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 FHWA 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 affected by the project.

The base floodplain is defined in 23 CFR 650.105 as "the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the base floodplain."

Affected Environment

The following text is based on the location hydraulic study and summary floodplain encroachment report for the proposed project (Mark Thomas & Co. and Nolte Associates 2008a) and the stormwater data report for the proposed project (Mark Thomas & Co. and Nolte Associates 2008b).

Solano County, a central region of California, is characterized by a Mediterranean climate. Summer is dominated by subtropical high pressure cells, with dry sinking air capping a surface marine layer of varying humidity, making rainfall impossible or unlikely but for the odd thunderstorm. During winter, the polar jet stream and associated periodic storms reach into the lower latitudes of the Mediterranean zones, bringing approximately 95% of the total precipitation for the region. Temperatures range from 27°C (80°F) to 43°C (110°F) in summer and from -1°C (30°F) to 10°C (50°F) in winter.

The San Francisco Bay RWQCB lists this region as Area 2 of its domain. The San Francisco Bay RWQCB further notes that its rainy season is from October 15 to April 15. Average rainfall for this area is 16 inches, and average rainfall for the western mountains is 30 inches.

The land gradually slopes to the south toward Suisun Bay. The area is composed of relatively flat grazing plains and rural open space with gently sloping hills adjacent to the I-80/I-680 interchange. The Vaca Mountains lie to the north of Suisun Valley and Fairfield. Along the reach

of the project area, two named creeks convey runoff to Suisun Bay to the south: Suisun Creek and Raines Drain. Historically, agriculture has affected runoff patterns in the areas adjacent to the project. There is extensive urban development in areas to the west and east of the project but not in the immediate project area. The affected drainage areas are on-site areas only, with minimal impacts on the flood plain. The watersheds will not be affected.

Suisun Creek and Raines Drain

The 100-year flow in Suisun Creek passes under the I-80 bridge without flooding the highway. However, at several locations within 2 miles upstream of I-80, 100-year flows escaped from the banks of Suisun Creek, flowing away from the creek. Some of these flood flows encounter the I-80 embankment at Raines Drain. The capacity of the Raines Drain cross culverts is not sufficient to carry the 100-year flood flows across the highway, causing flood flows to overtop the highway at this location, as defined on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM).

Environmental Consequences

The project would not involve construction of housing in the local 100-year floodplain, and the truck scale facility structures would be elevated above the floodplain. The project is not downstream of any dams or large bodies of water (as it is located approximately 8 miles north of Suisun Bay) and would not pose any risk of flooding hazards as a result of dam failure. Although levees line some of the creeks that cross under the highway, the risk of a levee failure significantly affecting people or structures would be low. The project area is located in an area of relatively flat topography that is not near any large bodies of water (Suisun Bay being located approximately 8 miles to the south). The potential for a seiche, tsunami, or mudflow is low.

Impact HYD-1: Impacts on Hydraulic Capacity at Suisun Creek Bridge

The existing highway bridge is 190 feet wide and 73 feet long (in the direction of traffic), while the new Suisun Creek bridge will be significantly longer, at 100 feet long by 63 feet wide (in the direction of traffic). The Suisun Creek side slopes and bottom would not be affected by the new Suisun Creek bridge. In addition, there are no planned modifications to Suisun Creek, and no impacts on the creek are anticipated. Existing FEMA 100-year flow elevation is 5.9 feet beneath the top of the highway elevation, 10.0 feet beneath the top of the new Suisun Creek bridge deck elevation, and 2.9 feet below the lowest point of the deck soffit. There are no planned longitudinal encroachments to the floodplain.

Because the 50-year design flood and the 100-year base flood are both contained within the existing bridge, and the new single-span bridge is higher and wider than the existing bridge, there will be no adverse effects on the hydraulic capacity of Suisun Creek as a result of the project.

Impact HYD-2: Impacts on the Hydraulic Capacity of Raines Drain

The location where Raines Drain crosses the highway is a low point in the highway vertical profile. Originally constructed for irrigation purposes, Raines Drain also serves as a storm drain. The waterway crossing consists of four culverts ranging in size from 42 inches to 66 inches in diameter. One of the 42-inch culverts is blocked at both the upstream and downstream ends per

agreement between the Department and the Solano Irrigation District. Because of poorly defined drainage patterns and low channel capacity, this area is prone to sheet flow flooding from areas to the north and from flood overflows from the upstream reaches of Suisun Creek and Ledgewood Creek. Certain reaches of Suisun Creek and Ledgewood Creek can flood, with overflows flowing away from Suisun Creek toward the Raines Drain crossing. The combined capacity of the three open culverts cannot convey the 50- or 100-year flows under the highway without overtopping. A previous hydraulic study of Raines Drain identifies the flow that reaches the edge of pavement as 300 cfs, and the flow that just begins to overtop the centerline of the highway as 475 cfs. Both of these flow rates are significantly below the 50-year flow rate of 925 cfs. Flood flows in excess of the total culvert capacity cause ponding upstream of the highway, and the FEMA FIRMs indicated that the 100-year high-water elevation crests the highway. Just south of the highway Raines Drain has a bank full capacity of 130 cfs; flows greater than 130 cfs will spread onto the floodplain as shown on the FEMA maps. Presently, one of the 3 existing 42-inch culverts has a control gate in a closed locked condition. Flood flows enter the 66-inch culvert first. At higher runoff rates and elevations, flow will begin to enter the 42-inch culverts. For flows to enter the 42-inch culverts they must first overtop the existing access road and bike lane immediately upstream of the highway.

The project would extend the southern ends of all existing culverts clear of the grading limits of the truck scales and approach ramps. The four existing reinforced concrete pipe (RCP) culverts (1 at 66 inches in diameter and 3 at 42 inches in diameter) would be lengthened approximately 150 feet; the headwalls would be relocated and a portion of Raines Drain would be shortened to match the culvert modifications. The extensions of the three 42-inch culverts and the 66-inch culvert should end at the same new headwall. From the new headwall, a concrete-lined transition will be constructed to match the existing downstream concrete-lined Raines Drain.

The new roadways (the on-ramps and connector) both would have reaches of low elevation that would allow the overtopping flows to cross over them and the freeway. The final roadway design would verify that the Raines Drain overtopping floodplain flows cross the two new roadways with no greater constraint than the existing freeway median. With this design in place, there would be no adverse effect on hydraulic capacity.

Impact HYD-3: Impact on Floodplain

The first flows in Raines Drain and on the Raines Drain floodplain are conveyed in a concrete lined ditch and pass under the freeway via four cross culverts. These existing culverts will be extended to match the width of the new freeway improvement. When the capacity of the existing culverts is exceeded, floodwaters rise on north side of the freeway and eventually overtop the freeway. The existing 100-year floodplain at Raines Drain overtops the mainline. The proposed project would not change the freeway median elevations and therefore would not have an adverse effect north of the highway on the upstream floodplain. The elevation of the new truck scales ramps to not impede flood flows that overtop the freeway; the overtopping flows continue to the existing floodplain south of the freeway. To the south of the highway, the eastbound scales will result in fill placed on the defined floodplain. However, the floodplain in this area is defined as sheet flow with less than 1 foot depth. Fill in this area would not have an adverse effect on the floodplain.

Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation measures are necessary.

Effects of the No-Project Alternative

Under the No-Project Alternative, no new effects on hydrology or floodplain would occur.

2.2.2 Water Quality and Stormwater Runoff

Regulatory Setting

Section 401 of the Clean Water Act (CWA) requires water quality certification from the State Water Resources Control Board (SWRCB) or from an RWQCB when the project requires a CWA Section 404 permit. Section 404 of the CWA requires a permit from the U.S. Army Corps of Engineers (USACE) to discharge dredged or fill material into waters of the United States.

Along with CWA Section 401, CWA Section 402 establishes the NPDES permit for the discharge of any pollutant into waters of the United States. The U.S. Environmental Protection Agency (EPA) has delegated administration of the NPDES program to the SWRCB and nine RWQCBs. The SWRCB and RWQCB also regulate other waste discharges to land within California through the issuance of waste discharge requirements (WDRs) under authority of the Porter-Cologne Water Quality Control Act of 2002 (Porter-Cologne Act).

The SWRCB has developed and issued a statewide NPDES permit to regulate stormwater discharges from all the Department's activities on its highways and facilities. The Department's construction projects are regulated under the statewide permit, and projects performed by other entities on the Department's right-of-way (encroachments) are regulated by the SWRCB's statewide general construction permit. All construction projects on more than 1 acre require a stormwater pollution prevention plan (SWPPP) to be prepared and implemented during construction. The Department's activities on less than 1 acre require a water pollution control program.

Affected Environment

The following discussion is based on information taken from the stormwater data report for the proposed project (Mark Thomas & Co. and Nolte Associates 2008b) and the water quality report for the proposed project (Mark Thomas & Co. and Nolte Associates 2008c).

The project area is located within the Suisun Hydrologic Unit; the Fairfield Hydrologic Area; Hydrological Subarea 207.21, Benicia; and Hydrological Subarea 207.23, Suisun Slough. There are two water bodies (Dan Wilson Creek and Suisun Creek) and one drain (Raines Drain) that cross the project area. Although it is a manmade canal, Raines Drain acts to drain runoff from adjacent land and excess flood flows from Suisun Creek and Ledgewood Creek. Raines Drain is concrete-lined within the project limits.

The project footprint is within the Suisun Creek watershed. The receiving water bodies closest to the project footprint are the Suisun Marsh wetlands, which are between approximately 1 and 2 miles downstream; Suisun Bay, which is approximately 12 miles downstream; and the Carquinez

Strait, which is approximately 19 miles downstream. The general topography of the land is gradually sloping to the south toward Suisun Bay.

The *Water Quality Control Plan for the San Francisco Bay Basin* (basin plan) establishes beneficial uses for waterways and water bodies within the region. Existing beneficial uses for Suisun Creek include freshwater supply, areas of special biological significance, cold freshwater habitat, fish migration, water contact recreation (potential), noncontact water recreation (potential), fish spawning, warm freshwater habitat, and wildlife habitat (San Francisco Regional Water Quality Control Board 2007).

Section 303(d) of the 1972 CWA states that territories and authorized tribes are required to develop a list of water quality–limited segments. These waters on the list do not meet water quality standards, even after point sources of pollution have the minimum required levels of pollution control technology. The water bodies to which the project discharges are not listed on the EPA's 303(d) List of Water Quality Limited Segments.

Of the named water bodies within the project vicinity, the San Francisco Bay RWQCB only lists the Suisun Marsh wetlands as impaired. Specifically, metal concentrations such as arsenic, cadmium, chromium, copper, lead, nickel, and zinc from urban runoff and storm sewers exceed the targeted design total maximum daily loads (TMDLs). However, these constituents also have low TMDL priority. Farther downstream, the Suisun Bay and Carquinez Strait also contain several CWA Section 303(d) listed pollutants (organic compounds, PCBs, mercury, selenium, general particulates and dissolved metals, nutrients and salinity).

Constituent testing in the project area has revealed that aerially-deposited lead (ADL) soils are present within the project footprint. That material would be disposed of in accordance with guidance and regulations (see section 2.2.5).

The project is located in the Suisun-Fairfield Valley groundwater basin (basin 2-3). The depth to groundwater ranges from 3 to 20 feet as reported in the as-built Log of Test Borings (LOTBs) from 1950, 1960, and 1970. These depths should be confirmed during the plans, specifications, and estimates (PS&E) phase. Identified existing beneficial uses are municipal and domestic supply, industrial service supply, industrial process supply, and agricultural supply.

Environmental Consequences

The Department has performed many studies to monitor and characterize highway stormwater runoff throughout the state. Commonly found pollutants are total suspended solids (TSS), nutrients, pesticides, metals, pathogens, litter, biochemical oxygen demand (BOD), and total dissolved solids (TDS). Some sources of these pollutants are natural erosion, phosphorus from tree leaves, combustion products from fossil fuels, the wearing of brake pads, and droppings of wild and domestic animals within state right-of-way.

Impact WQ-1: Increased Runoff and Paved Area

The project would slightly widen the eastbound I-80 mainline and add several thousand feet of separate roadway leading into and out of a new eastbound truck scale area. The project would increase the amount of stormwater runoff within state right-of-way. The project also would add a

significant paved area on acquired right-of-way for parking and inspection areas in support of the scales. No project drainage improvements would occur within Suisun Creek, as the new bridge would clear-span the creek. At Raines Drain, the existing culverts would be extended, replacing a segment of concrete-lined trapezoidal channel. To manage the stormwater runoff, the on-site drainage facilities would be reconfigured within the proposed right-of-way, as part of the project design. The associated watersheds would be only minimally affected. The minor impacts on the receiving water bodies are the result of capacity changes to hydraulic features of the drainage system and are not considered an adverse effect.

Impact WQ-2: Potential Water Quality, Erosion and Sediment Control Issues during Construction

The project has an estimated total disturbed soil area of 49.5 acres. There are about 28.4 acres of new pavement (on existing unpaved ground) and about 2.5 acres (the existing truck scales facility) that may have pavement replaced with natural ground. These aspects of the project could cause potential erosion and sediment control impacts during construction. Proper erosion and sediment control measures would be effective because of the relatively flat terrain and low grading heights.

Construction of the project would involve the use of construction equipment and associated fuels, solvents, lubricants and other pollutants. These substances may be released into the environment during construction and could result in adverse effects to water quality. Implementation of Measure WQ-2 would avoid these potential adverse effects.

Impact WQ-3: Potential to Require Dewatering during Construction

This area historically has high groundwater levels. Groundwater may be encountered in structure excavations. Early discussion would be initiated regarding the handling and disposal of this water during the design phase. Although handling of groundwater is not anticipated, proper handling, treatment, and discharge would be performed. No adverse effect is expected.

Avoidance, Minimization, and/or Mitigation Measures

Measure WQ-2: Prepare and Implement Stormwater Pollution Prevention Plan and Best Management Practices

According to the Department's NPDES permit and the Construction General Permit (U.S. Environmental Protection Agency 2008c), best management practices (BMPs) will be incorporated into this project to reduce the discharge of pollutants during construction, as well as permanently to the maximum extent practicable (MEP). These BMPs fall into three categories: temporary construction site BMPs, design pollution prevention BMPs, and permanent treatment BMPs.

Construction Site BMPs

Construction site BMPs are applied during construction activities to reduce the pollutants in the stormwater discharges throughout construction. One critical construction activity, dewatering, may be necessary for this project because of the high groundwater. Early discussion will be

initiated regarding the handling and disposal of this water during the design phase. If the water is found to be uncontaminated and acceptable by the RWQCB to be discharged back into the creek, appropriate temporary construction site BMPs will be required to reduce any potential discharge of pollutants to the extent feasible as described in section A.9 of the Construction General Permit. A project-specific WDR permit may be required from the RWQCB, if substantial dewatering is to be done.

No dewatering is anticipated at Suisun Creek, and no construction is anticipated within the stream banks.

Raines Drain is a concrete-line trapezoidal channel upstream and downstream of the existing cross culverts. Construction of the culvert extensions can be staged while one or more of the culverts is kept open to pass runoff, eliminating the need for dewatering.

At this phase of the project, no specific coordination with the Department's Division of Construction has occurred yet for the stormwater management issues.

Permanent Design Pollution Prevention BMPs

Design pollution prevention BMPs are permanent measures to improve stormwater quality by reducing erosion, stabilizing disturbed soil areas, and maximizing vegetated surfaces. Erosion control measures will be provided on all disturbed areas. These BMPs are shown in Table 2.2-1.

Downstream Effects Related to Potentially Increased Flow

The project should have little impact on the velocity of downstream flow in most locations because of the condition of the already significant existing highway facility and the very flat terrain. In the existing condition, much of the pavement runoff is directed to pervious strips or unlined ditches along the outside right-of-way. The project improvements in general will replicate this drainage pattern, using longitudinal ditches and drainage systems to convey site runoff to proper receiving drainage facilities.

There is potential for increased peak flow discharge, but the construction of planned longitudinal ditches will act to attenuate possible increase in peak flow runoff from the paved areas.

Drainage improvements for the highway widening will affect and change the existing ditches or channels along the outside of the highway. These project drainage improvements will not connect directly to unlined ditches, but will connect to velocity reduction systems or stormwater management facilities that discharge to unlined ditches.

There is minimal potential for increased sediment loading. All graded fill slopes (no cut slopes are anticipated) will be constructed with proper erosion control and permanent plantings. All new unlined ditches will be constructed with relatively flat grades and maximum 4:1 side slopes. If erosive velocities are anticipated, ditches will be constructed with lining, and the side slopes may be steepened.

Slope/Surface Protection Systems

Construction of fill slopes are necessary to create the proposed vertical profiles. No cut slopes are anticipated.

To minimize erosion from any of the new slopes, mitigating design features have been considered, including minimizing cut and fill slopes, shaping slopes to reduce concentrated flow, and collecting concentrated flows in stabilized channels. All graded slopes, either cut or fill, would be constructed with proper erosion control and permanent plantings. Except at bridges, no retaining walls are anticipated.

Certain areas of the project will be hardscaped as required for safety (ramp gores), maintenance (pullout areas), and slope stability (under bridges).

Construction of the project will remove moderate amounts of vegetation within the project right-of-way. In many locations, the project would replace existing unpaved areas with pavement or impervious structures. At all areas where new slopes are constructed, proper vegetation would be planted, monitored and maintained to establish permanent cover. Approval of the erosion control plan by the Department's Division of Design, Landscape Architecture will occur during final design.

Concentrated Flow Conveyance Systems

There are a variety of concentrated flow conveyance devices along the length of the project. Along most of the existing reach of the highway, runoff sheet flows off of the pavement, crossing several feet of vegetated strips before entering a swale oriented longitudinally to the right-of-way. The existing concentrated flow conveyance devices include: lined and unlined ditches and swales, drainage inlets and culverts, asphalt concrete (AC) dikes and overside drains, flared end sections, rock slope protection (RSP) pads, flow energy dissipation devices, and other approved drainage design devices. For this project, the planned drainage pattern will replicate as much as possible the existing runoff pattern. The drainage improvements will direct pavement runoff to sheet flow to the outside edge of the new pavement where improved drainage devices will collect and convey the project runoff.

Preservation of Existing Vegetation

One goal of the project and construction activities will be to preserve areas of existing vegetation wherever possible. At all areas where existing vegetation (on land to remain) is affected, or where new slopes are constructed, proper vegetation will be placed, monitored, and maintained to establish permanent cover. For those areas on the outside of the highway, pavement will be minimized in favor of retaining existing vegetative cover.

Bridge construction will occur at Suisun Creek, with additional major storm drain facilities at Raines Drain. The Suisun Creek bridge will span Suisun Creek, and the Raines Drain improvements are planned to be extensions of the existing cross culverts, minimizing impacts on the existing waterways. Environmentally sensitive areas (ESAs) that potentially would be affected, exist within the project area. Measures to reduce effects for ESAs are addressed in other sections of this document (section 2.3, Biological Environment). To the maximum extent practicable, areas outside the active work area will be excluded from construction access.

Table 2.2-1. Proposed Pollution Prevention BMPs by Reach

Reach	Proposed Design Pollution Prevention BMPs: Minimize Downstream Effects; Protect Slopes; Design Concentrated Flow Conveyance Systems; Preserve Vegetation
I-80/Truck Scales	Flat terrain with large area of short fill proposed. Critical area for placement of treatment BMPs. Biostrips and bioswales are anticipated along the perimeter of truck scale grading.
I-80/SR 12E	Very minor impact on the velocity or volume of downstream flow. Existing flat terrain; fill required to construct. Slopes <1:4. Erosion control plan to be prepared by landscape architect. Catch basins and piping or bioswales to biofilters within the right-of-way. Velocity not to exceed vegetative lining and soil scour velocities. Sustainable vegetation to be established.

Permanent Treatment BMPs

Because this project is considered a major reconstruction project, it is not exempt from incorporating treatment BMPs. Treatment BMPs are permanent devices and facilities treating stormwater runoff. The Department's approved treatment BMPs are biofiltration swales, infiltration basins, detention basins, traction sand traps, dry weather flow diversions, media filters, gross solids removal devices (GSRDs), multi-chamber treatment trains, and wet basins. Those most feasible in the Bay Area are biofiltration swales, infiltration basins, detention basins, media filters, multi-chamber treatment trains, and wet basins.

Because of potential high groundwater within the project area, infiltration and detention basins do not seem feasible. Biofiltration swales and biostrips have been investigated as possible alternatives. Both treatment BMPs treat the same types of constituents: TSS, particulate metals, and litter. Both biofiltration swales and strips are viable cost-effective treatment BMPs.

The targeted design constituents for this project are metals. Because of the limited permeability of the soils and potentially high groundwater, infiltration devices and other filters allowing percolation of stormwater back into the ground are no longer a consideration. However, engineered biofiltration strips and swales are proposed. Biofiltration strips and swales are effective at trapping litter, TSS, and particulate metals. Where possible, it is recommended that the existing vegetation be evaluated for use as effective biostrip cover, or the project should establish the proper vegetative cover and/or swale dimensions at each treatment location.

Locations within the project limits (primarily in the area between the toe of fill slopes and the right-of-way) are available to be used for permanent treatment BMPs. Plans developed at a later stage in design will be more specific in their location, size, vegetative characteristics, and performance measures.

Biofiltration Swales/Strips

Much of the area beyond the proposed roadway embankment limits is flat and wide enough to support stable and effective biofiltration. Therefore, biofiltration is considered throughout the project, and separate areas have been identified as potential biofiltration. Plans in the attachments identify all potential BMP locations. Biostrips are designed to provide the maximum treatment length. Water quality flow (WQF) is not defined for this BMP. The tributary area to the biostrips is the length of pavement from the highway median to the outside edge of pavement. Bioswales are to be designed according to the Department's guidance documents, with minimum bottom width and maximum side slopes and longitudinal slopes. Additional right-of-way for the project improvements and treatment BMPs has been identified and is included on the project layout sheets.

Dry Weather Diversion
Dry weather flow diversion BMPs were dropped from further considered for this project because there is no dry weather flow.

Infiltration Devices
Infiltration device BMPs are not feasible for this project for the following reasons: through much of the project, the groundwater is too high; most of the soils are Hydraulic Soil Group C or D, limiting the usefulness of infiltration; for infiltration basins, a gravity outlet cannot be created because of the flat terrain; and along most of the project, there is no room within the right-of-way, and areas beyond the right-of-way are mostly prime farmland under cultivation.

Detention Devices
Detention basin BMPs are not feasible for this project for the following three reasons: There is not enough hydraulic head available for proper design; there are several locations where the groundwater is high; and along most of the project, there are significant constraints on acquiring new right-of-way, with areas beyond the existing right-of-way consisting mostly of prime farmland under cultivation. Detention as a treatment device may have negative hydraulic impacts because the project is located far downstream in the watershed, and detaining the peak runoff from the tributary shed may increase the peak runoff from the entire shed. If hydromodification control is a requirement of this project, then detention facilities can be designed for that mitigation, but they would not specifically function as treatment for the reasons stated.

Gross Solids Removal Devices
Litter is not on the 303(d) list or identified as a TMDL for the water bodies near the project; therefore, GSRDs are not incorporated.

Traction Sand Traps
Traction sand trap BMPs are not appropriate for the project because traction sand is not applied within the project limits.

Media Filters
Media filter BMPs are not considered for this project for the primary reason that the seasonally high groundwater table is likely to be too close to the invert of the filter. Depending on the specific location within the project limits, there are two other reasons that media filters are not an appropriate consideration: 1) there is not enough hydraulic head available for proper design, and 2) along most of the project, there is no room within the right-of-way, and areas beyond the right-of-way are completely developed.

Multi-Chambered Treatment Trains
Multi-chambered treatment train BMPs are not feasible for the project because the highway is not considered a “Critical Source Area” (CSA). The Cordelia Truck Scales within the project limits may be considered a CSA and may require a specific spill containment area. At this time, direction from the Department is to treat the general pavement area of the truck scales in the same fashion as stormwater runoff from highway pavement areas.

Wet Basins
Wet basin BMPs are not feasible for this project for the following reasons: There is not enough hydraulic head available for proper design; there are several locations where the groundwater is high; along much of the project, there is limited ability to purchase additional right-of-way, and areas beyond the right-of-way are largely developed; and along most of the route, there is not a permanent source of water available to maintain a permanent wet pool.

Maintenance BMPs (Drain Inlet Stenciling)
The project improvements are located within highway controlled access right-of-way. For inlets within the truck scales, inlet stenciling will be placed on inlets.

Effects of the No-Project Alternative
Under the No-Project Alternative, no new effects on water quality or stormwater runoff would occur.

