System Determined POAQC: Non-Exempt

Project Information

Project Name: **I-580 (TriValley) Corridor - EB HOV/HOT Lanes**

Sponsor:	**Alameda County CMA**	TIP ID:	**ALA070020**	RTP ID:	**21116**
Agency:	**Alameda County CMA**	Mode:	**STATE HIGHWAY**	Sub Mode:	

Project Type: **HOV** Trans. System: **STATE HWY** Purpose: **EXPANSION** County: **Alameda**

Proj. Desc.: **I-580 (TriValley) Corridor: From east of Greenville Road to Hacienda Rd.; Construct Eastbound HOV/HOT lanes (includes auxiliary lanes). Sub-project of TIP ID ALA050006.**

RTP Tittle: **Widen I-580 from Foothill Road to Greenville Road in both directions for HOV lanes (includes auxiliary lanes)**

Step 1: Project Identification

1:	Does this project have any federal funding?	**Yes**
2:	Does this project (or any phases of the project) require any federal action (such as federal authorization or approval for funding or environmental review) after December 14, 2010?	**Yes**
3:	Is the project exempt from both regional and project-level air quality conformity under 40 CFR 93.126? Project Type Selected: **None Applies**	**No**
4:	Is the project exempt from regional air quality conformity under 40 CFR 93.127? Project Type Selected: **None Applies**	**No**
5:	Is the project exempt from regional air quality conformity under 40 CFR 93.128? Project Type Selected: **None Applies**	**No**
6:	Does this project meet the definition of a “project of air quality concern” under 40 CFR 93.123(b)(1)? Project Type Selected: **None Applies**	**No**

Dates for Interagency Consultation

Requested Date of Interagency Consultation: **APR-JUN, 2011**

Meeting Date of PM2.5 consultation via Air Quality Conformity Task Force to determine POAQC: **05/26/2011**

Action Date of PM2.5 consultation via Air Quality Conformity Task Force to determine POAQC:

Dates for PM2.5 Hot-Spot Analysis

Meeting Date of PM2.5 consultation via Air Quality Conformity Task Force to determine review hot-spot analysis:

Action Date of PM2.5 consultation via Air Quality Conformity Task Force to determine review hot-spot analysis:

D R A F T

QUALITATIVE $PM_{2.5}$ HOT SPOT ANALYSIS

I-580 EASTBOUND EXPRESS LANES PROJECT, ALAMEDA COUNTY, CALIFORNIA

EA 04-0G190K
04-ALA-580 PM R7.8-19.1

Prepared for

Alameda County Transportation Commission
1333 Broadway #220
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July 14, 2011

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This project-level hot spot analysis for the I-580 Eastbound Express Lanes Project responds to the United States Environmental Protection Agency's (EPA) requirement for a hot spot analysis for particulate matter of diameter less than or equal to 2.5 microns ($PM_{2.5}$), as required in the EPA's March 10, 2006 Final Transportation Conformity Rule (71 FR 12468). The effects of localized $PM_{2.5}$ hot spots were evaluated using the EPA and Federal Highway Administration (FHWA) guidance manual, *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in* $PM_{2.5}$ *and* PM_{10} *Nonattainment and Maintenance Areas* (FHWA and EPA 2006).

This $PM_{2.5}$analysis addresses the construction of the proposed project, which is included in the Metropolitan Transportation Commission's (MTC) current Regional Transportation Plan (RTP), the *Transportation 2035 Plan for the San Francisco Bay Area* (MTC 2009, RTP ID No. 230666 and No. 2030667). The FHWA made the conformity determination for the RTP on May 29, 2009.The project is also included in the 2011 Transportation Improvement Program (TIP), which was adopted by MTC on October 27, 2010 (TIP ID No. ALA-070020).

The California Department of Transportation (Department), in cooperation with the Alameda County Transportation Commission (Alameda CTC), proposes to upgrade the existing Interstate 580 (I-580) eastbound single high-occupancy vehicle (HOV) lane to a double (two-lane) express lane facility. The I-580 Eastbound Express Lanes Project (EA 04-0G190K) extends from just west of the Hacienda Drive interchange to just east of the Greenville Road undercrossing in the cities of Dublin, Pleasanton, and Livermore in Alameda County (Post Miles R7.8 to 19.1). The express lanes would be restricted at all times to HOVs and vehicles that pay a toll. HOVs include carpool vehicles with two or more people as well as motorcycles, transit buses, and eligible clean air vehicles. The total length of the project is approximately 11.3 miles. Figure 1-1 shows the project location and vicinity.

