overall durations of the various construction stages and the schedule of pile driving activities. The notification shall also describe the noise abatement measures that have been taken, as well as note the infeasibility of other measures that were considered but rejected.

**Traffic Noise Minimization Measures**

**Preliminary Noise Abatement Analysis.** Receptors that approach or exceed NAC must consider noise abatement measures. Many receptors along the project would experience future noise levels that would approach or exceed the NAC. In addition, one receptor would experience a substantial noise increase of 12 dBA or more over its corresponding existing peak noise level. As a result, noise abatement must be evaluated for these receptors.

According to the Department and FHWA policies, a sound barrier must provide a minimum 5-dBA reduction in traffic noise to be considered feasible. Furthermore, under the Department policies, a sound barrier should interrupt the line-of-sight between a truck stack (of average height) and a receptor. All properties requiring abatement consideration are within Category B (67 dBA $L_{eq}$ NAC).

Bold numbers in Table 2.2.7-6 show receptor locations that would approach or exceed the 67 dBA $L_{eq}$ NAC under the future worst-case traffic condition. Table 2.2.7-6 also notes that one receptor would experience a substantial noise increase of 12 dBA over its existing peak noise level because the existing wall along the southbound side of I-880 between 98th Avenue and Davis Street would be removed and relocated as part of the project to accommodate the new southbound HOV lane. The noise abatement analysis assumes the worst-case noise levels and substantial noise increase of 12 dBA or more would occur in the interim period during the reconstruction of the sound barrier. This existing wall would be relocated and replaced with the same wall height, at the very minimum. Sound barriers were analyzed for each of these sensitive receptor locations. At each location, five sound barrier heights were analyzed: 6, 8, 10, 12, 14, and 16 feet. Sound barriers with the height of 16 feet were not analyzed if the barrier would be located within 15 feet of the nearest travel lane (Caltrans *Highway Design Manual*, July 2008). The results of the sound barrier modeling are shown in Table 2.2.7-6. Modeled sound barrier locations are shown in Figure 2.2.7-1.

## Table 2.2.7-6. Sound Barrier Modeling

| Sound Barrier No. | Existing Wall No. | Receptor No. | Modeled Existing Peak Noise Level | Future Build (worst-Case) | With Barrier H = 6 ft | | With Barrier H = 8 ft | | With Barrier H = 10 ft | | With Barrier H = 12 ft | | With Barrier H = 14 ft | | With Barrier H = 16 ft | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $L_{eq}$ | I.L.[1] | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. |
| 1 | | R-1 | **73**[2] | **76** | **71**[3] | 5 | **70** | 6 | **69** | 7 | **67** | 9 | **66** | 10 | 65 | 11 |
| 2a | 1 | R-2 | 62 | **66** | -- | -- | -- | -- | --[4] | -- | 63 | 3 | 62 | 4 | 61 | 5 |
| | | R-3 | 63 | **66** | -- | -- | -- | -- | -- | -- | 64 | 2 | 63 | 3 | 62 | 4 |
| | | R-4 | 64 | **66** | -- | -- | -- | -- | -- | -- | 65 | 1 | 64 | 2 | 63 | 3 |
| | | R-5 | 63 | **66** | -- | -- | -- | -- | -- | -- | 65 | 1 | 65 | 1 | 64 | 2 |
| | | R-6 | 64 | **66** | -- | -- | -- | -- | -- | -- | 65 | 1 | 65 | 1 | 64 | 2 |
| | | R-7 | 64 | **66** | -- | -- | -- | -- | -- | -- | 65 | 1 | 65 | 1 | 64 | 2 |
| | | R-8 | 64 | **66** | -- | -- | -- | -- | -- | -- | 65 | 1 | 65 | 1 | 64 | 2 |
| | | R-9 | 63 | **67** | -- | -- | -- | -- | -- | -- | 65 | 1 | 64 | 3 | 64 | 3 |
| | | R-10 | 61 | 65 | -- | -- | -- | -- | -- | -- | 64 | 1 | 64 | 1 | 64 | 1 |
| | | R-11 | 59 | 63 | -- | -- | -- | -- | -- | -- | 61 | 2 | 61 | 2 | 61 | 2 |
| | | R-12 | 58 | 60 | -- | -- | -- | -- | -- | -- | 60 | 0 | 60 | 0 | 59 | 1 |
| | | R-13 | 59 | 61 | -- | -- | -- | -- | -- | -- | 60 | 1 | 60 | 1 | 60 | 1 |
| | | R-14 | 59 | 62 | -- | -- | -- | -- | -- | -- | 61 | 1 | 61 | 1 | 61 | 1 |
| | | R-15 | 62 | 65 | -- | -- | -- | -- | -- | -- | 65 | 0 | 65 | 0 | 65 | 0 |
| 3a | | R-16 | **66** | **68** | -- | -- | -- | -- | 61 | 7 | 60 | 8 | 59 | 9 | 59 | 9 |
| | | R-17 | **69** | **71** | -- | -- | -- | -- | 62 | 9 | 61 | 10 | 61 | 10 | 60 | 11 |
| | 3 | R-18 | 64 | 65 | -- | -- | -- | -- | 63 | 2 | 63 | 2 | 61 | 4 | 61 | 4 |
| | | R-19 | 62 | 64 | -- | -- | -- | -- | 64 | 0 | 64 | 0 | 64 | 0 | 64 | 0 |
| | | R-20 | 63 | 64 | -- | -- | -- | -- | 64 | 0 | 64 | 0 | 63 | 1 | 62 | 2 |
| | | R-21 | **66** | **68** | -- | -- | -- | -- | **68** | 0 | **68** | 0 | **68** | 0 | **68** | 0 |
| | | R-22 | **67** | **68** | -- | -- | -- | -- | **68** | 0 | **68** | 0 | **67** | 1 | **66** | 2 |
| | | R-23 | **66** | **68** | -- | -- | -- | -- | **68** | 0 | **67** | 1 | **66** | 2 | 65 | 3 |
| | | R-24 | **66** | **68** | -- | -- | -- | -- | **68** | 0 | **67** | 1 | **66** | 2 | 65 | 3 |
| | | R-25 | **66** | **68** | -- | -- | -- | -- | **68** | 0 | **67** | 1 | **66** | 2 | 65 | 3 |
| | | R-26 | 65 | **67** | -- | -- | -- | -- | **67** | 0 | **67** | 0 | **66** | 1 | 65 | 2 |
| | | R-27 | 63 | 65 | -- | -- | -- | -- | 64 | 1 | 64 | 1 | 63 | 2 | 62 | 3 |
| 3b | | R-28 | 63 | **67** | -- | -- | -- | -- | 65 | 2 | 63 | 4 | 62 | 5 | 61 | 6 |
| | | R-29 | 59 | 63 | -- | -- | -- | -- | 63 | 0 | 62 | 1 | 62 | 1 | 62 | 1 |
| 3a | | R-30 | 60 | 62 | -- | -- | -- | -- | 58 | 4 | 58 | 4 | 57 | 5 | 57 | 5 |

## Table 2.2.7-6. Sound Barrier Modeling

| Sound Barrier No. | Existing Wall No. | Receptor No. | Modeled Existing Peak Noise Level | Future Build (worst-Case) | With Barrier H = 6 ft | | With Barrier H = 8 ft | | With Barrier H = 10 ft | | With Barrier H = 12 ft | | With Barrier H = 14 ft | | With Barrier H = 16 ft | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $L_{eq}$ | I.L.[1] | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. |
| | | R-31 | 56 | 58 | -- | -- | -- | -- | 56 | 2 | 55 | 3 | 55 | 3 | 54 | 4 |
| | 3 | R-32 | 62 | 62 | -- | -- | -- | -- | 61 | 1 | 60 | 2 | 59 | 3 | 59 | 3 |
| | | R-33 | 63 | 64 | -- | -- | -- | -- | 64 | 0 | 62 | 2 | 62 | 2 | 61 | 3 |
| | | R-34 | 65 | **66** | -- | -- | -- | -- | **66** | 0 | 64 | 2 | 63 | 3 | 62 | 4 |
| | | R-35 | 64 | **66** | -- | -- | -- | -- | **66** | 0 | 64 | 2 | 63 | 3 | 63 | 3 |
| | | R-36 | 65 | **66** | -- | -- | -- | -- | **66** | 0 | 65 | 1 | 64 | 2 | 63 | 3 |
| | | R-37 | 62 | 64 | -- | -- | -- | -- | 64 | 0 | 63 | 1 | 62 | 2 | 62 | 2 |
| | 4 | R-38 | **67** | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 0 | NP[5] | NP |
| | | R-39 | **67** | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 0 | NP | NP |
| | | R-40 | **67** | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 1 | NP | NP |
| | | R-41 | **67** | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 1 | NP | NP |
| | | R-42 | **67** | **68** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 0 | NP | NP |
| | | R-43 | **67** | **68** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 0 | NP | NP |
| | | R-44 | **67** | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 0 | NP | NP |
| | | R-45 | **67** | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 1 | NP | NP |
| | | R-46 | **66** | **68** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 0 | NP | NP |
| | | R-47 | **67** | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 0 | NP | NP |
| | | R-48 | **66** | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 1 | NP | NP |
| | | R-49 | 59 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | 60 | 1 | NP | NP |
| | | R-50 | 61 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | 63 | 0 | NP | NP |
| | | R-51 | 61 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | 61 | 1 | NP | NP |
| | | R-52 | 61 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | 62 | 1 | NP | NP |
| | | R-53 | 60 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | 61 | 1 | NP | NP |
| | | R-54 | 60 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | 61 | 1 | NP | NP |
| | | R-55 | 61 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | 62 | 1 | NP | NP |
| | | R-56 | 61 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | 62 | 1 | NP | NP |
| | | R-57 | 60 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | 63 | 0 | NP | NP |
| | | R-58 | 60 | 65 | -- | -- | -- | -- | -- | -- | -- | -- | 64 | 1 | NP | NP |
| | 5 | R-59 | 56 | 64 | --[6] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-60 | 60 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## Table 2.2.7-6. Sound Barrier Modeling

| Sound Barrier No. | Existing Wall No. | Receptor No. | Modeled Existing Peak Noise Level | Future Build (worst-Case) | With Barrier H = 6 ft | | With Barrier H = 8 ft | | With Barrier H = 10 ft | | With Barrier H = 12 ft | | With Barrier H = 14 ft | | With Barrier H = 16 ft | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $L_{eq}$ | I.L.[1] | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. |
| | | R-61 | 60 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-62 | 62 | 65 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-63 | 62 | 65 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-64 | 62 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-65 | 61 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-66 | 62 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-67 | 61 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-68 | 60 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-69 | 62 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-70 | 64 | **66** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **66** | 0 |
| | | R-71 | 65 | **67** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **67** | 0 |
| | 5 | R-72 | 65 | **67** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **66** | 1 |
| | | R-73 | 65 | **67** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **66** | 1 |
| | | R-74 | 65 | **67** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **66** | 1 |
| | | R-75 | 65 | **67** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **66** | 1 |
| | | R-76 | **66** | **67** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **67** | 0 |
| | | R-77 | **69** | **70** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 1 |
| | | R-78 | **68** | **69** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 0 |
| | | R-79 | **68** | **70** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 1 |
| | | R-80 | **69** | **70** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 1 |
| 6a | | R-81 | **71** | **72** | -- | -- | -- | -- | -- | -- | **66** | 6 | **66** | 6 | NP | NP |
| | | R-82 | **70** | **73** | -- | -- | -- | -- | -- | -- | 64 | 9 | 64 | 9 | NP | NP |
| | | R-83 | **70** | **73** | -- | -- | -- | -- | -- | -- | 64 | 9 | 64 | 9 | NP | NP |
| | | R-84 | **70** | **73** | -- | -- | -- | -- | -- | -- | 63 | 10 | 63 | 10 | NP | NP |
| | | R-85 | 60 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-86 | 57 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 5 | R-87 | 56 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-88 | 62 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-89 | 61 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-90 | 62 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## Table 2.2.7-6. Sound Barrier Modeling

| Sound Barrier No. | Existing Wall No. | Receptor No. | Modeled Existing Peak Noise Level | Future Build (worst-Case) | With Barrier H = 6 ft | | With Barrier H = 8 ft | | With Barrier H = 10 ft | | With Barrier H = 12 ft | | With Barrier H = 14 ft | | With Barrier H = 16 ft | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $L_{eq}$ | I.L.[1] | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. |
| | | R-91 | 54 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-92 | 56 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-93 | 58 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-94 | 60 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-95 | 62 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-96 | 63 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-97 | 61 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-98 | 63 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-99 | 63 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-100 | 63 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-101 | 63 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-102 | 62 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 6 | R-103 | 63 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-104 | 63 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-105 | 63 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-106 | 63 | 65 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-107 | 63 | **66** | 65 | 1 | 65 | 1 | 65 | 1 | 65 | 1 | 65 | 1 | NP | NP |
| | | R-108 | 63 | **71** | **66** | 5 | 65 | 6 | 65 | 6 | 64 | 7 | 63 | 8 | NP | NP |
| 7 | 7 | R-109 | 63 | **71** | **66** | 5 | 65 | 6 | 64 | 7 | 63 | 8 | 63 | 8 | NP | NP |
| | | R-110 | 62 | **69** | 65 | 4 | 64 | 5 | 63 | 6 | 62 | 7 | 62 | 7 | NP | NP |
| | | R-111 | 60 | **68** | 62 | 6 | 62 | 6 | 61 | 7 | 61 | 7 | 61 | 7 | NP | NP |
| | | R-112 | 58 | **69** | 65 | 4 | 61 | 8 | 60 | 9 | 59 | 10 | 58 | 11 | NP | NP |
| | | R-113 | 55 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-114 | 56 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-115 | 55 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-116 | 57 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-117 | 57 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-118 | 56 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-119 | 56 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-120 | 57 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## Table 2.2.7-6. Sound Barrier Modeling

| Sound Barrier No. | Existing Wall No. | Receptor No. | Modeled Existing Peak Noise Level | Future Build (worst-Case) | With Barrier H = 6 ft | | With Barrier H = 8 ft | | With Barrier H = 10 ft | | With Barrier H = 12 ft | | With Barrier H = 14 ft | | With Barrier H = 16 ft | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $L_{eq}$ | I.L.[1] | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. |
| | | R-121 | 59 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 7 | | R-122 | 57 | 59 | 58 | 1 | 58 | 1 | 58 | 1 | 58 | 1 | 57 | 2 | NP | NP |
| | | R-123 | 57 | 59 | 58 | 1 | 58 | 1 | 58 | 1 | 58 | 1 | 57 | 2 | NP | NP |
| | | R-124 | 58 | 61 | 60 | 1 | 60 | 1 | 60 | 1 | 59 | 2 | 59 | 2 | NP | NP |
| 7 | 6 | R-125 | 58 | 62 | 60 | 2 | 60 | 2 | 60 | 2 | 59 | 3 | 59 | 3 | NP | NP |
| | | R-126 | 58 | 64 | 62 | 2 | 62 | 2 | 61 | 3 | 59 | 5 | 59 | 5 | NP | NP |
| | | R-127 | 58 | 65 | 63 | 2 | 62 | 3 | 61 | 4 | 59 | 6 | 59 | 6 | NP | NP |
| | | R-128 | 58 | 65 | 63 | 2 | 63 | 2 | 61 | 4 | 59 | 6 | 58 | 7 | NP | NP |
| | | R-129 | 57 | **66** | 63 | 3 | 62 | 4 | 60 | 6 | 58 | 8 | 58 | 8 | NP | NP |
| | | R-130 | 57 | **66** | 63 | 3 | 62 | 4 | 59 | 7 | 58 | 8 | 57 | 9 | NP | NP |
| | | R-131 | 57 | 65 | 63 | 2 | 61 | 4 | 59 | 6 | 58 | 7 | 57 | 8 | NP | NP |
| | 9 | R-132 | **68** | **71** | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 2 | NP | NP |
| | | R-133 | **66** | **70** | -- | -- | -- | -- | -- | -- | -- | -- | **70** | 0 | NP | NP |
| | | R-134 | **66** | **70** | -- | -- | -- | -- | -- | -- | -- | -- | **70** | 0 | NP | NP |
| | | R-135 | **67** | **71** | -- | -- | -- | -- | -- | -- | -- | -- | **71** | 0 | NP | NP |
| | | R-136 | **67** | **73** | -- | -- | -- | -- | -- | -- | -- | -- | **70** | 3 | NP | NP |
| | | R-137 | **68** | **72** | -- | -- | -- | -- | -- | -- | -- | -- | **71** | 1 | NP | NP |
| | | R-138 | **69** | **72** | -- | -- | -- | -- | -- | -- | -- | -- | **72** | 0 | NP | NP |
| | | R-139 | **70** | **73** | -- | -- | -- | -- | -- | -- | -- | -- | **71** | 2 | NP | NP |
| | | R-140 | **70** | **73** | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 4 | NP | NP |
| | | R-141 | **69** | **72** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 4 | NP | NP |
| | | R-142 | **67** | **70** | -- | -- | -- | -- | -- | -- | -- | -- | **66** | 4 | NP | NP |
| | | R-143 | 64 | **69** | -- | -- | -- | -- | -- | -- | -- | -- | 65 | 4 | NP | NP |
| | | R-144 | 63 | **67** | -- | -- | -- | -- | -- | -- | -- | -- | 64 | 3 | NP | NP |
| | | R-145 | 62 | **67** | -- | -- | -- | -- | -- | -- | -- | -- | 65 | 2 | NP | NP |
| | | R-146 | **67** | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **66** | 3 | NP | NP |
| | | R-147 | 65 | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 1 | NP | NP |
| | | R-148 | 65 | **69** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 1 | NP | NP |
| | | R-149 | **66** | **70** | -- | -- | -- | -- | -- | -- | -- | -- | **69** | 1 | NP | NP |
| | | R-150 | **66** | **70** | -- | -- | -- | -- | -- | -- | -- | -- | **68** | 2 | NP | NP |