2.2.3 Geology/Soils/Seismic/Topography

This section is adapted from the *Geologic and Seismic Section in Support of Environmental Document* (Parikh and Associates 2008).

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 also are protected under CEQA.

The following acts, regulations, and codes pertain to the proposed action.

- The Alquist-Priolo Earthquake Fault Zoning Act of 1972.
- The Seismic Hazards Mapping Act of 1990 (Public Resources Code [PRC] 2690).
- Seismic Hazards Mapping Regulations (14 California Code of Regulations [CCR] 3720–3725).
- The Uniform Building Code.

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 the Department's 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
The proposed project lies in the southwest portion of Solano County, which is the western gateway to the Sacramento Valley. The majority of the project footprint is mapped as alluvial fan deposits (Holocene) (Qhf), the most aerially extensive Quaternary map unit in the region, and natural levee deposit (Holocene) (Qhl) and modern stream channel deposits (Qhc), as evaluated

with reference to the *Geologic Map and Map Database of Northeastern San Francisco Bay Region, California* (Graymer et al. 2002). Holocene fan deposits are the sediments deposited by streams emanating from mountains as debris flow, hyperconcentrated mudflow, or braided stream flows. The particle size of the deposits typically decrease down slope from the fan apex. In places, Holocene fan deposits (Qhf) may be only a thin veneer over Pleistocene deposits (Qpf). Holocene fan levee deposit (Qhl) is formed by streams that overtop their banks and deposits sediment adjacent to the channel.

Descriptions of the main geologic units (deposits) are provided below.

> **Qhf**—Alluvial fan deposits (Holocene): Moderately to poorly sorted and moderately to poorly bedded sand, gravel, silt, and clay deposited where streams emanate from upland regions onto more gently sloping valley floors or plains. Holocene alluvial fan deposits are mostly "undissected" by later erosion. In places, Holocene deposits may only form a thin layer over Pleistocene and older deposits.
>
> **Qhl**—Natural levee deposits (Holocene): Moderately to well sorted sand with some silt and clay deposits by streams that overtop their banks during flooding.

Countywide Setting

Geology

Solano County includes portions of the Sacramento and San Joaquin Valleys and a small part of the Coast Ranges. The Sacramento River–San Joaquin River Delta is underlain primarily by intertidal deposits, consisting of the remains of hydrophytic vegetation and predominantly fine-textured mineral deposits. The Montezuma Hills, in the southeastern corner of the county, are underlain by the poorly consolidated clayey sand of the Montezuma Formation. The nearby Potrero Hills are underlain by Markley sandstone, Nortonville shale, and marine sandstone of the Capay Formation. The narrow valleys scattered throughout the county and the large alluvial plain located north of the Delta and west of the Vaca Mountains are underlain primarily by unconsolidated Quaternary alluvium and sedimentary rocks. The Vaca Mountains and other portions of the Coast Ranges uplands in the county are composed primarily of Markley sandstone, sedimentary and metasedimentary rocks of the Upper Cretaceous Great Valley and Lower Cretaceous-Upper Jurassic Great Valley Sequences, and Sonoma Volcanics (Wagner and Bortugno 1987; Wagner et al. 1987).

Subsurface soil and groundwater conditions based on the as-built LOTBs are summarized in Table 2.2-2 below.

Table 2.2-2. Subsurface Soil and Groundwater Conditions

Location	Subsurface Soil Conditions	Groundwater Condition
I-80/Dan Wilson Creek and its vicinity	10 to 15 feet of hard clayey silt underlain by dense to very dense sand with some gravel	Not encountered to the elevation of -8 feet.
I-80/Suisun Creek and its vicinity	30 to 75 feet of interbedded layers of soft to very stiff lean clay and medium dense sands, underlain by dense clayey sand	Encountered at depths between 10 feet and 30 feet below ground surface to the minimum elevation of +30 feet
I-80/SR 12E interchange and its vicinity	45 to 60 feet of stiff to hard clay underlain by interbedded layer of stiff to hard clays and medium dense to dense sands	Encountered at the depth of 12 feet below ground surface to the minimum elevation of +27 feet

Groundwater may vary with the passage of time because of seasonal groundwater fluctuation, surface and subsurface flows, ground surface runoff, water level in adjacent creeks, and other factors that may not be present at the time of the reference investigations.

The truck scales facility is located primarily in existing open farmland. Subsurface soil conditions in this area may be relatively soft at this location. New fill is expected to be placed in these areas.

Seismic Conditions

The project is located in a seismically active part of northern California. Faults existing in the vicinity of the project area include Cordelia fault, Green Valley fault, and Vaca–Kirby Hill–Montezuma Hills/E fault. These faults are capable of producing earthquakes and may cause strong ground shaking in the project area. Figure 2.2-1 presents the locations of the fault systems relative to the project area.

Based on the study *Summary of Earthquake Probabilities in the San Francisco Bay Region: 2003–2032* (Working Group on California Earthquake Probabilities 2003), the Green Valley fault, which is part of the Concord–Green Valley fault, has a 4% probability of one or more major (magnitude greater than 6.7) earthquakes during the coming 30 years. According to the same study, there is a 62% probability of at least one earthquake of magnitude 6.7 or greater within the San Francisco Bay region before 2032.

MCE magnitudes for some of the major faults in the project region are summarized in Table 2.2-3 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.

Based on this and other calculations, the controlling fault is the Cordelia fault (magnitude 6.5). This site-specific seismic information would be used in designing the proposed project structures.

Table 2.2-3. Faults That Have the Potential to Cause Ground Shaking in the Project Area

Fault	Closest Distance to Project Area (mi)	Maximum Credible Earthquake (Magnitude)	Peak Bedrock Acceleration (PBA) (g)	Peak Ground Acceleration (PBA) (g)
Cordelia (Style: strike-slip)	0.9	6.5	0.6	0.6
Green Valley (Style: strike-slip)	20.	6.75	0.6	0.6
Vaca–Kirby Hill–Montezuma Hills/E (Style: not known/published)	6.7	6.75	0.4	0.5

Seismic Hazards/Liquefaction Potential

Because no active fault passes through the immediate project area, the potential for fault rupture within the project limits is considered relatively low.

Liquefaction is a phenomenon in which saturated cohesion-less soils are subject to a temporary but essentially total loss of shear strength associated with earthquake shaking. Submerged

cohesion-less sands and silts of low relative density are the type of soils that usually are susceptible to liquefaction. Clays generally are not susceptible to liquefaction. The project area is generally underlain by layers of stiff to hard lean clay and medium dense to dense sands underlain by dense sands. The majority of the submerged cohesion-less subsoils are primarily medium dense to very dense, and thus the liquefaction potential within the project area is generally moderate, except at Suisun Creek, where it is high.

Environmental Consequences

Based on the preliminary design of the proposed project, the potential to expose people or structures to substantial adverse effects, including the risk of loss, injury, or death, due to rupture of a known fault or landslides is considered low. No known faults run through the project area, however, faults are located in the vicinity. Most construction activities would occur on flat land previously used for agriculture. The project would not be located on expansive soil and thereby would not create a substantial risk to life or property.

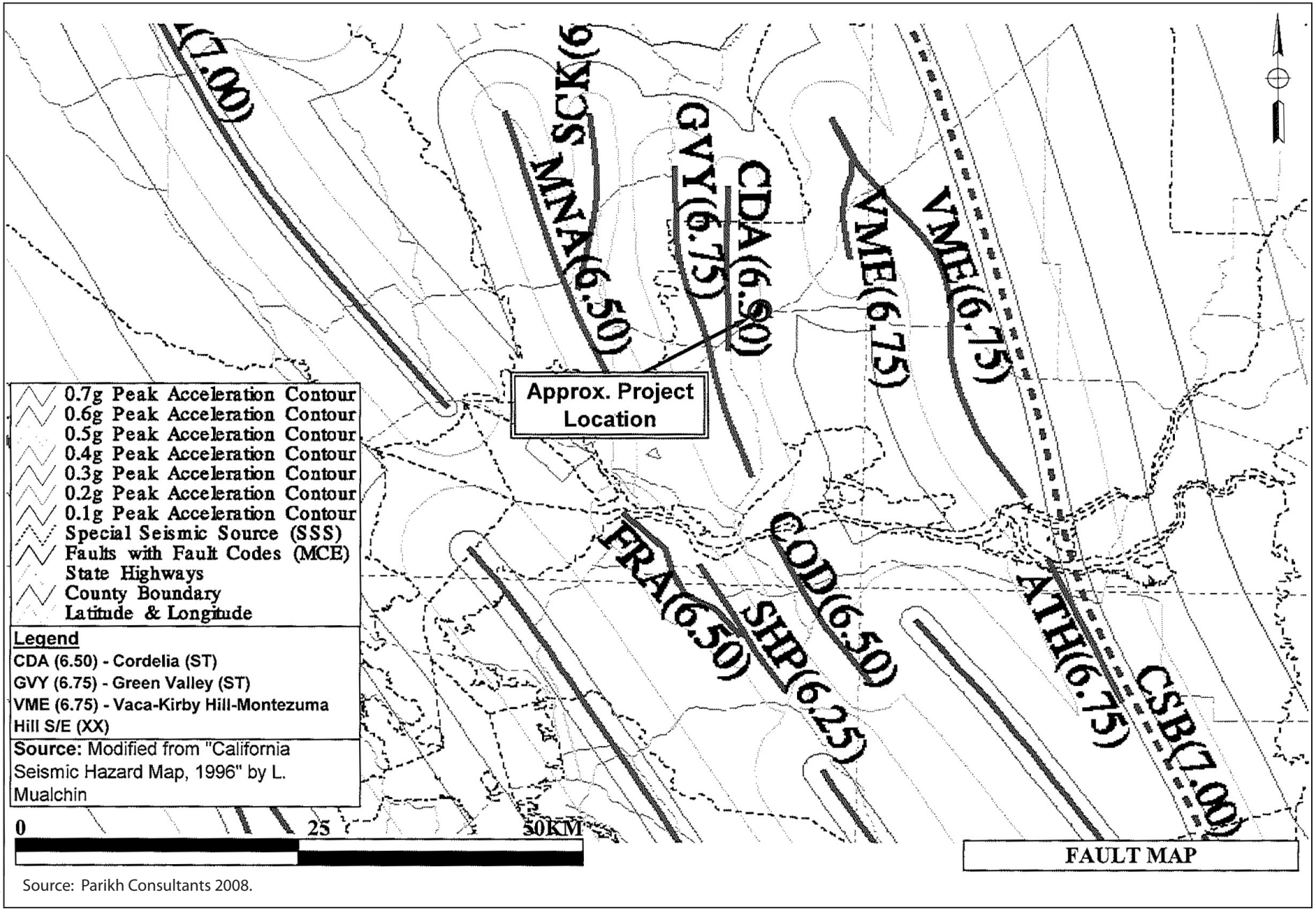
The proposed project would not be located on a geological unit or soil that is unstable or that would become unstable as a result of the project. The Green Valley fault passes through I-80 in the area of SR 12W/Jameson Canyon Road, and the Cordelia fault crosses I-80 near Green Valley Creek. Both faults are located west of the project area. Therefore, the potential for ground surface rupture as a result of faulting within this section of the project is considered relatively low.

The potential for the project area to experience liquefaction is moderate to high, while the potential for post-liquefaction settlement is considered moderate.

Impact GEO-1: Exposure of People to Injury or Structures to Damage from Strong Groundshaking, Seismic-Related Ground Failure, or Liquefaction

Groundshaking caused by an earthquake on any active and potentially active faults in the region could damage project facilities and result in injury to people using these facilities. While no known faults are located within the project area, they do occur in the vicinity. Soils in the immediate vicinity of Suisun Creek have a high potential for liquefaction. However, as part of its standard procedures, the Department will conduct a site-specific geotechnical investigation for seismic hazards and design all project facilities to avoid or minimize seismic hazards. This investigation of the alternative alignment will be conducted during final design to identify obvious indicators of recent fault displacement and groundshaking hazards and to ensure that project facilities are designed to avoid or minimize the potential for damage resulting from surface fault rupture, liquefaction, or landslides. The exact measures that would be used to avoid or minimize damage resulting from fault rupture could include reinforcing project-related structures and designing and constructing all facilities according to the most appropriate Uniform Building Code standards or the Department's requirements. Other measures could include:

- Removal or treatment of potentially liquefiable soils and sediments.
- Construction of edge containment structures (e.g., berms, dikes, retaining structures, compacted soil zones).
- Installation of drainage structures to lower the groundwater table.



Source: Parikh Consultants 2008.

Graphics...00342.08Teotech (8-08)

Figure 2.2-1
Fault Map

- In-situ ground densification.
- Other types of ground improvements.

With implementation of these measures, there would be no adverse effect related to the exposure of people to injury or structures to damage from strong groundshaking, seismic related ground failure, or liquefaction.

Impact GEO-2: Potential Construction-Related Soil Erosion and Sedimentation

Construction would involve some land clearing, grading, and other ground-disturbing activities that could temporarily increase soil-erosion rates during and shortly after project construction. Construction-related erosion could result in the loss of nonrenewable topsoil and adversely affect water quality in nearby surface waters. Implementation of Measure WQ-2 in Section 2.2.2 would reduce construction-related soil erosion and sedimentation impacts.

Impact GEO-3: Potential Damage to Facilities and Injury to the Public from the Presence of Expansive Soils

The Soil Survey of Solano County indicates that soils with high shrink-swell potential (i.e., potentially expansive soils) occur throughout the county. The presence of expansive soils could result in damage to project facilities and injury to people using these facilities. However, standard Department practice includes conducting site-specific geotechnical investigation for expansive soils, and the design of project facilities to avoid or minimize damage. A site-specific geotechnical investigation will be conducted during final design to identify areas with expansive soils and to ensure that project facilities are designed and constructed to avoid or minimize the potential for damage from the presence of expansive soils and sediments. The methods are likely to include the selective placement of expansive fill materials; use of imported, non-expansive fill materials; or other methods of ground improvement. With this investigation and corresponding design of project facilities, there would be no adverse effect related to the potential damage to facilities and injury to the public from the presence of expansive soils.

Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation measures are necessary.

Effects of the No-Project Alternative

Under the No-Project Alternative, no new effects on geology, soils, seismicity, or topography would occur.

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., the Antiquities Act of 1906 [16 USC 431–433] and the Federal-Aid Highway Act of 1935 [20 USC 78]). Under

California law, paleontological resources are protected by CEQA, 14 CCR Division 3, Chapter 1, Sections 4307 and 4309, and PRC Section 5097.5.

Affected Environment

The information in this section is based on the Paleontological Sensitivity Analysis for the I-80 Eastbound Cordelia Truck Scales Relocation Project (ICF Jones & Stokes 2008e).

The project area is located near the east flank of the Coast Ranges, in the east-central portion of California's Coast Ranges geomorphic province (e.g., Norris and Webb 1990).

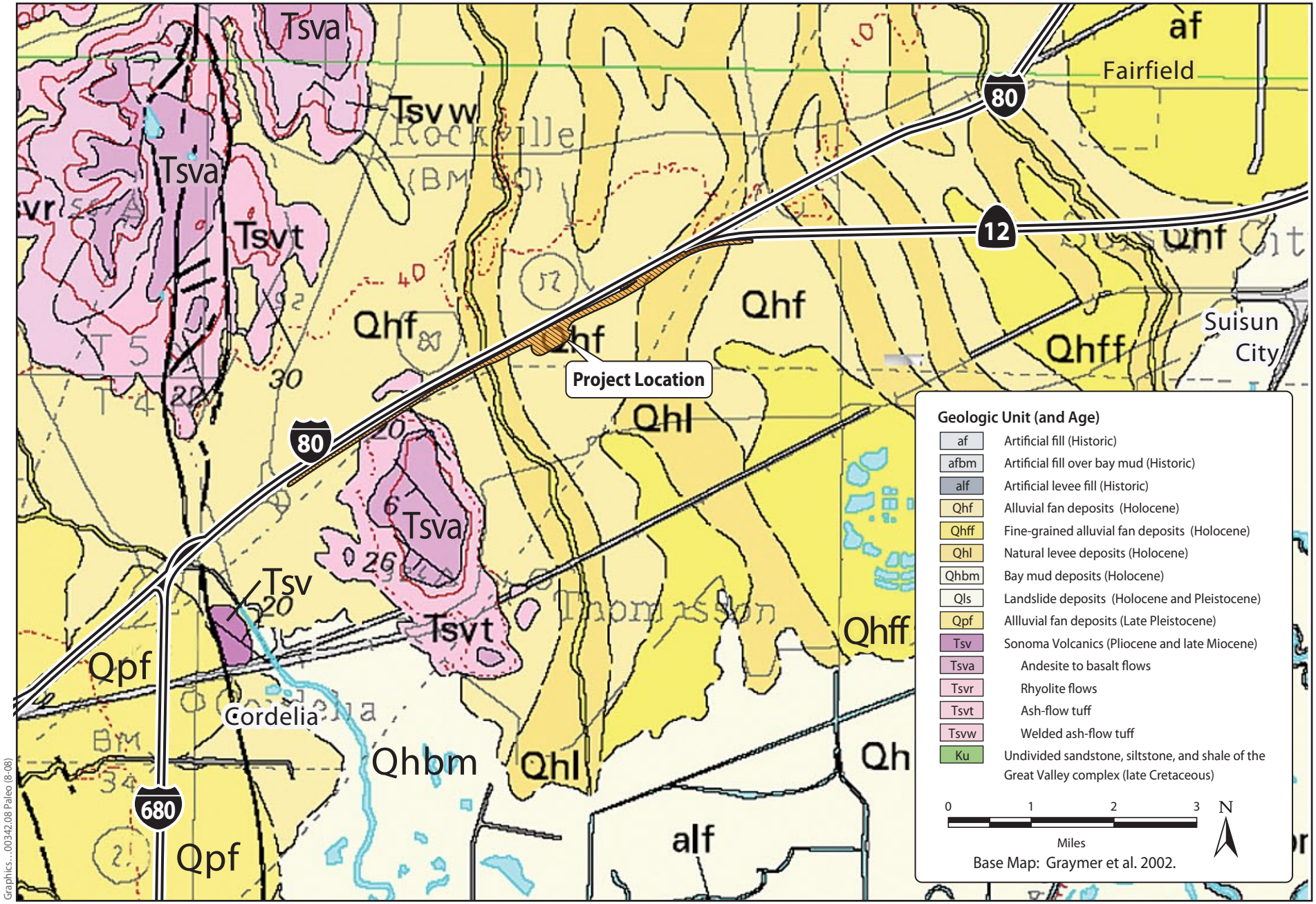
The Coast Ranges province is characterized by en echelon northwest-trending mountain ranges formed over the past 10 million years or less by active uplift related to complex tectonics of the San Andreas fault/plate boundary system (e.g., Norris and Webb 1990; Buising and Walker 1995; Atwater and Stock 1998). The eastern range front is defined by faults that have been interpreted as contractile features associated with shortening along an axis approximately normal to the range front (e.g., Wong et al. 1988; Sowers et al. 1992; Unruh et al. 1992; see also Jennings 1977 for regional mapping) but also may accommodate a right-lateral component of motion locally (e.g., Richesin 1996).

The eastern Coast Ranges are broadly antiformal. At the general latitude of the project area, they consist of a central "core" of Mesozoic units—including mafic and ultramafic rock allied with the Coast Ranges ophiolite and lithologically diverse units of the Franciscan complex—flanked on the west by extensive exposures of Miocene volcanic rocks (Sonoma Volcanics) and on the east by an upward younging sequence of marine and terrestrial sedimentary units that ranges in age from Cretaceous (Great Valley Group) to Neogene (Monterey Group, San Pablo Group, Sonoma Volcanics, and Huichica Formation). The area's larger drainages preserve several generations of alluvial fan and stream deposits ranging in age from Pleistocene to Holocene (Wagner and Bortugno 1982; Graymer et al. 2002).

The project footprint extends through three geologic units: alluvial fan deposits (Holocene), Natural Level deposits (Holocene), and Sonoma Volcanics (ash-flow tuff).

- Alluvial fan deposits (Holocene) are moderately to poorly sorted sand, gravel, silt, and clay that occurs locally as a thin veneer over older deposits.
- Natural levee deposits are moderately to well-sorted sand, with some silt and clay. These deposit as low ridges adjacent to channels.
- Sonoma Volcanics and ash-flow tuff of Sonoma Volcanics are tuff, obsidian, flow rock, pyroclastic breccia, and intrusives of varying composition (rhyolite to basalt).

The vast majority of the project is located in what is characterized as Holocene fan deposits or Holocene fan levee deposits (Graymer et al. 2002) (Figure 2.2-2). These deposits are young and have no potential to contain paleontological resources (in contrast to older sediments associated with the Pleistocene). Test trenches mechanically excavated to a depth of 15 feet indicated that deposits were uniform throughout (ICF Jones & Stokes 2008d). The Holocene deposits appear to be more than 15 feet thick, and therefore excavation would not extend into underlying Pleistocene deposits that are more sensitive for paleontological resources.



Graphics...00342.08 Paleo (8-08)

Figure 2.2-2
Geologic Map of the Project Vicinity

There are 69 records of vertebrate fossils in Solano County (University of California Museum of Paleontology 2007a). No fossils are known to occur in the Holocene geologic units that make up the bulk of the project area. However, Sonoma Volcanics, which comprises a small portion of the project area, is considered very sensitive for paleontological resources. Of the 69 vertebrate fossil records in the county, 29 occur in this unit. These records include horse, deer, and unidentified mammals.

Environmental Consequences

In evaluating a proposed project's potential to disturb or damage significant paleontological resources, it is important to keep two points in mind. First, most vertebrate fossils are rare and therefore are considered important paleontological resources. Second, unlike archaeological sites, which are narrowly defined, paleontological sites are defined by the entire extent (both areal and stratigraphic) of a unit or formation. In other words, once a unit is identified as containing vertebrate fossils, or other rare fossils, the entire unit is a paleontological site (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995).

Impact PALEO-1: Potential Disturbance or Destruction of Paleontological Resources in a Sensitive Area

Based on the project footprint's geologic context, only a small portion of the project area is sensitive for significant fossils (Figure 2.2-3). The remainder of the project area is not sensitive for significant fossils because excavation would be within Holocene units that generally do not contain significant fossils. Test trenches have indicated that the Holocene unit extends to the depth of the maximum excavation.

Though the bulk of the deposits within the project area are not sensitive for paleontological resources, a small portion of the project area is sensitive. Construction in this area would occur within the Department's right-of-way and would parallel an existing utility line. Even though this area appears to be disturbed, subsurface deposits and significant fossils may be encountered during excavation.

It is the policy of the department to implement a mitigation and monitoring plan for construction in sensitive areas, such as the ash-flow tuff of the Sonoma Volcanics geologic unit, where significant fossils may be encountered.

The monitoring and mitigation strategy would include a site- and project-appropriate mitigation strategy consistent with the SVP guidelines (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995). For this project, mitigation would be likely to entail a combination of the following components:

- Monitoring by a qualified paleontologist during key portions of the project (typically, those involving substantial disturbance in previously undisturbed materials with paleontological sensitivity).
- A requirement that construction crews stop work if fossil materials are encountered.
- Appropriate recovery, documentation, and curation of fossil materials.

Because of the implementation of this procedure, this is not considered an adverse impact.

Impact PALEO-2: Potential Destruction of Buried Paleontological Resources or Unique Geologic Features

Though most of the project area is not sensitive for paleontological resources, and the area that is sensitive will be monitored by a qualified paleontologist, there is the remote possibility that excavations may extend into older deposits and that buried paleontological resources may be inadvertently unearthed during construction. Activities such as excavation and grading into native soils, and trenching for drainage systems could damage such resources. Caltrans has standard provisions (SPs) to address inadvertently discovered paleontological resources. These SPs may require that construction personnel stop all work in the vicinity of the discovery, protect the area, and notify the engineer. These measures would prevent any adverse effect.

Impact Paleo-3: Damage to Buried Paleontological Resources as a Result of Pile Driving

Pile driving up to 85 feet would occur as part of project construction. This driving could damage buried paleontological resources. However, because the areal extent of the pile driving would be small, this effect is not considered an adverse effect.

Avoidance, Minimization, and/or Mitigation Measures

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

Effects of the No-Project Alternative

Under the No-Project Alternative, the proposed truck scales would not be constructed. Therefore, no effect on paleontology would occur.

2.2.5 Hazardous Waste/Materials

The information below is summarized from the initial site assessment (ISA) prepared for the proposed project by Geocon Consultants, Inc. in September 2008 (Geocon Consultants 2008a). This section describes the existing conditions in the study area.