The project would include installation of tolling equipment and signage in the median and trenching along the outside edge of pavement for installation of conduits. Roadway expansion, placement of additional pavement, and right-of-way acquisition to accommodate the express lanes would take place as part of Phase III of the I-580 Eastbound HOV Lane Project (EA 04-290851). Although the Phase III and express lanes projects are undergoing separate environmental review, both are included as a single action in the MTC's 2011 TIP (ID #ALA070020). Therefore, this report considers the two projects as a single action for purposes of transportation air quality conformity.

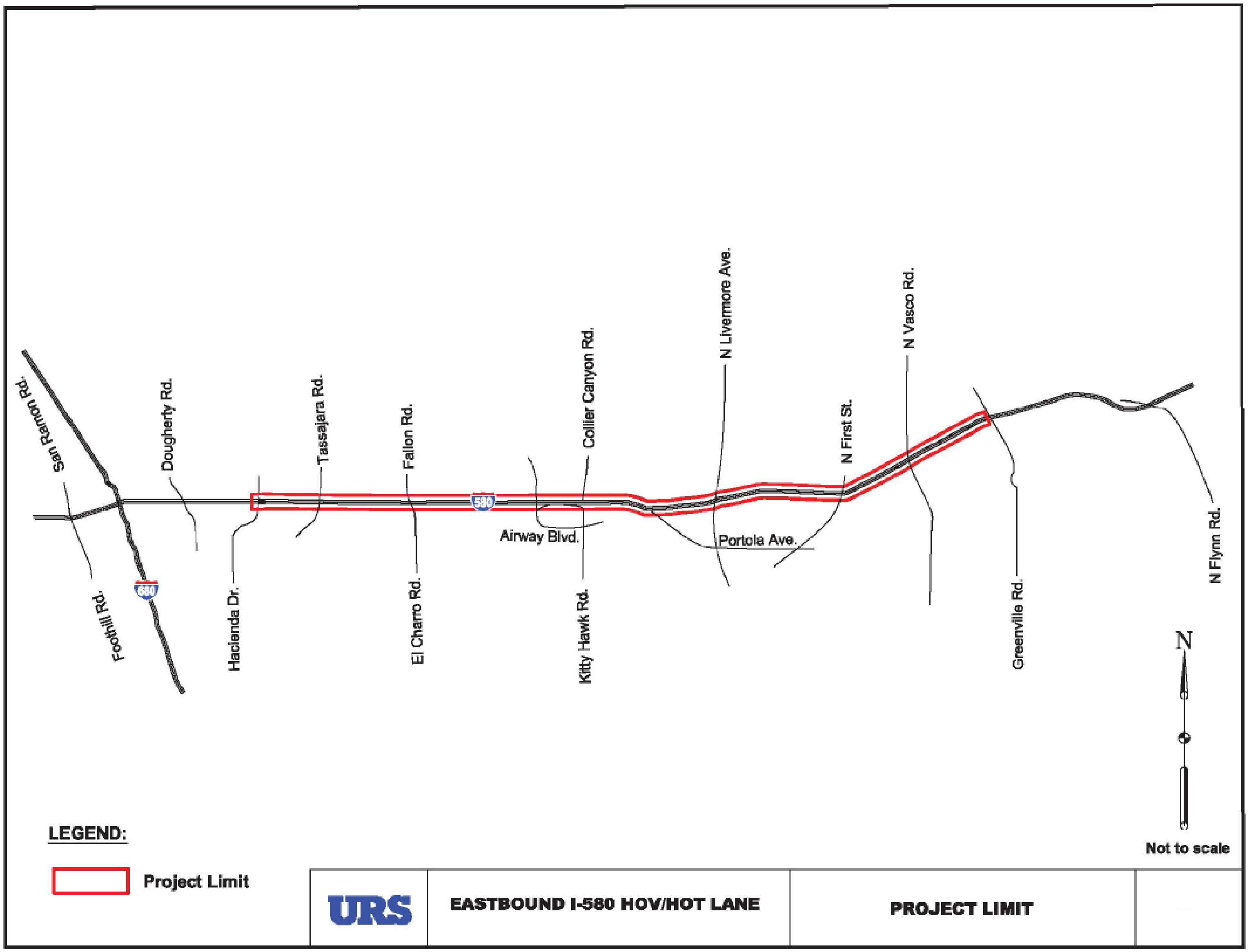
A single Build Alternative is being considered and would include the project components listed below.