## Table 2.2.7-6. Sound Barrier Modeling

| Sound Barrier No. | Existing Wall No. | Receptor No. | Modeled Existing Peak Noise Level | Future Build (worst-Case) | With Barrier H = 6 ft | | With Barrier H = 8 ft | | With Barrier H = 10 ft | | With Barrier H = 12 ft | | With Barrier H = 14 ft | | With Barrier H = 16 ft | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $L_{eq}$ | I.L.[1] | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. |
| | | R-151 | **67** | **70** | -- | -- | -- | -- | -- | -- | -- | -- | **67** | 3 | NP | NP |
| | | R-152 | **67** | **71** | -- | -- | -- | -- | -- | -- | -- | -- | **67** | 4 | NP | NP |
| 7 | 7 | R-153 | 61 | **71** | 63 | 8 | 63 | 8 | 62 | 9 | 61 | 10 | 61 | 10 | NP | NP |
| | | R-154 | 61 | **71** | 64 | 7 | 63 | 8 | 63 | 8 | 62 | 9 | 61 | 10 | NP | NP |
| | | R-155 | 62 | **72** | **66** | 6 | 65 | 7 | 64 | 8 | 63 | 9 | 63 | 9 | NP | NP |
| 7 | 7 | R-156 | 62 | **72** | **69** | 3 | **66** | 6 | 65 | 7 | 64 | 8 | 63 | 9 | NP | NP |
| | | R-157 | 63 | **74** | **69** | 5 | **67** | 7 | **66** | 8 | **66** | 8 | 65 | 9 | NP | NP |
| | | R-158 | 65 | **76** | **71** | 5 | **69** | 7 | **68** | 8 | **67** | 9 | **66** | 10 | NP | NP |
| | | R-159 | 65 | **80**[7] | **73** | 7 | **70** | 10 | **69** | 11 | **67** | 13 | **67** | 13 | NP | NP |
| | | R-160 | 65 | **75** | **71** | 4 | **70** | 5 | **68** | 7 | **67** | 8 | **67** | 8 | NP | NP |
| | | R-161 | 64 | **68** | **68** | 0 | **68** | 0 | **68** | 0 | **68** | 0 | **68** | 0 | NP | NP |
| | | R-162 | 64 | **67** | **67** | 0 | **67** | 0 | **67** | 0 | **67** | 0 | **67** | 0 | NP | NP |
| | | R-163 | 62 | 65 | 65 | 0 | 65 | 0 | 65 | 0 | 65 | 0 | 65 | 0 | NP | NP |
| | | R-164 | 60 | **71** | **67** | 4 | 63 | 8 | 62 | 9 | 61 | 10 | 60 | 11 | NP | NP |
| | | R-165 | 58 | **68** | 65 | 3 | 63 | 5 | 61 | 7 | 60 | 8 | 59 | 9 | NP | NP |
| | | R-166 | 58 | **69** | 65 | 4 | 64 | 5 | 61 | 8 | 60 | 9 | 60 | 9 | NP | NP |
| | | R-167 | 58 | **67** | 64 | 3 | 63 | 4 | 61 | 6 | 60 | 7 | 59 | 8 | NP | NP |
| | | R-168 | 60 | **70** | **68** | 2 | **67** | 3 | 64 | 6 | 63 | 7 | 62 | 8 | NP | NP |
| | | R-169 | 59 | **68** | 65 | 3 | 65 | 3 | 62 | 6 | 62 | 6 | 61 | 7 | NP | NP |
| | | R-170 | 61 | **68** | 65 | 3 | 65 | 3 | 64 | 4 | 62 | 6 | 62 | 6 | NP | NP |
| | | R-171 | 60 | **67** | 65 | 2 | 64 | 3 | 64 | 3 | 63 | 4 | 62 | 5 | NP | NP |
| | | R-172 | 62 | **67** | **66** | 1 | **66** | 1 | **66** | 1 | **66** | 1 | **66** | 1 | NP | NP |
| | | R-173 | 58 | 63 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | NP | NP |
| | | R-174 | 57 | 61 | 60 | 1 | 60 | 1 | 60 | 1 | 60 | 1 | 60 | 1 | NP | NP |
| | | R-175 | 58 | 62 | 61 | 1 | 61 | 1 | 61 | 1 | 61 | 1 | 61 | 1 | NP | NP |
| | | R-176 | 59 | 63 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | NP | NP |
| | 12&13 | R-177 | 56 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-178 | 59 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-179 | 55 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-180 | 59 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## Table 2.2.7-6. Sound Barrier Modeling

| Sound Barrier No. | Existing Wall No. | Receptor No. | Modeled Existing Peak Noise Level | Future Build (worst-Case) | With Barrier H = 6 ft | | With Barrier H = 8 ft | | With Barrier H = 10 ft | | With Barrier H = 12 ft | | With Barrier H = 14 ft | | With Barrier H = 16 ft | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $L_{eq}$ | I.L.[1] | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. |
| | | R-181 | 57 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 13 | R-182 | **66** | **67**[8] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-183 | 50 | 53 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 15 | R-184 | 53 | 54 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-185 | 56 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-186 | 51 | 54 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-187 | 53 | 54 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-188 | 55 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-189 | 54 | 55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-190 | 61 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-191 | 62 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-192 | 62 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-193 | 62 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-194 | 61 | 63 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-195 | 62 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 15 | R-196 | 60 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-197 | 58 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-198 | 58 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-199 | 58 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-200 | 58 | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-201 | 58 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-202 | 56 | 58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-203 | 56 | 57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-204 | 60 | 61 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | R-205 | 57 | 59 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 13 | R-206 | 64 | 65 | -- | -- | -- | -- | -- | -- | -- | -- | 65 | 0 | 62 | 3 |
| | | R-207 | 64 | 65 | -- | -- | -- | -- | -- | -- | -- | -- | 65 | 0 | 61 | 4 |
| | | R-208 | 64 | 65 | -- | -- | -- | -- | -- | -- | -- | -- | 65 | 0 | 61 | 4 |
| | | R-209 | 64 | 65 | -- | -- | -- | -- | -- | -- | -- | -- | 65 | 0 | 61 | 4 |
| | | R-210 | 65 | **66** | -- | -- | -- | -- | -- | -- | -- | -- | **66** | 0 | 63 | 3 |

## Table 2.2.7-6. Sound Barrier Modeling

| Sound Barrier No. | Existing Wall No. | Receptor No. | Modeled Existing Peak Noise Level | Future Build (worst-Case) | With Barrier H = 6 ft | | With Barrier H = 8 ft | | With Barrier H = 10 ft | | With Barrier H = 12 ft | | With Barrier H = 14 ft | | With Barrier H = 16 ft | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $L_{eq}$ | I.L.[1] | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. | $L_{eq}$ | I.L. |
| | | R-211 | **67** | **68** | -- | -- | -- | -- | -- | -- | -- | -- | 65 | 3 | 65 | 3 |
| | | R-212 | 65 | **66** | -- | -- | -- | -- | -- | -- | -- | -- | 64 | 2 | 63 | 3 |
| | | R-213 | 63 | 64 | -- | -- | -- | -- | -- | -- | -- | -- | 64 | 0 | 62 | 2 |
| | | R-214 | 61 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | 62 | 0 | 60 | 2 |
| | | R-215 | 61 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | 62 | 0 | 59 | 3 |
| | | R-216 | 61 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | 62 | 0 | 60 | 2 |
| | | R-217 | 61 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | 61 | 1 | 60 | 2 |
| | 13 | R-218 | 61 | 62 | -- | -- | -- | -- | -- | -- | -- | -- | 61 | 1 | 60 | 2 |

Source: LSA Associates, Inc., Noise Study Report, May 2009.

[1] I.L.: Insertion Loss.

[2] Numbers in bold represent noise levels that approach or exceed the NAC.

[3] Underlined noise levels have been attenuated by at least 5 dBA (i.e., feasible barrier height).

[4] Shaded area represents the existing wall height.

[5] NP = Not Permitted. Sound barriers within 15 ft of the nearest travel lane are not permitted to exceed 14 ft in height.

[6] No barrier was analyzed at this location because the modeled receptor would not approach or exceed the NAC.

[7] A modeled receptor would experience a substantial noise increase of 12 dBA or more over their corresponding modeled existing peak noise levels because the existing wall along the southbound side of I-880 between 98th Avenue and Davis Street would be removed and relocated as part of the project to accommodate the new southbound HOV lane. This existing wall would be relocated and replaced with the same wall height at the very minimum.

[8] No sound barrier was modeled because the existing wall height is currently at the maximum height of 16 ft.

dBA = A-weighted decibels

ft = feet

H = height

$L_{eq}$ = equivalent sound level

NAC = Noise Abatement Criteria

As shown in Table 2.2.7-6 above, the following sound barriers were determined to be feasible by reducing noise levels by 5 dBA or more:

- **SB No. 1:** An 867 ft long barrier located on the east side of I-880 south of Marina Avenue was analyzed along the edge of shoulder to shield Receptor R-1.
- **SB No. 2a:** A 218 ft long barrier along the State ROW on the east side of I-880 north of Marina Boulevard was analyzed to shield Receptor R-2.
- **SB No. 3a:** A 1,025 ft long barrier along the State ROW on the east side of I-880 north of Williams Street was analyzed to shield Receptors R-16 and R-17.
- **SB No. 3b:** A 548 ft long barrier along the State ROW on the east side of I-880 south of Davis Street was analyzed to shield Receptor R-28.
- **SB No. 6a:** A 1,188 ft long barrier along the State ROW on the east side of I-880 between Davis Street and 98th Street was analyzed to shield Receptors R-81 through R-84.
- **SB No. 7:** A 2,556 ft long barrier located along the west side of I-880 between Davis Street and 98th Avenue was analyzed along the State ROW to shield Receptors R-107 through R-112, R-129 and R-130, and R-153 through R-172. It should be noted that the existing sound barrier located at this location would be removed and replaced to accommodate the widening associated with the HOV lane extension. However, the noise abatement analysis assumes the worst-case noise levels and that a substantial noise increase of 12 dBA or more would occur in the interim period during the reconstruction of the sound barrier. At the very minimum, this sound barrier should replace Existing Wall No. 7 with the same height.
- **SB No. 9:** A 553 ft long barrier located along the east side of I-880 between 98th Avenue and Hegenberger Road was analyzed along the residential property line (outside the State right-of-way) to shield Receptors R-210 through R-212.

Section 3 of the Protocol states that a minimum noise reduction of 5 dBA must be achieved at the impacted receptors in order for the proposed noise abatement measure to be considered feasible. The final decision to include new or replacement sound barriers in the proposed project design may consider reasonableness factors, such as cost effectiveness, as well as other feasibility considerations. The feasibility criterion is not necessarily a noise abatement design goal. Greater noise reductions are encouraged if they can be reasonably achieved.

**Noise Abatement Decision Report**

A *Noise Abatement Decision Report* (NADR) was prepared for the project using NEPA-23 CFR 772 and the Department's Protocol, which require that noise abatement be considered for projects that are predicted to result in traffic noise impacts.

A summary of abatement information is provided in Table 2.2.7-7. Table 2.2.7-7 lists all the feasible sound barriers for the Build Alternative, along with their approximate height, length, noise attenuation range, number of benefited residences, reasonable allowance per residence, total reasonable allowance, and estimated sound barrier construction costs, and whether the sound barrier is preliminarily reasonable. As shown, 7 sound

barriers are capable of reducing noise levels by 5 dBA or more, as required to be considered feasible.

Section 3 of the Protocol states that a preliminary reasonableness determination of providing noise abatement for exteriors of residential areas in Activity Category B (which includes residential areas) begins with a $36,000 base allowance[1] per benefited residence. The $36,000 base allowance is adjusted using the following five factors in order to determine the total reasonable allowance per residence:

- Absolute noise level
- Design year increase over existing noise levels
- Achievable noise reduction
- New highway construction or pre-1978 residences
- Total reasonable allowance vs. project cost

The preliminary reasonableness of a sound barrier was determined by comparing the estimated construction cost of the sound barrier against the total reasonable allowance. The total reasonable allowance was determined based on the number of benefited residences multiplied by the reasonable allowance per benefited residence. The estimated sound barrier construction cost was provided by Rajappan & Meyer Consultant Engineers, Inc. (March 2009). The cost estimate for each sound barrier is provided in Appendix A of the NADR. If the estimated sound barrier construction cost exceeded the total reasonable allowance, the sound barrier was determined to be preliminarily not reasonable. However, if the estimated sound barrier construction cost is within the total reasonable allowance, the sound barrier was determined to be preliminarily reasonable. Table 2.2.7-7 shows that SB No. 7 was determined to be preliminarily reasonable because the estimated sound barrier construction cost was within the total reasonable allowance. It should be noted that this sound barrier is planned for replacement as part of the proposed project. However, Table 2.2.7-7 shows that SB Nos. 1, 2a, 3a, 3b, 6a, and 9 were determined to be preliminarily not reasonable because the estimated sound barrier construction cost exceeded the total reasonable allowance.

Factors not relating to acoustics that must be considered during the construction of sound barriers include: Safety, Maintenance, Security, and Utility Relocations. Additional factors to consider include opinions of affected residents, input from the public and public agencies. Social, economic, legal, and technological factors also must be considered. The factors not relating to acoustics for SB Nos. 1, 2a, 3a, 3b, 6a, 7, and 9 are addressed in the NADR.

**Preliminary Recommendation and Decision**

Based on the studies completed to date, the Build Alternative could incorporate noise abatement in the form of one sound barrier at SB No. 7 (located along the west side of I-880 between Davis Street and 98th Avenue) at a height of 14 feet high. As discussed in the previous sections, this sound barrier is planned for replacement as part of the

[1] Source: Caltrans Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects, August 2006.

proposed widening associated with the southbound HOV lane extension. Calculations based on preliminary design data indicate that the barrier will reduce noise levels by at least 5 dBA or more for 69 residences at a cost of $4,473,000. It should be noted that Receptor R-1, shielded by SB No. 1, and Receptors R-158 through R-160, shielded by SB No. 7, would experience a severe traffic noise impact of 75 dBA Leq or higher. The severe noise impacts at Receptors R-158 through R-160 would be short-term and occur only during the duration of the construction of the replacement sound barrier at those locations. For severe noise impacts, unusual and extraordinary abatement (insulation) can be considered for residences if regular noise abatement measures are deemed not feasible or reasonable. If, during final design, conditions have substantially changed, noise abatement may not be necessary. The final decision of the noise abatement will be made upon completion of the project design and the public involvement processes.

The Metropolitan Transportation Commission's (MTC) 2035 Transportation Plan references a future planned I-880 northbound HOV lane extension from Hacienda Avenue to Hegenberger Road (Project Reference No. 230088). Sound barriers evaluated along the northbound side of I-880 within the project area include SB Nos. 1, 2a, 3a, 3b, 6a, and 9. These walls, if constructed, may be affected by the planned northbound HOV lane extension.