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. The RCRA provides for “cradle to grave” regulation of hazardous wastes. Other federal laws include:

- The Community Environmental Response Facilitation Act (CERFA) of 1992.

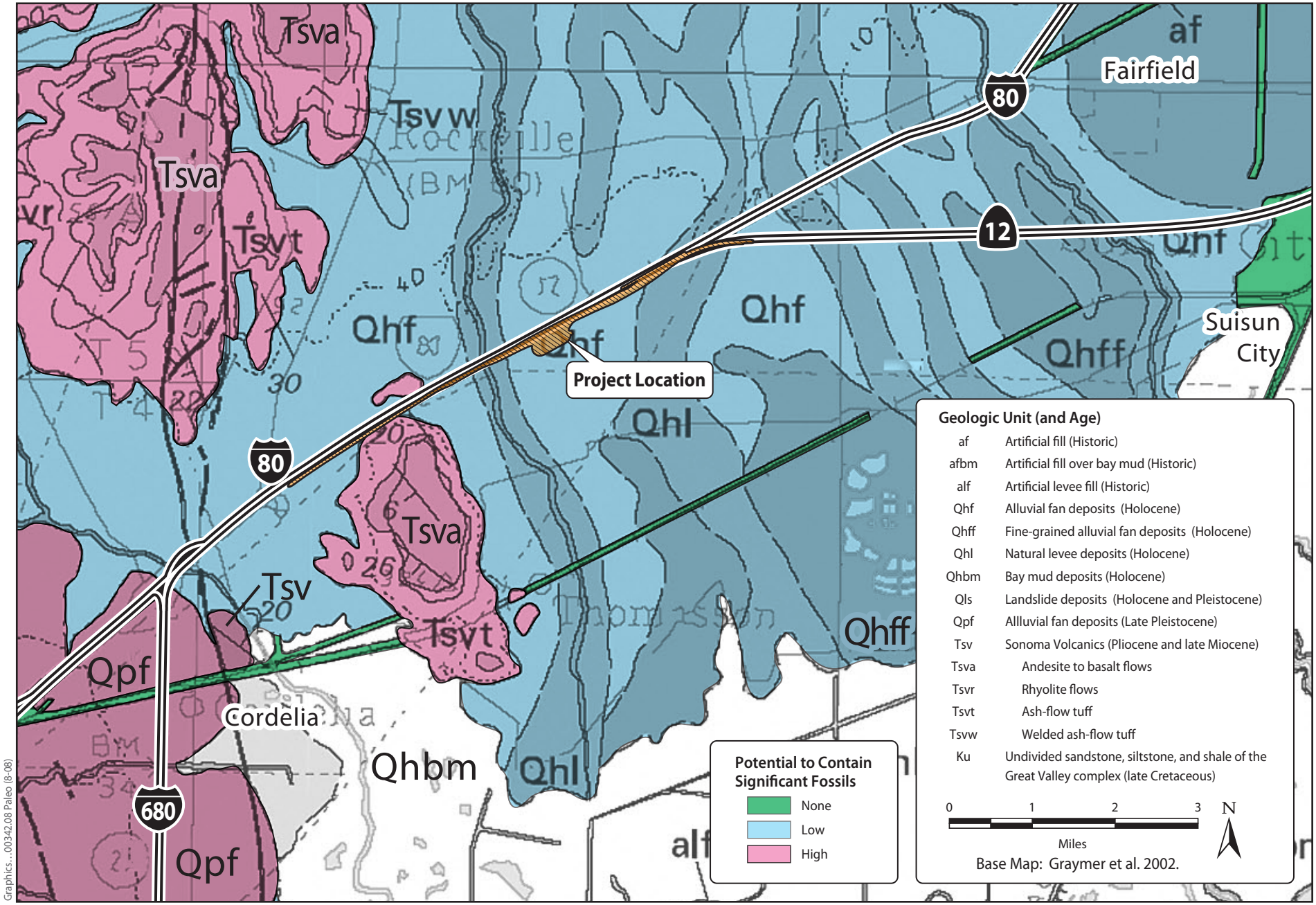


Figure 2.2-3
Paleontological Sensitivity Map of the Project Area

- The CWA.
- The Clean Air Act (CAA).
- The Safe Drinking Water Act.
- The Occupational Safety and Health Act (OSHA).
- The Atomic Energy Act.
- The Toxic Substances Control Act (TSCA).
- The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

In addition to the acts listed above, EO 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.

Asbestos Regulations

Title 8 CCR Section 1529 regulates asbestos exposure in all construction work and defines permissible exposure limits and work practices. Typically, removal or disturbance of more than 100 square feet of material containing more than 0.1% asbestos must be performed by a registered asbestos abatement contractor, but associated waste labeling is not required if the material contains 1% or less asbestos. When the asbestos content of materials exceeds 1%, virtually all requirements of the standard become effective. With respect to potential worker exposure, notification, and registration requirements, the California Division of Occupational Safety and Health, known as Cal/OSHA, defines asbestos-containing construction material (ACCM) as construction material that contains more than 0.1% asbestos (8 CCR 341.6).

Aerially-Deposited Lead

Aerially-deposited lead (ADL) in soils adjacent to highways is attributed to the historic use of leaded gasoline. Areas of primary concern are soils along routes that have had high vehicle emissions from large traffic volumes or congestion during the time period when leaded gasoline was in use (generally prior to 1986). Typically, ADL is found in the top 2 feet of material in areas within the highway right-of-way. Soils within the Department's right-of-way that contain hazardous waste concentrations of ADL can be reused under the authority of variances issued by the California Department of Toxic Substances Control (DTSC). The variances allow stockpiling, transporting, and reusing soils with concentrations of lead below maximum allowable levels on the Department's right-of-way when specific conditions are met.

Affected Environment

The project area is characterized by a mix of undeveloped, residential, and agricultural use on the land south of the eastbound I-80 corridor from the western end of the project area at Dan Wilson Creek to Hale Ranch Road, located south of the off-ramp from SR 12E to Chadbourne Road. Anheuser-Busch's Budweiser brewery is located east of the I-80/SR 12E interchange, and land use adjacent to the I-80/SR 12E interchange consists of commercial development. A review of aerial photographs, combined with site reconnaissance, indicate that portions of the project area have undergone significant changes (roadway expansion and industrial and commercial development) between 1937 and the present. A Union Pacific Railroad track is south of the project area, oriented southwest-northeast. There are no schools, churches, airports, or other sensitive receptors within 0.25 mile of the project area.

Wildland fires are a seasonal hazard in northern California and represent more than half the fires occurring in the unincorporated areas. According to the California Department of Forestry and Fire Protection (CDFFP) Solano County Natural Hazard Disclosure (Fire) map (California Department of Forestry and Fire Protection 2000), the project area is not located in a region identified as a "wildland area that may contain substantial forest fire risks and hazards, or very high fire hazard severity zone."

According to information presented in the DOC Division of Mines and Geology map, naturally occurring asbestos is not indicated in the project footprint or in the vicinity of the project.

The eastbound I-80 truck scales facility consists of five structures and asphalt-paved areas. The structures include those listed below.

- A single-story, on-slab building that contains a control room and offices, is situated on the western portion of the facility; a modular addition is located on the southern portion of the building and contains locker rooms.
- A single-story on-slab building containing restrooms is located west of the office building.
- A modular structure used as a training classroom and a storage trailer are located between the restroom structure and the control room/office building.
- A three-sided metal-frame structure, on a concrete slab, containing four truck bays is situated on the northern portion of the facility; this structure contains an inspection shed.
- A storage building is located adjacent to the eastern side of the truck bay structure; the shed was observed to contain bags of an Oil-Dri product and miscellaneous tools.

CHP Leuitenant Mike Ferrell provided information regarding the operation and history of the existing truck scales facility. Lt. Ferrell indicated that ASTs and USTs have never been present at the facility. He also indicated that there were no wells at the facility. A sewage holding tank is located directly west of the control room/office building. The holding tank is accessed by two manholes and is connected by piping beneath the I-80 right-of-way to a 3-tank septic system that in turn is connected to the municipal sewer.

Aerially-Deposited Lead

Testing for levels of ADL was conducted within the existing right-of-way in the summer of 2008 and documented in the Draft Aerially-Deposited Lead Investigation Report (Geocon 2008b). More than 100 soil samples were collected at intervals along the project alignment approximately 2 feet from the edge of pavement. Another 24 samples were collected from borings located 10 and 15 feet further from the initial borings. These samples were analyzed for total and soluble lead concentrations. Based on the soil samples, the top one foot of soil in the central portion of the project area (from just west of Suisun Creek to approximately 1000 feet east of the proposed truck scale facility) would be classified as a California hazardous waste based on lead content. In this excavation scenario, the underlying soil would not be classified as hazardous waste based on lead content. Additionally, soil from the eastern and western portions of the project area, would not be classified as hazardous waste based on lead content.

Environmental Data Resources Database Search

Environmental Data Resources (EDR) performed a search of federal, state, and local databases for the project footprint and the surrounding area (Appendix E in Geocon Consultants 2008a). The following sections provide additional information regarding properties with potential hazardous materials located within approximately 0.25 mile upgradient of the project footprint.

Leaking Underground Storage Tank Listings

There are six facilities in the vicinity of the project area that are referenced on the leaking underground storage tank (LUST) database (Table 2.2-4).

Table 2.2-4. LUST Properties

Name	Address	Substance	Affected Media	Status
Old Fruitbowl Mobil Station, Valine property	4000 Russell Road	Petroleum hydrocarbons	Soil and groundwater (drinking water aquifer)	Case closed in January 2008
Fairfield Suisun Sewer District	1010 Chadbourne Road	Diesel	Soil and groundwater	Case closed in 1998
Mangels Ranch Property.	287 Suisun Valley Road	Gasoline	Soil	Case closed in 1998
Texaco Terminal Stations Inc./JS&J Ser Shell	100 Suisun Valley Road	Gasoline	Soil and groundwater	Case closed in 2001
Shell	4450 Central Way	Gasoline	Soil and groundwater	Case closed in 1996
Campbell's Carpet	4731 Central Way	Gasoline and methyl tertiary butyl ether (MTBE)	Soil and groundwater	Case closed in 1998

Underground Storage Tank/Aboveground Storage Tank Listings

The EDR report notes that five facilities located at or in the vicinity of the project area contain registered underground storage tanks (USTs) or aboveground storage tanks (ASTs). The listed facilities include:

- ARCO AM/PM, Cordelia, 4449 Central Place.
- Nella Oil Co. #28 Flyers, 4444 Central Place.
- Anheuser-Busch, 3101 Busch Drive.

- The Valine property at 4000 Russell Road.
- The Department, with an address of Russell (I-80) Road, Suisun City, listed as an inactive UST facility.

Resource Conservation and Recovery Act Small Quantity Generator, Facility Index System, and HAZNET Listings

Three facilities in or in the vicinity of the project area are referenced on the HAZNET database: Anheuser-Busch, at 3101 Busch Drive; Wal-Mart, at 300 Chadbourne Road; and Texaco Terminal Stations, at 100 Suisun Valley Road.

Based on a review of the listings, the Anheuser-Busch facility may be located at property proposed for partial Department acquisition as part of the proposed project. In addition to the UST database, this facility also is listed in the following: the Emergency Response Notification System (ERNS); the RCRA Small Quantity Generator (SQG); the Facility Index System (FINDS); HAZNET, which lists facilities that have filed hazardous waste manifests; the Toxics Release Inventory System (TRIS); and the Aerometric Information Retrieval System (AIRS).

Information available from the EDR report regarding the Anheuser-Busch facility indicates that it is an RCRA-SQG, which generates between 100 and 1,000 kilograms (kg) of hazardous waste per month and was a large quantity generator (LQG) until 2004. The FINDS listing relates to chemical use, storage, and disposal. Wastes removed from the facility include contaminated soil from site cleanups and asbestos-containing waste. An ERNS site report for the facility documents an ammonia spill from a refrigeration unit in 1990. In addition, the facility reportedly is registered with the BAAQMD, AIRS, and TRIS, for air emissions. No violations are reported for the facility.

The “Orphan Summary” section in the EDR report identifies properties that have incomplete address information and could not be specifically plotted. Two properties listed on the “Orphan Summary” are located within or adjacent to the project area.

- “Eastbound I-80 at CHP Scales in Fairfield” has a reported ERNS listing because of a spill of anhydrous ammonia from a truck onto the ground surface in 1993. The incident reportedly did not affect any waterways or require cleanup.
- “Fairfield STP, located south of Highway 80 and Busch Lane, east of Abernathy,” is listed as a known or suspected abandoned, inactive or uncontrolled hazardous waste site, with no further remedial action planned. The site reportedly was archived in 1989.

Site Reconnaissance

Site reconnaissances were performed on April 16 and May 8, 2008. The purpose of the reconnaissances was to survey the existing eastbound I-80 and SR-12E corridors, adjacent roadway connectors, and private property conditions within and adjacent to the ESA. A walkover of the truck inspection facility also was performed. Reconnaissance was conducted from public thoroughfares and Department-owned property to attempt to identify visual indicators of potential hazardous waste facilities/impacts.

Site plans depicting the project boundaries and potential hazardous waste facilities with indicated map identification numbers (Map ID Nos.) are presented in Figures 2.2-4a and 2.2-4b. Table 2.2-5 lists the identified facilities, along with their respective Map ID Nos., the potential impact (low and moderate risk) on the project ESA, and potential right-of-way acquisitions.

Environmental Consequences

This analysis of potential impacts is based on the ISA, which was based on information derived from the following sources.

- A review of as-built and right-of-way plans.
- A review of environmental records, conducted using a commercial database search, for current and past areas with records of hazardous material storage, use, generation, spills, disposal, investigations, and remediation as readily available in selected agency records.
- Interviews with pertinent agency and site personnel regarding site use and a history of potential hazardous materials use, spills, investigations, and remediation.
- A review of historical aerial photographs over several different time periods for evidence of past land uses involving disposal and other practices.

The ISA identified the following potential hazardous materials/waste conditions.

- **Impacts associated with nearby agricultural uses:**
  - Aerially applied chemicals associated with agricultural use, which could act as a respiratory irritant.
  - Soil impacts associated with pesticides, herbicides, petroleum hydrocarbons, and metals from agricultural use.
- **Other soil impacts:**
  - Contaminated soil associated with leaking storage tanks, and sanitary sewer pipelines.
- **Impacts associated with traffic or roadway maintenance:**
  - ADL.
  - Lead-containing paint (LCP) associated with yellow pavement striping.
- **Impacts associated with the removal or modification of facilities or structures:**
  - ACCMs.
  - LCP.
  - Treated-wood waste.

ADL is present in the surface and near-surface soils as a result of past emissions from vehicles powered by leaded gasoline. Yellow thermoplastic and paint striping, potentially containing lead chromate, is present on roadway surfaces within the project area. The truck inspection facility structure may harbor ACMs and possible LCPs. Potential LCP and ACMs also may be present in bridge construction materials within the project area. A review by Geocon Consultants (2008a) shows that plans for the Suisun Creek bridge indicate the use of asbestos sheet packing as guard

rail shims on the bridge. The Suisun Creek bridge would not be dismantled or modified during this project.

Impact HAZ-1: Potential for Exposure of Construction Workers or Nearby Land Uses to Previously Unknown Hazardous Materials

The ISA indicates that the ESA generally has a low risk of previously unreported hazardous materials that could be discovered during project construction. However, previously unreported hazardous materials could be discovered during project construction. Standard Department procedures include development of a health and safety plan to address worker health and safety. As part of this plan, the location of underground pipeline crossings will be determined and safety plans will be prepared for excavation work at these pipeline crossings before construction. These plans will include emergency plans in the event of a pipe rupture or if a preexisting leak has occurred. The safety plan will also include remediation plans to handle and remove contaminated soil. As necessary, a health and safety plan will be prepared to address worker safety when working with potentially hazardous materials, including biological contaminants, potential LCPs, soils potentially containing ADL, and other construction-related materials within the right-of-way for any soil disturbance. With development of this plan, there would be no adverse effect related to potential exposure of construction workers or nearby land uses to previously unknown hazardous materials.

Impact HAZ-2: Potential for Exposure of Known Hazardous Materials to Humans or the Environment

The ISA indicates that the project area generally has the potential for hazardous materials in the form of heavy metals, such as chromium and lead in yellow pavement striping; ACCMs; soils contaminated with pesticides, herbicides, and metals; treated-wood waste; bridge rail post sulfur; and petroleum hydrocarbons. In addition, the Draft ADL investigation report (Geocon 2008b) confirmed the presence of ADL within the project area. Soil sampling and analysis to evaluate ADL in shallow soil within the existing eastbound I-80 right-of-way indicates that the top one foot of soil in the central portion of the project area would be classified as hazardous waste based on lead content. A sewage holding tank and associated pump station are located at the existing truck scales facility. These structures and their contents and other subsurface utilities present in the project area would be removed and disposed in accordance with county and state requirements.

Yellow thermoplastic and paint striping that is removed during planned roadway improvements may require special handling and disposal requirements unless combined with sufficient asphalt grindings per the Department's Special Provisions. Asbestos-containing pipe, treated wood, and the use of molten sulfur for bridge rail posts also may be encountered during construction of the planned highway improvements. Any encountered asbestos-containing pipe, treated-wood waste, and bridge rail post sulfur would require proper handling and disposal in accordance with regulatory requirements.

Other potential sources of contamination include aerially applied chemicals during agricultural use of adjacent parcels that could present a respiratory irritant to construction workers.

Table 2.2-5. Summary of Identified Potential Hazardous Waste Facilities and Recommendations

Map ID No.	Facility	Address	Assessor's Parcel Number	Potential Impact on Right-of-Way and Acquisitions	Information Source(s)	Known or Potential Environmental Impacts	Regulatory Status	Potential Impact on the Proposed Project and Recommendations
1	**I-80 eastbound truck inspection facility**	**Existing right-of-way in western portion of project environmental study area**	**N/A**	**Moderate impact on existing I-80 right-of-way**	**Recon**	**Existing structures to be removed**	**N/A**	**Asbestos and lead-containing paint surveys should be conducted at the TIF prior to any planned renovation or demolition to evaluate worker health and safety, abatement and waste disposal options and comply with applicable regulations, including Bay Area Air Quality Management District requirements. Subsurface structures, including sewage holding tanks, should be removed and disposed in accordance with state and county requirements.**
2	Former Old Fruit Bowl Mobil Station (Valine Ranch property)	4000 Russell Road	0027-271-060	Low impact on environmental study area	SCDRM files LUST	The property is a former service station (operated from 1946 to 1972) located west of and adjacent to I-80 north of the project environmental study area. Five USTs removed in 2000 under observation by SCDRM. On-site petroleum impacts on soil and groundwater identified. Impacted soil over-excavated and stockpiled for onsite remediation and groundwater pumped for offsite disposal. Residual petroleum impacted soil stockpile remains on-site.	SCDRM and SFRWQCB approved case closure in January 2008	This facility is located north of I-80 westbound and presents a low risk of affecting the project site, as petroleum-impacted soil has been excavated and is stockpiled on-site. According to the closure document, stockpiled soil is to reused on site as existing road base or disposed.

Table 2.2-5. Continued

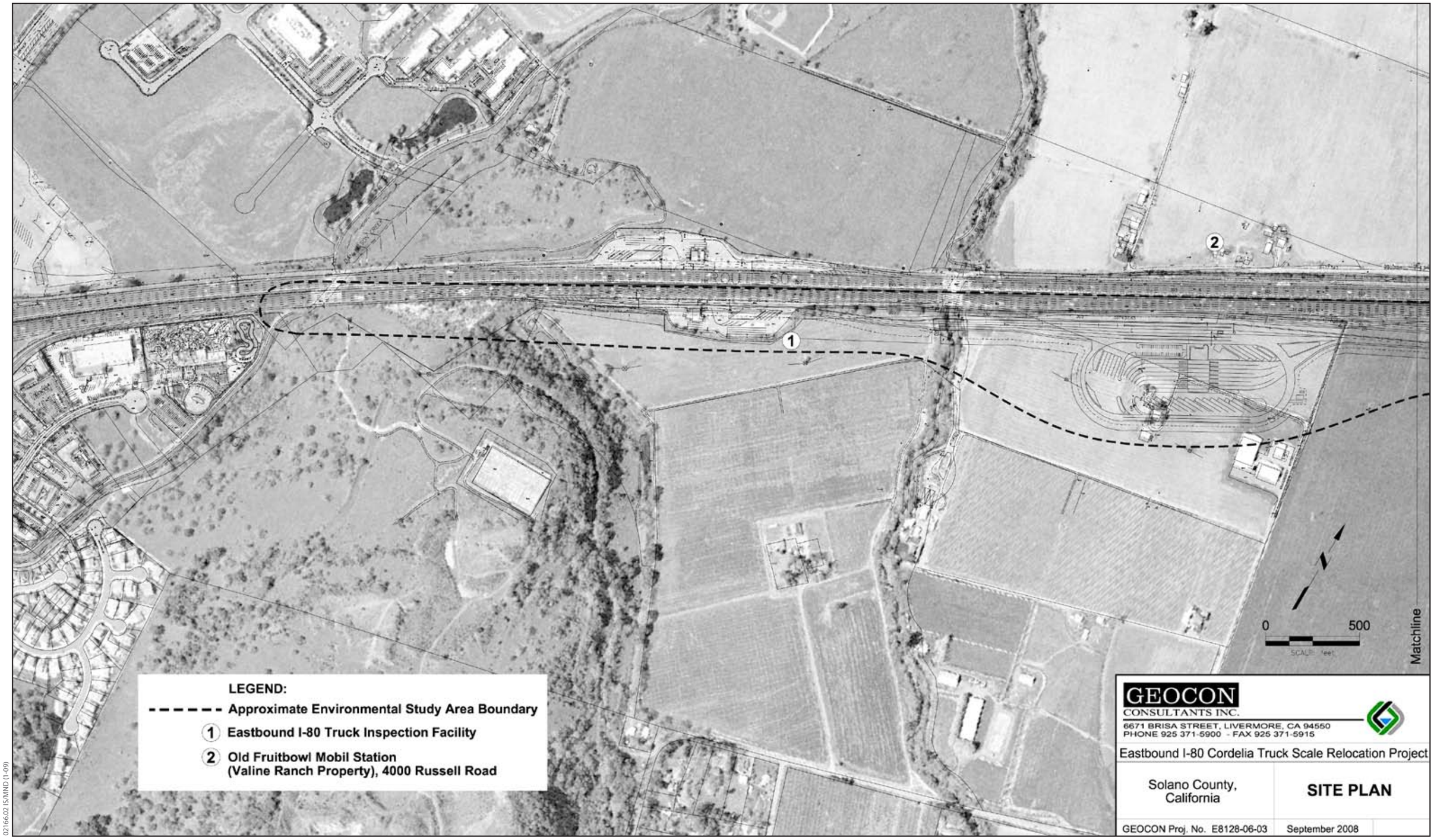
Map ID No.	Facility	Address	Assessor's Parcel Number	Potential Impact on Right-of-Way and Acquisitions	Information Source(s)	Known or Potential Environmental Impacts	Regulatory Status	Potential Impact on the Proposed Project and Recommendations
3	Moore Tractor Co.	4088 Russell Road	0027-510-040	Low impact on environmental study area	Recon prior Phase I SCDRM files	Currently an operating tractor sales and service facility. SCDRM inspections reported bulk automotive fluids stored at the property including diesel fuel (500-gallon AST), engine oil, and waste oil. A cement sump associated with a wash rack was also noted. Past SCDRM violations have included an overflowing sump, onsite automotive fluid spills, and improper drum storage.	No pending regulatory action or active violations are noted for this facility	This facility is located southwest of the I-80/SR 12E interchange and north of the project environmental study area. The facility presents a low risk of impacting the project Site based on proposed construction area boundaries.
4	Concrete Pipe Distributors	4974 Abernathy Road	0027-510-070	Low impact on environmental study area	Recon prior Phase I	Currently a concrete pipe distributor. A prior UST was reportedly removed in approximately 1985. No SCDRM information regarding the removal. 55-gallon drums from the adjacent Moore Tractor Co. were observed stored at the facility in 1994.	No pending regulatory action or active violations are noted for this facility	This facility is located north of eastbound I-80 and presents a low risk of affecting the project site based on proposed construction area boundaries.
5	Pacific Gas & Electric substation	South of the I-80/ SR 12E interchange	0027-252-080	Low impact on environmental study area	Recon	Active PG&E electrical substation with fluid-cooled pad-mounted transformers; possible polychlorinated biphenyl (PCB) compound impacts on soil at the facility.	No pending regulatory action or active violations are noted for this facility	This facility is located south of eastbound I-80, in the central portion of the project environmental study area, and presents a low risk of affecting the project site based on proposed construction area boundaries.
N/A	**I-80/SR 12E**	**Right-of-way acquisition**	**N/A**	**Moderate impact on new right-of-way**	**Recon**	**Properties with current or historical agricultural land use may contain residual agricultural chemicals in shallow soil, including APNs 0027-252-080, 0027-270-080, 0027-272-140, 0027-272-160, 0027-272-180.**	**N/A**	**Conduct soil and groundwater investigations for pesticides, herbicides, petroleum hydrocarbons, and metals as applicable on land proposed for full or partial acquisition based on past agricultural land usage to evaluate soil reuse and soil/groundwater disposal options.**

Table 2.2-5. Continued

Map ID No.	Facility	Address	Assessor's Parcel Number	Potential Impact on Right-of-Way and Acquisitions	Information Source(s)	Known or Potential Environmental Impacts	Regulatory Status	Potential Impact on the Proposed Project and Recommendations
N/A	**I-80/SR 12E**	**Right-of-way acquisition**	**N/A**	**Moderate impact on new right-of-way**	**Recon**	**Existing structures within the project environmental study area and on parcel takes requiring demolition.**	**N/A**	**Asbestos and lead-containing paint surveys should be conducted prior to any planned renovation or demolition of buildings either within the Caltrans right-of-way or on properties proposed for full or partial takes to evaluate worker health and safety and abatement and waste disposal options, and to comply with applicable regulations, including Bay Area Air Quality Management District requirements.**
N/A	**I-80/SR 12E**	**Existing corridors**	**N/A**	**Existing I-80/SR 12 east right-of-way**	**Recon prior nearby ADL study**	**Planned excavation and grading within existing right-of-way.**	**N/A**	**Perform shallow soil sampling to evaluate potential ADL in soil for worker health and safety and soil disposal options related to historical automobile exhaust emissions.**
N/A	**I-80/SR 12E**	**Existing corridors**	**N/A**	**Existing I-80/ SR 12E right-of-way**	**Recon**	**Planned excavation and pavement work within existing right-of-way.**	**N/A**	**Further evaluate potential hazardous waste issues or provide construction special provisions for thermoplastic traffic paint, asbestos pipe, bridge rail post sulfur and proper abandonment of wells, septic systems, and encountered unidentified USTs.**

Notes: Properties and locations listed in **bold** print have a moderate risk of affecting the project environmental study area and are recommended for further evaluation.