2.1 EXPRESS LANES

Eastbound I-580 in the project limits has four mixed-flow lanes (lanes that are open to all vehicles). A previous project constructed a single HOV lane in the median of this segment of eastbound I-580. Construction of the I-580 Eastbound HOV Lane Project (Department 2007, 2008, 2009a, 2011) has taken place in three phases:

- Phase I (EA 04-290841) was opened to traffic on October 2, 2009. The improvements included mainline widening and ramp modifications to allow the addition of an eastbound HOV lane between Portola Avenue and Greenville Road. The roadway widening included 8 feet to accommodate the planned conversion of the HOV lane to a single express lane.
- Phase II (EA 04-290831) was opened to traffic on November 10, 2010. The improvements included mainline widening and ramp modifications to allow the addition of an eastbound HOV lane between Hacienda Drive and Portola Avenue. As with Phase I, the roadway widening included 8 feet to accommodate the planned conversion of the HOV lane to a single express lane.
- Phase III (EA 04-290851) will construct auxiliary lanes (lanes that extend from on-ramps to off-ramps) on eastbound I-580. Phase III will also widen the freeway segments within the auxiliary lane limits, at the Hacienda Drive on-ramp to eastbound I-580, and between the Tassajara Road/Santa Rita Road and El Charro Road/Fallon Road interchanges to accommodate the double express lane facility.

Figure 1-1. Project Limit



Express Lane Configuration

Traveling eastbound in the vicinity of the Hacienda Drive interchange, a single express lane would be introduced to the left of the mixed-flow lanes. A second express lane would be introduced just west of the Fallon Road/El Charro Road overcrossing. Between Hacienda Drive and just west of Greenville Road, ingress and egress from the express lanes would be restricted to specific entry/exit points between interchanges as shown in Figure 1-2. The express lanes would typically be separated from the mixed-flow lanes by a 2-foot-wide buffer zone delineated by double solid white striped lines. Crossing the double striped lines would constitute a traffic infraction.

2.1.1 Express Lane Tolling Facilities and Operations

Electronic tolling equipment would be installed at five tolling zones: one at the beginning of the express lanes in the vicinity of Hacienda Drive, and one at each intermediate entrance to the express lanes. The tolling equipment would be mounted on overhead cantilever structures that would communicate with transponders mounted to the windshields of vehicles that pass through the tolling zone. Transponders are electronic devices that enable the unique identification and tolling of single-occupant vehicles. Trip recording and billings would be managed by the Bay Area Toll Authority (BATA), which manages the FasTrak electronic tolling system. Express lane users would have to set up a FasTrak account, if they do not already have one.