## Table 2.2.7-7. Sound Barrier Reasonableness

| Sound Barrier No. | Height (ft) | Approximate Length (ft) | Noise Attenuation Range (dBA) | Receptor Locations Shielded | Number of Benefited Residences[1] | Reasonable Allowance per Residence | Total Reasonable Allowance | Estimated Sound Barrier Construction Cost[2] | Preliminarily Reasonable? |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6 | 867 | 5 | R-1 | 4 | $54,000 | $216,000 | $312,120 | No |
| | 8 | 867 | 6 | R-1 | 4 | $56,000 | $224,000 | $416,160 | No |
| | 10 | 867 | 7 | R-1 | 4 | $56,000 | $224,000 | $520,200 | No |
| | 12* | 867 | 9 | R-1 | 4 | $58,000 | $232,000 | $624,240 | No |
| | 14 | 867 | 10 | R-1 | 4 | $58,000 | $232,000 | $728,280 | No |
| | 16 | 867 | 11 | R-1 | 4 | $58,000 | $232,000 | $832,320 | No |
| 2a | 16* | 218 | 5 | R-2 | 1 | $50,000 | $50,000 | $209,280 | No |
| 3a | 10* | 1,025 | 7-9 | R-16, R-17 | 7 | $54,000 | $378,000 | $615,000 | No |
| | 12 | 1,025 | 8-10 | R-16, R-17 | 7 | $54,000 | $378,000 | $738,000 | No |
| | 14 | 1,025 | 5-10 | R-16, R-17, R-30 | 10 | $54,000 | $540,000 | $861,000 | No |
| | 16 | 1,025 | 5-10 | R-16, R-17, R-30 | 10 | $54,000 | $540,000 | $984,000 | No |
| 3b | 16* | 548 | 5 | R-28 | 3 | $50,000 | $150,000 | $526,080 | No |
| 6a | 12* | 1,188 | 6-10 | R-81-R-84 | 8 | $56,000 | $448,000 | $855,360 | No |
| | 14 | 1,188 | 6-10 | R-81-R-84 | 8 | $56,000 | $448,000 | $997,920 | No |
| 7[3] | 6 | 2,556 | 5-8 | R-108,R-109, R-111, R-153-R-155, R-157-R-159 | 23 | $62,000 | $1,426,000 | $1,917,000 | No |
| | 8 | 2,556 | 5-10 | R-108-R-112, R-153-R-160, R-164-R-166 | 41 | $64,000 | $2,624,000 | $2,556,000 | Yes |
| | 10 | 2,556 | 6-11 | R-108-R-112, R-129-R-131, R-153-R-160, R-164-R-169 | 54 | $64,000 | $3,456,000 | $3,195,000 | Yes |
| | 12* | 2,556 | 5-13 | R-108-R-112, R-126-R-131, R-153-R-160, R-164-R-170 | 66 | $66,000 | $4,356,000 | $3,834,000 | Yes |
| | 14 | 2,556 | 5-13 | R-108-R-112, R-126-R-131, R-153-R-160, R-164-R-171 | 69 | $66,000 | $4,554,000 | $4,473,000 | Yes |
| 9 | 8 | 553 | 5-7 | R-210, R-211 | 6 | $50,000 | $300,000 | $541,940 | No |
| | 10* | 553 | 5-8 | R-210-R-211 | 8 | $50,000 | $400,000 | $608,300 | No |
| | 12 | 553 | 5-9 | R-210-R-212 | 8 | $52,000 | $416,000 | $674,660 | No |
| | 14 | 553 | 6-9 | R-210-R-212 | 8 | $52,000 | $416,000 | $741,020 | No |
| | 16 | 553 | 6-10 | R-210-R-212 | 8 | $52,000 | $416,000 | $807,380 | No |

Source: LSA Associates, Inc., Noise Abatement Decision Report, July 2009.
[1] Number of residences attenuated by 5 dBA or more by the modeled barrier. [2] Rajappan & Meyer Consultant Engineers, Inc., March 2009.
[3] At the very minimum, Sound Barrier No. 7 should be relocated to the new right-of-way with the same wall height.
* Denotes the minimum wall height required to break the line of sight between the receptor and the truck exhaust stack.
dBA = A-weighted decibels ft = feet

### CEQA Noise Analysis

The Department's Protocol states that a traffic noise impact is considered significant under CEQA if the project would result in a substantial increase in traffic noise over the future No Build condition. The CEQA threshold of significance correlates with how perceptible the noise increase is in a given area. A 3 dBA increase in noise level is barely perceptible to the human ear in an outdoor environment. The results of the noise modeling indicate that, for the majority of receptors, the project will result in noise increases of up to 3 dBA.

As shown in Table 2.2.7-8, the change in projected future noise levels with the project (i.e., Build Alternative) when compared with the projected future noise levels without the project (i.e., No Build Alternative) will be 3 dBA or less for the majority of the modeled receptors. This increase in noise levels would not be perceptible to the human ear in an outdoor environment. However, of the 218 modeled receptors, 29 receptors would be subject to noise level increases that are above 3 dBA, as indicated in the column titled "Change from Future Build." It should be noted, however, that these 29 receptors are located behind modeled SB No. 7 (Figure 2.2.7-1), which will be removed and replaced as part of the project to accommodate the widening of southbound I-880 for the new HOV lane. Increased noise levels would be expected during the period of removal and reconstruction of the sound barriers at these locations. However, as shown in Table 2.2.7-8, once the sound barriers are reinstated (assuming a 14-foot high barrier), the noise levels would be reduced to 68 dBA or below, which, for these receptors would result in a change of 3 dBA or less in the projected future noise levels with the project when compared with the projected future noise levels without the project. Long-term effects under CEQA would be less-than-significant. Short-term, construction-duration effects under CEQA would be less-than-significant with the implementation of the Construction Noise Minimization Measures included in the previous section.

## Table 2.2.7-8. Projected Traffic Noise Levels, dBA $L_{eq}$

| Receptor No. | Location | Modeled Existing Peak Noise Level | Future No Build | Future Build (worst-case) | Change from Existing Peak Level | Change from Future No Build |
|---|---|---|---|---|---|---|
| R-1 | Teagarden Street | **73**[2] | **75** | **76** | 3 | 1 |
| R-2 | Sundberg Avenue | 62 | **66** | **66** | 4 | 0 |
| R-3 | Sundberg Avenue | 63 | **66** | **66** | 3 | 0 |
| R-4/M-2[1] | Sundberg Avenue | 64 | **66** | **66** | 2 | 0 |
| R-5 | Sundberg Avenue | 63 | **66** | **66** | 3 | 0 |
| R-6 | Sundberg Avenue | 64 | **66** | **66** | 2 | 0 |
| R-7 | Sundberg Avenue | 64 | **66** | **66** | 2 | 0 |
| R-8 | Sundberg Avenue | 64 | **66** | **66** | 2 | 0 |
| R-9 | Sundberg Avenue | 63 | **67** | **67** | 4 | 0 |
| R-10 | Sundberg Avenue | 61 | 65 | 65 | 4 | 0 |
| R-11 | Sundberg Avenue | 59 | 62 | 63 | 4 | 1 |
| R-12 | Sundberg Avenue | 58 | 60 | 60 | 2 | 0 |
| R-13 | Sundberg Avenue | 59 | 61 | 61 | 2 | 0 |
| R-14 | Sundberg Avenue | 59 | 61 | 62 | 3 | 1 |
| R-15 | Sundberg Avenue | 62 | 65 | 65 | 3 | 0 |
| R-16 | Leonard Drive | **66** | **68** | **68** | 2 | 0 |
| R-17/M-3 | Leonard Drive | **69** | **71** | **71** | 2 | 0 |
| R-18 | Leonard Drive | 64 | 65 | 65 | 1 | 0 |
| R-19 | Leonard Drive | 62 | 64 | 64 | 2 | 0 |
| R-20 | Leonard Drive | 63 | 64 | 64 | 1 | 0 |
| R-21 | Leonard Drive | **66** | **68** | **68** | 2 | 0 |
| R-22 | Leonard Drive | **67** | **68** | **68** | 1 | 0 |
| R-23 | Leonard Drive | **66** | **68** | **68** | 2 | 0 |
| R-24/M-4 | Leonard Drive | **66** | **68** | **68** | 2 | 0 |
| R-25 | Leonard Drive | **66** | **68** | **68** | 2 | 0 |
| R-26 | Leonard Drive | 65 | **67** | **67** | 2 | 0 |
| R-27 | Leonard Drive | 63 | 65 | 65 | 2 | 0 |
| R-28 | Leonard Drive | 63 | **66** | **67** | 4 | 1 |
| R-29 | Leonard Drive | 59 | 63 | 63 | 4 | 0 |
| R-30 | Leonard Drive | 60 | 62 | 62 | 2 | 0 |
| R-31 | Leonard Drive | 56 | 58 | 58 | 2 | 0 |
| R-32 | Leonard Drive | 62 | 61 | 62 | 0 | 1 |
| R-33 | Lucia Court | 63 | 64 | 64 | 1 | 0 |
| R-34 | Leonard Drive | 65 | **66** | **66** | 1 | 0 |
| R-35 | Johnson Street | 64 | **66** | **66** | 2 | 0 |
| R-36 | Leonard Drive | 65 | **66** | **66** | 1 | 0 |
| R-37 | Maria Drive | 62 | 64 | 64 | 2 | 0 |
| R-38 | Timothy Drive | **67** | **68** | **69** | 2 | 1 |
| R-39 | Timothy Drive | **67** | **68** | **69** | 2 | 1 |
| R-40 | Timothy Drive | **67** | **68** | **69** | 2 | 1 |
| R-41 | Timothy Drive | **67** | **68** | **69** | 2 | 1 |
| R-42 | Timothy Drive | **67** | **68** | **68** | 1 | 0 |
| R-43 | Timothy Drive | **67** | **68** | **68** | 1 | 0 |
| R-44/M-5 | Timothy Drive | **67** | **68** | **69** | 2 | 1 |
| R-45 | Timothy Drive | **67** | **68** | **69** | 2 | 1 |
| R-46 | Timothy Drive | **66** | **68** | **68** | 2 | 0 |
| R-47 | Timothy Drive | **67** | **68** | **69** | 2 | 1 |
| R-48 | Timothy Drive | **66** | **68** | **69** | 3 | 1 |
| R-49 | Timothy Drive | 59 | 60 | 61 | 2 | 1 |
| R-50 | Timothy Drive | 61 | 62 | 63 | 2 | 1 |

## Table 2.2.7-8. Projected Traffic Noise Levels, dBA $L_{eq}$

| Receptor No. | Location | Modeled Existing Peak Noise Level | Future No Build | Future Build (worst-case) | Change from Existing Peak Level | Change from Future No Build |
|---|---|---|---|---|---|---|
| R-51 | Timothy Drive | 61 | 62 | 62 | 1 | 0 |
| R-52 | Timothy Drive | 61 | 62 | 63 | 2 | 1 |
| R-53 | Timothy Drive | 60 | 61 | 62 | 2 | 1 |
| R-54 | Timothy Drive | 60 | 61 | 62 | 2 | 1 |
| R-55 | Timothy Drive | 61 | 62 | 63 | 2 | 1 |
| R-56 | Timothy Drive | 61 | 62 | 63 | 2 | 1 |
| R-57 | Timothy Drive | 60 | 62 | 63 | 3 | 1 |
| R-58 | Timothy Drive | 60 | 63 | 65 | 5 | 2 |
| R-59 | Donovan Drive | 56 | 63 | 64 | 8 | 1 |
| R-60 | Billings Boulevard | 60 | 64 | 64 | 4 | 0 |
| R-61 | Martin Boulevard | 60 | 63 | 63 | 3 | 0 |
| R-62 | Martin Boulevard | 62 | 64 | 65 | 3 | 1 |
| R-63 | Martin Boulevard | 62 | 64 | 65 | 3 | 1 |
| R-64/M-8 | Martin Boulevard | 62 | 64 | 64 | 2 | 0 |
| R-65 | Martin Boulevard | 61 | 63 | 64 | 3 | 1 |
| R-66 | Martin Boulevard | 62 | 64 | 64 | 2 | 0 |
| R-67 | Martin Boulevard | 61 | 62 | 63 | 2 | 1 |
| R-68 | Martin Boulevard | 60 | 61 | 62 | 2 | 1 |
| R-69 | O'Donnell Avenue | 62 | 64 | 64 | 2 | 0 |
| R-70 | O'Donnell Avenue | 64 | **66** | **66** | 2 | 0 |
| R-71 | O'Donnell Avenue | 65 | **67** | **67** | 2 | 0 |
| R-72 | Wrin Avenue | 65 | **67** | **67** | 2 | 0 |
| R-73 | Wrin Avenue | 65 | **67** | **67** | 2 | 0 |
| R-74 | Wrin Avenue | 65 | **67** | **67** | 2 | 0 |
| R-75/M-9 | Wrin Avenue | 65 | **67** | **67** | 2 | 0 |
| R-76 | Wrin Avenue | **66** | **67** | **67** | 1 | 0 |
| R-77 | Reynolds Street | **69** | **70** | **70** | 1 | 0 |
| R-78 | White Fir Drive | **68** | **69** | **69** | 1 | 0 |
| R-79/M-10 | White Fir Drive | **68** | **69** | **70** | 2 | 1 |
| R-80 | White Fir Drive | **69** | **70** | **70** | 1 | 0 |
| R-81 | White Fir Drive | **71** | **74** | **72** | 1 | -2 |
| R-82 | 105th Avenue | **70** | **76** | **73** | 3 | -3 |
| R-83 | 105th Avenue | **70** | **75** | **73** | 3 | -2 |
| R-84 | 105th Avenue | **70** | **76** | **73** | 3 | -3 |
| R-85 | Martin Boulevard | 60 | 62 | 62 | 2 | 0 |
| R-86 | Martin Boulevard | 57 | 59 | 59 | 2 | 0 |
| R-87 | Martin Boulevard | 56 | 58 | 58 | 2 | 0 |
| R-88 | Wrin Avenue | 62 | 64 | 64 | 2 | 0 |
| R-89 | Wrin Avenue | 61 | 63 | 63 | 2 | 0 |
| R-90 | Wrin Avenue | 62 | 63 | 64 | 2 | 1 |
| R-91 | Laura Avenue | 54 | 62 | 62 | 8 | 0 |
| R-92 | Laura Avenue | 56 | 63 | 63 | 7 | 0 |
| R-93 | Laura Avenue | 58 | 63 | 63 | 5 | 0 |
| R-94 | Melcher Street | 60 | 61 | 62 | 2 | 1 |
| R-95 | Melcher Street | 62 | 63 | 63 | 1 | 0 |
| R-96 | Melcher Street | 63 | 64 | 64 | 1 | 0 |
| R-97 | Melcher Street | 61 | 62 | 63 | 2 | 1 |
| R-98 | Melcher Street | 63 | 63 | 64 | 1 | 1 |
| R-99/M-6 | Melcher Street | 63 | 63 | 64 | 1 | 1 |

## Table 2.2.7-8. Projected Traffic Noise Levels, dBA $L_{eq}$

| Receptor No. | Location | Modeled Existing Peak Noise Level | Future No Build | Future Build (worst-case) | Change from Existing Peak Level | Change from Future No Build |
|---|---|---|---|---|---|---|
| R-100 | Melcher Street | 63 | 63 | 64 | 1 | 1 |
| R-101 | Warden Avenue | 63 | 64 | 64 | 1 | 0 |
| R-102 | Warden Avenue | 62 | 63 | 64 | 2 | 1 |
| R-103 | Warden Avenue | 63 | 64 | 64 | 1 | 0 |
| R-104 | Warden Avenue | 63 | 64 | 64 | 1 | 0 |
| R-105 | Warden Avenue | 63 | 63 | 64 | 1 | 1 |
| R-106 | Warden Avenue | 63 | 64 | 65 | 2 | 1 |
| R-107/M-7 | Warden Avenue | 63 | 63 | **66** | 3 | 3 |
| R-108 | Warden Avenue | 63 | 63 | **71** | 8 | 8 |
| R-109 | Warden Avenue | 63 | 64 | **71** | 8 | 7 |
| R-110 | Warden Avenue | 62 | 62 | **69** | 7 | 7 |
| R-111 | Warden Avenue | 60 | 60 | **68** | 8 | 8 |
| R-112 | Warden Avenue | 58 | 59 | **69** | 11 | 10 |
| R-113 | Laura Avenue | 55 | 57 | 59 | 4 | 2 |
| R-114 | Laura Avenue | 56 | 58 | 59 | 3 | 1 |
| R-115 | Laura Avenue | 55 | 58 | 58 | 3 | 0 |
| R-116 | Melcher Street | 57 | 58 | 59 | 2 | 1 |
| R-117 | Melcher Street | 57 | 58 | 59 | 2 | 1 |
| R-118 | Melcher Street | 56 | 57 | 58 | 2 | 1 |
| R-119 | Melcher Street | 56 | 57 | 58 | 2 | 1 |
| R-120 | Melcher Street | 57 | 58 | 58 | 1 | 0 |
| R-121 | Warden Avenue | 59 | 60 | 60 | 1 | 0 |
| R-122 | Warden Avenue | 57 | 58 | 59 | 2 | 1 |
| R-123 | Warden Avenue | 57 | 58 | 59 | 2 | 1 |
| R-124 | Warden Avenue | 58 | 59 | 61 | 3 | 2 |
| R-125 | Warden Avenue | 58 | 58 | 62 | 4 | 4 |
| R-126 | Warden Avenue | 58 | 58 | 64 | 6 | 6 |
| R-127 | Warden Avenue | 58 | 58 | 65 | 7 | 7 |
| R-128 | Warden Avenue | 58 | 58 | 65 | 7 | 7 |
| R-129 | Warden Avenue | 57 | 58 | **66** | 9 | 8 |
| R-130 | Warden Avenue | 57 | 57 | **66** | 9 | 9 |
| R-131 | Warden Avenue | 57 | 57 | 65 | 8 | 8 |
| R-132 | Bernhardt Drive | **68** | **71** | **71** | 3 | 0 |
| R-133/M-11 | Bernhardt Drive | **66** | **69** | **70** | 4 | 1 |
| R-134 | Bernhardt Drive | **66** | **70** | **70** | 4 | 0 |
| R-135 | Bernhardt Drive | **67** | **70** | **71** | 4 | 1 |
| R-136 | Bernhardt Drive | **67** | **70** | **73** | 6 | 3 |
| R-137 | Bernhardt Drive | **68** | **71** | **72** | 4 | 1 |
| R-138/M-12 | Bernhardt Drive | **69** | **72** | **72** | 3 | 0 |
| R-139 | Bernhardt Drive | **70** | **73** | **73** | 3 | 0 |
| R-140 | Bernhardt Drive | **70** | **73** | **73** | 3 | 0 |
| R-141 | Bernhardt Drive | **69** | **72** | **72** | 3 | 0 |
| R-142 | Bernhardt Drive | **67** | **70** | **70** | 3 | 0 |
| R-143 | Bernhardt Drive | 64 | **68** | **69** | 5 | 1 |
| R-144 | Bernhardt Drive | 63 | **67** | **67** | 4 | 0 |
| R-145 | Bernhardt Drive | 62 | **67** | **67** | 5 | 0 |
| R-146 | Bernhardt Drive | **67** | **70** | **69** | 2 | -1 |