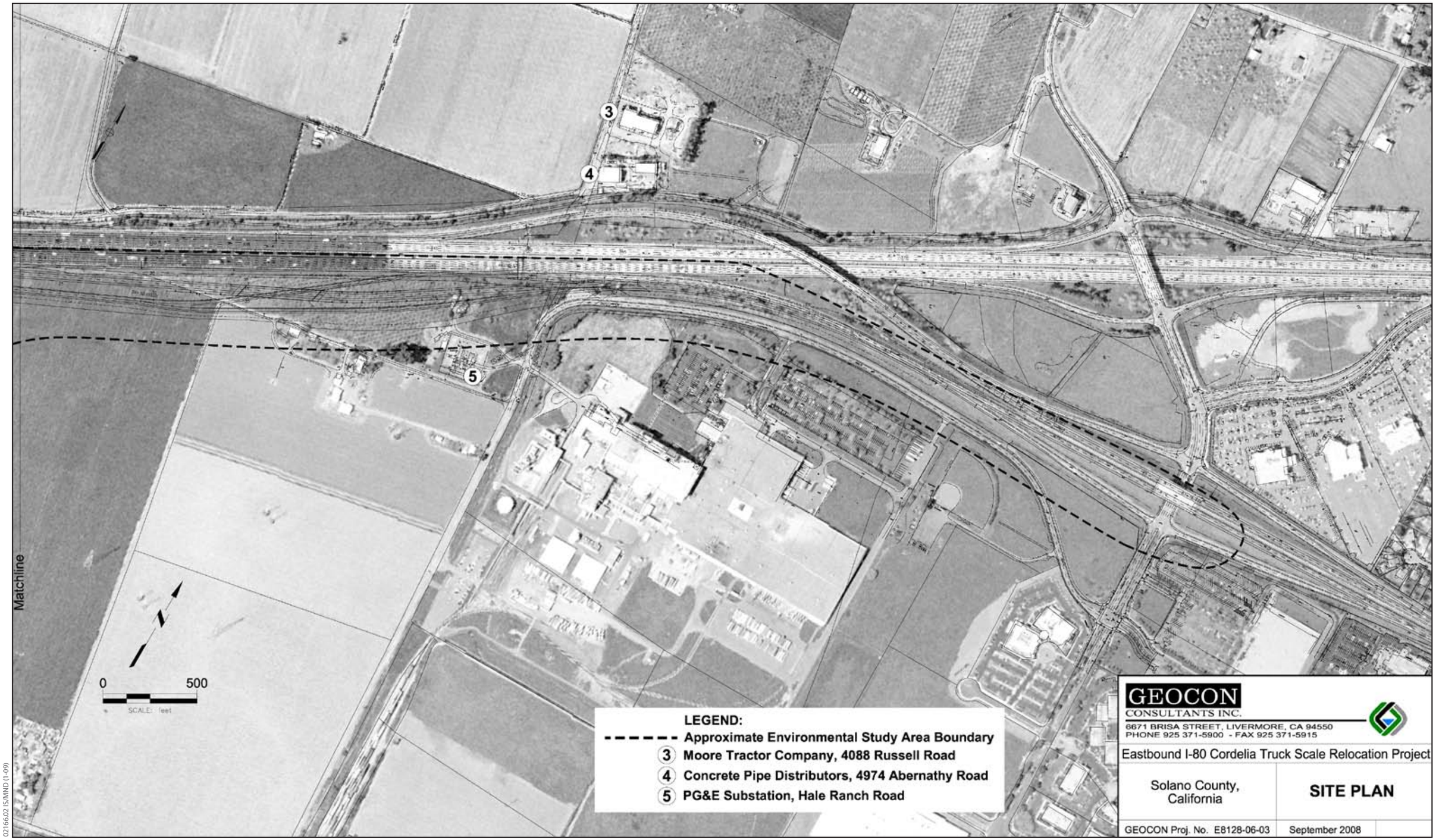
SCDRM = Solano County Department of Resource Management.
N/A = not applicable.
UST = underground storage tank .
SFBRWQCB = San Francisco Bay RWQCB.
AST = aboveground storage tank.
LUST = leaking UST.
ADL = aerially deposited lead.
I = interstate.
SR = State Route.
TIF = truck inspection facility.
Recon = reconnaissance.



02166.02 IS/MND (1-09)

ICF Jones & Stokes
an ICF International Company

Figure 2.2-4a
Site Plan



02166.02 IS/MND (1-09)

ICF Jones & Stokes
an ICF International Company

Figure 2.2-4b
Site Plan

Construction may require the movement or disposal of soils or materials containing some or all of these hazardous materials.

Standard Department procedures include the conduct of sampling, testing, removal, storage, transportation, and disposal of yellow striping along existing roadways. It will be ensured that sampling and testing of yellow pavement striping scheduled for removal is performed to determine if lead is present. All aspects of the proposed project associated with removal, storage, transportation, and disposal will be in strict accordance with appropriate regulations. Disposal of the stripes will be at a Class 1 disposal facility.

Standard Department procedures include disposal of soils contaminated with ADL, pesticides, and herbicides in accordance with appropriate regulations. Contaminated soil will be handled or disposed of in accordance with DTSC requirements. Under the DTSC Variance, this soil may be reused onsite if the excavated soil is placed under clean fill or pavement and a minimum of 5 feet above the maximum water table elevation.

In accordance with standard Department procedures, all aspects of the removal, storage, transportation, and disposal of soil subsequently characterized as a hazardous waste will be conducted in strict accordance with the appropriate regulations. The contractor will prepare a health and safety plan to address worker safety when working with potentially contaminated soils during construction.

Standard Department procedures also include the timing of construction to avoid exposure of construction workers to respiratory irritants from aerially applied chemicals. The Department or the appropriate local agency will ensure that the contractor coordinates the timing of aerially applied chemicals with the individual growers on parcels within or adjacent to the project area to avoid effects on workers during construction.

With the implementation of the relevant standard Department procedures described above, there would be no adverse effects related to the potential for exposure of known hazardous materials to humans or the environment.

Impact HAZ-3: Potential for Exposure of Humans and the Environment to Hazardous Conditions from the Accidental Release of Hazardous Materials

Construction would involve the use of heavy equipment, small quantities of hazardous materials (e.g., petroleum and other chemicals used to operate and maintain construction equipment), and larger quantities of potentially hazardous road construction materials (i.e., blacktopping materials) that may result in hazardous conditions on site. In addition, sanitary sewer pipelines may cross or exist within the planned roadway construction alignment. If pre-existing leaks are encountered, or if pipelines are ruptured during construction, construction workers or nearby land uses could be exposed to biological contamination. However, implementation of standard Department procedures to ensure worker safety would reduce the severity of this effect and therefore, it is not considered adverse.

Avoidance, Minimization, and/or Mitigation Measures

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

Impacts of the No-Project Alternative

Under the No-Project Alternative, no new impacts related to hazardous waste or hazardous materials would occur.

2.2.6 Air Quality

This chapter describes the environmental setting (existing conditions and regulatory setting) for air quality relating to the proposed project; the impacts on air quality that would result from the proposed project; and measures that would reduce these impacts, if applicable. The information contained in this section is based upon the *Interstate-80 Eastbound Cordelia Truck Scale Relocation Project Air Quality Technical Report* which is hereby incorporated by reference in its entirety (California Department of Transportation 2008).

Regulatory Setting

The proposed project is located in the Solano County portion of the BAAQMD. The BAAQMD has jurisdiction over air quality issues in southwestern Solano County, in addition to the counties surrounding the San Francisco Bay. It administers air quality regulations developed at the federal, state, and local levels. Federal, state, and local air quality regulations applicable to the proposed project are described below.

Federal Requirements

The federal CAA, enacted in 1970 and amended twice thereafter (including the 1990 amendments), establishes the framework for modern air pollution control. The EPA has established national ambient air quality standards (NAAQS) for criteria pollutants (Table 2.2-6). Criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), particulate matter 10 microns or less in diameter (PM10), particulate matter 2.5 microns or less in diameter (PM2.5), and lead. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as the protection of crops, the protection of materials, or the avoidance of nuisance conditions).

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 (NO_2), ozone (O_3), particulate matter (PM), lead (Pb), and sulfur dioxide (SO_2).

Regional level conformity in California is concerned with how well the region is meeting the standards set for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and particulate matter (PM). California is in attainment for the other criteria pollutants. At the regional level, Regional Transportation Plans (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 Metropolitan Transportation Commission (MTC) for Solano County and

Table 2.2-6. Ambient Air Quality Standards Applicable in California and the Attainment Status of Solano County

Pollutant	Symbol	Average Time	Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria		Attainment Status of Solano County[a]	
			California	National	California	National	California	National	California	National
Ozone	O_3	1 hour	0.09	N/A	180	N/A	If exceeded	If exceeded more than 3 days in 3 years	Serious nonattainment	N/A
		8 hours	0.070	0.075	137	147	If exceeded	If fourth highest 8-hour concentration in a year, averaged over 3 years, is exceeded at each monitor within an area	Not yet classified	Marginal nonattainment
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded more than 1 day per year	Attainment	Marginal maintenance[b]
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded more than 1 day per year	Attainment	Unclassified/ attainment
(Lake Tahoe only)		8 hours	6	N/A	7,000	N/A	If equaled or exceeded	N/A	N/A	N/A
Nitrogen dioxide	NO_2	Annual average	0.03	0.053	N/A	100	N/A	If exceeded	N/A	Attainment
		1 hour	0.18	N/A	338	N/A	If exceeded	If exceeded	Attainment	N/A
Sulfur dioxide	SO_2	Annual average	NA	0.030	N/A	80	N/A	If exceeded	N/A	Attainment
		24 hours	0.04	0.14	105	365	If exceeded	If exceeded more than 1 day per year	Attainment	Attainment
		1 hour	0.25	N/A	655	N/A	N/A	N/A	Attainment	N/A
Hydrogen sulfide	H_2S	1 hour	0.03	N/A	42	N/A	If equaled or exceeded	N/A	Unclassified	N/A
Vinyl chloride	C_2H_3Cl	24 hours	0.010	N/A	26	N/A	If equaled or exceeded	N/A	No designation	N/A
Inhalable particulate matter	PM10	Annual arithmetic mean	N/A	N/A	20	50	If exceeded	If exceeded	Nonattainment	Unclassified/ attainment
		24 hours	N/A	N/A	50	150	If exceeded	If average 1% over 3 years is exceeded	Nonattainment	Unclassified/ attainment
	PM2.5	Annual arithmetic mean	N/A	N/A	12	15	If exceeded	If exceeded	Nonattainment	Unclassified/ attainment
		24 hours	N/A	N/A	N/A	35	N/A	If average 2% over 3 years is exceeded	N/A	Unclassified/ attainment
Sulfate particles	SO_4	24 hours	N/A	N/A	25	N/A	If equaled or exceeded	N/A	Attainment	N/A
Lead particles	Pb	Calendar quarter	N/A	N/A	N/A	1.5	N/A	If exceeded more than 1 quarter per year	N/A	No designation
		30 days	N/A	N/A	1.5	N/A	If equaled or exceeded	N/A	Attainment	N/A

Source: California Air Resources Board 2008a.

Notes: All standards are based on measurements at 25ºC and 1 atmosphere pressure; national standards shown are the primary (health effects) standards; N/A = not applicable.

[a] the portion of Solano County within the San Francisco Bay Area Air Basin.

[b] Urbanized areas described in the Technical Support Document from 3/29/85, 50 CFR 12540, in U.S. Environmental Protection Agency 2008b.

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.

Ozone and its precursors, reactive organic gases (ROG) and oxides of nitrogen (NO_x); sulfates; visibility reducing particles; NO_2; and PM10 and PM2.5 are considered to be regional pollutants because they affect air quality on a regional scale. NO_2 reacts photochemically with ROG to form ozone, and PM10 and PM2.5 can originate from chemical reactions of atmospheric chemicals, including NO_x, sulfates, nitrates, and ammonia. These processes can occur at some distance downwind of the source of pollutants. Pollutants such as CO, SO_2, and lead are considered to be local pollutants because they tend to disperse rapidly with distance from the source. PM10 is considered a localized pollutant, as well as a regional pollutant, because direct emissions of PM10 from automobile exhaust can accumulate in the air locally near the emission source.

The CAA requires states to submit a state implementation plan (SIP) for areas designated as nonattainment for federal air quality standards. The SIP, which is reviewed and approved by the EPA, must demonstrate how the federal standards will be achieved. Failing to submit a plan or secure approval could lead to a denial of federal funding and permits. In cases where the SIP is submitted by the state but fails to demonstrate achievement of the standards, the EPA is directed to prepare a federal implementation plan.

Transportation Conformity

Transportation conformity, a concept introduced in the 1977 federal CAA, requires that no federal dollars be used to fund a transportation project unless it can be clearly demonstrated that the project would not cause or contribute to violations of the NAAQS. Conformity requirements were made substantially more rigorous in the CAA amendments of 1990. The U.S. Department of Transportation and the EPA developed guidance for determining conformity of transportation plans, programs, and projects in November 1993 in the transportation conformity rule (40 CFR 51 and 40 CFR 93).

Conformity for transportation projects typically is assessed by evaluating whether a project is included in a conforming RTP or a transportation improvement program (TIP), or both. Any project listed in an RTP or a TIP must demonstrate conformity with the SIP. The local metropolitan planning organization (MPO) is responsible for the preparation of regional transportation plans and associated demonstration of conformity to the SIP. In addition, a local pollutant impact analysis usually is required.

In Solano County, the MTC is the responsible MPO and develops the RTP and TIP for the region. The RTP and TIP include projects whose emissions are within the budget planned in the SIP, with the goal of attaining the NAAQS. The TIP is also in accord with the EPA's transportation conformity rule as it pertains to the attainment of air quality standards in the BAAQMD. The description of the project is the same in the RTP, TIP, and in this environmental document.

The federally required RTP and TIP are comprehensive listings of all transportation projects that receive federal funds or that are subject to a federally required action, such as a review for impacts on air quality. The TIP sets forth the MTC's investment priorities for transit and transit-related improvements, highways and roadways, and other surface transportation improvements in the Solano County region. The MTC prepares and adopts the TIP every 2 years.

In addition to demonstrating that a proposed project has been identified in an approved regional transportation improvement program (RTIP) and incorporated in an EPA-approved SIP or demonstrating that a proposed project is exempt from conformity requirements, agencies constructing transportation projects must demonstrate that they do not exacerbate an existing violation of an NAAQS or create a new exceedance under Section 93.114 of the EPA transportation conformity regulations. The section states that "there must be a currently conforming regional transportation plan and transportation improvement program at the time of project approval." The proposed project (identified as reference number 22701 for the Cordelia Truck Scales' relocation) is included in the *Transportation 2030 Plan* and the *2007 Transportation Improvement Program*. The MTC adopted the 2007 TIP on March 9, 2007. The FHWA made its conformity determination for the *Transportation 2030 Plan* on March 17, 2005, and the *2007 Transportation Improvement Program* on October 4, 2007. The proposed project (identified as reference number 22701 for the Cordelia Truck Scales Relocation) is included in the *Transportation 2030 Plan* and the *2007 Transportation Improvement Program.*

With respect to the first criterion, we conclude that the project's operational emissions (which include the ozone precursors ROG and NO_x) meet the transportation conformity requirements imposed by the EPA and the BAAQMD. Although the proposed project is a conforming project for regional emissions, it requires both a CO and PM10/PM2.5 "hot spot" analysis to determine any localized emissions effects. The PM hot spot analysis is not required for project level conformity because the area is in attainment or unclassified for the national PM10 and PM2.5 standards.

Typically, evaluating whether a project is included in a conforming RTP or TIP is done to determine transportation conformity for ozone precursors. Because PM10/PM2.5 and CO are localized pollutants, the determination of transportation conformity for these pollutants is assessed by identifying whether the proposed project would generate elevated hot-spot

concentrations for these two pollutants. For PM10 and PM2.5, the determination of conformity is qualitative; for CO, the determination is quantitative.

Mobile Source Air Toxics

The CAA of 1990 identified 188 pollutants as hazardous air pollutants (HAPs), also known as air toxics. From this list, the EPA identified a group of 21 as mobile source air toxics (MSATs) in its final rule, "Control of Emissions of Hazardous Air Pollutants from Mobile Sources" (66 Federal Register [FR] 17235) in March 2001. From this list of 21 MSATs, the EPA has identified six MSATs—benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene—as being priority MSATs. To address emissions of MSATs, the EPA has issued a number of regulations that will dramatically decrease MSATs through cleaner fuels and cleaner engines. The area of air toxics analysis is a new and emerging issue and is a continuing area of research. Although much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques available for assessing project-specific health impacts from MSATs are limited. Given the emerging state of the science and of project-level analysis techniques, there are no established criteria for determining when MSAT emissions should be considered a significant issue in the NEPA context. The FHWA currently is preparing guidance as to how mobile source health risks should factor into project-level decision-making under NEPA. In addition, the EPA has not established regulatory concentration targets for the six relevant MSAT pollutants appropriate for use in the project development process.

In light of the recent development regarding MSATs, the FHWA has issued interim guidance for the assessment of MSATs in NEPA documents for highway projects. The FHWA has developed a tiered approach for analyzing MSATs in NEPA documents. Depending on the specific project circumstances, FHWA has identified three levels of analysis, listed below.

1. No analysis for exempt projects or projects with no potential for meaningful MSAT effects.

   The types of projects included in this category are:

   – Projects qualifying as a categorical exclusion under 23 CFR 771.117(c).

   – Projects exempt under the CAA conformity rule under 40 CFR 93.126.

   – Other projects with no meaningful impacts on traffic volumes or vehicle mix.

   Projects that are categorically excluded under 23 CFR 771.117(c), or are exempt under the CAA pursuant to 40 CFR 93.126, require no analysis or discussion of MSATs. Documentation sufficient to demonstrate that the project qualifies as a categorical exclusion or exempt project will suffice. For other projects with no or negligible traffic impacts, regardless of the class of NEPA environmental document, no MSAT analysis is required.[1] However, the project record must document the basis for the determination of "no meaningful potential impacts" with a brief description of the factors considered.

[1] The types of projects categorically excluded under 23 CFR 771.117(d) or exempt from conformity under 40 CFR 93.127 do not warrant an automatic exemption from an MSAT analysis, but they usually will have no meaningful impact.

2. Qualitative analysis for projects with low potential MSAT effects.

   This category covers a broad range of projects, as projects included in this category are those that serve to improve operations of highway, transit, or freight without adding substantial new capacity or creating a facility that is likely to meaningfully increase emissions.

   The FHWA anticipates that most highway projects will fall into this category. Any projects not meeting the threshold criteria for higher potential effects set forth in subsection 3 below and not meeting the criteria in subsection 1 above should be included in this category. Examples of these types of projects are minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street or where design year traffic is not projected to meet the 140,000–150,000 annual average daily traffic (AADT) criterion.2

   A qualitative assessment of emissions projections should be conducted for these projects. The qualitative assessment would compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic and the associated changes in MSATs for the project alternatives, based on VMT, vehicle mix, and speed. It also would discuss national trend data projecting substantial overall reductions in emissions because of stricter engine and fuel regulations issued by the EPA. Because the emission effects of these projects are low, the FHWA expects there would be no appreciable difference in overall MSAT emissions between the alternatives. In addition, quantitative emissions analysis of these types of projects will not yield credible results that are useful to project-level decision-making because of the limited capabilities of the transportation and emissions forecasting tools.

3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

   Projects included in this category have the potential for meaningful differences among project alternatives. The FHWA expects only a limited number of projects to meet this two-pronged test. To fall into this category, projects must:

   – Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location.

   – Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,0003, or greater, by the design year (and projects also must be proposed to be located in proximity to populated areas or in rural areas, in proximity to concentrations of vulnerable populations, such as schools, nursing homes, or hospitals).

   Projects falling within this category should be more rigorously assessed for impacts, and the FHWA should be contacted for assistance in developing a specific approach for assessing

[2] The FHWA guidance for the assessment of MSATs in NEPA documents does not specifically address the analysis of construction-related emissions because of their relatively short duration. The FHWA is considering whether more guidance is needed on construction activities in future versions of its guidance.

[3] Using the EPA's MOBILE6.2 emissions model, FHWA technical staff determined that this range of AADT would be roughly equivalent to the CAA definition of a major hazardous air pollutant (HAP) source (i.e., 25 tons per year [tpy] for all HAPs or 10 tpy for any single HAP). Significant variations in conditions such as congestion or vehicle mix could warrant a different range for AADT.

impacts. This approach would include a quantitative analysis that would attempt to measure the level of emissions for the six priority MSATs for each alternative, to use as a basis of comparison. This analysis also may address the potential for cumulative impacts, where appropriate, based on local conditions. How and when cumulative impacts should be considered would be addressed as part of the assistance outlined above. If the analysis for a project in this category indicates meaningful differences in levels of MSAT emissions, mitigation options should identified and considered.

State Requirements

Responsibility for achieving California's ambient air quality standards (CAAQS) (Table 2.2-6), which are more stringent than federal standards for certain pollutants and averaging periods, is placed on the California Air Resources Board (ARB) and local air pollution control districts. State standards are to be achieved through district-level air quality management plans that are incorporated into the SIP. In California, the EPA has delegated authority to prepare SIPs to the ARB, which, in turn, has delegated that authority to individual air districts.

The ARB traditionally has established state air quality standards, maintained oversight authority in air quality planning, developed programs for reducing emissions from motor vehicles, developed air emission inventories, collected air quality and meteorological data, and approved SIPs.

Responsibilities of air districts include overseeing stationary source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by CEQA.

The California Clean Air Act (CCAA) of 1988 substantially added to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures.

The CCAA focuses on attainment of the CAAQS and requires the designation of attainment and nonattainment areas with respect to these standards. The act also requires that local and regional air districts expeditiously adopt and prepare an air quality attainment plan if the district violates CAAQS for CO, SO_2, NO_2, or ozone. These plans are specifically designed to attain state standards and must be designed to achieve an annual 5% reduction in district-wide emissions of each nonattainment pollutant or its precursors. No locally prepared attainment plans are required for areas that violate the state PM10 standards; the ARB is responsible for developing plans and projects that achieve compliance with the state PM10 standards.