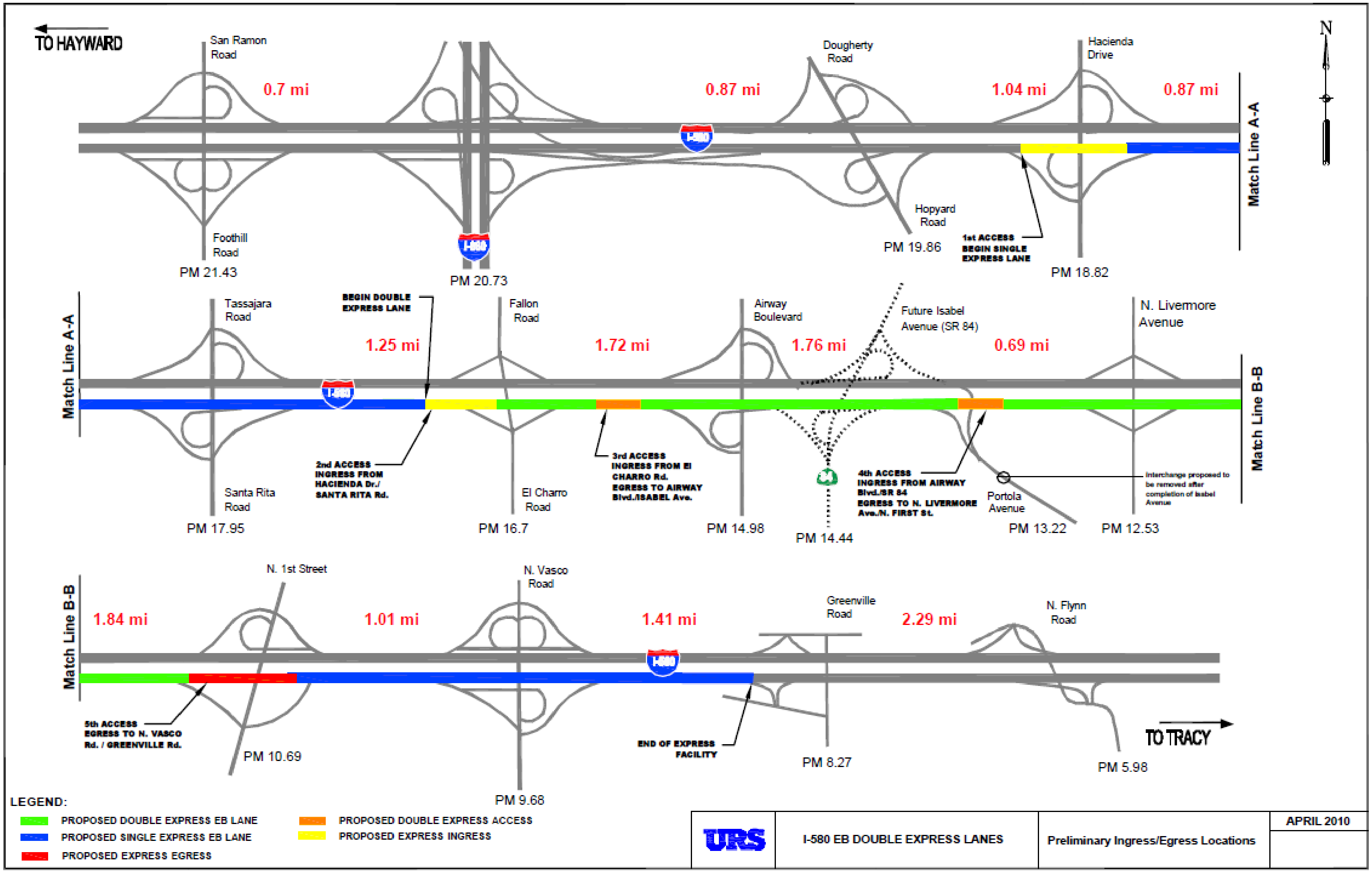
Traffic in all lanes would be monitored, and toll rates would be adjusted based on the congestion in the express lanes and mixed-flow lanes. Equipment for traffic congestion monitoring would include vehicle detection stations along regular intervals, roadway sensors that can detect vehicles and transmit data to a roadside controller cabinet, and overhead radar vehicle sensors to measure traffic operations in each mixed-flow lane. New roadway surveillance closed-circuit television (CCTV) cameras for off-site observation of traffic would also be installed at 1-mile intervals in the project limits.

If the monitoring system identifies that congestion is low and the express lanes can accommodate more vehicles, the toll rate would be low. If the express lanes have less capacity, the toll rate would be increased to deter additional single-occupant vehicles from entering. The pricing would be adjusted to maintain flow in the express lanes to continue to encourage use by HOV users. Signs would identify the toll price to allow single-occupant drivers time to decide whether to pay the toll before they enter the facility. Electronic message signs would indicate the current toll, or no toll/open to all. The Department's Traffic Management Center could override the system in the event of an emergency or incident response.

2.1.2 Express Lane Signage

Approximately one-quarter mile preceding each tolling zone, an overhead dynamic message sign (DMS) would be installed to display the current toll rate and destination information so single-occupant drivers can decide whether to enter the express lanes facility. The DMS would indicate that HOVs are allowed to use the express lanes facility free of charge. Approximately 1 mile preceding each tolling zone, and at the beginning of each intermediate express lane segment, overhead signs would inform drivers that an entrance to the express lanes facility is approaching. The overhead signs would also notify drivers that an intermediate exit is one-half mile to a mile

Figure 1-2. Project Preliminary Ingress/Egress Locations



away and that they need to merge to the right to exit into the mixed-flow lanes. An additional exit sign would be placed at every intermediate exit location.