## Table 2.2.7-8. Projected Traffic Noise Levels, dBA $L_{eq}$

| Receptor No. | Location | Modeled Existing Peak Noise Level | Future No Build | Future Build (worst-case) | Change from Existing Peak Level | Change from Future No Build |
|---|---|---|---|---|---|---|
| R-147 | Bernhardt Drive | 65 | **68** | **69** | 4 | 1 |
| R-148 | Bernhardt Drive | 65 | **68** | **69** | 4 | 1 |
| R-149 | Bernhardt Drive | **66** | **69** | **70** | 4 | 1 |
| R-150 | Bernhardt Drive | **66** | **69** | **70** | 4 | 1 |
| R-151 | Bernhardt Drive | **67** | **70** | **70** | 3 | 0 |
| R-152 | Bernhardt Drive | **67** | **70** | **71** | 4 | 1 |
| R-153 | Empire Road | 61 | 61 | **71** | 10 | 10 |
| R-154 | Empire Road | 61 | 62 | **71** | 10 | 9 |
| R-155 | Empire Road | 62 | 62 | **72** | 10 | 10 |
| R-156 | Empire Road | 62 | 62 | **72** | 10 | 10 |
| R-157 | Gibraltar Road | 63 | 64 | **74** | 11 | 10 |
| R-158/M-13 | Gibraltar Road | 65 | 65 | **76** | 11 | 11 |
| R-159 | Gibraltar Road | 65 | **66** | **80** | 15[3] | 14 |
| R-160/M-14 | Gibraltar Road | 65 | **66** | **75** | 10 | 9 |
| R-161 | Gibraltar Road | 64 | 65 | **68** | 4 | 3 |
| R-162 | Gibraltar Road | 64 | 65 | **67** | 3 | 2 |
| R-163 | Hesket Road | 62 | 64 | 65 | 3 | 1 |
| R-164 | Empire Road | 60 | 60 | **71** | 11 | 11 |
| R-165 | Empire Road | 58 | 59 | **68** | 10 | 9 |
| R-166 | Empire Road | 58 | 59 | **69** | 11 | 10 |
| R-167 | Empire Road | 58 | 58 | **67** | 9 | 9 |
| R-168 | Gibraltar Road | 60 | 61 | **70** | 10 | 9 |
| R-169 | Gibraltar Road | 59 | 60 | **68** | 9 | 8 |
| R-170 | Gibraltar Road | 61 | 62 | **68** | 7 | 6 |
| R-171 | Gibraltar Road | 60 | 62 | **67** | 7 | 5 |
| R-172 | Gibraltar Road | 62 | 63 | **67** | 5 | 4 |
| R-173 | Hesket Road | 58 | 60 | 63 | 5 | 3 |
| R-174 | Hesket Road | 57 | 60 | 61 | 4 | 1 |
| R-175 | Hesket Road | 58 | 60 | 62 | 4 | 2 |
| R-176 | Hesket Road | 59 | 61 | 63 | 4 | 2 |
| R-177 | Norgren Street | 56 | 60 | 60 | 4 | 0 |
| R-178/M-15 | Caswell Avenue | 59 | 63 | 63 | 4 | 0 |
| R-179 | Jones Avenue | 55 | 59 | 59 | 4 | 0 |
| R-180 | Clara Avenue | 59 | 62 | 62 | 3 | 0 |
| R-181 | Clara Avenue | 57 | 61 | 61 | 4 | 0 |
| R-182/M-18 | Edes Avenue | **66** | **67** | **67** | 1 | 0 |
| R-183 | Coral Road | 50 | 52 | 53 | 3 | 1 |
| R-184/M-16 | Coral Road | 53 | 54 | 54 | 1 | 0 |
| R-185 | Coral Road | 56 | 57 | 57 | 1 | 0 |
| R-186 | Wistar Road | 51 | 54 | 54 | 3 | 0 |
| R-187 | Coral Road | 53 | 54 | 54 | 1 | 0 |
| R-188 | Tunis Road | 55 | 56 | 57 | 2 | 1 |
| R-189 | Coral Road | 54 | 55 | 55 | 1 | 0 |
| R-190 | Coral Road | 61 | 62 | 63 | 2 | 1 |
| R-191 | Coral Road | 62 | 63 | 64 | 2 | 1 |

## Table 2.2.7-8. Projected Traffic Noise Levels, dBA $L_{eq}$

| Receptor No. | Location | Modeled Existing Peak Noise Level | Future No Build | Future Build (worst-case) | Change from Existing Peak Level | Change from Future No Build |
|---|---|---|---|---|---|---|
| R-192 | Coral Road | 62 | 63 | 63 | 1 | 0 |
| R-193/M-17 | Coral Road | 62 | 63 | 63 | 1 | 0 |
| R-194 | Coral Road | 61 | 62 | 63 | 2 | 1 |
| R-195 | Coral Road | 62 | 63 | 64 | 2 | 1 |
| R-196 | Coral Road | 60 | 61 | 61 | 1 | 0 |
| R-197 | Coral Road | 58 | 59 | 59 | 1 | 0 |
| R-198 | Sextus Road | 58 | 59 | 59 | 1 | 0 |
| R-199 | Coral Road | 58 | 59 | 59 | 1 | 0 |
| R-200 | Coral Road | 58 | 60 | 60 | 2 | 0 |
| R-201 | Makin Road | 58 | 59 | 59 | 1 | 0 |
| R-202 | Coral Road | 56 | 58 | 58 | 2 | 0 |
| R-203 | Fitzpatrick Road | 56 | 57 | 57 | 1 | 0 |
| R-204 | Coral Road | 60 | 61 | 61 | 1 | 0 |
| R-205 | Coral Road | 57 | 59 | 59 | 2 | 0 |
| R-206 | Worth Street | 64 | 65 | 65 | 1 | 0 |
| R-207 | Worth Street | 64 | 65 | 65 | 1 | 0 |
| R-208/M-19 | Worth Street | 64 | 65 | 65 | 1 | 0 |
| R-209 | Worth Street | 64 | 65 | 65 | 1 | 0 |
| R-210 | Worth Street | 65 | **66** | **66** | 1 | 0 |
| R-211 | Worth Street | **67** | **68** | **68** | 1 | 0 |
| R-212 | Worth Street | 65 | **66** | **66** | 1 | 0 |
| R-213 | Worth Street | 63 | 64 | 64 | 1 | 0 |
| R-214 | Worth Street | 61 | 62 | 62 | 1 | 0 |
| R-215 | Worth Street | 61 | 62 | 62 | 1 | 0 |
| R-216 | Worth Street | 61 | 62 | 62 | 1 | 0 |
| R-217 | Worth Street | 61 | 62 | 62 | 1 | 0 |
| R-218 | Worth Street | 61 | 62 | 62 | 1 | 0 |

Source: LSA Associates, Inc., July 2009.

# 2.3 BIOLOGICAL ENVIRONMENT

## 2.3.1 Wetlands and Other Waters

### *Regulatory Setting*

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Clean Water Act (33 U.S.C. 1344) is the primary law regulating wetlands and waters. The Clean Water Act regulates the discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters, interstate waters, territorial seas and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the Clean Water Act, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils subject to saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the Clean Water Act.

Section 404 of the Clean Water Act establishes a regulatory program that provides that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program is run by the U.S. Army Corps of Engineers (USACE) with oversight by the Environmental Protection Agency (EPA).

The Executive Order for the Protection of Wetlands (E.O. 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this executive order states that a federal agency, such as the Federal Highway Administration, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: 1) that there is no practicable alternative to the construction and 2) the proposed project includes all practicable measures to minimize harm.

At the state level, wetlands and waters are regulated primarily by the Department of Fish and Game (CDFG) and the Regional Water Quality Control Boards (RWQCB). In certain circumstances, the Coastal Commission (or Bay Conservation and Development Commission) may also be involved. Sections 1600-1607 of the Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFG before beginning construction. If CDFG determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFG jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFG.

The Regional Water Quality Control Boards were established under the Porter-Cologne Water Quality Control Act to oversee water quality. The RWQCB also issues water quality certifications in compliance with Section 401 of the Clean Water Act. Please see Section 2.2.2, *Water Quality and Storm Water Runoff*, for additional details.

## *Affected Environment*

This section reports the results of the *Natural Environment Study* (NES) (LSA Associates, Inc. July 2009) and the *Delineation of Waters of the United States* (LSA Associates, Inc. May 2009) prepared for the project. The Delineation Report was submitted to the USACE in December 2008 to initiate the verification process and determine regulatory jurisdiction. It was updated in May 2009 to reflect the preliminary verification determination of the USACE. A copy of the most recent Delineation Report with wetland mapping is included as an appendix in the NES. For the purposes of this assessment, all wetland and water resources described in this section should be considered both waters of the United States and waters of the state.

As described below, waters of the United States identified within the project site consist of stream segments (i.e., San Leandro Creek and a tributary), including segments with wetland characteristics, and freshwater marsh seasonal wetlands.

### Stream Segments

**San Leandro Creek.** San Leandro Creek crosses under an elevated portion of I-880 between 98th Avenue and Davis Street that also crosses over a Southern Pacific railroad track. Within and near its crossing of the project site, San Leandro Creek is channelized with a concrete bed and bank. Within the project site, a portion of the creek channel contains hydrophytic vegetation, including watercress (*Rorippa nasturtium-aquatica*), smartweed *(Polygonum* sp.), flat sedge (*Cyperus eragrostis*), and rabbit's-foot grass (*Polypogon monspeliensis*), with Bermuda grass (*Cynodon dactylon*) and common plantain (*Plantago major*) along the banks. Other than this area of hydrophytic vegetation, the vegetation along the creek banks consists of non-hydrophytic species that do not appear to be influenced by the hydrology of the creek. These species typically include wild oats (*Avena* spp.) and wild radish (*Raphanus sativa*), along with Italian rye (*Lolium multiflorum*) and bristly ox-tongue (*Picris echioides*). The jurisdictional extent of San Leandro Creek includes the hydrophytic vegetation along its channel. San Leandro Creek contained flowing water during site investigation.

The reach of San Leandro Creek on the project site is mapped by the USGS as a solid blue-line stream on the San Leandro quadrangle. Approximately 260 linear feet of San Leandro Creek crosses through the project site. The jurisdictional area of San Leandro Creek within the project site is 2,395 square feet (0.055 acre).

**Tributary Channel.** A steep-sided trapezoidal concrete tributary channel joins with San Leandro Creek within the project site. The channel bed and banks are concrete. The channel has no vegetation and contains only minimal sediments. The jurisdictional width of the channel is 6 feet. The tributary channel was flowing during site investigation. Approximately 150 linear feet of the tributary channel is within the project site. The jurisdictional area of the tributary channel within the project site is 655 square feet (0.015 acre).

### Seasonal Wetlands

**Seasonal Wetlands A and B.** Seasonal Wetlands A and B are located in the southern quadrant of the Hegenberger Road interchange, on either side of the I-880 on-ramp and are connected via a culvert located underneath the ramp. Seasonal Wetland A is

predominantly a cattail-filled swale containing ponded water. It has a jurisdictional area of 8,190 square feet (0.188 acre). Seasonal Wetland B has a jurisdictional area of 3,790 square feet (0.087 acre). Both of these features may have a more perennial rather than seasonal wetland hydrology and may be better characterized as freshwater marsh.

**Seasonal Wetland E.** Seasonal Wetland E is located in a basin filled with cattails and alkali rush located in the eastern quadrant of the Davis Street interchange. The deeper center and northern portions of the basin is vegetated with cattails and was ponded during the site investigation. The northern edge of the basin is lined with mature willows. Seasonal Wetland E has a jurisdictional area of 10,540 square feet (0.242 acre). This feature may have a more perennial wetland hydrology and may be better characterized as a freshwater marsh.

### *Environmental Consequences*

Waters of the U.S. identified within the project area consist of stream segments, including segments with wetland characteristics, and freshwater marsh seasonal wetlands. The total potential jurisdictional area is 0.59 acres. A breakdown of jurisdictional acreage is provided in Table 2.3.1-1. The total length of jurisdictional stream channel is 410 feet.

**Table 2.3.1-1. Waters of the United States**

| Feature Type | Area (square ft) | Area (acres) |
|---|---|---|
| Stream Channel Segments | 3,050 | 0.07 |
| Freshwater Marsh Seasonal Wetlands | 22,520 | 0.52 |
| **Total** | **25,570** | **0.59** |

The width and alignment of the project components were designed to avoid and minimize impacts to sensitive natural resources, including wetland habitat and the stream channel segments. Support columns and construction staging for the newly expanded portion of the San Leandro Creek bridge will be outside of the channel, bed, and bank of San Leandro Creek. The northbound Davis Street on-ramp was designed to avoid impacts to the adjacent freshwater marsh vegetated with cattails, alkali bulrush, nut sedge, rabbit's foot grass, and bristly ox-tongue (identified as Seasonal Wetland E in the jurisdictional delineation). Earlier design plans for this location involved the placement of a new fill slope that would have resulted in approximately 0.16 acre of permanent impacts to Seasonal Wetland E. The design of the Davis Street loop on-ramp was ultimately reconfigured to avoid fill of this wetland.

The project will not result in any permanent impacts to existing jurisdictional waters. As such, no permits from the USACE, CDFG, or RWQCB are required.

### *Avoidance, Minimization, and/or Mitigation Measures*

All activities in the vicinity of jurisdictional waters would be subject to a Stormwater Pollution Prevention Plan (SWPPP) that would be prepared and implemented by the contractor in accordance with Regional Water Quality Control Board guidelines. The SWPPP would include the following major components, at a minimum:

- A comprehensive erosion and sediment control plan, depicting areas to remain undisturbed, and providing specifications for revegetation of disturbed areas.
- A list of potential pollutants from building materials, chemicals, and maintenance practices used during construction, and the specific control measures to be implemented to minimize release and transport of these constituents in runoff.
- Specifications and designs for the appropriate Best Management Practices (BMPs) for controlling drainage and treating runoff in the construction phase.
- A program for monitoring all control measures that includes schedules for inspection and maintenance, and identifies the party responsible for monitoring.
- A site map that locates all water quality control measures and restricted areas to be left undisturbed.

All jurisdictional areas located outside of the immediate grading footprint would be avoided during construction and no fill would be allowed in these areas. Exclusion fencing (i.e., orange plastic construction fencing or silt fencing) would be erected at the boundary of Seasonal Wetland E during the construction of the northbound Davis Street I-880 on-ramp to delineate the boundary of construction and heavy equipment activity. Exclusion fencing would also be erected along the edge (i.e., top of bank) of San Leandro Creek for any construction activities conducted within 100 feet of the creek. A qualified biological monitor would oversee the installation of the exclusion fence and would periodically monitor the construction site to document avoidance of jurisdictional areas.

### 2.3.2 Plant Species

#### *Regulatory Setting*

The U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) share regulatory responsibility for the protection of special-status plant species. "Special-status" species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the Federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). Please see the Threatened and Endangered Species Section [2.3.4] in this document for detailed information regarding these species.

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

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

## *Affected Environment*

This section reports the results of the *Natural Environment Study* (NES) (LSA Associates, Inc. July 2009) prepared for the project. As documented in the NES, biologists conducted field surveys to identify the vegetation in the project area, consulted regulatory agency databases to help determine whether there is the potential for rare plants to occur in the project area, and assessed project impacts based on relevant project information and field survey and background research results.

Prior to conducting fieldwork, biologists searched the California Natural Diversity Database (CNDDB) for records of special-status species occurrences in the project vicinity (i.e., San Leandro, Hayward, and Newark U.S. Geological Survey [USGS] 7.5-minute quadrangles). In addition, lists of potentially occurring rare plants and federally listed species in the same quadrangles were obtained from the California Native Plant Society Inventory of Rare and Endangered Vascular Plants of California (CNPS 2008) and an online database maintained by the Sacramento USFWS office (USFWS 2008). These lists are provided in Appendix B of the NES.

The vegetation of the project area is dominated by ornamental landscaping and ruderal vegetation, as described below. The NES concluded that no special-status plant species are expected to occur within the project area due to the absence of suitable habitat.