The CCAA requires that the state air quality standards be met as expeditiously as practicable, but, unlike the federal CAA, the CCAA does not set precise attainment deadlines. Instead, the act establishes increasingly stringent requirements for areas that will require more time to achieve the standards.

The CCAA emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. The act gives local air pollution control districts explicit authority to regulate indirect

sources of air pollution and to establish traffic control measures (TCM). The CCAA does not define the terms *indirect* and *area-wide*. However, Section 110 of the federal CAA defines an indirect source as "a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution. Such term includes parking lots, parking garages, and other facilities subject to any measure for management of parking supply."

TCMs are defined in the CCAA as "any strategy to reduce trips, vehicle use, VMT, vehicle idling, or traffic congestion for the purpose of reducing vehicle emissions."

California Department of Transportation Standard Specification 7-1.01F and Standard Specification 10

Construction activities are subject to Department requirements found in the Department document *Standard Specifications* (California Department of Transportation 2006). Standard Specification 7-1.01F stipulates that construction activities must comply with all rules, regulations, ordinances, and statutes of the local air pollution control district, and Standard Specification 10 addresses dust control requirements.

Global Warming Solutions Act of 2006 (Assembly Bill 32)

On June 1, 2005, California Governor Arnold Schwarzenegger signed EO S-3-05. The goal of this EO is to reduce California's greenhouse gas (GHG) emissions to: 2000 levels by 2010, 1990 levels by 2020, and 80% below the 1990 levels by 2050. In 2006, this goal was reinforced further with the passage of Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that the ARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." EO S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

Climate change and GHG reduction are also concerns at the federal level; however, at this time, no federal legislation or regulations specifically addressing GHG emissions reductions and climate change have been enacted.

Local and Regional Implementation of Federal Requirements

The air quality management agencies of direct importance to western Solano County include the EPA, the ARB, and the BAAQMD. The EPA has established NAAQS for which the ARB and the BAAQMD have primary implementation responsibility. The ARB and the BAAQMD are also responsible for ensuring that the CAAQS are met.

Local Standards

Guidance for the determination of significant air impacts under CEQA within western Solano County is found in the BAAQMD document *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans* (Bay Area Air Quality Management District 1999).

The BAAQMD does not require quantification of construction emissions. Instead, it requires the implementation of effective and comprehensive feasible control measures to reduce PM10 emissions (Bay Area Air Quality Management District 1999). PM10 emitted during construction activities varies greatly depending on the level of activity, the specific operations taking place,

the equipment being operated, local soils, and weather conditions. Despite this variability in emissions, experience has shown that a number of feasible control measures can be reasonably implemented to reduce PM10 emissions during construction; these measures are summarized in Table 2.2-7. According to the BAAQMD, if all control measures listed in Table 2.2-7 are implemented (as appropriate, depending on the size of the project area), air pollutant emissions from construction activities would be considered less than significant (Bay Area Air Quality Management District 1999). Construction equipment also emits CO and ozone precursors. Construction-related emissions of these pollutants were not estimated, however, because they are included already in the emission inventory that forms the basis for the BAAQMD's regional air quality plans and because those emissions are not expected to impede attainment or maintenance of ozone and CO standards in the Bay Area (Bay Area Air Quality Management District 1999).

Table 2.2-7. BAAQMD Feasible Control Measures for Construction Emissions of PM10

Basic Control Measures (Controls That Should Be Implemented at All Construction Sites)
Water all active construction areas at least twice daily. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 0.6 meters (2 feet) of freeboard. Pave; apply water three times daily; or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites. Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites. Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
Enhanced Control Measures (Additional Measures That Should Be Implemented at Construction Sites Greater than 4 acres in Area)
Hydroseed or apply (nontoxic) soil stabilizers to inactive construction areas (i.e., previously graded areas inactive for 10 days or more). Enclose, cover, water twice daily, or apply (nontoxic) soil binders to exposed stockpiles (e.g., dirt and sand). Limit traffic speeds on unpaved roads to 24.1 kilometers per hour (15 mph). Install sandbags or other erosion control measures to prevent silt runoff to public roadways. Replant vegetation in disturbed areas as quickly as possible.
Optional Control Measures (Control Measures That Are Strongly Encouraged at Construction Sites that Are Large in Area, Located Near Sensitive Receptors, or for Any Other Reason May Warrant Additional Emissions Reductions; the Project Applicant Is Not Required to Implement Them)
Install wheel washers for all exiting trucks or wash off the tires or tracks of all trucks and equipment leaving the site. Install windbreaks or plant trees or vegetative wind breaks at windward sides of construction areas. Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph. Limit the area subject to excavation, grading, and other construction activity at any one time.

Source: Bay Area Air Quality Management District 1999.

For project operations, the BAAQMD identifies a significant air quality impact as being a:

- Net increase in pollutant emissions of 80 pounds per day (ppd) or 15 tons per year (tpy) of ROG, NO_x, or PM10.
- Project-related contribution to CO concentrations exceeding the CAAQS for the 1- and 8-hour standards.

According to the BAAQMD, localized CO concentrations should be estimated for projects in which:

- Vehicle emissions of CO exceed 550 ppd.
- Project traffic affects intersections or roadway links operating at LOS D, E, or F.

- Project traffic causes intersection or roadway link LOS to decline to D, E, or F.
- Project traffic increases traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour).

Affected Environment

This chapter evaluates the potential air quality effects of the proposed action. The information contained in this section is based upon the *I-80 Eastbound Cordelia Truck Scale Relocation Project Air Quality Impacts Technical Study* which is hereby incorporated by reference in its entirety (California Department of Transportation 2008).

Physical Setting

Ambient air quality is affected by climatological conditions, topography, and the types and amounts of pollutants emitted. The following discussion describes relevant characteristics of the air basin and offers an overview of conditions affecting pollutant ambient air concentrations in the basin.

Climate and Topography

The project lies within the Carquinez Strait region of the San Francisco Bay Area Air Basin (SFBAAB). The Carquinez Strait is the only sea-level gap between the San Francisco Bay and the Central Valley. Within the region, the prevailing winds are from the west, but during the summer and fall months, marine air flows eastward through the Carquinez Strait due to high pressure offshore and low pressure in the Central Valley. These easterly winds usually contain more pollutants from the Sacramento and San Joaquin Valleys in the east than the cleaner marine air from the west. During summer and fall months, this can result in elevated pollutant levels as pollutants move through the strait into the central Bay Area from surrounding areas. The high-pressure periods during the summer and fall months often are accompanied by low wind speeds, shallow mixing depths, higher temperatures, and little or no rainfall. Mean maximum temperatures reach about 32.2ºC (90ºF) during the summer, and mean minimum temperatures are typically 1.6–4.4ºC (35–40ºF) in the winter. In distant areas like Fairfield, where the region is sheltered from the moderating effects of the strait, temperature extremes are especially pronounced.

Many industrial facilities, such as chemical plants and refineries, are located within the Carquinez Strait region and generate significant air pollutant emissions. However, the high wind speeds in the region often help moderate the pollution potential of this area. Occasionally, short-term pollution episodes can result from upsets at industrial facilities, while unpleasant odors may occur anytime. The result is that receptors downwind of these facilities could suffer more long-term exposure to air contaminants than individuals elsewhere. Areas of the region that are traversed by major roadways, such as I-80, also may be subject to higher local concentrations of CO and particulate matter, as well as certain toxic air contaminants (TACs), such as benzene.

Environmental Consequences

Regional Air Quality Conformity

Transportation conformity, a concept introduced in the 1977 federal CAA, requires that no federal dollars be used to fund a transportation project unless it can be clearly demonstrated that

the project would not cause or contribute to violations of the NAAQS. Conformity requirements were made substantially more rigorous in the CAA amendments of 1990. The U.S. Department of Transportation and the EPA developed guidance for determining conformity of transportation plans, programs, and projects in November 1993 in the transportation conformity rule (40 CFR 51 and 40 CFR 93).

In Solano County, the MTC is the local MPO and develops the RTP and TIP for the region. The RTP and TIP include projects whose emissions are within the budget planned in the SIP, with the goal of attaining the NAAQS. The TIP is also in accord with the EPA's transportation conformity rule as it pertains to the attainment of air quality standards in the BAAQMD.

Under Section 93.114 of the EPA transportation conformity regulations, the section states that "there must be a currently conforming regional transportation plan and transportation improvement program at the time of project approval." The most recent regional transportation plan in the project area is the MTC's *Transportation 2030 Plan*, which the MTC adopted in February 2005. The proposed project (identified as reference number 22701 for the Cordelia Truck Scales relocation) is included in the *Transportation 2030 Plan* and the *2007 Transportation Improvement Program*. The MTC adopted the 2007 TIP on March 9, 2007. The FHWA made its conformity determination for the *Transportation 2030 Plan* on March 17, 2005, and the *2007 Transportation Improvement Program* on October 4, 2007. The project description is the same in the RTP, TIP, and in this environmental document.

Project Level Conformity

National and State Ambient Air Quality Standards

As required by the CAA, the NAAQS have been established for major air pollutants: ozone, CO, NO_x, sulfur oxides (SO_x), particulate matter, and lead. Pursuant to the CCAA, the state has established the CAAQS. The CAAQS are generally more stringent than the corresponding federal standards (NAAQS) and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Because the CAAQS are more stringent than the NAAQS, the CAAQS are used as the comparative standard in the air quality analysis contained in this report.

Both state and federal standards are summarized in Table 2.2-8. The "primary" standards have been established to protect public health. The "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation and other aspects of the general welfare.

Attainment Status

The CCAA requires the ARB to designate areas within California as either attainment or nonattainment for each criteria pollutant, based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data show that a state standard for the pollutant was violated at least once during the previous three calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard and are not used as a basis for designating areas as nonattainment.

The ARB has classified the county as being a serious nonattainment area for the ozone CAAQS. For the CO CAAQS, the ARB has classified the county as being an attainment area (California Air Resources Board 2008c). For the PM10 and PM2.5 CAAQS, the ARB has classified the county as a nonattainment area. Solano County's attainment status for each of these pollutants relative to the NAAQS and CAAQS is summarized in Table 2.2-9.

Table 2.2-8. Ambient Air Quality Standards

Pollutant	Average Time	California Standards		National Standards		
		Concentration	Measurement Method	Primary	Secondary	Measurement Method
Ozone (O_3)	1 hour	0.09 ppm	Ultraviolet photometry	N/A	N/A	Ultraviolet photometry
	8 hours	0.07 ppm		0.075 ppm	0.075 ppm	
Carbon monoxide (CO)	8 hours	9.0 ppm	Non-dispersive infrared spectroscopy	9 ppm	None	Non-dispersive infrared spectroscopy
	1 hour	20 ppm		35 ppm		
Nitrogen dioxide (NO_2)	Annual arithmetic mean	0.030 ppm	Gas phase chemiluminescence	0.053 ppm	0.053 ppm	Gas phase chemiluminescence
	1 hour	0.18 ppm		N/A	N/A	
Sulfur dioxide (SO_2)	Annual arithmetic mean	N/A	Ultraviolet fluorescence	0.03 ppm	N/A	Pararosaniline
	24 hours	0.04 ppm		0.14 ppm	N/A	
	3 hours	N/A		N/A	0.5 ppm	
	1 hour	0.25 ppm		N/A	N/A	
Particulate matter 10 microns or less in diameter (PM10)	24 hours	50 $\mu g/m^3$	Gravimetric or beta attenuation	150 $\mu g/m^3$	150 $\mu g/m^3$	Inertial separation and gravimetric analysis
	Annual arithmetic mean	20 $\mu g/m^3$		N/A	N/A	
Particulate matter 2.5 microns or less in diameter (PM2.5)	Annual arithmetic mean	12 $\mu g/m^3$	Gravimetric or beta attenuation	15 $\mu g/m^3$	15 $\mu g/m^3$	Inertial separation and gravimetric analysis
	24 hours	No separate state standard		35 $\mu g/m^3$	35 $\mu g/m^3$	
Lead	30-day average	1.5 $\mu g/m^3$	Atomic absorption	N/A	N/A	High volume sampler and atomic absorption
	Calendar quarter	N/A		1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	
Visibility reducing particles	8 hours	Extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more due to particles when relative humidity is less than 70%; Method: beta attenuation and transmittance through filter tape		N/A	N/A	N/A
Sulfates	24 hours	25 $\mu g/m^3$	Ion chromatography	N/A	N/A	N/A
Hydrogen sulfide (H_2S)	1 hour	0.03 ppm	Ultraviolet fluorescence	N/A	N/A	N/A
Vinyl chloride	24 hours	0.010 ppm	Gas chromatography	N/A	N/A	N/A

Source: California Air Resources Board 2008b.
Notes: ppm = parts per million.
$\mu g/m^3$ = micrograms per cubic meter.
N/A = not applicable.

Table 2.2-9. Attainment Status for the BAAQMD

Pollutant	Federal Designations	State Designations
Ozone (1-hour)	N/A	Nonattainment
Ozone (8-hour)	Nonattainment	Nonattainment
PM10 (annual)	N/A	Nonattainment
PM10 (24-hrs)	Unclassified	Nonattainment
PM2.5 (annual)	Attainment	N/A
PM2.5 (24-hrs)	Nonattainment	Attainment
CO	Attainment/Maintenance	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Pb	Attainment	Attainment
Sulfates	N/A	Attainment
H_2S	N/A	Unclassified
Visibility	N/A	Unclassified

Note: N/A = not applicable.

Description of Pollutants

The following is a general description of the pollutants for which there are standards (criteria pollutants) and ambient measurements.

Ozone

Ozone is a respiratory irritant that increases susceptibility to respiratory infections. It is also an oxidant that can cause substantial damage to vegetation and other materials.

Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone precursors (ROG and NO_x) react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem.

Ozone is a regional pollutant. Because photochemical reactions take time to occur, high ozone levels often occur downwind of the emission source. Because the predominant wind direction in the project area is from the west, Solano County is a receptor of regional pollutants, such as ozone, from the Bay Area. The ARB has identified the SFBAAB as a transport contributor to the Sacramento region, the Mountain Counties Air Basin, the North Central Coast Air Basin, the North Coast Air Basin, the San Joaquin Valley Air Basin, and the South Central Coast Air Basin. The amount of transport impact varies from day to day, depending in large part on meteorology. To the extent that the Bay Area continues to reduce ozone precursor emissions, the transport impact on downwind areas should decrease also (California Air Resources Board 2005).

State and federal standards for ozone have been set for 1- and 8-hour averaging times. The state 1-hour ozone standard is 0.09 parts per million (ppm), not to be exceeded. The federal 1-hour ozone standard recently was replaced with an 8-hour standard of 0.075 ppm, not to be exceeded more than three times in any 3-year period. The state 8-hour standard is 0.07 ppm, not to be exceeded.

Carbon Monoxide

CO is a public health concern because it combines readily with hemoglobin and reduces the amount of oxygen transported in the bloodstream. CO can cause health problems, such as fatigue, headache, confusion, dizziness, and even death.

Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

State and federal CO standards have been set for 1- and 8-hour averaging times. The state 1-hour standard is 20 ppm, not to be exceeded, whereas the federal 1-hour standard is 35 ppm, not to be exceeded more than 1 day per year. Both state and federal standards for the 8-hour averaging period are 9 ppm; the state standard may not be exceeded, and the federal standard may not be exceeded more than 1 day per year.

Inhalable Particulate Matter

Particulates can damage human health and retard plant growth. Health concerns associated with suspended particulate matter focus on those particles small enough to reach the lungs when inhaled. Particulates also reduce visibility and corrode materials.

Sources of PM10 in Solano County comprise both rural and urban sources, including agricultural burning, tilling of agricultural fields, industrial emissions, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere.

The NAAQS and CAAQS for particulate matter apply to two classes of particulates: PM2.5 and PM10. The state PM10 standards are 50 micrograms per cubic meter (μ/m^3) as a 24-hour average and 20 μ/m^3 as an annual arithmetic mean. The federal PM10 standards are 150 μ/m^3 as a 24-hour average. For PM2.5, the state has adopted a standard of 12 μ/m^3 for the annual arithmetic mean. The federal PM2.5 standards are 35 μ/m^3 for the 24-hour average and 15 μ/m^3 for the annual arithmetic mean. The Bay Area is now classified as non-attainment area for the federal 24-hours PM2.5 standard.

Nitrogen Dioxide

Nitrogen oxides are a family of highly reactive gases that are primary precursors to the formation of ground-level ozone, reacting in the atmosphere to form acid rain. NO_x, a mixture of nitric oxide (NO) and NO_2, are produced from natural sources, motor vehicles, and other fuel combustion processes.

NO is colorless and odorless and is oxidized in the atmosphere to form NO_2, an odorous, brown, acidic, highly corrosive gas that can affect human health and the environment. Nitrogen oxides (denoted as NO_x) are critical components of photochemical smog. NO_2 produces the yellowish-brown color of the smog. The EPA has set an NAAQS standard for NO_2 but not for NO.

NO_x can irritate and damage the lungs and lower resistance to respiratory infections such as influenza. The effects of short-term exposure are still unclear, but continued or frequent exposure

to concentrations that are typically much higher than those normally found in the ambient air may cause increased incidence of acute respiratory illness in children. Health effects associated with NO_x are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO_2 may lead to eye and mucus membrane aggravation along with pulmonary dysfunction. NO_x can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals as a result of the production of particulate nitrates. Airborne NO_x can impair visibility also. NO_x is a major component of acid deposition in California. NO_x may affect both terrestrial and aquatic ecosystems. NO_x in the air is a potentially significant contributor to a number of environmental effects, such as acid rain and eutrophication in coastal waters. Eutrophication occurs when a body of water suffers an increase in nutrients that reduces the amount of oxygen in the water, producing an environment that is destructive to fish and other animal life.

Sulfur Oxides

SO_x gases are a family of colorless, pungent gases, which include SO_2 and are formed primarily by combustion of sulfur-containing fossil fuels (mainly coal and oil), metal smelting, and other industrial processes. SO_x can react to form sulfates, which significantly reduce visibility. SO_x is a precursor to particulate matter formation, which is in nonattainment in the project area.

The major health concerns associated with exposure to high concentrations of SO_x include effects related to breathing, respiratory illness, alterations in pulmonary defenses, and aggravation of existing cardiovascular disease. Major subgroups of the population that are most sensitive to SO_x include individuals with cardiovascular disease or chronic lung disease (such as bronchitis or emphysema), as well as children and the elderly. Emissions of SO_x can also damage the foliage of trees and agricultural crops. Together, SO_x and NO_x are the major precursors to acid rain, which is associated with the acidification of lakes and streams and accelerated corrosion of buildings and monuments.

Lead

Lead is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Lead was used several decades ago to increase the octane rating in automotive fuel. Because gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels, and the use of leaded fuel has been mostly phased out, the ambient concentrations of lead have dropped dramatically.

Short-term exposure to high levels of lead can cause vomiting, diarrhea, convulsions, coma, or even death. However, even small amounts of lead can be harmful, especially to infants, young children, and pregnant women. Symptoms of long-term exposure to lower lead levels may be less noticeable but are still serious. Anemia is common, and damage to the nervous system may cause impaired mental function. Other symptoms are appetite loss, abdominal pain, constipation, fatigue, sleeplessness, irritability, and headache. Continued excessive exposure, as in an industrial setting, can affect the kidneys.

Lead exposure is most serious for young children because they absorb lead more easily than adults do and are more susceptible to its harmful effects. Even low-level exposure may harm the intellectual development, behavior, size, and hearing of infants. During pregnancy, especially in

the last trimester, lead can cross the placenta and affect the fetus. Female workers exposed to high levels of lead have more miscarriages and stillbirths.

Toxic Air Contaminants

Although ambient air quality standards exist for criteria pollutants, no ambient standards exist for TACs. Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, the ARB consistently has found that there are no levels or thresholds below which exposure is risk-free. Individual TACs vary greatly in the risk each presents. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. For certain TACs, a unit risk factor can be developed to evaluate cancer risk. For acute and chronic health risks, a similar factor, called a hazard index, is used to evaluate risk.

In the early 1980s, the ARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Toxic Air Contaminant Identification and Control Act (AB 1807) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) supplements the AB 1807 program by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

Naturally Occurring Asbestos

Naturally occurring asbestos (NOA) is present in approximately 44 of California's 58 counties. Asbestos is often found in serpentine rock and ultramafic rock near fault zones. Asbestos is a human health hazard when airborne. Asbestos fibers can be inhaled into lungs, causing inflammation and respiratory ailments and cancers. *A General Location Guide for Ultramafic Rock in California—Areas More Likely to Contain Naturally Occurring Asbestos* (California Department of Conservation 2000) indicates that there is no naturally occurring asbestos located near or in the project area.

Existing Air Quality Conditions

The existing air quality conditions in the project area can be characterized by monitoring data collected in the region. The closest air quality monitoring station is located in Fairfield at Chadbourne Road; this station monitors for ozone. The closest monitoring station that monitors for CO and particulate matter is located in Vallejo at Tuolumne Street. Table 2.2-10 summarizes air quality monitoring data from the Fairfield and Vallejo monitoring stations during the last 3 years for which complete data are available (2005–2007). Table 2.2-10 indicates that the Fairfield monitoring station has exceeded the state ozone standard on three occasions and the national ozone standard only once during the 3-year monitoring period, while the Vallejo station has no exceedance of the federal and state ozone standards. The Vallejo station has exceeded the state PM10 standards three times in the same period. No other violations occurred at these monitoring stations during this 3-year monitoring period.

Table 2.2-10. Ambient Air Quality Monitoring Data Measured at the Fairfield Chadbourne Road and Vallejo Tuolumne Street Monitoring Stations

Pollutant Standards		Fairfield			Vallejo		
		2005	2006	2007	2005	2006	2007
Ozone							
	Maximum 1-hour concentration (ppm)	0.090	0.106	0.089	0.087	0.080	0.078
	Maximum 8-hour concentration (ppm)	0.073	0.087	0.067	0.070	0.069	0.066
Number of days standard exceeded[a]							
	CAAQS 1-hour (> 0.09 ppm)	0	3	0	0	0	0
	NAAQS 8-hour (> 0.075 ppm)	0	1	0	0	0	0
Carbon Monoxide (CO)							
	Maximum 8-hour concentration (ppm)	–	–	–	3.09	2.94	2.70
	Maximum 1-hour concentration (ppm)	–	–	–	3.9	3.7	3.3
Number of days standard exceeded[a]							
	NAAQS 8-hour (≥ 9.0 ppm)	–	–	–	0	0	0
	CAAQS 8-hour (≥ 9.0 ppm)	–	–	–	0	0	0
	NAAQS 1-hour (≥ 35 ppm)	–	–	–	0	0	0
	CAAQS 1-hour (≥ 20 ppm)	–	–	–	–	–	–
Particulate Matter (PM10)[b]							
	National[c] maximum 24-hour concentration ($\mu g/m^3$)	–	–	–	49.4	46.6	49.1
	National[c] second-highest 24-hour concentration ($\mu g/m^3$)	–	–	–	49.1	43.9	47.3
	State[d] maximum 24-hour concentration ($\mu g/m^3$)	–	–	–	52.3	50.1	52.4
	State[d] second-highest 24-hour concentration ($\mu g/m^3$)	–	–	–	50.4	47.2	51.1
	National annual average concentration ($\mu g/m^3$)	–	–	–	16.8	19.1	18.2
	State annual average concentration ($\mu g/m^3$)[e]	–	–	–	–	19.8	19.0
Number of days standard exceeded[a]							
	NAAQS 24-hour (> 150 $\mu g/m^3$)[f]	–	–	–	0	0	0
	CAAQS 24-hour (> 50 $\mu g/m^3$)[f]	–	–	–	1	0	2
Particulate Matter (PM2.5)							
	National[c] maximum 24-hour concentration ($\mu g/m^3$)	–	–	–	43.8	42.2	40.8
	National[c] second-highest 24-hour concentration ($\mu g/m^3$)	–	–	–	41.0	40.5	40.0
	State[d] maximum 24-hour concentration ($\mu g/m^3$)	–	–	–	47.2	44.0	41.5
	State[d] second-highest 24-hour concentration ($\mu g/m^3$)	–	–	–	47.1	43.2	41.3
	National[b] annual average concentration ($\mu g/m^3$)	–	–	–	9.7	–	–
	State[c] annual average concentration ($\mu g/m^3$)[e]	–	–	–	–	12.4	12.0
Number of days standard exceeded[a]							
	NAAQS 24-hour (> 35 $\mu g/m^3$)	–	–	–	0	0	0

Sources: California Air Resources Board 2008b; U.S. Environmental Protection Agency 2008a.