All sign structures would be installed within the existing I-580 median and within the footprint of the I-580 Eastbound HOV Lane Project phases.

2.2 PHASE III OF THE I-580 EASTBOUND HOV LANE PROJECT

As stated previously, Phase III of the I-580 Eastbound HOV Lane Project would include the roadway expansion, placement of additional pavement, and right-of-way acquisition to accommodate the express lanes. Phase III would construct additional pavement at the eastbound on-ramp to Hacienda Drive (0 to 1.7 feet in width), between the Tassajara Road/Santa Rita Road and El Charro Road/Fallon Road interchanges (0 to 14.3 feet in width), and within the existing Caltrans right-of-way between 0.4 mile west of the Portola Avenue overcrossing and 0.2 mile west of First Street (18 feet in width). The additional pavement also would accommodate eastbound auxiliary lanes in the segment of I-580 between the Isabel Avenue and North Livermore Avenue interchanges, and between the North Livermore Avenue and First Street interchanges.

Roadway widening will require the construction of one soundwall and 11 retaining walls from just west of the El Charro Road/Fallon Road interchange to First Street, as well as widening of the two bridges that convey eastbound I-580 over Arroyo Las Positas (located approximately 100 feet east of the Portola Avenue overcrossing and approximately 500 feet west of Las Colinas Road overcrossing). Each bridge will be widened by approximately 32 feet. Roadway widening will also require the extension of the existing culvert over Arroyo Seco, which is approximately 1,500 feet west of the First Street overcrossing.

3.1 REGULATORY BACKGROUND

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

Regional level conformity in California is concerned with how well the region is meeting the standards set for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and particulate matter (PM). California is in attainment for the other criteria pollutants. At the regional level, Regional Transportation Plans (RTPs) 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 implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization, such as the Alameda County Transportation Commission and the appropriate federal agencies, such as the Federal Highway Administration, make the determination that the RTP is in conformity with the State Implementation Plan for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as described in the RTP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Conformity at the project-level also requires "hot spot" analysis if an area is "nonattainment" or "maintenance" for carbon monoxide (CO) and/or particulate matter. A region is a "nonattainment" area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas but have recently met the standard are called "maintenance" areas. "Hot spot" analysis is essentially the same, for technical purposes, as CO or particulate matter analysis performed for NEPA purposes. Conformity does include some specific standards for projects that require a hot spot analysis. In general, projects must not cause the CO standard to be violated, and in "nonattainment" areas the project must not cause any increase in the number and severity of violations. If a known CO or particulate matter violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

The concept of transportation conformity was introduced in the CAA 1977 amendments. Transportation conformity 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 national ambient air quality standards (NAAQS). Conformity requirements were made substantially more rigorous in the 1990 CAA amendments, and the transportation conformity regulation that details implementation of the new requirements was issued in November 1993.

DOT and the EPA developed guidance for determining conformity of transportation plans, programs, and projects in November 1993 in the Transportation Conformity Rule (40 Code of Federal Regulations [CFR] 51 and 40 CFR 93). The demonstration of conformity to the SIP is the responsibility of the local Metropolitan Planning Organization (MPO), which is also responsible for preparing RTPs and associated demonstration of SIP conformity. Section 93.114 of the Transportation Conformity Rule states that "there must be a currently conforming regional transportation plan and transportation improvement plan at the time of project approval."

The Alameda CTC is the designated federal MPO and state regional transportation planning agency for Alameda County. As such, the Alameda CTC coordinates the region's major transportation projects and programs, and promotes regionalism in transportation investment decisions.

3.1.1 Statutory Requirements for PM Hot Spot Analyses

On March 10, 2006, the EPA issued a final transportation conformity rule (40 CFR 51.390 and Part 93) that addresses local air quality impacts in PM_{10} and $PM_{2.5}$ nonattainment and maintenance areas. The final rule requires a hot spot analysis to be performed for a Project of Air Quality Concern (POAQC) or any other project identified by the $PM_{2.5}$ SIP as a localized air quality concern. Transportation conformity, under CAA Section 176(c) (42 U.S.C. 7506(c)), requires that federally supported highway and transportation project activities conform to the SIP, if one exists. The rule provides criteria and procedures to ensure that these activities will not create new violations or "worsen" existing violations, or prevent adherence to relevant NAAQS as described in 40 CFR 93.101.