### Ornamental Landscaping

The majority of vegetation within the project area consists of ornamental trees and shrubs that have been planted as landscaping within the various interchanges. Coast redwood (*Sequoia sempervirens*), photinia (*Photinia* sp.), and plum (*Prunus* sp.) are among the more commonly planted species, with sweetgum (*Liquidambar styraciflua*), acacia (*Acacia* sp.), toyon (*Heteromeles arbutifolia*), weeping willow (*Salix babylonica*), Monterey pine (*Pinus radiata*), rose (*Rosa* sp.), walnut (*Juglans* sp.), myoporum (*Myoporum* sp.), escallonia (*Escoallonia macrantha*), and blue gum (*Eucalyptus globulus*) also present in varying amounts. The ground surface of most landscaped areas is covered in wood chips, with plant growth limited to sporadic patches of ruderal species such as prickly lettuce (*Lactuca serriola*), field bindweed (*Convovulus arvensis*), wild radish (*Raphanus sativa*), and bristly ox-tongue (*Picris echioides*). Large patches of ground-hugging highway iceplant (*Carpobrotus edulis*) are present in the Davis Street and Marina Boulevard interchanges.

As part of the tree removal plan for the project, an inventory of all trees present within the project area was conducted. Table 2.3.2-1 summarizes the result of the tree inventory.

### Ruderal

Several areas within the Marina Boulevard interchange are dominated by non-native annual grasses and ruderal forbs, and are more open than nearby areas planted with ornamentals. Dominant grass species include Italian ryegrass (*Lolium multiflorum*), hare barley (*Hordeum murinum* ssp. *leporinum*), and wild oats (*Avena fatua*). Many of the same ruderal species mentioned above also occur in these areas.

### Wetland Vegetation

Several small freshwater marsh/seasonal wetland areas in the project area are predominately vegetated with cattails (*Typha* spp.) and alkali bulrush (*Scirpus robustus*). Other hydrophytic (water-loving) species grow along more shallowly inundated edges and sometimes willows (*Salix* spp.) grow along the banks. Hydrophytic species observed growing in portions of the San Leandro Creek channel include watercress (*Rorippa nasturtium-aquatica*), smartweed (*Polygonum* sp.), flat sedge (*Cyperus eragrostis*), and rabbit-foot grass (*Polypogon monspeliensis*), with Bermuda grass (*Cynodon dactylon*) and common plantain (*Plantago major*) growing along the banks.

**Table 2.3.2-1. Tree Species Within Project Area**

| Species | # present | # proposed for removal |
|---|---|---|
| Plum (*Prunus* sp.) | 148 | 2 |
| Coast redwood (*Sequoia sempervirens*) | 130 | 5 |
| Acacia (*Acacia* sp.) | 113 | 15 |
| Western redbud (*Cercis occidentalis*) | 53 | 4 |
| Coast live oak (*Quercus agrifolia*) | 28 | 6 |
| Sweetgum (*Liquidambar styraciflua*) | 17 | 0 |
| Walnut (*Juglans* sp.) | 14 | 0 |
| Cedar (*Cedrus* sp.) | 13 | 0 |
| Willow (*Salix* sp.) | 10 | 0 |
| Alder (*Alnus* sp.) | 9 | 0 |
| Eucalyptus (*Eucalyptus* sp.) | 9 | 4 |
| Pine (*Pinus* sp.) | 5 | 0 |
| Pittosporum (*Pittosporum* sp.) | 5 | 0 |
| Unknown tree | 5 | 0 |
| Pear (*Pyrus* sp.) | 3 | 0 |
| Cyanotis (*Cyanotis* sp.) | 2 | 2 |
| Myoporum (*Myoporum* sp.) | 1 | 1 |
| Cottonwood (*Populus* sp.) | 1 | 1 |
| Ironwood (*Lyonothamnus* sp.) | 1 | 0 |
| Toyon (*Heteromeles arbutifolia*) | 1 | 0 |
| **TOTAL** | **568** | **40** |

Source: Sugimura Finney Architects tree removal plan drawings, 65% submittal, August 8, 2008

## *Environmental Consequences*

The project would result in the removal of 40 trees, including four western redbuds, two cyanotis, six coast live oaks, one cottonwood, one myoporum, four blue gums, two plums, five coast redwoods, and 15 acacias.

Any ornamental landscaping that would be removed would be replaced as part of a landscape replacement plan.

The project would not adversely affect any special status plant species.

## *Avoidance, Minimization, and/or Mitigation Measures*

All trees to be removed shall be replaced by similar species at a minimum 1:1 ratio.

### 2.3.3 Animal Species

#### *Regulatory Setting*

Many state and federal laws regulate impacts to wildlife. The U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA) Fisheries and the California Department of Fish and Game (CDFG) are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with wildlife not listed or proposed for listing under the state or federal Endangered Species Act. Species listed or proposed for listing as threatened or endangered are discussed in Section 2.3.4 below. All other special-status animal species are discussed here, including CDFG fully protected species and species of special concern, and USFWS or NOAA Fisheries candidate species.

Federal laws and regulations pertaining to wildlife include the following:

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

State laws and regulations pertaining to wildlife include the following:

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

#### *Affected Environment*

This section reports the results of the *Natural Environment Study* (NES) (LSA Associates, Inc. July 2009) prepared for the project. As documented in the NES, biologists conducted field surveys to identify the wildlife habitat present in the project area, consulted regulatory agency databases to help determine whether there is the potential for any special-status wildlife species to occur in the project area, conducted specific field surveys for special-status species as necessary, and assessed project impacts based on relevant project information and field survey and background research results.

Prior to conducting fieldwork, biologists searched the California Natural Diversity Database (CNDDB) for records of special-status species occurrences in the project vicinity (i.e., San Leandro, Hayward, and Newark U.S. Geological Survey [USGS] 7.5-minute quadrangles). In addition, lists of potentially occurring federally listed species in the same quadrangles were obtained from the online database maintained by the Sacramento USFWS office (USFWS 2008). These lists are provided in Appendix B of the NES. The database searches and assessment of existing habitat conditions resulted in the potential for the following species to occur in the project area:

- Steelhead (Central California Coast Evolutionary Significant Unit [ESU]) (*Oncorhynchus mykiss*)
- Burrowing owl (*Athene cunicularia*)

- Salt marsh common yellowthroat (*Geothylpis trichas sinuosa*)
- Tricolored blackbird (*Agelaius tricolor*)
- Pallid bat (*Antrozous pallidus*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)

Steelhead (Central California Coast ESU) is discussed in Section 2.3.4 because it is listed under FESA as threatened in addition to being protected by the California Endangered Species Act (CESA) as a State species of concern. Burrowing owls, the salt marsh common yellowthroat, and tricolored blackbird are all State species of concern and are protected by the Migratory Bird Treaty Act (MBTA). Marginal habitat for these species exists in the project area, but the heavily urbanized setting and disturbed surroundings likely preclude occurrence. The pallid bat and Townsend's big-eared bat are protected by CESA as State species of concern. A bat habitat assessment was conducted by a biologist in December 2008, as described below.

Wildlife use of the project area is somewhat limited due to the high traffic volume associated with I-880, which poses high risk to species that travel by land (i.e., mammals, reptiles, and amphibians), as well as low-flying birds. Species that do occur have successfully adapted to high-density urban landscapes. Most species detected during the site visit were birds, which use ornamental trees and shrubs for foraging, roosting, and occasionally nesting.

**Bat Habitat Assessment**

As documented in the NES, a biologist conducted a habitat assessment for special-status bat species, including pallid bat and Townsend's bid-eared bat, on December 3, 2008. The bat assessment consisted of a careful inspection of the undersides of the Marina Boulevard, Davis Street, San Leandro Creek, 98th Avenue, and Hegenberger Road bridges for signs of bat roosting. The biologist used binoculars to search accessible expansion joints (i.e., those located near the bridge ends, as opposed to those above onrushing traffic) and other crevices near bridge abutments for day-roosting bats.

Although both the Marina Boulevard and Davis Street bridges contain expansion joints that provide suitable roosting habitat for bats, the likelihood of bats using these crevices is reduced by the constant heavy automobile and truck traffic that passes under these bridges and the associated risk of vehicle collisions. Furthermore, the lack of suitable foraging habitat, such as riparian vegetation and open water, in the vicinity of these bridges renders them even more unattractive as suitable roost sites. The 98th Avenue bridge is of even lower habitat quality for roosting bats due to its box girder design and consequent lack of suitable crevices. Similarly, no suitable crevices were observed under the west abutment of the Hegenberger Road bridge. No signs of bat roosting were detected below these four bridges during the habitat assessment.

The San Leandro Creek bridge is somewhat more suitable for roosting bats due to the availability of marginal foraging habitat (San Leandro Creek), limited ongoing human activity beneath the bridge, and numerous crevices. However, no evidence of a sizeable maternity or night roost was observed during the habitat assessment. Further surveys

during the breeding season would enable a more definitive conclusion on whether and to what extent the bridge supports roosting bats.

## *Environmental Consequences*

### Nesting Birds

The nests of all native bird species are protected under the federal MBTA and California Fish and Game Code. During the site visit, a killdeer nest with four eggs was found in the bare, rocky area next to the Hegenberger Road on-ramp to southbound I-880. Although no other nests were found, the numerous ornamental trees and shrubs throughout the project area provide nesting habitat for urban-adapted bird species such as house finch, western-scrub jay, American robin, and mourning dove. House finches, mourning doves, and swallows may also nest under the existing bridges.

If construction occurs during the breeding season (March 15th through August 15th), construction activities could directly impact nesting birds by removing trees that support active nests. Prolonged loud construction noise could also disturb nesting birds, resulting in nesting failure in trees that are not removed. However, implementation of the minimization measures described below would avoid impacts by ensuring that nesting birds are not present or disturbed during construction activities. The proposed project is not expected to result in cumulative effects to nesting birds.

### Bats

Demolition and replacement of the Marina Boulevard and Davis Street bridge overcrossings are not expected to impact roosting bats because none are expected to use these structures due to ongoing heavy traffic below the bridges and lack of suitable foraging habitat nearby. Construction activities associated with widening of the San Leandro Creek bridge may disturb roosting bats, if any are present on the bridge at the time of construction. Further surveys are necessary to determine the presence or absence of roosting bats on the bridge. The project would not result in a permanent loss of roosting habitat, since the existing bridge would be left in place. The proposed project is not expected to result in cumulative effects to bats.

## *Avoidance, Minimization, and/or Mitigation Measures*

### Nesting Birds

- To the extent feasible, vegetation removal and bridge demolition activities shall not occur during the breeding season of March 15 through August 15.
- If vegetation removal and/or bridge demolition must occur during the breeding season, all sites shall be surveyed by a qualified biologist to verify the presence or absence of nesting birds.
- Pre-removal surveys shall be conducted no more than seven days prior to the start of work from March 15 through August 15.
- If the survey indicates the potential presence of nesting birds, the biologist shall determine an appropriately sized buffer around the nest in which no work shall be allowed until the young have successfully fledged.
- The size of the nest buffer shall be determined by the biologist in consultation with the CDFG, and shall be based to a large extent on the nesting species and its

sensitivity to disturbance. In general, buffer sizes of 300 feet for raptors and 50 feet for other birds should suffice to prevent disturbance to birds nesting in the urban environment, but these buffers may be increased or decreased, as appropriate, depending on the bird species and the level of disturbance anticipated near the nest.

**Bats**

- Prior to construction, a qualified bat biologist shall conduct focused day and night emergence surveys of the San Leandro Creek bridge to determine presence or absence of roosting bats. The surveys shall be conducted between April 1 and September 15, ideally in the year before construction is to begin.
- If no bat roosts are detected, no further action is required. If a significant night roost is identified, the following avoidance measures shall be implemented, as recommended in Johnston et al. (2004):
    - No work shall occur within 100 feet of the bridge between sunset and sunrise.
    - No lighting shall be used where it would shine on the underside of the bridge.
    - Combustion equipment, such as generators, pumps, and vehicles, shall not be parked or operated under or adjacent to the bridge.
    - No personnel shall operate under the bridge during the evening or at night.
- If a significant day roost is identified, the following avoidance measures shall be implemented for any work conducted between April 1 and September 15, as recommended in Johnston et al. (2004):
    - No work shall occur within 100 feet of an active roost. The area around the bridge shall be designated an Environmentally Sensitive Area.
    - Combustion equipment, such as generators, pumps, and vehicles, shall not be parked or operated under or adjacent to the bridge.
    - No personnel shall be allowed under the colony, especially during the evening exodus.
- The above measures may be modified to be more or less stringent, depending on site-specific conditions observed by the bat biologist during the day and night emergence surveys. The bat biologist shall make recommendations for further or reduced mitigation measures in a report summarizing the results of the emergence surveys.

### 2.3.4 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 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, are required to consult with the U.S. Fish and Wildlife Service

(USFWS) and the National Marine Fisheries Service (NOAA Fisheries) to ensure that they are not undertaking, funding, permitting or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under formal Section 7 is a Biological Opinion or an incidental take permit. Section 3 of FESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct."

California has enacted a similar law at the state level, the California Endangered Species Act (CESA), California Fish and Game Code, Section 2050, et seq. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate planning to offset project caused losses of listed species populations and their essential habitats. The California Department of Fish and Game (CDFG) is the agency responsible for implementing CESA. Section 2081 of the Fish and Game Code prohibits "take" of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by CDFG. For projects requiring a Biological Opinion under Section 7 of the FESA, CDFG may also authorize impacts to dually-listed FESA and CESA species by issuing a Consistency Determination under Section 2080.1 of the Fish and Game Code.

### *Affected Environment*

This section reports the results of the *Natural Environment Study* (NES) (LSA Associates, Inc. July 2009) prepared for the project. As documented in the NES, biologists conducted field surveys to identify the vegetation and wildlife habitat in the project area, consulted regulatory agency databases to help determine whether there is the potential for special-status plant and wildlife species to occur in the project area, conducted specific field surveys for special-status species as necessary, and assessed project impacts based on relevant project information and field survey and background research results.

Prior to conducting fieldwork, biologists searched the California Natural Diversity Database (CNDDB) for records of special-status species occurrences in the project vicinity (i.e., San Leandro, Hayward, and Newark U.S. Geological Survey [USGS] 7.5-minute quadrangles). In addition, lists of potentially occurring rare plants and federally listed species in the same quadrangles were obtained from the California Native Plant Society Inventory of Rare and Endangered Vascular Plants of California (CNPS 2008) and an online database maintained by the Sacramento USFWS office (USFWS 2008). These lists are provided in Appendix B of the NES.

The NES provides a table of the special-status species that could potentially occur in the region surrounding the project area. Of the 50 species listed in the table, there is only one federally or State-listed species with the potential to occur within the project area. San Leandro Creek supports a small run of the Central California Coast Evolutionarily Significant Unit (ESU) of steelhead (*Oncorhynchus mykiss)*, which is listed as *threatened* under the FESA. However, San Leandro Creek is not identified as Critical Habitat for steelhead under the FESA. The remaining species listed in the table are not expected to

occur due to the heavily urbanized setting of the project area and consequent lack of native plant communities and/or habitats.

**Steelhead (Central California Coast ESU)**

Steelhead are federally-listed as threatened and a California Species of Special Concern. Like other salmonids, steelhead are anadromous, migrating from the ocean to freshwater streams to spawn. Steelhead within San Francisco Bay may be classified as ocean-maturing or winter steelhead that typically begin their spawning migration during the fall and winter, and spawn within a few weeks to a few months from when they enter freshwater. Steelhead migrate upstream from the ocean after one to four growing seasons at sea. Upstream migrating steelhead may be observed within San Francisco Bay and Suisun Marsh/Bay between August and March. Ocean-maturing steelhead typically spawn between December and April, with most spawning occurring between January through March. Steelhead may not die after spawning like Pacific salmon, and thus, return to the ocean following spawning and spawn again the following year, and potentially a third or fourth time. Juvenile steelhead rear in freshwater for one to four years before migrating downstream. San Leandro Creek, which bisects the project area, is known to support a small steelhead run of unknown size.

Important factors associated with preferred stream channel conditions include temperature, velocity, depth, gravel substrate, and water quality. Also important are diverse stream habitats consisting of shallow riffles for spawning and relatively deep pools for rearing. Shaded banks with overhanging riparian vegetation (termed “shaded riverine aquatic cover” by the USFWS) are also beneficial to salmonids, providing foraging habitat and cover from predators. High water temperatures, low rates of streamflow, low levels of dissolved oxygen, and low sediment input can be detrimental to steelhead populations.

### *Environmental Consequences*

San Leandro Creek below Lake Chabot is known to support a small steelhead run of unknown size. Although suitable spawning and rearing habitat for anadromous steelhead is present in the upper portions of the creek (i.e., “from approximately 0.5 mi downstream of Interstate 580 to Chabot Dam”), such conditions are not present within the project area below the San Leandro Creek bridge. Nevertheless, upstream migrating adults and downstream migrating smolts may move through the project area during the winter spawning season (December through April). A reconnaissance-level fish passage assessment conducted at the San Leandro Creek bridge in December 2008 concluded that the bridge support columns do not represent a substantial passage constraint for migrating salmonids (i.e., “Bridge without passage constraints” crossing type indicated; see Appendix D in the *Natural Environment Study*). At regular flows during the steelhead migratory season, it is expected that adults migrating upstream and juveniles migrating downstream (smolts) would be able to navigate around the existing columns.