Notes: CAAQS = California ambient air quality standards.
NAAQS = national ambient air quality standards.
ppm = parts per million.
$\mu g/m^3$ = micrograms per cubic meter.
– = insufficient data available to determine the value.

[a] An exceedance is not necessarily a violation.

[b] Measurements usually are collected every 6 days.

[c] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[d] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California-approved samplers.

[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[f] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored.

Areas are classified as either attainment or nonattainment with respect to the CAAQS and NAAQS. These classifications are made by comparing actual monitored air pollutant concentrations with state and federal standards. If a pollutant concentration is lower than or meets the state or federal standard over a designated period of time, the area is classified as being in attainment of the standard for that pollutant. If a pollutant violates the standard, the area is considered a nonattainment area for that pollutant. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated as unclassified. This typically occurs in nonurbanized areas where levels of the pollutant are not a concern.

The EPA has classified the portion of Solano County within the SFBAAB as being a marginal nonattainment area for the 8-hour ozone NAAQS. For the CO NAAQS, the EPA has classified the county as a moderate (≤12.7 ppm) maintenance area for urbanized areas; the rest of the county is classified as an unclassified/attainment area (U.S. Environmental Protection Agency 2008b). For the PM10 and PM2.5 NAAQS, the EPA has classified the county as an unclassified/attainment area.

The ARB has classified the county as being a serious nonattainment area for the ozone CAAQS. For the CO NAAQS, the ARB has classified the county as being an attainment area (California Air Resources Board 2008c). For the PM10 and PM2.5 NAAQS, the ARB has classified the county as a nonattainment area. Solano County's attainment status for each of these pollutants relative to the NAAQS and CAAQS is summarized in Table 2.2-6.

Sensitive Receptors

One of the thresholds of significance includes potential impacts on sensitive receptors. The BAAQMD defines a sensitive receptor as a location where human populations, especially children, seniors, and sick persons, are present and where there is a reasonable expectation of continuous human exposure to pollutants. *Sensitive receptors* normally refer to land uses with heightened sensitivity to localized rather than regional pollutants. Examples include emissions of criteria or toxic air pollutants (PM10 and PM2.5) that have health effects and, to a lesser extent, odors or odorous compounds such as ammonia and sulfur dioxide. Sensitive receptors would not be directly affected by emissions of regional pollutants such as ozone precursors (ROG and NO_x).

The BAAQMD identifies sensitive receptors as certain locations with populations that are more susceptible to the effects of air pollution than the general population. Sensitive receptors located in or near the vicinity of known air emissions sources, including freeways and intersections, are of particular concern. Sensitive receptors are located throughout Solano County and typically include:

- Residences.
- Schools.
- Playgrounds.
- Child care centers.
- Athletic facilities.

- Health care facilities.
- Convalescent centers.
- Rehabilitation centers.

Land use compatibility issues relative to the siting of pollution-emitting sources or the siting of sensitive receptors must be considered. In the case of schools, state law requires that siting decisions consider the potential for toxic or harmful air emissions in the surrounding area.

Possible Receptors

There are five single-family residences within 1,000 feet of the project footprint, and two of these are within 500 feet of the proposed truck scale on-ramps to the freeways. (See Figure 2.2-5). The ARB has established guidelines for the siting of sensitive receptors near certain air pollution sources (California Air Resources Board 2005). These potential air pollution sources include, among others, distribution centers. While truck scales are not specifically mentioned by the ARB as a potential air pollution source, they will be similar to warehouse distribution centers in terms of multiple diesel trucks idling and traveling at slow speeds for most or all of the day. Therefore, the siting recommendations outlined by the ARB were used for this project.

Localized CO and PM10/PM2.5 Hot Spot Analysis Approach

Typically, evaluating whether a project is included in a conforming RTP or TIP is done to determine transportation conformity for ozone precursors. Because PM10/PM2.5 and CO are localized pollutants, the determination of transportation conformity for these pollutants is assessed by identifying whether the proposed project would generate elevated hot-spot concentrations for these two pollutants. For PM10 and PM2.5, the determination of conformity is qualitative; for CO, the determination is quantitative.

Traffic information provided by the traffic engineers (Fehr & Peers 2008b) indicates that LOS ratings are not expected to degrade to E or worse under future with-project conditions for freeway segments, freeway off-ramps, and surface street intersections in the surrounding area of the proposed project. In addition, the LOSs for most of the segment, off-ramps, and intersection analyzed has not change when comparing the proposed project to the no-project scenario.

The approved RTP and TIP for the project area have no CO mitigation or control measures that relate to the project's construction or operation. Therefore, a written commitment to implement CO control measures is not required.

The PM2.5/PM10 hot-spot analysis is not required because the project is located in an area that is in attainment/unclassifiable for PM10 and PM2.5.

Local Impacts Associated with Truck Scales

Impact AQ-1: Temporary Increase in Ozone Precursor (ROG and NO_x) and PM10 Emissions during Grading and Construction Activities

Implementation of the proposed project would result in the construction of four sets of scales, seven inspection bays, parking for semi-truck trailer combinations and automobiles, roadway along the outer edge of an oval truck scale facility, as well as truck off-ramp and on-ramp improvements. In addition, the proposed project would result in the reconfiguration of the ramps at the truck scales. Temporary construction emissions would result from grubbing/land clearing, grading/excavation, drainage/utilities/subgrade, and paving activities, and from construction worker commuting patterns. Pollutant emissions would vary daily, depending on the level of activity, specific operations, and prevailing weather, and would be substantial. It is anticipated that construction activities would be completed between the years 2012 and 2015. For the purposes of this report, 2015 is considered the opening year, and 2035 is considered the horizon year.

Implementation of Department standard specifications will ensure that this effect is not adverse. The project proponent will follow Caltrans' Standard Specification 7-1.01F and Standard Specification 10, which address the requirements of the local air pollution control district (the BAAQMD) and requirements for dust control, respectively.

PM10 control measures required by the BAAQMD will be included in the construction contract and will be implemented unless unfeasible.

Naturally Occurring Asbestos

According to the DOC's 2000 publication *A General Location Guide for Ultramafic Rock in California—Areas More Likely to Contain Naturally Occurring Asbestos*, there are no geologic features normally associated with NOA (i.e., serpentine rock or ultramafic rock near fault zones) in or near the project area (California Department of Conservation 2000). As such, there is no potential for impacts related to NOA emissions during construction activities.

Impact AQ-2: Potential Violations of Carbon Monoxide National Ambient Air Quality Standards

In general, CO hot spots would be anticipated near affected intersections because operation of vehicles in the vicinity of congested intersections involves vehicle stopping and idling for extended periods. To assess the potential for a CO hot-spot analysis, *Transportation Project-Level Carbon Monoxide Protocol* (Garza et al. 1997) was followed to determine whether a CO hot spot is likely to form as a result of project-generated traffic. In accordance with the protocol, CO hot spots are typically evaluated when (a) the LOS of an intersection decreases to E or worse; (b) signalization or channelization is added to an intersection; or (c) sensitive receptors, such as residences, schools, or hospitals, are located in the vicinity of the affected intersection.

Traffic information provided by the traffic engineers (Fehr & Peers 2008b) indicate that future with-project conditions are not expected to change to LOS E or worse for freeway segments, freeway off-ramps, and surface street intersections in the surrounding area of the proposed

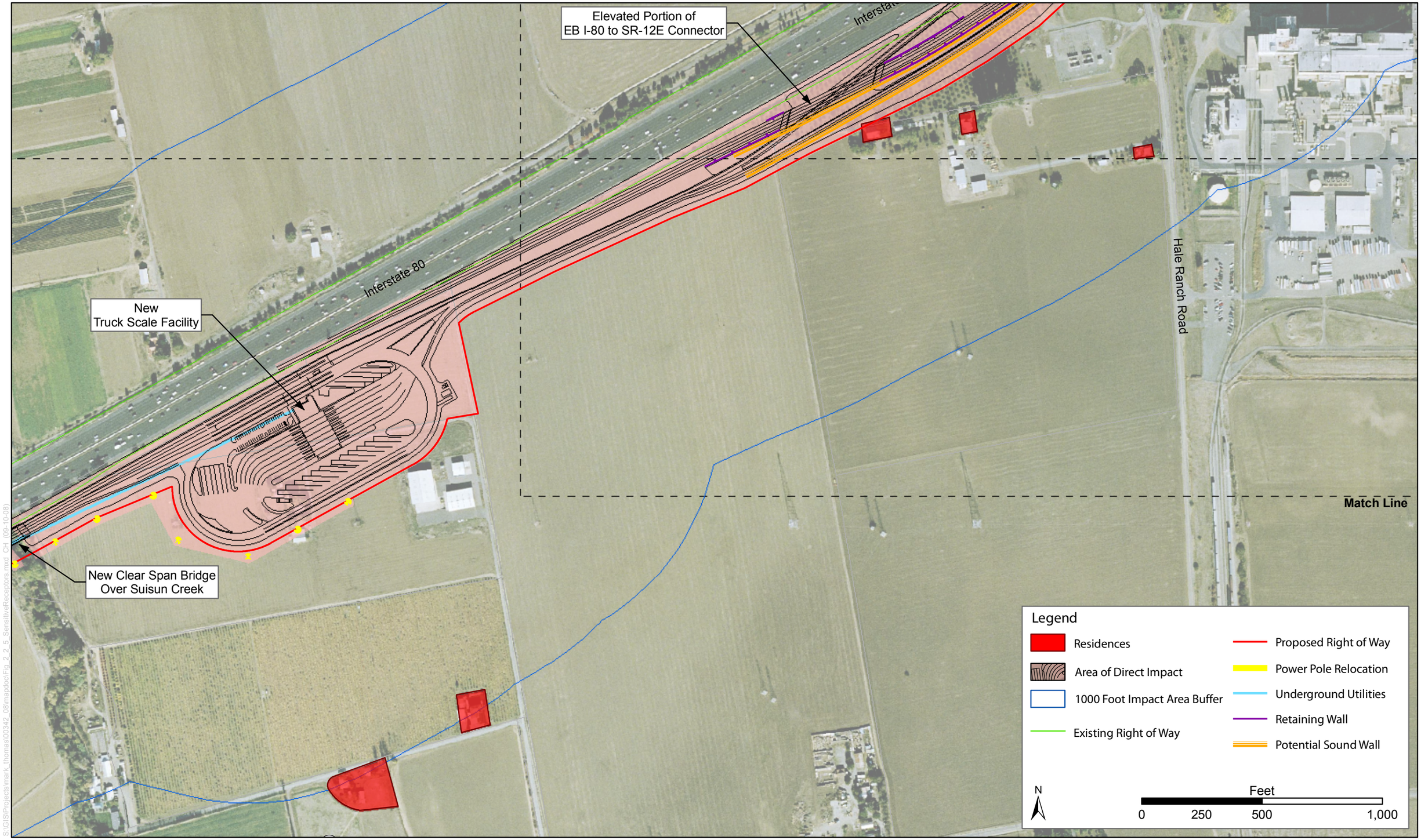


Figure 2.2-5
Locations of Sensitive Receptors

project. In addition, the LOS ratings for most of the segment, off-ramps, and intersections analyzed are not expected to worsen when comparing the proposed project to the no-project scenario. For the purposes of providing a worst-case analysis for the truck scales facility, CO concentrations have been modeled at the nearest residential locations to the facility. There are five single-family residences within 1,000 feet south of the project site and two of these single-family residences are within 500 feet south of the proposed truck scale. The analysis was conducted using the CALINE4 line source dispersion model. Input parameters required for the CALINE4 model include traffic volumes, CO emission factors, receptor locations, meteorological conditions, and background concentrations. The peak-hour truck volumes at the truck scales and peak-hour vehicles on the adjacent freeways that include the proposed project-generated traffic were modeled. The traffic study provided by the traffic engineers (Fehr & Peers 2008) indicated that peak-hour truck volumes will be approximately 788 and 1,104 trucks per hour in 2015 and 2035. The traffic study also indicated that eastbound peak-hour freeway volumes will be approximately 8,198 and 8,461vehicle per hour in 2015 and 2035 and westbound peak-hour traffic volumes will be approximately 10,207 and 11,139 in 2015 and 2035, respectively. The CT-EMFAC2007 emission rate program was used to estimate CO emission factors in year 2015 and 2035. CT-EMFAC2007 model outputs are presented in Appendix E.

Meteorological inputs to the CALINE4 model were determined using methodology recommended in the CO Protocol (Garza et al. 1997). The meteorological conditions used in the modeling represent a calm winter period. The worst-case wind angles option was used to determine a worst-case concentration for each receptor.

A background concentration of 3.9 ppm was added to the modeled 1-hour values to account for sources of CO not included in the modeling. Eight-hour modeled values were calculated from the 1-hour values using a persistence factor of 0.7. A background concentration of 3.1 ppm was added to the modeled 8-hour values. All CO background concentration data (see Table 2.2-10) were taken from the highest of the three recent years of monitoring data provided by CARB (CARB 2008) and USEPA (USEPA 2008).

Table 2.2-11 presents maximum 1-hour and 8-hour CO concentrations predicted at locations 3 meters from the edge of the intersection in all directions. The CALINE4 model outputs are presented in Appendix F.

Table 2.2-11. CO Modeling Concentrations (ppm)

Truck Scales Facility Sensitive Receptors	2015		2035	
	1-hour	8-hour	1-hour	8-hour
Residence 1	8.0	6.0	7.9	5.9
Residence 2	8.0	6.0	7.9	5.9
Residence 3	8.3	6.2	8.0	6.0
Residence 4	8.3	6.2	8.0	6.0
Residence 5	8.2	6.1	8.0	6.0
NQQAS Standard	35.0	9.0	35.0	9.0
CAAQS Standard	20.0	9.0	20.0	9.0
Significant?	***No***	***No***	***No***	***No***

Note: Background CO concentrations of 3.9 ppm and 3.1 ppm were added to the modeling.

The results show that the Federal one- and eight- hour standards of 35 ppm and 9 ppm, respectively, and State one- and eight- hour standards of 20 ppm and 9 ppm, respectively, would not be exceeded at any of the five receptors. Therefore, the proposed project is not anticipated to significantly contribute to CO ambient concentration impacts. No violations of either the 1-hour or the 8-hour Federal and state CO standard were found. Therefore, there is no adverse effect.

Impact AQ-3: Conformity with the Regional Transportation Plan

The proposed project is included in the adopted RTP, *Transportation 2030 Plan*, and adopted TIP, *2007 Transportation Improvement Program* (Metropolitan Transportation Commission 2007a). The proposed project is identified in Appendix 1 of the RTP as "RTP ID: 22701, I-80/I-680/Route 12 interchange improvements (Phase 3), including partial relocation/reconstruction of Cordelia truck weight station, ramp improvement and auxiliary lanes" (Metropolitan Transportation Commission 2005). The design concept and scope of the proposed project is consistent with the project listed in the RTP and TIP.

Air quality modeling conducted by the MTC shows that emissions associated with the RTP are within the allowable emission budgets for CO and ozone precursors (Metropolitan Transportation Commission 2007b). Consequently, the proposed project is considered a conforming transportation project for these regional nonattainment pollutants.

Impact AQ-4: Potential Generation of Significant Levels of Air Toxics Emissions

MSATs are a subset of the 188 air toxics defined by the CAA. The MSATs are compounds emitted from highway vehicles and off-road construction equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. A primary source of potential air toxics associated with proposed project operations include six primary MSAT emissions from trucks (e.g., truck traffic on freeway and on-site truck idling). For construction, the greatest potential for air toxics emissions would be related to diesel particulate emissions associated with heavy equipment operations. Therefore, the project would not generate significant levels of air toxics emissions.

Operational Impacts

The area of air toxics analysis is a new and emerging field and is an area of continuing research. Currently, there are limited tools and techniques available for assessing project-specific health impacts from MSATs, because there are no established criteria for determining when MSAT emissions should be considered a significant issue in the NEPA context.

To comply with CEQ regulations (40 CFR 1502.22[b]) regarding incomplete or unavailable information, Appendix E describes how air toxics analysis is an emerging field and current scientific techniques, tools, and data are not sufficient to accurately estimate human health impacts that would result from a transportation project in a way that would be useful to decision-makers. Also in compliance with 40 CFR 150.22(b), Appendix E contains a summary of current studies regarding the health impacts of MSATs.

Since the proposed truck scale project would have the same I-80 freeway traffic conditions as no project scenario, and it was assumed that the net changes in the proposed project and the no project alternatives would have the same MSAT emissions from the freeways. Therefore, the net differences in the MSAT emission analysis will only include a discussion of the diesel truck activities at the truck scales relocation site.

The University of California, Davis, prepared a CT-EMFAC spreadsheet tool that incorporates EMFAC2007 emission factors and ARB speciation factors and allows analysts to input project-specific traffic activity data, such as peak hours, VMT, speed, travel times, and traffic volumes (Bai et al. 2006). The assessment presented below is derived in part from a study conducted by the university, *Estimating Mobile Source Air Toxics Emissions: A Step-by-Step Project Analysis Methodology*. Appendix G of the university study presents the MSAT spreadsheet data. The results of the impacts associated with the trucks at the truck scales are summarized in Table 2.2-12.

Table 2.2-12. Summary of Project-Level MSAT Emissions at Truck Scales

Scenario	Diesel PM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde
2015 No-Build Alternative	4,742	1,674	292	1,199	62	2,825
2015 Build Alternative	3,693	1,112	186	1,132	37	2,520
Differences from the No-Build Alternative	-1,049	-562	-106	-68	-25	-305
2035 No-Build Alternative	1,460	676	103	558	21	1,260
2035 Build Alternative	1,441	653	97	639	19	1,411
Differences from the No-Build Alternative	-19	-23	-6	**+82**	-2	**+151**

Note: Emissions expressed in grams per day.

For the no-project scenario, it was assumed that the current scales have a capacity of 400 trucks per hour. Under current conditions, 788 and 1,104 trucks per hour for years 2015 and 2035, respectively, are assumed to pass through the area. Of those, because the CHP closes the scales when the trucks queue onto the mainstream highway, 388 and 704 trucks are assumed to bypass the scales during the peak hour. Therefore, during the peak hour, 400 trucks travel at the assumed scale speed (5 mph), and 388 and 704 trucks travel at the assumed highway speed (55 mph). Whereas with the proposed project for both years 2015 and 2035, all projected 788 and 1,104 trucks, respectively, would travel at the assumed scale speed (5 mph). The truck scale ramps were assumed to be 5,000 feet in length combined. Truck scale speed was assumed to be 5 mph for both the off- and on-ramps because it represents the worst-case MSAT scenario.

According to the traffic study (Fehr & Peers 2008), approximately 139,250 and 176,863 vehicles under the no-project scenario will be traveling by the Cordelia truck scales area on the adjacent I-80 freeway. During the AM and PM peak hours, the average speed of all the vehicles is predicted to slow down (due to traffic congestions) to approximately 35–40 mph in year 2015 and to approximately 25–30 mph in year 2035. Under the proposed project scenario, the relocation of the truck scales would slightly increase the number of vehicles on the I-80 freeway

to approximately 139,300 and 176,900 vehicles for years 2015 and 2035, respectively. The average speeds for the peak hour and off-peak hour traffic is predicted to be similar to the no-project scenario.

Relocation of the truck scale facility and improvements to the off-ramps and on-ramps would decrease the amounts of MSATs, except acetaldehyde and formaldehyde, for all vehicles when compared with the no-project scenario. The MSATs for diesel trucks would increase under the proposed project scenarios primarily because MSAT emissions are greater at 5 mph than at 55 mph (CT-EMFAC). Therefore, because the distance that trucks travel for each scenario is the same (5,000 feet), emissions at lower speeds will be greater than emissions at greater speeds. However, the freeway and truck scales traffic under the proposed project results in lower MSAT emissions than under the no-project scenario, even though the net increases in MSATs for acteldehyde and formaldehyde are too small to be considered as a meaningful difference in the levels of MSAT emissions. More importantly, the diesel particulate matter (DPM) emissions would be reduced under with-project conditions. Therefore, the proposed project is not anticipated to significantly contribute to PM impacts. Because the PM2.5 is of primary concern, the MSAT impact is not considered an adverse effect.

The FHWA's *Interim Guidance on Air Toxic Analysis in NEPA Documents* states that when the analysis for a project indicates "meaningful differences" in levels of MSAT emissions, mitigation options should be identified and considered. The guidance does not indicate, however, what threshold of emissions increase or decrease would possibly constitute a "meaningful difference." Appendix E of the FHWA guidance document suggests several mitigation strategies, including diesel retrofit technologies, speed limit enforcements or traffic management policies, anti-idling strategies, truck-stop electrification, and establishment of buffer zones between new traffic alignments and vulnerable populations.

Construction Impacts

Construction emissions would result in an increase in PM2.5 emissions in addition to PM10 and ozone precursors. PM2.5 emissions of concern would be associated primarily with DPM because particulates generated by excavation, grading, and other soil-disturbance activities are normally outside the PM2.5 size range. Diesel exhaust particulates contain substances that are suspected carcinogens. Diesel exhaust contains both pulmonary irritants and hazardous compounds that could affect sensitive receptors such as young children, senior citizens, and those susceptible to chronic respiratory diseases such as asthma, bronchitis, and emphysema.

In 2000, the ARB approved a comprehensive *Diesel Risk Reduction Plan* to reduce diesel emissions from both new and existing diesel-fueled engines. The plan focuses on reducing emissions from diesel-fueled engines (through new standards and retrofitting) and reducing the sulfur content of diesel fuel to enable the use of advanced DPM emissions controls. The plan's goals are to achieve a 75% reduction in DPM by 2010 and an 85% reduction by 2020 (from the 2000 baseline). Though many of the new regulations are source-based controls, in 2005, the ARB approved a regulatory measure (Section 2485 of the California Health and Safety Code) to reduce emissions of toxic and criteria pollutants by limiting the idling of new heavy-duty diesel vehicles. The proposed project proponent would be required to comply with these requirements.

The BAAQMD does not have methodologies for estimating impacts from diesel exhaust or determining the significance of a project's contribution. Recent ARB air pollution studies indicate a high correlation between traffic emissions and health impacts within 1,000 feet of a road, with the strongest association within 300 to 500 feet. Studies also show that concentrations of traffic emissions decline with distance from the road, with a dramatic decrease in the first 300 to 500 feet (up to a 70% decrease in one study). Given these studies, the ARB recommends that new sensitive land uses not be located within 500 feet of freeways, urban roads carrying 100,000 vehicles a day, or rural roads carrying 50,000 vehicles a day (California Air Resources Board 2005). Therefore, if sensitive receptors are located more than 500 feet from a construction site, potential health effects associated with elevated DPM are not considered adverse.

For the proposed project, the residence closest to the truck scale facility is approximately 930 feet south/southwest of the truck scales site; at this distance, potential health risks associated with DPM would not be considered an adverse effect. For the residences within 500 feet of the truck scales' on-ramps to the freeway, the predicted number of trucks would not exceed 50,000 trucks per day. Therefore, according to the ARB's air quality and land use guidance, there would be no adverse effect. Consequently, DPM emissions generated by truck traffic (excess cancer risk would be less than 1 in 1 million) under the proposed project would not constitute an adverse effect.

Regional Impacts Associated with Freeway Traffic

Impact AQ-5: Decrease in Regional Ozone Precursor (ROG and NO_x), CO, and PM10 and PM2.5 Emissions Associated with Project Operations

Implementation of the proposed project would result in increased traffic flows on roadways near the project, including I-80, I-680, and SR 12. The project would relieve congestion along eastbound I-80 by creating expanded truck scale facilities, braided on- and off-ramps for trucks exiting and entering eastbound I-80, and an auxiliary lane for trucks onto SR 12E. The relief of traffic congestion would increase freeway speeds and reduce travel time.

Emissions of criteria pollutants (ROG, NO_x, CO, CO_2, PM10, and PM2.5) for both 2015 and 2035, with and without the project, were evaluated using the ARB's CT-EMFAC2007 emission rate model and system-wide morning and afternoon peak-hour traffic data provided by the traffic engineers. Daily emissions were obtained based on the sum of morning and afternoon emissions and a multiplier of 5 (Fehr & Peers 2008b). Project-level emissions were obtained by comparing future with-project and future no-project emissions. Appendix E presents the system-wide emissions spreadsheet. The results of these calculations are presented in Table 2.2-13.