EPA's final rule, 40 CFR 93.123(b)(1), defines POAQCs as:

> (i) New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;
>
> (ii) Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
>
> (iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
>
> (iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
>
> (v) Projects in or affecting locations, areas, or categories of sites which are identified in the $PM_{2.5}$ or PM_{10} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

In March 2006, the FHWA and EPA issued a guidance document entitled *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (FHWA and EPA 2006). This guidance details a qualitative step-by-step screening procedure to determine whether project-related particulate emissions have a potential to generate new air quality violations, worsen existing violations, or delay attainment of NAAQS for $PM_{2.5}$ or PM_{10}. The PM_{10} hot spot analysis is not required for project-level conformity because the area is in attainment or unclassified for the national PM_{10} standards.

Hot spot analyses only need to be performed for POAQCs. POAQCs are certain highway and transit projects that involve significant levels of diesel traffic or any other project identified in a $PM_{2.5}$ or PM_{10} SIP as a project of localized air quality concern. The following list provides examples of POAQCs.

- A project on a new highway or expressway that serves a significant volume of diesel truck traffic, such as facilities with greater than 125,000 annual average daily traffic (AADT) where 8% or more of such AADT is diesel truck traffic.
- New exit ramps and other highway facility improvements to connect a highway or expressway to a major freight, bus, or intermodal terminal.
- Expansion of an existing highway or other facility that affects a congested intersection (operating at LOS D, E, or F) that has a significant increase in the number of diesel trucks.
- Similar highway projects that involve a significant increase in the number of diesel transit buses and/or diesel trucks.

The list below provides examples of projects that are not of air quality concern.

- Any new or expanded highway project that primarily services gasoline vehicle traffic (i.e., does not involve a significant number or increase in the number of diesel vehicles), including such projects involving congested intersections operating at LOS D, E, or F.
- An intersection channelization project or interchange configuration project that involves either turn lanes or slots or lanes or movements that are physically separated. These kinds of projects improve freeway operations by smoothing traffic flow and vehicle speeds by improving weave and merge operations, which would not be expected to create or worsen $PM_{2.5}$ or PM_{10} violations.
- Intersection channelization projects, traffic circles or roundabouts, intersection signalization projects at individual intersections, and interchange reconfiguration projects that are designed to improve traffic flow and vehicle speeds, and do not involve any increases in idling. Thus, they would be expected to have a neutral or positive influence on $PM_{2.5}$ or PM_{10} emissions.

For projects identified as not being POAQCs, qualitative $PM_{2.5}$ (for regions without an approved conformity SIP) hot spot analyses are not required. For these types of projects, state and local project sponsors should briefly document in their project-level conformity determinations that CAA and 40 CFR 93.116 requirements were met without a hot spot analysis, since the projects have been found to not be of air quality concern under 40 CFR 93.123(b)(1). The project area is classified as a nonattainment area for the federal $PM_{2.5}$ standard, therefore a determination must be made as to whether it would result in a $PM_{2.5}$ hot spot.

Of the five POAQC types identified above, the project most likely falls into the first category: "A project on a new highway or expressway that serves a significant volume of diesel truck traffic, such as facilities with greater than 125,000 AADT where 8% or more of such AADT is diesel truck traffic." As shown in Table 3-1, the most recent Department traffic counts for I-580 show that the project corridor already exceeds 125,000 total AADT and 8% trucks (i.e., 10,000 truck AADT).

Table 3-1. 2009 Total AADT and Truck AADT

I-580 Segment	Post Mile	Total AADT	Truck AADT	% Trucks
East of Livermore, Greenville Road	8.265	134,000	13,936	10.4
West of Livermore, Greenville Road	8.265	133,000	11,079	8.33
East of First Street	10.689	158,000	19,276	12.2
West of First Street	10.689	159,000	7,235	4.55

Source: Caltrans 2009b

Consequently, a qualitative project-level $PM_{2.5}$ hot spot analysis was conducted to assess whether the project would cause or contribute to any new localized $PM_{2.5}$ violations, or increase the frequency or severity of any existing violations, or delay timely attainment of the or $PM_{2.5}$ NAAQS.