Minimal effects to steelhead are expected with the implementation of the minimization measures listed below. Construction activities adjacent to San Leandro Creek would occur outside the time of year when steelhead would be migrating upstream. The stream channel conditions within the project area are also not suitable for steelhead spawning or rearing. The cobbles within the channel at this location are embedded in concrete grout and thus do not provide adequate microhabitat (i.e., small spaces

between channel bottom and cobble undersides) for the laying of steelhead eggs. In addition, the lack of deep pools and associated shaded riverine aquatic cover does not provide adequate predator protection for steelhead juveniles and smolts. Numerous algae-strewn cobbles were observed during the habitat assessment, suggesting that water quality within this reach is also unsuitable for spawning or rearing.

### *Avoidance, Minimization, and/or Mitigation Measures*

- Construction activities adjacent to San Leandro Creek shall be limited to the non-migratory period for steelhead (June through November).
- If pile driving is required to construct the foundation for the new bridge column, a vibratory hammer shall be used, if feasible, instead of an impact hammer to reduce the level of underwater sound within San Leandro Creek. If possible, a cushioning block shall also be used between the pile and hammer to further reduce underwater sound levels.
- Disturbance to existing grades and vegetation shall be limited to the actual project site and necessary access routes. Placement of access roads and staging areas shall avoid the banks and channel of San Leandro Creek. The project shall not disturb the banks or channel of San Leandro Creek.
- Construction BMPs and erosion control methods shall be implemented to ensure that no excess sediment enters San Leandro Creek.
- Equipment maintenance and fueling areas shall be located at least 100 feet away from the creek bank. All construction vehicles and equipment shall be checked for oil, fuel, and coolant leaks prior to initiating work. Any equipment found to be leaking fluids shall not be used near San Leandro Creek to minimize the chances of habitat contamination and potential impacts to aquatic wildlife, including steelhead.
- The contractor shall prepare an emergency response and clean-up plan prior to initiating work near San Leandro Creek. The plan shall detail the methods used to contain and clean up spills of petroleum products or other hazardous materials in the work area.
- Water containing mud or silt from construction activities shall be treated by filtration, or retention in a settling pond, adequate to prevent muddy water from entering San Leandro Creek.

Caltrans will initiate informal Section 7 consultation pursuant to the Endangered Species Act and request concurrence from NOAA Fisheries on a Not Likely to Adversely Affect determination.

## 2.3.5 Invasive Species

### *Regulatory Setting*

On February 3, 1999, President Clinton signed Executive Order 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." Federal Highway Administration guidance issued

August 10, 1999 directs the use of the state's noxious weed list to define the invasive plants that must be considered as part of the NEPA analysis for a proposed project.

### *Affected Environment*

This section reports the results of the *Natural Environment Study* (NES) (LSA Associates, Inc. July 2009) prepared for the project.

Several areas within the Marina Boulevard interchange are dominated by non-native annual grasses and ruderal forbs, and are more open than nearby areas planted with ornamentals. Dominant grass species include Italian ryegrass (*Lolium multiflorum*), hare barley (*Hordeum murinum* ssp. *leporinum*), and wild oats (*Avena fatua*).

### *Environmental Consequences*

Construction-related activities would potentially promote the distribution of invasive plant species through ground disturbance.

### *Avoidance, Minimization, and/or Mitigation Measures*

To avoid the introduction of invasive species into the project area during project construction, contract specifications would include, at a minimum, the following measures:

- All earthmoving equipment to be used during project construction shall be thoroughly cleaned before arriving on the project site.
- All seeding equipment (i.e., hydroseed trucks) shall be thoroughly rinsed at least three times prior to arriving at the project site and beginning seeding work.
- To avoid spreading any non-native invasive species already existing on-site, to off-site areas, all equipment shall be thoroughly cleaned before leaving the site.

## 2.4 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 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.

CEQA Guidelines, Section 15130, describes when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts, under CEQA, can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts, under NEPA, can be found in 40 CFR, Section 1508.7 of the CEQA Regulations.

## *Affected Environment*

### Regional Context

This document is based on accepted, regional land use forecasts for 2035, and assumes transportation improvements programmed within the same time frame. The effects evaluated with the project include the cumulative effects of development within the region. Permanent cumulative effects of the proposed project would be beneficial, as the addition of the HOV lane would increase the capacity of the freeway for high-occupancy vehicles and reduce mainline congestion and freeway travel time. An analysis of cumulative effects related to specific development and transportation improvement projects within the region has been included in the discussion of transportation, air quality, and noise impacts included in previous sections. No further discussion of cumulative impacts for these sections is necessary.

### Local Context

The proposed I-880 Southbound HOV Lane project was analyzed to determine whether environmental effects that would be experienced locally, rather than regionally, could become considerable when assessed in combination with other reasonably foreseeable future projects in the project area. Projects are considered "reasonably foreseeable" if they: (a) have applications pending with a government agency; (b) are included in an agency's budget or capital improvement program; or (c) are foreseeable future phases of existing projects. Table 2.4-1 below lists the reasonable foreseeable projects in the project area. Projects considered are within ½ mile of the project alignment.

**Table 2.4-1. Reasonably Foreseeable Projects in the Project Vicinity**

| Project Name | Location & Size | Proposed Uses | Status |
|---|---|---|---|
| Kaiser Permanente San Leandro Medical Center/Marina Point Mixed-use Development Project | 65-acre site bounded by I-880, Marina Boulevard, Merced Street, and Fairway Drive | Retail and mixed-use residential (30 acres), medical uses (35 acres) | Construction expected to begin in late 2009, expected completion in 2013 |
| Lion Creek Crossing Phase IV | 66th Ave. at San Leandro St., 72 units | Residential | Application approved |
| Arcadia Park | 98th Ave. at San Leandro St., 366 units | Residential | Project under construction |
| Coliseum Center | 633 Hegenberger Rd., 167,000 S.F. | Commercial/retail | Application submitted, under review |
| East Oakland Sports Center | 9175 Edes Avenue, 49,000 S.F. | Civic: recreational | Project under construction |

Sources: City of Oakland Active and Major Development projects Mar-April 2009 (http://www.oaklandnet.com/government/ceda/revised/planningzoning/MajorProjectsSection/majorprojectslist.pdf); Major Project Updates, City of San Leandro (http://www.ci.san-leandro.ca.us/newsmajprojupdates.html) and personal communications with City of San Leandro Engineering and Planning Staff

Large-scale transportation projects and other actions requiring federal approval are generally subject to laws and permit processes requiring consideration of and mitigation for impacts to special-status species and their habitats; wetlands and waters of the U.S., water quality; cultural resources; and parks and recreation resources. These laws and requirements assure that the impacts of such undertakings would be fully mitigated. Minimization and mitigation measures required for these projects would ensure that they would have no contribution to cumulative impacts.

Primary threats to biological and wetlands resources are from urban and agricultural development, however, these types of local projects are not consistently subject to the types of laws and permit requirements as federal actions. Therefore, the discussion of cumulative impacts includes local development projects for which no or only limited regulatory protections exist, or for which such regulation might be applied inconsistently.

### *Environmental Consequences*

The proposed I-880 Southbound HOV Lane project would result in no adverse impacts to a number of environmental resources, including existing and future land use, the coastal zone, wild and scenic rivers, growth, farmlands/timberlands, community character and cohesion, relocations, environmental justice and natural communities. Therefore, the proposed project would not contribute considerably to cumulative impacts to these environmental resources.

The discussion below is limited to environmental topics that are not already accounted for by the 2035 project projections (e.g., transportation, air, noise) and that have the potential to be cumulatively-impacted by the proposed project and reasonable foreseeable projects in the project area.

#### Land Use

As described in Section 2.1.1, the proposed project includes all or portions of three Metropolitan Transportation Commission (MTC) projects, as listed in the *Transportation 2035 Plan for the San Francisco Bay Area* dated April 2009 and would be consistent with the stated objectives of local jurisdictions. The consistency of other improvements in the vicinity of the project site with relevant local plans or policies would be determined as part of individual project approval. Therefore, the proposed project would not contribute substantially to a cumulative impact with these other projects, nor do the projects taken together result in a considerable cumulative land use impact.

#### Visual/Aesthetics

The proposed project, in conjunction with other improvements in the vicinity of the project site, would result in cumulative visual changes in the project corridor. These projects will be required to individually assess any adverse effects to landscaped areas or other elements resulting from development of each project. In many cases, avoidance measures would be similar to the measures proposed as part of this project, including aesthetic treatments (i.e., tree planting, terraced block wall), replacement planting, and other architectural treatments. In general, although surrounding commercial and residential uses would experience a perceptible change, it is expected to be minor and is not anticipated to be adverse.

### Cultural Resources

The proposed project would not result in any adverse effects to cultural resources as no known historical or archaeological resources were identified in or adjacent to the project site and compliance with Department policy and the State Health and Safety Code would protect previously unidentified resources. Because the impacts to cultural resources are relatively minor and would be mitigated by measures specified in Section 2.1.6, the project does not contribute substantially to a cumulative impact with these other projects, nor do the projects taken together result in considerable cumulative impacts on cultural resources.

### Water Quality and Stormwater Runoff

**Cumulative Impacts to Surface Waters.** The proposed project would increase the total impervious surface within the project limits, but such an increase would be minimal and would not affect the velocity or volume of downstream flow or result in substantial hydraulic changes or erosion. Other projects in the vicinity could increase the amount of impervious surface but would constitute only a small percentage of the total drainage area. Therefore, the potential for future development in the project area to increase impervious surfaces and increase runoff is negligible. In addition, each project would be subject to environmental review and agency permitting that would require avoidance, minimization, and/or mitigation measures to address increases in storm water runoff or impacts to water quality in compliance with the NPDES Permit or other local regulations. Such measures would include preparation and implementation of stormwater treatment plans, construction of detention/infiltration basins or other control measures.

**Cumulative Impacts to Groundwater.** The project would not result in any adverse effects on groundwater quantities in the East Bay Plain aquifer. However, there is a possibility for mobilized pollutants to enter the groundwater through recharge during project construction. As described in Section 2.2.2, Water Quality and Stormwater Runoff, under *Avoidance, Minimization and/or Mitigation*, BMPs would be incorporated into the project in accordance with the Department's SWMP. Other improvements in the vicinity would be required to implement similar measures. With implementation of adequate BMPs, cumulative effects on groundwater would not be adverse.

### Geology/Soils/Seismic/Topography

Geotechnical considerations within the project area would be addressed using the Department's standard design and construction techniques and the recommendations included in the *Geotechnical Design and Material Report*. Effects associated with the proposed project would have no affect on other sites or projects in the vicinity. Therefore, the proposed project would not contribute substantially to a cumulative impact with adjacent projects, nor do the projects taken together result in a considerable cumulative impact.

### Hazardous Waste/Materials

Implementation of the proposed project could result in the release of soil and groundwater contaminants, including aerially-deposited lead, other priority pollutant metals, petroleum hydrocarbons, and volatile organic compounds. Planned projects in the vicinity could also release hazardous materials associated with construction

activities. However, the proposed project and other proposed improvements would be required to adhere to federal, State, and local hazardous materials regulations. As a result, the overall cumulative impact would be minor and is not anticipated to be adverse.

### Biological Resources

Cumulative impacts to biological resources are discussed above in Section 2.3. Because the impacts to biological resources are relatively minor and would be lessened by measures specified in Section 2.3, the project does not contribute substantially to a cumulative impact with these other projects, nor do the projects taken together result in a considerable cumulative impact on biological resources.

### Construction Phase Traffic Impacts

The proposed project in conjunction with reasonably foreseeable future projects in the area would result in construction related impacts (i.e., air quality, noise, water quality). However, the proposed project, as well as other future development projects, would comply with minimization and/or mitigation requirements based on federal, state, and local policies. Adherence to these mitigation requirements would ensure that this project, along with other current and foreseeable future projects, would not contribute to cumulative construction impacts.

As described in Section 2.1.4, *Avoidance, Minimization and Mitigation Measures,* construction of the project would be managed to minimize traffic impacts. Detours and delays would be coordinated with local authorities. Therefore, the project would not contribute to adverse cumulative effects. Permanent cumulative effects of the addition of the HOV lane would increase the capacity of the freeway for high-occupancy vehicles and reduce mainline congestion and freeway travel time.

### *Avoidance, Minimization, and/or Mitigation Measures*

Overall, the results from the analysis conducted for this project show positive effects for resources in the project area. The analysis also shows that the incremental effects of the proposed project, combined with the effects of past, present, and probable future projects are not cumulatively considerable for this project. No avoidance, minimization or mitigation measures are required in addition to those already contained in this document.

## 2.5 CLIMATE CHANGE

### *Regulatory Setting*

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to greenhouse gas (GHG) emissions reduction and climate change research and policy have increased dramatically in recent years. These efforts are primarily concerned with the emissions of GHG related to human activity that include carbon dioxide ($CO_2$), methane, nitrous oxide, tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, HFC-23 (fluoroform), HFC-134a (s, s, s, 2 –tetrafluoroethane), and HFC-152a (difluoroethane).

In 2002, with the passage of Assembly Bill 1493 (AB 1493), California launched an innovative and pro-active approach to dealing with GHG emissions and climate change at the state level. Assembly Bill 1493 requires the California Air Resources Board (CARB) to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year; however, in order to enact the standards California needed a waiver from the U.S. Environmental Protection Agency (EPA). The waiver was denied by EPA in December 2007. See California v. Environmental Protection Agency, 9th Cir. Jul. 25, 2008, No. 08-70011. However, on January 26, 2009, it was announced that EPA will reconsider their decision regarding the denial of California's waiver. On May 18, 2009, President Obama announced the enactment of a 35.5 mpg fuel economy standard for automobiles and light duty trucks which will take effect in 2012. This standard is the same standard that was proposed by California, and so the California waiver request has been shelved.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by the 2020 and 3) 80 percent below the 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. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

With Executive Order S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this executive order, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

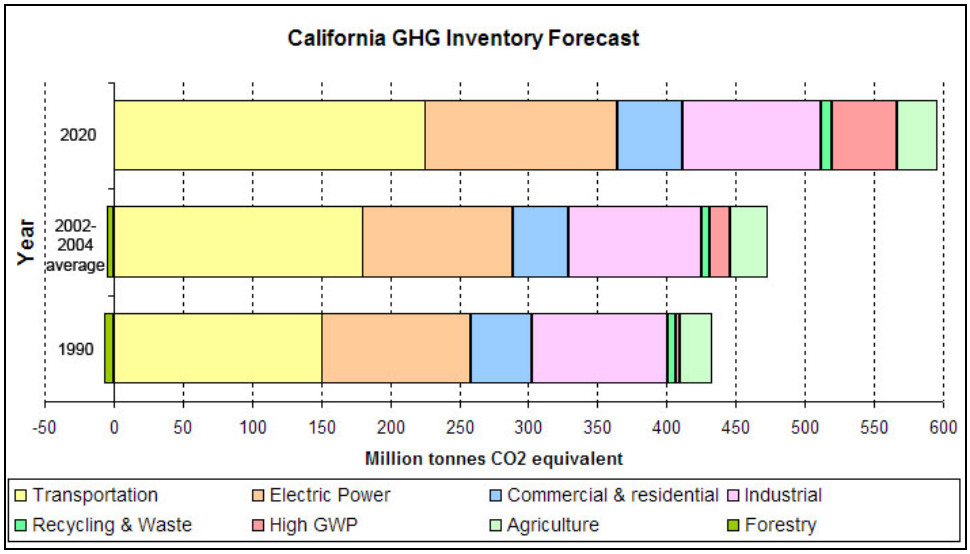
Climate change and GHG reduction is also a concern at the federal level; however, at this time, no legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change. California, in conjunction with several environmental organizations and several other states, sued to force the U.S. Environmental Protection Agency (EPA) to regulate GHG as a pollutant under the Clean Air Act (Massachusetts vs. Environmental Protection Agency et al., 549 U.S. 497 (2007). The court ruled that GHG does fit within the Clean Air Act's definition of a pollutant, and that the EPA does have the authority to regulate GHG. Despite the Supreme Court ruling, there are no promulgated federal regulations to date limiting GHG emissions.

According to Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate change in CEQA Documents (March 5, 2007), 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 participate in a potential impact through its incremental contribution combined with the contributions of all other sources of GHG. In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable." See CEQA Guidelines sections 15064(i)(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.

As part of its supporting documentation for the Draft Scoping Plan, CARB recently released an updated version of the GHG inventory for California (June 26, 2008). Shown below is a graph from that update that shows the total GHG emissions for California for 1990, 2002-2004 average, and 2020 projected if no action is taken.