Table 2.2-13. System-Wide Project-Related Motor Vehicle Emissions

	Pounds per Day				
	ROG	NO_x	CO	PM10	PM2.5
2015 no-project scenario	187	527	2,103	25	23
2015 with the proposed project	124	349	1,248	17	15
Change with the project	-63	-178	-855	-8	-8
2035 no-project scenario	84	134	712	18	16
2035 with the proposed project	80	134	683	16	15
Change with the project	-4	0	-29	-2	-1

Project-related emissions would decrease with the implementation of the project for each criteria pollutant. The net change in criteria pollutants would not exceed the significance threshold of 80 ppd for ROG, NO_x, and PM10, or the 500 ppd threshold for CO within the BAAQMD (Bay Area Air Quality Management District 1999).

The 80 ppd significance threshold would not be exceeded for ROG and PM10. The 500 ppd significance threshold would not be exceeded for CO. The BAAQMD has not established a threshold for PM2.5. Therefore, emissions would not result in an adverse effect.

Avoidance, Minimization, and/or Mitigation Measures

The Department's Mitigation Requirements for Construction Impacts

Construction activities are subject to Department requirements found in the Department's document *Standard Specifications* (California Department of Transportation 2006b). Standard Specification 7-1.01F stipulates that construction activities must comply with all rules, regulations, ordinances, and statutes of the local air pollution control district, and Standard Specification 10 addresses dust control requirements. In addition, the BAAQMD requires the implementation of all feasible, effective, and comprehensive control measures to reduce PM10 emissions from construction activities. These control measures are summarized in Table 2.2-7.

Implementation of the following control measures would minimize air quality impacts from construction activities.

Effects of the No-Project Alternative

Under the No-Project Alternative, traffic congestion—and consequently air quality—would worsen.

2.2.7 Noise

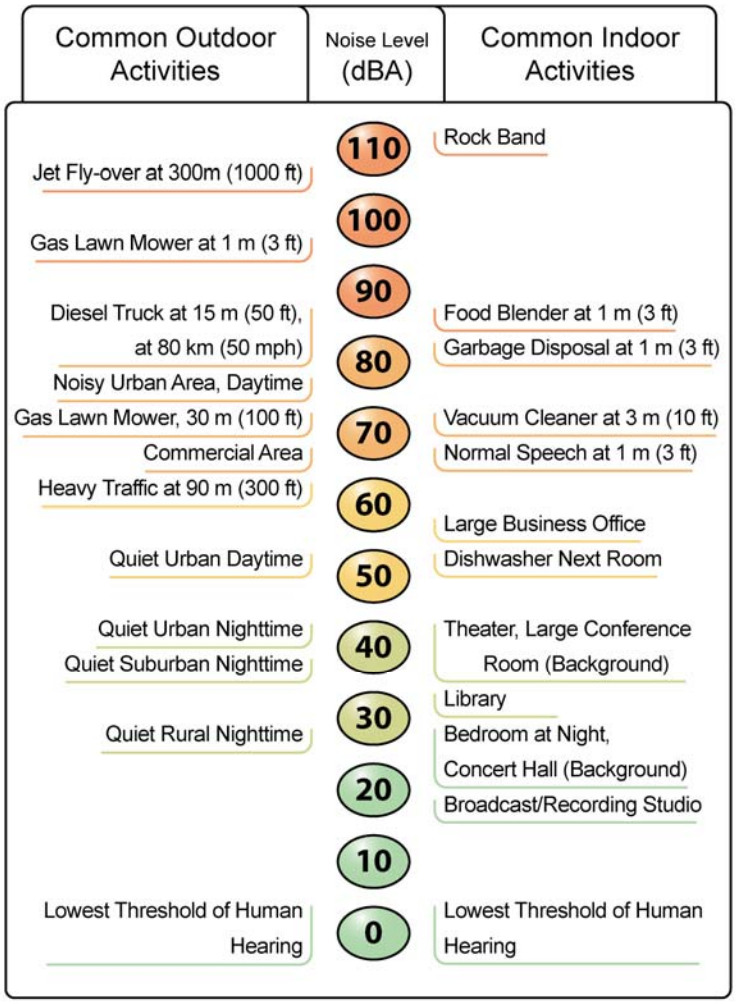
Regulatory Setting

NEPA provides a broad basis for analysis and abatement of highway traffic noise effects. The intent of NEPA is to promote general welfare and to foster a healthy environment. The following are brief definitions of acoustical terms used in this discussion:

- Sound—A vibratory disturbance created by a vibrating object that, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- Noise—Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- Ambient noise—The composite of noise from all sources near and far in a given environment, exclusive of particular noise sources to be measured.
- Decibel (dB)—A unitless measure of sound on a logarithmic scale that indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micropascals.
- A-weighted decibel (dBA)—An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- Equivalent sound level (L_{eq})—The equivalent steady state sound or vibration level that, in a stated period of time, would contain the same acoustical or vibration energy.

Table 2.2-14 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 2.2-14. Typical A-Weighted Noise Levels



23 CFR 772

For highway transportation projects with FHWA (and the Department, 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). Table 2.2-15 lists the noise abatement criteria for use in the 23 CFR 772 analysis.

Table 2.2-15. Activity Categories and 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	Not applicable	Undeveloped lands.
E	52 interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Note: dBA L_{eq}(h) = one-hour A-weighted equivalent sound level.

In accordance with the Department's *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (*Traffic Noise Analysis Protocol*), a noise impact occurs when the future noise level with the project results in a substantial increase in the noise level (defined as an increase of 12 dB or more) or when the future noise level with the project approaches or exceeds the NAC (California Department of Transportation 2006c). Approaching the NAC is defined as a noise level within 1 dB of the NAC.

If it is determined that the project would 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 likely would be incorporated into the project.

The Department's *Traffic Noise Analysis Protocol* sets forth the criteria for determining when an abatement measure is reasonable and feasible. The feasibility of noise abatement is basically an engineering concern. A minimum 5 dB reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include: residents' acceptance, the absolute noise level, build (project) noise versus existing noise, environmental impacts of abatement, public and local agencies' input, newly constructed development versus development predating 1978, and the cost per benefited residence.

Affected Environment

A noise study technical report was prepared for this project and submitted for the Department's review in July 2008 (ICF Jones & Stokes 2008f). The noise study technical report discusses potential noise impacts and related noise abatement measures associated with the construction and operation of a truck scale facility on I-80 between I-680 and SR 12 in Solano County. The report was prepared to comply with 23 CFR 772, "Procedures for Abatement of Highway Traffic Noise," and the Department's noise analysis policies as described in the *Traffic Noise Analysis Protocol*.

Single-family residences were identified as Activity Category B land uses per 23 CFR 772. Commercial and industrial areas exist in the project area and are Activity Category C uses.

As stated in the Protocol, noise abatement is considered only where frequent human use occurs and where a reduced noise level would be beneficial. In general, frequent human use is considered to occur at exterior locations where people are exposed to highway noise for at least 1 hour on a regular basis. As an extension of this concept, impacts are assessed in detail only at locations where frequent human use occurs and where a reduced noise level would be beneficial. Accordingly, impact assessment focuses on locations with defined outdoor activity areas, such as residential backyards, common-use areas at multifamily facilities, and parks with defined activity areas (e.g., playgrounds and picnic tables).

Noise-sensitive receptors affected by this project are located on the south side of I-80 and consist of scattered single-family residences (Activity Category B) and commercial buildings with no areas of outdoor frequent human use (Activity Category C) near Hale Ranch Road (Figure 2.2-6). Three receptors are counted as Activity Category B for this analysis. There are no existing sound barriers in this area.

Noise Monitoring

Noise monitoring was conducted in this study area. These monitoring data are used to characterize existing noise conditions in the project area.

Short-term monitoring was conducted on Thursday, January 19, 2006, using a Larson-Davis Model 812 Precision Type 1 sound level meter (serial number 0239). The measurement was taken over a 15-minute interval at a distance of approximately 400 feet from the edge of pavement of I-80. Short-term monitoring was conducted near an Activity Category B land use. Table 2.2-16 summarizes the results of the short-term noise monitoring conducted in the project area.

Table 2.2-16. Summary of Short-Term Noise Monitoring

Measurement Location	Description	Area	Start Time	Duration (minutes)	Existing Wall Height	Measured L_{eq}
I-80—ST-1	Cordelia Road	I-80	1 p.m.	15	N/A	60.4

Minute-to-minute L_{eq} values collected during the measurement period (typically 15 minutes in duration) were logged manually, and dominant noise sources observed during individual 1-minute periods were identified and logged. This allowed for the separation of minutes when traffic noise was a dominant contributor to noise levels at a given measurement site from when other noise sources contributed significantly; thus, the significance of non-traffic noise sources (such as aircraft and lawn equipment) could be evaluated. The calibration of the meter was checked before and after the measurement, using a Larson-Davis Model CA250 calibrator (serial number 0125).

Traffic volumes on I-80 were classified and counted during short-term noise measurements. Vehicles were classified as automobiles, medium-duty trucks, or heavy-duty trucks. An automobile is defined as a vehicle with two axles and four tires that are designed primarily to

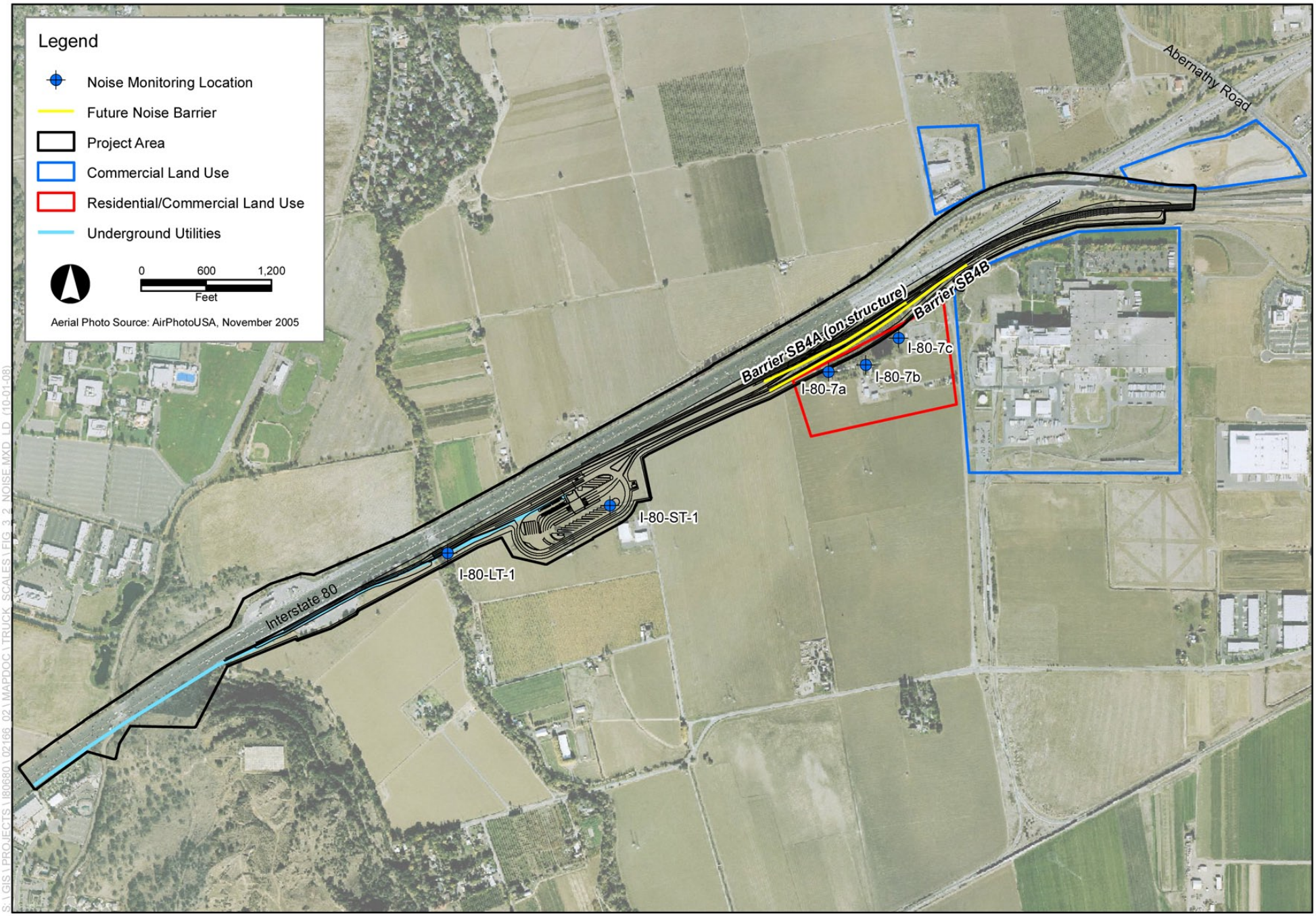


Figure 2.2-6
Sensitive Receptors and Potential Noise Barriers

carry passengers. Small vans and light trucks are included in this category. Medium-duty trucks include all cargo vehicles with two axles and six tires. Heavy-duty trucks include all vehicles with three or more axles. The posted speed on I-80 is 65 mph.

Conclusions under 23 CFR 772

Predicted Traffic Noise Levels

A noise impact analysis was conducted for the proposed project. To analyze the potential for impacts, first noise-sensitive receptors were noted, and then existing noise conditions were determined through short- and long-term monitoring. A three-dimensional traffic noise model was built and calibrated using data from monitoring. Predicted traffic information (volumes, vehicle types, and speeds) was input into the model to determine whether implementation of the project would create noise impacts.

Noise levels at all three receptor locations were predicted to approach or exceed the NAC. Noise impacts resulting from a substantial increase over existing noise levels are not predicted to occur under the full buildout. Loudest-hour traffic volumes, classification percentages, and speeds used to model traffic noise under existing and design-year (2035) conditions were provided by Fehr & Peers (2008). The largest average heavy truck volumes are predicted to occur during the a.m. peak hour, resulting in higher sound levels than the p.m. peak hour; therefore, a.m. peak-hour traffic volumes were used in the project area.

Although the widening and addition of HOV lanes would improve the LOS on I-80, most segments of I-80 would be LOS D or worse during peak hours. For this analysis, it is assumed that each project roadway lane has a maximum capacity of 2,000 vehicles per hour at the corresponding roadway design speed. For example, for the I-80 future five-lane case, total modeled traffic volumes in each direction were capped at 10,000 vehicles per hour. Table 2.2-17 summarizes the traffic noise modeling results under existing and design-year conditions.

Table 2.2-17. I-80 Truck Scales Traffic Noise Impact Evaluation Activity Category B Land Uses

Position	Location	Area	Existing Traffic Noise Level, dBA, L_{eq}(h)	Design-Year No-Project Traffic Noise Level, dBA, L_{eq}(h)	Design Year with Project		Traffic Noise Impact Under 23 CFR772[a]
					Traffic Noise Level, dBA, L_{eq}(h)	Increase from Existing, Decibels (dB)	
I-80—7a	Hale Ranch Road	I-80	71	72	73	+2	A/E
I-80—7b	Hale Ranch Road	I-80	66	67	69	+3	A/E
I-80—7c	Hale Ranch Road	I-80	67	69	71	+4	N/A[b]

[a] A/E = approaches or exceeds the NAC listed in Table 2.2-15.

[b] Activity Category C land use that does not include outdoor areas of frequent human use that would benefit from a lowered noise level.

Modeling results in Table 2.2-17 indicate that predicted traffic noise levels for the design-year with-project conditions would be in the range of 69–73 dBA, L_{eq}(h). Traffic noise is predicted to exceed the NAC at three residences in this area. Therefore, under 23 CFR 772, noise abatement must be evaluated.

Noise Abatement Evaluation

In accordance with 23 CFR 772, noise abatement is considered where noise impacts are predicted in areas of frequent human use that would benefit from a lowered noise level. Potential noise abatement measures identified in the Protocol include the following:

- Avoiding the impact by using design alternatives, such as altering the horizontal and vertical alignment of the project.
- Constructing noise barriers.
- Acquiring property to serve as a buffer zone.
- Using traffic management measures to regulate types of vehicles and speeds.
- Acoustically insulating public-use or nonprofit institutional structures.

Because of the configuration and location of the project, noise barriers are the only form of noise abatement evaluated in this report.

Each noise barrier has been evaluated for feasibility based on achievable noise reduction. For each noise barrier found to be acoustically feasible, reasonable cost allowances were calculated. Worksheets in Appendix B of the noise study technical report (ICF Jones & Stokes 2008f) summarize the reasonable cost allowance calculations, based on the procedure outlined in the Protocol.

For any noise barrier to be considered reasonable from a cost perspective the estimated cost of the noise barrier should be equal to or less than the total cost allowance calculated for the barrier. The cost calculations of the noise barrier should include all items appropriate and necessary for construction of the barrier, such as traffic control, drainage modification, and retaining walls. The design of noise barriers presented in this report is preliminary only and has been conducted at a level appropriate for environmental review but not for final design of the project.

Preliminary information on the physical location, length, and height of noise barriers is provided in this report. If pertinent parameters change substantially during the final project design, preliminary noise barrier designs may be modified or eliminated from the final project.

The traffic noise modeling results indicate that traffic noise levels at isolated residences would approach or exceed the NAC of 67 dBA L_{eq}(h), for Activity Category B land uses within the project area. Where noise impacts were identified, noise abatement options were evaluated for feasibility and cost-reasonableness.

No noise barriers are currently located in this area. Noise Barrier SB4 consists of two barriers that would provide shielding for traffic noise from both I-80 and the SR 12E flyover transition ramp. The barriers, SB4A and SB4B, have been evaluated for barrier heights in the range of 6 to 16 feet and will meet the Department line-of-sight requirement at a barrier height of 12 feet. The barriers were found to be acoustically feasible, providing at least 5 dB of noise reduction at barrier heights in the range of 10 to 16 feet. Table 2.2-18 summarizes the calculated reasonable allowances for the two barriers at equal heights. Noise Barriers SB4A and SB4B are shown in Figure 2.2-6.

Table 2.2-18. Summary of Reasonableness Determination Data—Noise Barriers SB4A and SB4B

Noise Barrier SB4			Length: 4,300 feet (two barriers)			
Predicted Sound Level without Barrier						
Design-year noise level, dBA-L_{eq}(h)			73			
Design-year noise level minus existing noise level			4			
Design Year with Barrier (inside I-80 right-of-way)	**Height = 6 feet**	**Height = 8 feet**	**Height = 10 feet**	**Height = 12 feet**	**Height = 14 feet**	**Height = 16 feet**
Barrier noise reduction, dB	3	4	7	8	9	9
Number of benefited residences	0	0	1	3	3	3
New highway or more than 50% of residences predate 1978	Yes	Yes	Yes	Yes	Yes	Yes
Reasonable allowance per benefited residence	$52,000	$52,000	$54,000	$54,000	$56,000	$56,000
Total reasonable allowance	N/A	N/A	$54,000	$162,000	$168,000	$168,000

Note: N/A = not applicable.

A Noise Abatement Decision Report (NADR) was prepared to include noise abatement construction cost estimates that have been prepared by the project engineer based on site-specific conditions. These cost estimates are then compared to the total reasonableness allowances as shown in Table 2.2-19.

Table 2.2-19. Summary of Reasonableness Allowances and Cost Estimates for the Evaluated Noise Barrier Design SB4

Height (ft)	Receivers Benefited	Existing Noise Level, dBA-Leq[h]	Predicted Design Year Noise Level, dBA-Leq[h]	Predicted Design Year Noise Level with Barrier, dBA-Leq[h]	Estimated Construction Cost ($)	Department Reasonableness Allowance ($)
10	1	71	73	66	1,710,000	54,000
12	3	71	73	65	2,072,000	162,000
14	3	71	73	64	2,414,000	168,000
16	3	71	73	64	2,776,000	168,000

As Table 2.2-19 shows, the estimated construction costs exceed the reasonableness allowance in all cases. Accordingly, the barrier design is not considered to be reasonable from a cost perspective. The determination of final reasonableness will made upon completion of the public input process.

Environmental Consequences

Impact NOI-1: Exposure of Noise-sensitive Land Uses to increased traffic noise

As indicated in Table 2.2-17 Design Year with-project traffic noise levels are predicted to be 1 to 2 dB greater than Design Year no-project traffic noise levels. Because this increase is than the threshold of a perceptible change (3 dB) future traffic noise levels due to the project are not expected to result in an adverse effect under NEPA.

Impact NOI-2: Exposure of Noise-sensitive Land Uses to construction noise

Construction noise is regulated by the Department's Standard Specifications Section 7-1.01I, "Sound Control Requirements," which states that noise levels generated during construction will comply with applicable local, state, and federal regulations and that all equipment will be fitted with adequate mufflers according to the manufacturers' specifications.

Table 2.2-20 summarizes noise levels produced by construction equipment that is commonly used on roadway construction projects. Construction equipment is expected to generate noise levels ranging from 70 to 90 dB at a distance of 50 feet, and noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance.

Table 2.2-20. Construction Equipment Noise

Equipment	Maximum Noise Level (dBA at 50 feet)
Scrapers	89
Bulldozers	85
Heavy trucks	88
Backhoe	80
Pneumatic tools	85
Concrete pump	82

Source: Federal Transit Administration 2006.

No adverse noise effects from construction are anticipated, because construction would be conducted in accordance with the Department's Standard Specifications Section 7-1.01I and applicable local noise standards. Construction noise would be short-term, intermittent, and masked by local traffic noise. In addition, standard Department procedures include implementation of the following measures to minimize the temporary noise effects from construction:

- All equipment will have sound-control devices that are no less effective than those provided on the original equipment. No equipment will have an unmuffled exhaust.
- As directed by the Department, the contractor will implement appropriate additional noise mitigation measures, including changing the location of stationary construction equipment, turning off idling equipment, rescheduling construction activity, notifying adjacent residents in advance of construction work, and installing acoustic barriers around stationary construction noise sources.

There would be no adverse effects related to the exposure of noise-sensitive land uses to construction noise.

Effects of the No-Project Alternative

Under no-project conditions, no new noise effects associated with the project would occur. As shown in Table 2.2-17, noise levels associated with traffic would increase in the future as traffic congestion associated with growth increases.

2.2.8 Energy

This section of the EIR/EA for the proposed project provides an estimate of local energy demand directly related to the project and no-project scenarios for construction and operation. The information contained in this section is based upon the *Interstate-80 Eastbound Cordelia Truck Scale Relocation Project Energy Technical Report* which is hereby incorporated by reference in its entirety (California Department of Transportation 2008).

The CEQA Guidelines, Appendix F, Energy Conservation, state that EIRs are required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy.

NEPA (42 USC Part 4332) requires the identification of all potentially adverse effects to the environment, including energy impacts.

Issues related to energy use include the levels of consumption of nonrenewable energy sources for the construction of transportation projects and use in private and commercial transportation. Transportation energy use is related to the following factors: the efficiency of automobiles, trucks, and public transportation; the choice of travel mode (automobile, carpool, or public transit); and miles traveled for each mode. Energy also is consumed with construction and ongoing and routine operation and maintenance of transportation infrastructure. Also, because of concerns with increasing concentrations of GHGs, such as carbon dioxide (CO_2), in the atmosphere, this section discusses global warming as well.

Regulatory Setting

Federal and state agencies regulate energy consumption through various policies, standards, and programs. At the local level, individual cities and counties regulate energy through their regulatory and planning activities.

Federal Regulations

The Energy Policy and Conservation Act (EPCA) of 1975 established nationwide fuel economy standards to conserve oil. Pursuant to this act, the National Highway Traffic and Safety Administration, part of the U.S. Department of Transportation, is responsible for revising existing fuel economy standards and establishing new vehicle fuel economy standards.

The Corporate Average Fuel Economy (CAFE) program was established to determine vehicle manufacturer compliance with the government's fuel economy standards. Compliance with CAFE standards is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. The CAFE rules require the average fuel economy of all vehicles of a given class that a manufacturer sells in each model year to be equal to or greater than the standard. The current CAFE standard for passenger cars is 27.5 miles per gallon (mpg) and 21.6 mpg for light trucks (gross vehicle weight of 8,500 pounds or less). Heavy-duty vehicles (i.e., gross vehicle weight of more than 8,500 pounds) are not currently subject to fuel economy standards. The EPCA was reauthorized in 2000 (49 CFR 533).

In December 2007, the Energy Independence and Security Act became law. One of the key provisions of the law is to improve vehicle fuel economy. The CAFE standards for passenger

cars and light trucks will be raised to 35 mpg by 2020. The law also requires automakers to improve vehicle electrification technology for plug-in hybrid vehicles and increase the production of biofuel-compatible vehicles.

State Regulations

The 1975 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission (CEC). The act established a state policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures. The PUC regulates privately owned utilities in the energy, rail, telecommunications, and water fields.