**Table 2.5-1. California Greenhouse Gas Inventory**



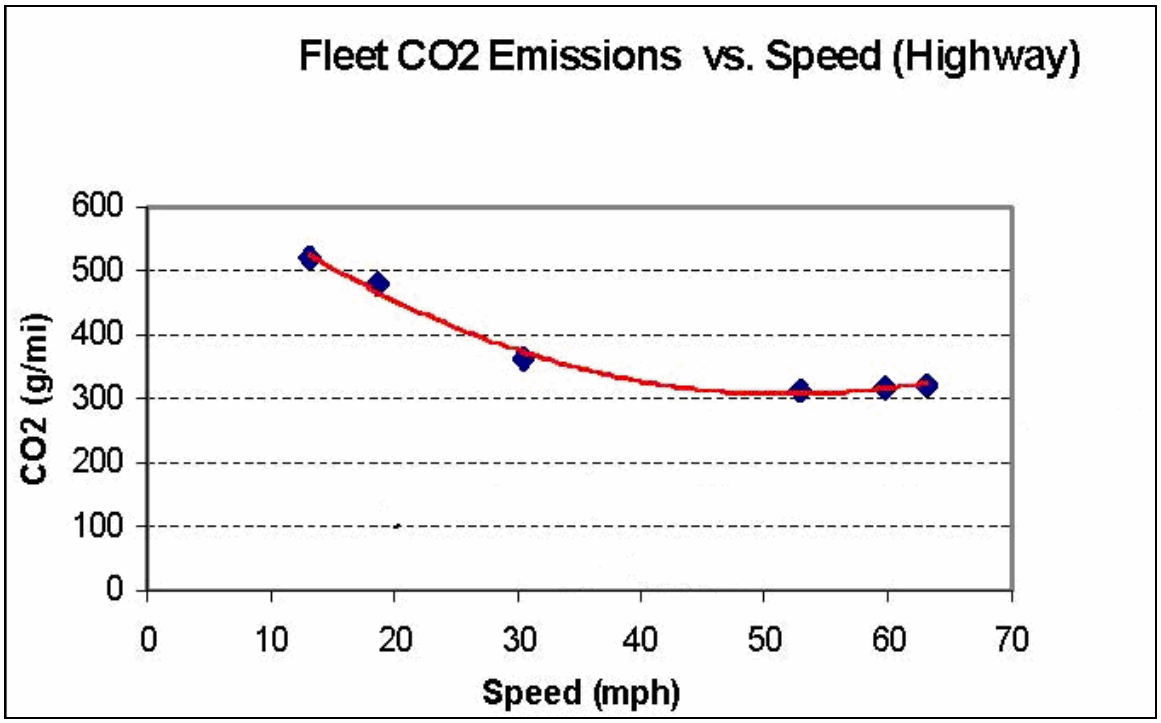

Source: http://www.arb.ca.gov/cc/inventory/data/forecast.htm

Caltrans 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 (see Climate Action Program at Caltrans (December 2006), Caltrans has created and is implementing the Climate Action Program at Caltrans that was published in December 2006. This document can be found at: http://www.dot.ca.gov/docs/ClimateReport.pdf.

### *Project Analysis*

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 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 Table 2.5-2 below). To the extent that a project relieves congestion by enhancing operations and improving travel times in high congestion travel Corridors, GHG emissions, particularly $CO_2$, may be reduced.

**Table 2.5-2. Fleet $CO_2$ Emissions vs. Speed (Highway)**




Source: Center for Clean Air Policy:
http://www.ccap.org/Presentations/Winkelman%20TRB%202004%20(1-13-04).pdf

### AB 32 Compliance

Caltrans continues to be actively involved on the Governor's Climate Action Team as CARB works to implement the Governor's Executive Orders and help achieve the targets set forth in AB 32. Many of the strategies Caltrans is using to help meet the targets in AB 32 come from the California Strategic Growth Plan, which is updated each year. Governor Arnold Schwarzenegger's Strategic Growth Plan calls for a $238.6 billion infrastructure improvement program to fortify the state's transportation system, education, housing, and waterways, including $100.7 billion in transportation funding through 2016.[1] 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 yield the promised reduction in congestion. The Strategic Growth Plan relies on a complete systems approach of a variety of strategies: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements.

As part of the Climate Action Program at Caltrans (December 2006, http://www.dot.ca.gov/docs/ClimateReport.pdf), Caltrans is supporting efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies: job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. Caltrans is working closely with local jurisdictions on planning

[1] Governor's Strategic Growth Plan, Fig. 1 (http://gov.ca.gov/pdf/gov/CSGP.pdf)

activities; however, Caltrans does not have local land use planning authority. Caltrans is also supporting efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks; Caltrans is doing this by supporting on-going research efforts at universities, by supporting legislative efforts to increase fuel economy, and by its participation on the Climate Action Team. It is important to note, however, that the control of the fuel economy standards is held by EPA and CARB. Lastly, the use of alternative fuels is also being considered; the Department is participating in funding for alternative fuel research at the UC Davis.

The proposed I-880 Southbound HOV Lane project is considered "growth accommodating" since it will provide sufficient roadway capacity to accommodate increases in regional and local traffic. The project is needed in response to growth forecasts and does not provide excess capacity for unanticipated growth. Since the project is not a "land use" project, new vehicular trips are not generated by the project. By relieving congestion with project improvements, long-term generation of greenhouse gas emissions and contribution to global warming due to the project will be reduced.

Table 2.5-3 summarizes the Department and statewide efforts that Caltrans is implementing in order to reduce GHG emissions. For more detailed information about each strategy, please see Climate Action Program at Caltrans (December 2006); it is available at http://www.dot.ca.gov/docs/ClimateReport.pdf.

The project would support regional air quality attainment goals by reducing congestion and delay. To the extent that it is applicable or feasible for the project and through coordination with the project development team, the following measures would be included in the project to reduce the GHG emissions and potential climate change impacts from the project:

- Caltrans and the California Highway Patrol are working with regional agencies to implement intelligent transportation systems (ITS) to help manage the efficiency of the existing highway system. 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.
- Landscaping reduces surface warming, and through photosynthesis, decreases $CO_2$. The project shall include revegetation of portions of the interchanges or along the I-880 mainline where vegetation removal would occur. Trees and ornamental landscaping would help offset any potential $CO_2$ emissions increase.
- The project shall incorporate the use of energy efficient lighting, such as LED traffic signals. LED bulbs — or balls, in the stoplight vernacular — cost $60 to $70 apiece but last five to six years, compared to the one-year average lifespan of the incandescent bulbs previously used. The LED balls themselves consume 10 percent of the electricity of traditional lights, which will also help reduce the projects $CO_2$ emissions.[1]
- According to Caltrans Standard Specification Provisions, idling time for lane closure during construction is restricted to ten minutes in each direction; in addition, the

[1] Knoxville Business Journal, "LED Lights Pay for Themselves," May 19, 2008 at http://www.knoxnews.com/news/2008/may/19/led-traffic-lights-pay-themselves/.

contractor must comply with Bay Area Air Quality Management District's rules, ordinances, and regulations in regards to air quality restrictions.

### Adaptation Strategies

"Adaptation strategies" refer to how Caltrans and others can plan for the effects of climate change on the state's transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, storm surges and intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damaging roadbeds by longer periods of intense heat; increasing storm damage from flooding and erosion; and inundation from rising sea levels. These effects will vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. There may also be economic and strategic ramifications as a result of these types of impacts to the transportation infrastructure.

## Table 2.5-3. Climate Change Strategies

| Strategy | Program | Partnership | | Method/Process | Estimated $CO_2$ Savings (MMT) | |
|---|---|---|---|---|---|---|
| | | Lead | Agency | | 2010 | 2020 |
| Smart Land Use | Intergovernmental Review (IGR) | Caltrans | Local Governments | Review and seek to mitigate development proposals | Not Estimated | Not Estimated |
| | Planning Grants | Caltrans | Local and regional agencies & other stakeholders | Competitive selection process | Not Estimated | Not Estimated |
| | Regional Plans and Blueprint Planning | Regional Agencies | Caltrans | Regional plans and application process | 0.975 | 7.8 |
| Operational Improvements & Intelligent Trans. System (ITS) Deployment | Strategic Growth Plan | Caltrans | Regions | State ITS; Congestion Management Plan | .007 | 2.17 |
| Mainstream Energy & GHG into Plans and Projects | Office of Policy Analysis & Research; Division of Environmental Analysis | Interdepartmental effort | | Policy establishment, guidelines, technical assistance | Not Estimated | Not Estimated |
| Educational & Information Program | Office of Policy Analysis & Research | Interdepartmental, CalEPA, CARB, CEC | | Analytical report, data collection, publication, workshops, outreach | Not Estimated | Not Estimated |
| Fleet Greening & Fuel Diversification | Division of Equipment | Department of General Services | | Fleet Replacement<br>B20<br>B100 | 0.0045 | 0.0065<br>0.45<br>.0225 |
| Non-vehicular Conservation Measures | Energy Conservation Program | Green Action Team | | Energy Conservation Opportunities | 0.117 | .34 |

| Strategy | Program | Partnership | | Method/Process | Estimated $CO_2$ Savings (MMT) | |
|---|---|---|---|---|---|---|
| | | Lead | Agency | | 2010 | 2020 |
| Portland Cement | Office of Rigid Pavement | Cement and Construction Industries | | 2.5 % limestone cement mix<br>25% fly ash cement mix<br>> 50% fly ash/slag mix | 1.2<br>.36 | 3.6 |
| Goods Movement | Office of Goods Movement | Cal EPA, CARB, BT&H, MPOs | | Goods Movement Action Plan | Not Estimated | Not Estimated |
| Total | | | | | 2.72 | 18.67 |

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, Governor Schwarzenegger signed Executive Order S-13-08 which directed a number of state agencies to address California's vulnerability to sea level rise caused by climate change.

The California Resources Agency (now the Natural Resources Agency, (Resources Agency), through the interagency Climate Action Team, was directed to coordinate with local, regional, state and federal public and private entities to develop a state Climate Adaptation Strategy. The Climate Adaptation Strategy will summarize the best known science on climate change impacts to California, assess California's vulnerability to the identified impacts and then outline solutions that can be implemented within and across state agencies to promote resiliency.

As part of its development of the Climate Adaptation Strategy, the Resources Agency was directed to request the National Academy of Science to prepare a *Sea Level Rise Assessment Report* by December 2010 to advise how California should plan for future sea level rise. The report is to include:

- Relative sea level rise projections for California, 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 for California.

Furthermore, Executive Order S-13-08 directed the Business, Transportation, and Housing Agency to prepare a report to assess vulnerability of transportation systems to sea level 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.

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. However, all projects that have filed a Notice of Preparation, and/or are programmed for construction funding the next five years (through 2013), or are routine maintenance projects as of the date of Executive Order S-13-08 may, but are not required to, consider these planning guidelines. 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. (Executive Order S-13-08 allows some exceptions to this planning requirement.)

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 as part of Governor's Schwarzenegger's Executive Order on Sea Level Rise and is mobilizing to be able to respond to the National Academy of Science report on *Sea Level Rise Assessment* which is due to be released by December 2010. 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 impacts, 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.

The I-880 Southbound HOV Lane project has been approved for CMIA funding for construction in the 2010/2011 fiscal year. Although no further analysis is required to assess project vulnerability to sea level rise in accordance with Executive Order S-13-08, additional information is provided below.

In April 2009, the San Francisco Bay Conservation Development Commission (BCDC) issued a Draft Staff Report, *Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on the Shoreline*, that reflects current knowledge regarding the potential impacts of climate change on the San Francisco Bay region. The following information is referenced from this timely report.

According to the report, the San Francisco Bay will experience a sea level rise of 16 inches by mid-century and 55 inches by the end of the century as a result of global warming. Climate change may increase storm activity and, combined with higher sea levels, would result in flooding. This sea level rise would flood 180,000 acres of Bay shoreline by mid-century and 213,000 acres by the end of the century. These estimates are generally consistent with other state planning, although the State of California continues to formulate statewide policy direction for adapting to sea level rise. The study conservatively uses a 16-inch sea level rise by mid-century forecast and a 55-inch rise by the end of the century forecast based on higher greenhouse gas emissions scenarios in order to better protect public safety and to generate plans that will address extreme conditions.

Roads and highways, a critical component of moving goods in the region, may be directly impacted by sea level rise and extreme flooding because of the proximity to the Bay. According to the BCDC Staff Report, approximately 99 miles of the major roads and highways within the region are vulnerable to a 16-inch rise in Bay water levels, and approximately 186 miles of major roads and highways are vulnerable to a 55-inch rise. Although I-880 includes significant portions of roadway that are vulnerable to flooding, the elevation of the roadway along the project alignment is higher than the forecast sea levels, and therefore not directly vulnerable to these estimates of sea level rise. For reference, I-880 was mostly built at-grade or on fill with an approximate elevation of 30

feet above mean sea level (amsl) near the Marina Boulevard overcrossing and decreasing to an elevation of 11 feet amsl near the Hegenberger Road overcrossing at I-880. Finally, although the elevation of the I-880 project alignment may not be directly vulnerable to flooding, secondary impacts from sea level rise could occur, including: erosion or undermining of protective and/or highway structures, traffic diversions, and increased construction activity.

### Construction Emissions

GHG 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. During construction activities, the proposed project would be subject to the Caltrans Standard Specifications Provisions and the Bay Area Air Quality Management District's (BAAQMD) rules and ordinances related to construction equipment emissions and maintenance.

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# Chapter 3 Comments and Coordination

Early and continuing coordination with the general public and appropriate public agencies is an essential part of the environmental process. It helps planners to determine the necessary scope of environmental documentation, the level of analysis required, and to identify potential impacts and mitigation measures and related environmental requirements. Agency consultation and public participation for this project have been accomplished through a variety of formal and informal methods, including: public meetings, local government and UPRR coordination meetings, and agency consultation. This chapter summarizes the results of the Department's efforts to fully identify, address and resolve project-related issues through early and continuing coordination.

## 3.1 Public Participation

### 3.1.1 Early Informational Meeting

ACCMA, City of San Leandro and ACTIA jointly conducted a public open house at Woodrow Elementary School, 1300 Williams Street, San Leandro on May 27, 2009 for the I-880 Southbound HOV Lane Project and other planned City projects in the I-880/Davis Street interchange area. The meeting was advertised in local newspapers, and notices were posted on the City of San Leandro website. In addition, notices were posted to 574 property owners/residents and seven elected officials were invited. Displays illustrating the proposed improvements, project schedule, funding, and environmental subject areas being studied were provided at the meeting. A presentation summarized the project and the planned environmental and design process/steps, including future opportunities to provide comment and input during circulation of the environmental document for public review and comment. Approximately 70 residents attended the meeting, as well as representatives from Caltrans, ACCMA, City of San Leandro and ACTIA. Topics raised and covered at the meeting included the proposed improvements (in particular the I-880/Davis Street Interchange improvements) and concerns pertaining to air quality, noise and landscaping.

### 3.1.2 Public Meeting

It is anticipated that a public meeting will be held, or at least the opportunity for a public meeting will be extended, before any action is taken to adopt a Negative Declaration or request a Finding of No Significant Impact on the Interstate 880 Southbound HOV Lane Extension project.

## 3.2 Project Coordination

### 3.2.1 City of San Leandro Facilities Committee Meetings

**January 13, 2009.** The I-880 Southbound HOV Lane Project was presented at the City of San Leandro City Council and Transportation Committee meeting held at the San Leandro City Hall, located at 835 East 14th Street in San Leandro, on January 13, 2009. The Principal Engineer for the City of San Leandro gave a PowerPoint presentation on issues relating to the I-880/Davis and Marina Interchanges and the I-880 HOV lane

extension. City staff explained that the area would generally remain the same other than bridge improvements and minor changes of ramps. The City Council and Transportation Committee agreed to a meeting with residents to present the project and solicit feedback.

**May 12, 2009.** The project was discussed at the City of San Leandro City Council and Transportation Committee meeting held at the San Leandro City Hall, located at 835 East 14th Street in San Leandro, on May 12, 2009 from 4:00 p.m. to 5:30 p.m. The Principal Engineer for the City of San Leandro was joined by ACCMA staff and the consulting engineer in giving a PowerPoint presentation summarizing the proposed project. The summary included an introduction to the project team, project objectives, a project history and summary, project design plans, and the project schedule and budget. After the presentation, the Principal Engineer for the City of San Leandro, ACCMA, and the consulting engineer took questions from City staff. Questions related to the height of the Davis Street overcrossing, a public meeting, and traffic closures during construction.

### 3.2.2 UPRR Coordination Meeting

Representatives from ACCMA, Caltrans, the consulting engineers, and UPRR attended a UPRR coordination meeting on June 18, 2009. The proposed project, including the proposed structural design features of the UPRR/San Leandro Creek bridge, was summarized for the UPRR. Topics raised during the meeting included UPRR requirements, existing utilities in the UPRR right-of-way below the bridge, proposed columns in the UPRR right-of-way, temporary netting to prevent debris from falling on the track during construction, the possibility of a temporary haul road for construction access on both sides of the track, the feasibility of crane use over the existing tracks, temporary construction easements (TCEs), and site drainage. The meeting closed with a discussion of the project schedule and UPRR Agreements.

## 3.3 Agency Consultation

Consultations with regulatory agencies have been conducted regarding project features, potential impact issues, technical methodologies, and documentation. The Distribution List (Chapter 5) identifies the federal, state, and local agencies that will receive notification of the availability of this environmental document for review. Agencies contacted or consulted during the preparation of this environmental document are summarized in Table 3.1.

## Table 3.1. Agency Consultation

| Agency | Date | Notes |
|---|---|---|
| NOAA Fisheries | To be determined | Section 7 informal consultation for Threatened and Endangered Species (steelhead) to get concurrence on Not Likely to Adversely Affect. |
| U.S. Army Corps of Engineers (USACE) | May 5, 2009 and to be determined | Request and receipt of verification of the jurisdictional delineation report. |
| California Department of Fish and Game (CDFG) | To be determined | CDFG should be contacted to request concurrence that the project is not likely to adversely affect state species of concern (steelhead) and that a Streambed Alteration Agreement is not necessary as a result of potential effects to steelhead during project construction. |
| CDFG | December 3, 2008 | Fish passage assessment findings were submitted to CDFG. |
| SF Bay Conservation Development Commission (BCDC) | December 17, 2008 | Confirmed that San Leandro Creek below I-880 is outside of BCDC jurisdiction. |
| Native American Heritage Commission (NAHC) | June 9, 2008 | Asked NAHC to to review their Sacred Lands File for any Native American cultural resources that might be affected by the proposed project, and requested the names of Native Americans who might have information or concerns about the APE. |
| NAHC | June 12, 2008 | Response fax received saying that the Sacred Lands File does not indicate any “Native American cultural resources in the immediate project area”, and providing a list of Native American contacts. |
| Jakki Kehl | June 16, 2008 (Letter); July 25 (phone call) | Notification of the proposed project and a request for information and concerns. No response received to date. |
| Anne Marie Sayers, Indian Canyon Mutsun Band of Costanoon | June 16, 2008 (Letter); July 25 (phone call) | Notification of the proposed project and a request for information and concerns. On July 25, she recommended that if ground disturbance extends deeper than 1-foot in native soil, an archaeological monitor and a Native American monitor be present. |
| Katherine Erolinda Perez | June 16, 2008 (Letter); July 25 (phone call) | Notification of the proposed project and a request for information and concerns. No response received to date. |
| Rosemary Cambra, Muwekma Ohlene Indian Tribe of the San Francisco Bay Area | June 16, 2008 (Letter); July 25 (phone call) | Notification of the proposed project and a request for information and concerns. No response received to date. |
| Andrew Galvan, the Ohlone Indian Tribe | June 16, 2008 (Letter); July 25 (phone call) | Notification of the proposed project and a request for information and concerns. On July 25, he requested a copy of the records search and literature review results, and a copy of the recommendations made by this Archaeological Survey Report. He would like an archaeological monitor and a Native American monitor present for all ground disturbance. |
| Irene Zwierlein, Amah/Mutsun Tribal Band | June 16, 2008 (Letter); July 25 (phone call) | Notification of the proposed project and a request for information and concerns. On July 25, she stated “you’d better have your cultural monitor.” |
| Ramona Garibay, Trina Marine Ruano Family | June 16, 2008 (Letter) | Notification of the proposed project and a request for information and concerns. No response received to date. |
| Alameda County Historical | June 9, 2008 (letter); July 28, 2008 (voicemail); | Notification of the proposed project and a request for information or concerns regarding historic resources in the project vicinity. |

| Agency | Date | Notes |
|---|---|---|
| Society | October 8, 2008 (letter); October 22, 2008 (email) | |
| Alameda County Historical Society | October 23, 2008 | Response from the Alameda County Historical Society indicating no concerns about the proposed project. |
| Oakland Museum of California | July 28, 2008 (voicemail); October 8, 2008 (letter), October 22, 2008 (voicemail) | Notification of the proposed project and a request for information or concerns regarding cultural resources in the project vicinity. No response received to date. |
| Oakland Cultural Heritage Society | October 8, 2008 (letter); October 22, 2008 (voicemail) | Notification of the proposed project and a request for information or concerns regarding cultural resources in the project vicinity. No response received to date. |
| San Leandro Historical Society | October 8, 2008 (letter); October 22, 2008 (voicemail) | Notification of the proposed project and a request for information or concerns regarding cultural resources in the project vicinity. No response received to date. |

# Chapter 4 List of Preparers

## Caltrans Oversight Staff

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Ed Pang, Senior Environmental Planner, Caltrans, District 4

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## Rajappan and Meyer Consulting Engineers, Inc.

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Jason Lui, Senior Noise Specialist
Teak Kim, Senior Noise Specialist

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Marty Beene, P.E., Lead for Travel Forecast Analysis and Traffic Operations Analysis

***Parikh Consultants, Inc. – Geotechnical***

Gary Parikh, P.E., Principal Geotechnical and Environmental Engineer
Y. David Wang, P.E., Principal

***Schaaf & Wheeler Consulting Civil Engineers – Floodplain and Water Quality***

Charles Hardy, P.E., Associate Engineer

***Geocon Consultants, Inc. – Hazardous Materials***

Richard Day, Regional Manager
Chris Giuntoli, Senior Project Scientist
David Watts, Senior Project Scientist
Lauren Vigliotti, Senior Staff Geologist

# Chapter 5 Distribution List

## ELECTED FEDERAL OFFICIALS

### Members of the U.S. Senate:

The Honorable Barbara Boxer
United States Senator
1700 Montgomery Street, Suite 240
San Francisco, CA 94111

The Honorable Dianne Feinstein
United States Senator
One Post Street, Suite 2450
San Francisco, CA 94104

### Members of the House:

The Honorable Barbara Lee
United States Representative
9th Congressional District of California
1301 Clay Street Suite 1000-N
Oakland, CA 94612

The Honorable Pete Stark
United States Representative
13th Congressional District of California
39300 Civic Center Drive, Suite 220
Fremont, CA 94538

## ELECTED STATE OFFICIALS

### Members of the State Senate:

The Honorable Loni Hancock
Member of the Senate
9th District
1515 Clay Street, Suite 2202
Oakland, CA 94612

The Honorable Ellen Corbett
California State Senate
10th District
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San Leandro, CA 94577

### Members of the State Assembly:

The Honorable Sandre R. Swanson
Member of the Assembly
16th District
1515 Clay Street, Suite 2204
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The Honorable Mary Hayashi
Member of the California Assembly
18th District
22320 Foothill Boulevard, Suite 540
Hayward, CA 94541

## ELECTED LOCAL OFFICIALS

### County Board of Supervisors:

The Honorable Nathan A. Miley
Board of Supervisors, Alameda County
District 4
County Administration Building
1221 Oak Street, Room 536
Oakland, CA 94612-4224

The Honorable Alice Lai-Bitker
Board of Supervisors, Alameda County
District 3
County Administration Building
1221 Oak Street, Room 536
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### Mayors:

The Honorable Ron Dellums
Mayor
City of Oakland
One Frank Ogawa Plaza
(One City Hall Plaza)
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Oakland, California 94612

The Honorable Tony Santos
Mayor
City of San Leandro
835 E. 14th Street
San Leandro, CA 94577

**FEDERAL AGENCIES**

Environmental Protection Agency,
Region IX
Federal Activities Office, CMD-2
75 Hawthorne Street
San Francisco, CA 94105-3901

Federal Transit Administration, Region IX
201 Mission Street, Suite 1650
San Francisco, CA 94105

U.S. Fish and Wildlife Service
Sacramento Field Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

National Marine Fisheries Service
Santa Rosa Field Office
Attn: Protected Resources Division
777 Sonoma Ave, Room 325
Santa Rosa, CA 95404

U.S. Army Corps of Engineers
San Francisco District
Attention: CESPN-CO-R
333 Market Street, 8th floor
San Francisco, CA 94105-2197

**STATE AGENCIES**

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1120 N Street, Room 2221 (MS-52)
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State Clearinghouse, Executive Officer
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# Appendix A California Environmental Quality Act Checklist

Supporting documentation of all CEQA checklist determinations is provided in Chapter 2 of this Initial Study/Environmental Assessment. Documentation of "No Impact" determinations is provided at the beginning of Chapter 2. Discussion of all impacts, avoidance, minimization, and/or compensation measures under the appropriate topic headings in Chapter 2.

This checklist identifies physical, biological, social and economic factors that might be affected by the proposed project. In many cases, background studies performed in connection with the projects indicate no impacts. A NO IMPACT answer in the last column reflects this determination. The words "significant" and "significance" used throughout the following checklist are related to CEQA, not NEPA, impacts.

| | Potentially Significant Impact | Less Than Significant with Mitigation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **I. AESTHETICS**: Would the project: | | | | |
| a) Have a substantial adverse effect on a scenic vista | ☐ | ☐ | ☐ | ☒ |
| b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway | ☐ | ☐ | ☐ | ☒ |
| c) Substantially degrade the existing visual character or quality of the site and its surroundings? | ☐ | ☐ | ☒ | ☐ |
| d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? | ☐ | ☐ | ☒ | ☐ |
| **II. AGRICULTURE RESOURCES**: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project: | | | | |
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | ☐ | ☐ | ☐ | ☒ |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | ☐ | ☐ | ☐ | ☒ |
| c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use? | ☐ | ☐ | ☐ | ☒ |

| | Potentially Significant Impact | Less Than Significant with Mitigation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **III. AIR QUALITY**: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project: | | | | |
| a) Conflict with or obstruct implementation of the applicable air quality plan? | ☐ | ☐ | ☐ | ☒ |
| b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation? | ☐ | ☐ | ☐ | ☒ |
| c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non- attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? | ☐ | ☐ | ☐ | ☒ |
| d) Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☐ | ☐ | ☒ |
| e) Create objectionable odors affecting a substantial number of people? | ☐ | ☐ | ☐ | ☒ |
| **IV. BIOLOGICAL RESOURCES**: Would the project: | | | | |
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? | ☐ | ☐ | ☒ | ☐ |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service? | ☐ | ☐ | ☐ | ☒ |
| c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ☐ | ☐ | ☐ | ☒ |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☐ | ☐ | ☐ | ☒ |
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☐ | ☐ | ☒ |

| | Potentially Significant Impact | Less Than Significant with Mitigation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☐ | ☐ | ☒ |
| **V. CULTURAL RESOURCES**: Would the project: | | | | |
| a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5? | ☐ | ☐ | ☐ | ☒ |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | ☐ | ☐ | ☐ | ☒ |
| c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ☐ | ☐ | ☒ |
| d) Disturb any human remains, including those interred outside of formal cemeteries? | ☐ | ☐ | ☐ | ☒ |
| **VI. GEOLOGY AND SOILS**: Would the project: | | | | |
| a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: | | | | |
| i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42? | ☐ | ☐ | ☐ | ☒ |
| ii) Strong seismic ground shaking? | ☐ | ☐ | ☒ | ☐ |
| iii) Seismic-related ground failure, including liquefaction? | ☐ | ☐ | ☒ | ☐ |
| iv) Landslides? | ☐ | ☐ | ☐ | ☒ |
| b) Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ☐ | ☒ |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | ☐ | ☐ | ☐ | ☒ |
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? | ☐ | ☐ | ☐ | ☒ |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? | ☐ | ☐ | ☐ | ☒ |

| | Potentially Significant Impact | Less Than Significant with Mitigation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **VII. HAZARDS AND HAZARDOUS MATERIALS**: Would the project: | | | | |
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☐ | ☐ | ☐ | ☒ |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | ☐ | ☐ | ☐ | ☒ |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ☐ | ☐ | ☐ | ☒ |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | ☐ | ☐ | ☐ | ☒ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? | ☐ | ☐ | ☐ | ☒ |
| f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? | ☐ | ☐ | ☐ | ☒ |
| g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☐ | ☒ |
| h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? | ☐ | ☐ | ☐ | ☒ |
| **VIII. HYDROLOGY AND WATER QUALITY**: Would the project: | | | | |
| a) Violate any water quality standards or waste discharge requirements? | ☐ | ☐ | ☐ | ☒ |
| b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? | ☐ | ☐ | ☐ | ☒ |

| | Potentially Significant Impact | Less Than Significant with Mitigation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? | ☐ | ☐ | ☐ | ☒ |
| d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? | ☐ | ☐ | ☒ | ☐ |
| e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? | ☐ | ☐ | ☒ | ☐ |
| f) Otherwise substantially degrade water quality? | ☐ | ☐ | ☐ | ☒ |
| g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? | ☐ | ☐ | ☐ | ☒ |
| h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows? | ☐ | ☐ | ☐ | ☒ |
| i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? | ☐ | ☐ | ☐ | ☒ |
| j) Inundation by seiche, tsunami, or mudflow | ☐ | ☐ | ☐ | ☒ |
| **IX. LAND USE AND PLANNING**: Would the project: | | | | |
| a) Physically divide an established community? | ☐ | ☐ | ☐ | ☒ |
| b)Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? | ☐ | ☐ | ☐ | ☒ |
| c) Conflict with any applicable habitat conservation plan or natural community conservation plan? | ☐ | ☐ | ☐ | ☒ |
| **X. MINERAL RESOURCES**: Would the project: | | | | |
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | ☐ | ☐ | ☐ | ☒ |
| b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | ☐ | ☐ | ☐ | ☒ |

| | Potentially Significant Impact | Less Than Significant with Mitigation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **XI. NOISE**: Would the project result in: | | | | |
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☐ | ☒ | ☐ |
| b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? | ☐ | ☐ | ☒ | ☐ |
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☐ | ☒ | ☐ |
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☐ | ☒ | ☐ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |
| **XII. POPULATION AND HOUSING**: Would the project: | | | | |
| a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | ☐ | ☐ | ☐ | ☒ |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |
| **XIII. PUBLIC SERVICES**: | | | | |
| a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | ☐ | ☐ | ☐ | ☒ |
| Fire protection? | ☐ | ☐ | ☐ | ☒ |

| | Potentially Significant Impact | Less Than Significant with Mitigation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| Police protection? | ☐ | ☐ | ☐ | ☒ |
| Schools? | ☐ | ☐ | ☐ | ☒ |
| Parks? | ☐ | ☐ | ☐ | ☒ |
| Other public facilities? | ☐ | ☐ | ☐ | ☒ |
| **XIV. RECREATION**: | | | | |
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☐ | ☒ |
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☐ | ☒ |
| **XV. TRANSPORTATION/TRAFFIC**: Would the project: | | | | |
| a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)? | ☐ | ☐ | ☐ | ☒ |
| b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways? | ☐ | ☐ | ☐ | ☒ |
| c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks? | ☐ | ☐ | ☐ | ☒ |
| d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☐ | ☐ | ☐ | ☒ |
| e) Result in inadequate emergency access? | ☐ | ☐ | ☐ | ☒ |
| f) Result in inadequate parking capacity? | ☐ | ☐ | ☐ | ☒ |
| g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)? | ☐ | ☐ | ☐ | ☒ |
| **XVI. UTILITIES AND SERVICE SYSTEMS**: Would the project: | | | | |

| | Potentially Significant Impact | Less Than Significant with Mitigation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? | ☐ | ☐ | ☐ | ☒ |
| b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☐ | ☒ |
| c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☐ | ☒ |
| d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? | ☐ | ☐ | ☐ | ☒ |
| e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ☐ | ☒ |
| f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? | ☐ | ☐ | ☐ | ☒ |
| g) Comply with federal, state, and local statutes and regulations related to solid waste? | ☐ | ☐ | ☐ | ☒ |
| **XVII. MANDATORY FINDINGS OF SIGNIFICANCE** | | | | |
| a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | ☐ | ☐ | ☐ | ☒ |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? | ☐ | ☐ | ☐ | ☒ |
| c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☐ | ☐ | ☒ |

# Appendix B Title VI Policy Statement

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January 14, 2005

# TITLE VI
# POLICY STATEMENT

The California Department of Transportation under Title VI of the Civil Rights Act of 1964 and related statutes, ensures that no person in the State of California shall, on the grounds of race, color, national origin, sex, disability, and age, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity it administers.

WILL KEMPTON
Director

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# Appendix C List of Technical Studies

A number of technical studies were used to analyze the impacts of the proposed project and the no-build alternative, and are summarized in the EA/IS. These studies include:

- Air Quality Assessment Report, LSA Associates, Inc., June 2009
- Archaeological Survey Report, LSA Associates, Inc., May 2009
- Asbestos and Lead Containing Paint Survey, Geocon Consultants, Inc., December 2008
- Conceptual Drainage Report, Schaaf & Wheeler, January 2009 (Draft)
- Historic Property Survey Report, LSA Associates, Inc., October 2009
- Geotechnical Design and Material Report, Parikh Consultants, Inc., August 2009 (Draft)
- Hydraulic Study Report of the San Leandro Creek Bridge, Schaaf & Wheeler, March 2009
- Initial Site Assessment, Parikh Consultants, Inc., November 2006
- Limited Site Investigation Report, Geocon Consultants, Inc., December 2008
- Location Hydraulic Study Report, Schaaf & Wheeler, August 2008
- Natural Environment Study, LSA Associates, Inc., July 2009
- Noise Study Report, LSA Associates, Inc., May 2009
- Noise Abatement Decision Report, LSA Associates, Inc., July 2009
- Traffic Forecasts Technical Memorandum, Dowling Associates, Inc., November 2008
- Traffic Operations Analysis Report, Dowling Associates, Inc., August 2009 (Draft)
- Water Quality Assessment Report, Schaaf & Wheeler, November 2008 (Draft)

Technical studies are available for viewing, along with copies of the EA/IS at:

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