A CEQA amendment requires projects subject to EIRs to include a discussion of the potential energy impacts of proposed projects in the EIR, with particular emphasis on avoiding or reducing the inefficient, wasteful, and unnecessary consumption of energy (Consulting Engineers and Land Surveyors of California 2006).

State of California Energy Action Plan

The CEC is responsible for preparing the state's energy action plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The current plan is the *California Energy Action Plan 2008 Update* (California Energy Commission 2008). The state's energy policies have been significantly influenced by the passage of AB 32, the California Global Warming Solutions Act of 2006. The CEC's *Integrated Energy Policy Report 2007* advances policies that would enable the state to meet its energy needs in a carbon-constrained world. The report also provides a comprehensive set of recommended actions to achieve these policies.

California Environmental Quality Act

Appendix F of the State CEQA Guidelines describes the types of information and analyses related to energy conservation that are to be included in EIRs. In Appendix F of the State CEQA Guidelines, energy conservation is described in terms of decreased per capita energy consumption, decreased reliance on natural gas and oil, and increased reliance on renewable energy sources. To ensure that energy implications are considered in project decisions, EIRs must include a discussion of the potentially significant energy impacts of proposed projects, with particular emphasis on avoiding or reducing the inefficient, wasteful, and unnecessary consumption of energy.

Affected Environment

Physical Setting

ICF Jones & Stokes completed an energy technical report (2008g). The technical report provides estimates of local energy demand directly related to the proposed project during construction and operation and compares that with the no-project scenario.

Energy Types and Sources

Petroleum products supply approximately 39% of the energy demand in the United States (Energy Information Administration 2007). Coal and natural gas each supply approximately 23%

of the national energy demand, and nuclear and renewable sources supply the rest in roughly equal proportions.

Petroleum and natural gas supply most of the energy consumed in California. Petroleum products provide approximately 50% of the state's energy demand, and natural gas provides approximately 29% (California Energy Commission 2005). The remaining 21% of the state's energy demand is met by a variety of energy resources, including coal, nuclear, geothermal, wind, solar, and hydropower.

California's transportation sector, including on-road and rail transportation, consumes roughly 2 quadrillion (million billion) British thermal units (BTUs)[4] of energy annually, which is equal to 940,000 barrels of oil being consumed every day for 1 year (there are approximately 42 gallons in a barrel). The energy consumed by transportation modes accounts for roughly 60% of California's petroleum demand and 40% of its CO_2 emissions (California Energy Commission 2001).

Petroleum

Most gasoline and diesel fuel sold in California for motor vehicles is refined in California to meet state-specific formulations required by the ARB. Major petroleum refineries in California are concentrated in three counties: Contra Costa County in northern California, Kern County in central California, and Los Angeles County in southern California. Valero, Tesoro, Phillips, Shell, and Chevron operate refineries in Contra Costa County, which is adjacent to Solano County, where the proposed project is located.

In 2006, refineries in California processed approximately 661 million barrels of crude oil (California Energy Commission 2007). Nearly 39% of the crude oil came from in-state oil production facilities; approximately 16% came from Alaska; and the remainder (approximately 45%) came from foreign sources. Together, the refineries in the Bay Area have a crude oil processing capacity of 767,450 barrels per day. The long-term oil supply outlook for California indicates that in-state and Alaska supplies are declining, leading to increasing dependence on foreign oil sources.

Natural Gas

Four regions supply California with natural gas. Three of them—the southwestern United States, the Rocky Mountains, and Canada—supply 86.5% of all the natural gas consumed in California (California Energy Commission 2007). The remainder of the natural gas (13.5%) is produced in California. In 2006, approximately 40% of all the natural gas consumed in California was used to generate electricity. Residential consumption represented one-fifth of California's natural gas

[4] The units of energy used in this report are British thermal units, kilowatt-hours (kWh), therms, and gallons. A BTU is the quantity of heat required to raise the temperature of 1 pound of water 1°F at sea level. Because the other units of energy can all be converted into equivalent BTUs, the BTU is used as the basis for comparing energy consumption associated with different resources. A kWh is a unit of electrical energy, and 1 kWh is equivalent to approximately 10,200 BTUs, taking into account initial conversion losses (i.e., from one type of energy, such as chemical, to another type of energy, such as mechanical) and transmission losses. Natural gas consumption typically is described in terms of cubic feet or therms; 1 cubic foot of natural gas is equivalent to approximately 1,050 BTUs, and 1 therm represents 100,000 BTUs. One gallon of gasoline/diesel is equivalent to approximately 125,000/139,000 BTUs, respectively, taking into account energy consumed in the refining process.

use, with the balance consumed by the industrial, resource extraction, and commercial sectors. PG&E is the primary natural gas provider for the Bay Area. PG&E obtains its energy supplies from natural gas fields in northern California.

Electricity

Power plants in California meet approximately 78% of the in-state electricity demand; hydroelectric power from the Pacific Northwest provides another 7%, and power plants in the southwestern United States provide another 15% (California Energy Commission 2007). Among other factors, the contribution between in-state and out-of-state power plants depends upon the precipitation that occurred in the previous year and the corresponding amount of available hydroelectric power. In the Bay Area, Contra Costa County is home to one of the largest power plants in California: the Pittsburg Power Plant. It is the fourth-largest power plant in California, and it consumes natural gas. Smaller power plants and cogeneration facilities are located throughout the Bay Area. PG&E is the primary electricity supplier to northern California.

Alternative Fuels

The U.S. Department of Transportation currently recognizes the following as alternative fuels: methanol and denatured ethanol (alcohol mixtures that contain no less than 70% of the alcohol fuel), natural gas (compressed or liquefied), liquefied petroleum gas (LPG), hydrogen, coal-derived liquid fuels, fuels derived from biological materials (i.e., biomass), and electricity. The liquid fuel referred to as methanol (M85) consists of methanol and gasoline and is derived from natural gas, coal, or woody biomass. The liquid fuel referred to as ethanol (E85) consists of ethanol and gasoline and is derived from corn, grains, or agricultural waste. Natural gas consists of a high percentage of methane (generally above 85%) and varying amounts of ethane, propane, butane, and inerts (typically nitrogen, CO_2, and helium) and comes from underground reserves. LPG consists mostly of propane and is a byproduct of petroleum refining or natural gas processing. Current technologies for electric vehicles include lead-acid and nickel-metal hydride batteries.

Energy Use for Transportation

Transportation is the largest energy consumer in the state, accounting for 60% of total energy use (California Energy Commission 2007). On-road vehicles are estimated to consume approximately 80% of California's transportation energy demand, with automobiles, trucks, and buses accounting for nearly all of the on-road fuel consumption.

On-road vehicles use about 90% of the distillate (petroleum) consumed in California. The Department estimates that in 2007, more than 3.3 billion gallons of gasoline and diesel fuel would have been consumed in the nine Bay Area counties, an increase of about 127 million gallons over 2000 consumption levels (California Energy Commission 2007).

Long-term energy consumption trends for transportation will be largely determined by fuel efficiency trends for motor vehicles, because motor vehicles are the predominant transportation mode for passengers and commercial goods.

Energy Use for Commercial-Industrial Buildings

Commercial and industrial buildings in California need a lot of energy to operate. The major components of energy usage in commercial buildings are lighting, heating, cooling, ventilation

(HVAC) and other electrical outlet end use amenities. HVAC refers to the equipment, distribution system, and controls that provide heating, ventilation, and air conditioning for buildings. HVAC systems are the main energy consumers in commercial buildings, accounting for approximately half of all the energy used in the buildings. Lighting systems normally account for 30 percent of the electrical energy use in these buildings. An inefficient lighting system adds excessive heat inside the building. In addition to the energy costs, lighting and HVAC systems affect building occupants´ health, comfort, and productivity. Improving HVAC and lighting system performance saves energy and promotes a healthier, more comfortable workplace.

Energy Used by Private and Commercial Vehicles

Commercial vehicles, generally composed of light, medium, and heavy trucks, are typically fueled by diesel or gasoline and are part of the general fleet mix of vehicles present within the Bay Area transportation system. This energy analysis uses an average on-road vehicle fleet fuel economy of 17.98 mpg in 2006, based on the 2006 *California Motor Vehicle Stock, Travel, and Fuel Forecast* (California Department of Transportation 2006a).

In the short-term, average fuel economy is expected to decrease due to the increase in light-duty trucks as a fraction of the light-duty vehicle fleet in California. Model year 2007 cars had the lowest recorded fuel economy ratings since 1980, largely due to buyer preferences for sport utility vehicles (21% of new car sales in the United States). Since 1981, improved engine performance has largely been offset by an increase in the average weight of cars and light-duty trucks (10% and 16%, respectively).

Global Warming

Scientists and climatologists have cited evidence that the burning of fossil fuels by vehicles, power plants, industrial facilities, residences, and commercial facilities has led to an increase in the earth's temperature. Although climate changes can result from many natural processes, most scientists and climatologists agree that human activities may be accelerating the warming process. The concentration of GHGs in the atmosphere changes the amount of heat that is radiated from the earth back into space. GHGs include CO_2, methane, ozone, halocarbons, and nitrous oxide.

CO_2 is one of the most potent GHGs because it traps more heat in the atmosphere than other GHGs do, and much of it tends to remain in the atmosphere for centuries (Intergovernmental Panel on Climate Change 2007). The United States has one of the highest per-capita emissions of GHGs of any country in the world. Transportation accounts for about 39% of the CO_2 (the primary pollutant responsible for global warming) produced in California (California Energy Commission 2004).

Environmental Consequences

Significance Criterion

There is no threshold of significance for energy. Instead, the Department and FHWA require a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

Methods

Energy consumption associated with building a facility mostly comprises electric energy imported from Pacific Gas and Electric (PG&E) and vehicular movement, which is almost entirely the consumption of fossil fuel (gasoline and diesel). Transportation-related activities account for approximately half of all the petroleum products consumed in California. The consumption of nonrenewable resources remains high even though state and federal policies, such as the California Low-Emission Vehicle Program and the Federal Energy Policy Act of 1992, are increasing the use of alternative fuel and low-emission vehicles. Determining future 2015 and 2035 fuel consumption would require the estimation of 2015 and 2035 fuel efficiencies for both gasoline and diesel vehicle and advances in alternative fuel technology. The forecast future fuel efficiency is difficult to accurately predict, so this qualitative analysis will consider the "worst-case scenario," which utilizes current fuel efficiencies and assumes no improvement in alternative fuel technology or increase n alternative fuel technology use.

Direct Energy Consumption

Direct energy is that energy used in the daily operation of the transportation system, including the propulsion of on-road vehicles under varying conditions. In assessing the direct energy impact, consideration was given to the following factors: fleet mix, annual VMT, and variation of fuel consumption rates over time and by vehicle type.

Energy Consumption in Commercial Buildings

Cordelia Truck Scales facility receives electricity from a direct access provider utilizing the PG&E transmission grid. Because of the lack of electricity consumption data for the Cordelia Truck Scales Facility, this analysis uses electricity usage rates based on the total number of square footage of the buildings. The calculations of electricity consumptions for the proposed Build and No-Build Alternatives are based on the electricity usage rate of 10.5 kilowatt-hour per square foot of space per year (kWh/sq. ft./yr) for miscellaneous buildings, which was obtained from the South Coast Air Quality Management District's Air Quality Handbook (SCAQMD 1993). Annual electricity consumption by the existing 9,600 square foot Cordelia facility was estimated at 100,800 kWh/year.

Indirect Energy Consumption

Indirect energy is the energy required to construct, operate, and maintain the transportation network as well as manufacture and maintain on-road vehicles and transit vehicles. Indirect energy consumption also includes changes in energy demand resulting from a project, such as changes related to trip origins and destinations or travel modes. Indirect energy consumption from the production of fuel as well as transportation/transmission services for end users is not included in this analysis because any such analysis would be speculative.

Because the proposed project is in the conceptual planning stages and because detailed construction information, such as the number of pieces of equipment and types, materials, and labor hours, is not available, a detailed quantitative assessment of construction and maintenance impacts is not possible.

Environmental Consequences

Impact EN-1: Increase in Direct Energy Consumption at Cordelia Facility

Additional energy would likely be required for operation of the expanded truck scales proposed under the Build Alternative. The new building and parking lot would be larger than the facilities at the existing truck scales; therefore, energy consumption is expected to be greater. Annual and projected electricity consumption is summarized in Table 2.2-21 for both 2015 and 2035. Total projected electricity consumption would be approximately 264,600 kWh/year.

Table 2.2-21. Direct Electricity Consumptions

Land Use	Total Electricity Usage
Truck Scales Facility (Miscellaneous)	
Existing Condition	100,800 kWh/year (or 3.01 x10^{12} Btu/year)
Proposed Project	264,600 kWh/year (or 7.91 x10^{12} Btu/year)

The significant increase of approximately 163,600 kWh/year (or 4.90 x10^{12} Btu/year) would be reduced by at least 20 percent with the use of more energy-efficient heating, ventilation, air-conditioning, and lighting equipment throughout the truck scales facility.

Conserving Facility Energy

The Governor's Executive Order S-20-04 and Green Building Action Plan establishes the sustainable building and facility goals to treat an entire facility as one system, recognizing that individual building features, such as lighting, windows, heating and cooling systems, and control systems need to be designed as a coherent whole. Sustainable design or "building green" is an opportunity to use our resources efficiently while creating healthier buildings. It provides cost savings through improved human health and productivity, lower building operational costs, and resource efficiency. Specifically, by using less energy, water, and materials, sustainable buildings save California's natural resources. Sustainable buildings provide a healthier work environment with more natural light and cleaner air, contributing to employee wellbeing and increased productivity. Sustainable buildings are also cost-effective, saving taxpayer money by reducing operations and maintenance costs and lowering utility bills.

In designing, constructing, and operating the new facility, the Department will continue to incorporate programs and techniques that create buildings and systems with a LEED Silver or higher rating and that help provide for a sustainable environment. Specifically, the Department will continue to implement energy-saving projects that conserve energy, improve efficiency, and reduce energy costs through a variety of programs. Project design typically incorporates energy-efficient lighting fixtures; occupancy sensors that activate lights when people enter/leave rooms; double glazed, low "E" windows to reduce heat gain/loss throughout the day; and low-flow plumbing fixtures. The Department also works to meet or improve upon the Title 24 energy efficiency standards. The significant increase of approximately 163,600 kWh/year (or 4.90 x10^{12} Btu/year) would be reduced by at least 20% with the use of more energy-efficient heating, ventilation, air-conditioning, and lighting equipment throughout the truck scales facility.

Thus, as a Department facility, the proposed project will adhere to the following policies and standards regarding green building design:

- The Department will set a goal for all new building projects to outperform the required provisions of the California Energy Code's Title 24 energy efficiency standards by at least 20%.
- The Department will design and build all new buildings to a minimum standard equivalent of LEED Silver or higher, whenever possible within the constraints of program needs and standard budget parameters.
- The Department will use its purchasing power to promote the availability of sustainable products by means that include pursuing contracts for building materials, subsystems, components, equipment, and supplies that promote sustainability.
- The Department will work with regulatory agencies and other entities to speed the development, approval, and implementation of products and technologies that improve energy efficiency, renewable energy resources, and support sustainable design, construction, and operating practices.

In addition, the operation and maintenance energy usage of the facility will be much less than the indirect energy consumption for vehicles and/or roadways. When balancing energy used during operation against energy saved by relieving congestion and other transportation efficiencies, the proposed project would not have substantial energy effects. Therefore, no adverse effects on electrical energy at the proposed facility are expected.

Impact EN-2: Increase in Regional Vehicle Energy Consumption

In December 2007, the Energy Independence and Security Act of 2007 amended Energy Policy and Conservation Act CAFE Program requirements and granted DOT additional rulemaking authority. Pursuant to the Energy Independence and Security Act, on April 22, 2008, NHTSA proposed CAFE standards for model year 2011–2015 passenger cars and light trucks to achieve a combined fuel economy average of at least 35 miles per gallon. The Energy Policy and Conservation Act fuel economy requirements, including the four factors NHSTA must consider in determining maximum feasible CAFE levels—technological feasibility, economic practicability, the need to conserve energy, and the effect of other standards of the Government on fuel economy—form the purpose of and need for the model year 2011–2015 CAFE standards. Because the new CAFE standard covers the initial 5 model years, the standards for the second 5-year period (i.e., model years 2016–2020) have not been decided, but it is expected to reach the 35 miles per gallon for total passenger vehicle fleet requirements. Based on the NHSTA forecast, the new CAFE standard is expected to increase the fuel savings in motor vehicles in 2035, if the model years 2011–2015 can achieve the 35 miles per gallon fuel economy. The most significant measure for direct energy expenditures would be adoption and implementation of more rigorous CAFE standards for passenger cars and light trucks, as stated in the Energy Independence and Security Act of 2007.

Additional energy likely would be required for operation of the expanded truck scales proposed with the project. The new building and parking lot would be larger than the facilities at the existing truck scales; therefore, energy consumption is expected to be greater. The increase, however, would be offset by the use of more energy-efficient heating, ventilation, air-conditioning, and lighting equipment throughout the truck scales facility. The change in energy

consumption required for operations at the new truck scales (building and lighting) is expected to be minimal. When balancing energy used during operation against energy saved by relieving congestion and other transportation efficiencies, the proposed project would not have substantial energy effects.

Impact EN-3: Increase in Consumption of Indirect Energy Types

There would be indirect energy impacts from the consumption of energy for construction, manufacturing, and maintenance purposes under the proposed project. Construction of the proposed project would require the expenditure of energy for building the project, manufacturing the materials used in construction, and transporting these materials to the construction area. Construction equipment and construction worker vehicles operated during project demolition and construction would use fossil fuels. This increased fuel consumption would be temporary and would cease at the end of the construction activity, and it would not have a residual requirement for additional energy input. The marginal increases in fossil fuel use resulting from project construction are not expected to have an appreciable effect on energy resources.

Impact EN-4: Increase in Carbon Dioxide Emissions and Potential Impacts on Global Warming

The purpose of the proposed project is to alleviate existing and future traffic congestion along I-80 and at the truck scales facility. The proposed project will not generate new vehicle trips since it will not construct new homes or businesses. However, there is a possibility that some traffic currently utilizing other routes would be attracted to use the improved facility, resulting in a slight increase in VMT. The impact of GHG emissions is global rather than a local issue. Therefore, the impact of the proposed project on GHG emissions was calculated using the systemwide traffic VMT data (Fehr & Peers 2008) for the I-80 corridor.

The GHG CO_2, which contributes to global warming, is produced largely by transportation-related sources. CO_2 emissions depend on VMT and emission factors derived from the EMFAC2007 model. Based on the traffic study (Fehr & Peers 2008), the proposed project would reduce congestion and improve LOS. Relieving congestion by enhancing operations and improving travel times in high-congestion travel corridors would lead, in general, to an overall reduction in GHG emissions; accordingly, modeling output in Tables 2.2-22 and 2.2-23 focuses on VMT, but does not include the beneficial effect of improving traffic flow and speed.

As shown in Tables 2.2-22 and 2.2-23, the project is expected to increase CO_2 by nearly 2 million tpy in 2015 and 8 million tpy in 2035. These changes in CO_2 levels represent increases of 0.4% and 1.4% in 2015 and 2035, respectively. No thresholds for CO_2 emissions have been established; therefore, the project is considered to have an adverse effect.

Table 2.2-22. Estimated Carbon Dioxide Emissions during Operations in 2015

Vehicles	2015 No Project	2015 With Project
VMT/year	5.35×10^8	5.34×10^8
Tons/year	4.92×10^8	4.94×10^8
Percent change in CO_2	Not applicable	+0.4%

Table 2.2-23. Estimated Carbon Dioxide Emissions during Operations in 2035

Vehicles	2035 No Project	2035 With Project
VMT/year	5.74×10^8	5.93×10^8
Tons/year	5.39×10^8	5.47×10^8
Percent change in CO_2	Not applicable	+1.4%

Limitation and Uncertainties with EMFAC Modeling

Although EMFAC can calculate CO_2 emissions from mobile sources, the model does have limitations when it comes to accurately reflecting CO_2 emissions. According to the National Cooperative Highway Research Program report, *Development of a Comprehensive Modal Emission Model* (April 2008), studies have revealed that brief but rapid accelerations can contribute significantly to a vehicle's carbon monoxide and hydrocarbon emissions during a typical vehicle trip. Current emission factor models are insensitive to the distribution of such modal events (i.e., cruise, acceleration, deceleration, and idle) in the operation of a vehicle and instead estimate emissions by average trip speed. This limitation creates an uncertainty in the model's results when compared o the estimated emissions of the various alternatives with baseline in an attempt to determine impacts. Although work done by EPA and the CARB is underway on modal-emissions models, neither agency has yet approved modal-emissions models that can be used to conduct this more accurate modeling. In addition, EMFAC does not include speed corrections for most vehicle classes for CO2; for most vehicle classes, emission factors are held constant, which means that EMFAC is not sensitive to the decreased emissions associated with improved traffic flows for most vehicle classes. Therefore, the difference in modeled CO_2 emissions de to speed change will be slight.

It is interesting to note that CARB is currently not using EMFAC tocreate it inventory of GHG emissions, and is unclear why CARB has made this decision. Its web site only states:

> "REVISION: Both the EMFAC and OFFROAD Models develop CO_2 and CH_4 [methane] emission estimates; however, they are not currently used as the basis for [CARB's] official [GHG] inventory which is based on fuel usage information. However, CRB is working towards reconciling the emissions estimates from the fuel usage approach and the models."

With current science, project level analysis of GHG emissions is limited. Although a GHG analysis is included for this project, there are numerous key GHG variables that are likely to change dramatically during the design life of the proposed project and would thus dramatically change the projected CO_2 emissions. The following brief key GHG variables are: (1) vehicle fuel economy is increasing, (2) near-zero carbon vehicles will come into the market during the design life of this project, (3) California has recently adopted a low-carbon transportation fuel standard, and (4) driver behavior has been changing as the U.S. economy and oil prices have changed.

In any event, the Department is firmly committed to implementing measures to help reduce the potential effect of the project. Implementation of The Department's Climate Action Program, described in Measure EN-4, would reduce the severity of this effect.

Avoidance, Minimization, and/or Mitigation Measures

The proposed project is not expected to result in permanent direct or indirect impacts to energy. As stated previously, the consumption of fossil fuels and electricity would occur at typical amounts, and excesses in consumption are not expected.

For the GHG effects, the implementation of Measure EN-4 would reduce the level of the GHG emissions.

Measure EN-4: Implement Climate Action Program

Two of the most effective means to reduce emissions from transportation are outside the direct control of The Department. The most direct approach to improving the energy efficiency of the transportation sector is to increase vehicle fuel economy in new cars and light- and heavy-duty trucks. The Department does not control the fuel economy standards; rather, the EPA and the ARB have that control. The Department does, however, continue to be actively involved in the governor's Climate Action Team as the ARB works to implement AB 1493 and AB 32. The second approach is to reduce VMT by planning and implementing smart land use strategies: job/housing proximity, transit-oriented development, and high-density housing along transit corridors. As part of The Department's Climate Action Program, The Department will work closely with local jurisdictions on planning activities; however, The Department does not have local land use planning authority.

The Department and its parent agency, the Business, Transportation, and Housing Agency, will continue to address NO_x and GHG emission reductions through the following strategies in the Climate Action Program.

- Improve transportation energy efficiency—Builds on current efforts to provide a framework for expanded and new initiatives including incentives, tools, and information that advance cleaner transportation and reduce climate change emissions.
- Smart land use and Intelligent Transportation Systems (ITS)—Smart land use strategies encourage jobs/housing proximity, promote transit-oriented development, and encourage high-density residential/commercial development along transit corridors. ITS is the application of advanced technology systems and management strategies to improve operational efficiency of transportation systems and movement of people, goods, and services. Governor Schwarzenegger is finalizing a comprehensive 10-year strategic growth plan with the intent of developing ways to promote, through state investments, incentives, and technical assistance, land use, and technology strategies that provide for a prosperous economy, social equity, and a quality environment. Smart land use, demand management, ITS, and value pricing are critical elements in this plan for improving mobility and transportation efficiency. Specific strategies include promoting jobs/housing/proximity and transit-oriented development; encouraging high-density residential/commercial development along transit/rail corridors; valuing and congestion pricing; implementing intelligent transportation systems, traveler information/traffic control, and incident management;

accelerating the development of broadband infrastructure; and comprehensive, integrated multimodal/intermodal transportation planning.

Effects of the No-Project Alternative

Under the No-Project Alternative, no new energy effects associated with the project would occur. As shown in Table 2.2-21, less indirect energy consumption would occur under the No-Project Alternative. As shown in Tables 2.2-23 and 2.2-24, less carbon dioxide production would occur under the No-Project Alternative.