3.1.2 Ambient Air Quality Standards

- **24-hour $PM_{2.5}$ Standard:** 35.0 $\mu g/m^3$
- **Annual $PM_{2.5}$ Standard:** 15.0 $\mu g/m^3$

The Bay Area was designated as a nonattainment area for the federal $PM_{2.5}$ standard on October 8, 2009, with an effective date of December 14, 2009. The BAAQMD must submit a SIP to the EPA by December 14, 2012 demonstrating how the Bay Area will achieve the $PM_{2.5}$ NAAQS by December 14, 2014.

The 24-hour $PM_{2.5}$ standard is based on 3-year average of the 98th percentile of 24-hour recorded concentrations; the annual standard is based on 3-year average of the annual arithmetic mean $PM_{2.5}$ recorded at the monitoring station. A $PM_{2.5}$ hot-spot analysis must consider both standards, unless it is determined for a given area that meeting the controlling standard would ensure that CAA requirements are met for both standards. The interagency consultation process should be used to discuss how the qualitative $PM_{2.5}$ hot-spot analysis meets statutory and regulatory requirements for both standards, depending on the factors that are evaluated for a given project.

3.2 PM2.5 HOT SPOT ANALYSIS

A hot-spot analysis is defined in 40 CFR 93.101 as an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant air quality standards. A hot-spot analysis assesses the air quality impacts on a project-level – a scale smaller than an entire nonattainment or maintenance area, such as for congested roadway intersections and highways or transit terminals. Such an analysis is a means of demonstrating that a transportation project meets the federal CAA conformity requirements to support state and local air quality goals with respect to achieving the attainment status in a timely manner. When a hot spot analysis is required, it is included in the project-level conformity determination that is made by FHWA or the Federal Transit Administration (FTA).

3.2.1 Analysis Methodology and Types of Emissions Considered

The EPA and FHWA established in the *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in* $PM_{2.5}$ *and* PM_{10} *Nonattainment and Maintenance Areas* (FHWA and EPA 2006) the following two methods for completing a $PM_{2.5}$ hot-spot analysis:

1. Comparison to another location with similar characteristics (pollutant trend within the air basin)

2. Air quality studies for the proposed project location (ambient PM trend analysis in the project area)

This analysis uses a combined approach to demonstrate that the proposed project would not result in a new or worsened $PM_{2.5}$ violation. Method 1 was used to establish that the proposed project area will meet the NAAQS. Method 2 was used to demonstrate that implementation of the proposed project would not delay attainment of the NAAQS.

The analysis was based on directly emitted $PM_{2.5}$ emissions, including tailpipe, brake wear, and tire wear. Re-entrained dust caused by vehicles traveling over paved and unpaved roads was not included in the qualitative analysis, as the California Air Resources Board has not made a determination that re-entrained road dust is a significant contributor to ambient $PM_{2.5}$ concentrations in the project region.

Secondary particles formed through $PM_{2.5}$ and PM_{10} precursor emissions from a transportation project take several hours to form in the atmosphere, giving emissions time to disperse beyond the immediate project area of concern for localized analyses; therefore, they were not considered in this hot-spot analysis. Secondary emissions of $PM_{2.5}$ and PM_{10} are considered as part of the regional emission analysis prepared for the conforming RTP and Federal Transportation Improvement Program (FTIP).

Project construction is anticipated to last approximately 1.5 years. In addition, the project must comply with Bay Area Air Quality Management District (BAAQMD) construction-related fugitive dust control measures, which will ensure that fugitive dust from construction activities are minimized. Consequently, construction-related $PM_{2.5}$ emissions were not included in the hot spot analysis per 40 CFR 93.123(c)(5).

3.2.2 Air Quality Trend Analysis

Local air quality data was obtained from the Livermore monitoring station to characterize existing air quality and predict future conditions in the project area. In addition to monitoring data, this analysis presents project-level $PM_{2.5}$ emissions in the future (2015 and 2030) years to help characterize the project's impact on total $PM_{2.5}$ emissions generated in the project area.

3.2.2.1 Data Considered

The nearest air quality monitoring station is the Livermore station (793 Rincon Avenue, Livermore, CA 94550), which is approximately 0.5 mile south of the project corridor.

3.2.2.2 Climate and Topography

Due to its topographic diversity, the meteorology and climate of the Bay Area is often described in terms of different subregions and their microclimates. The proposed project is located in the Livermore Valley subregion, as defined by the BAAQMD.

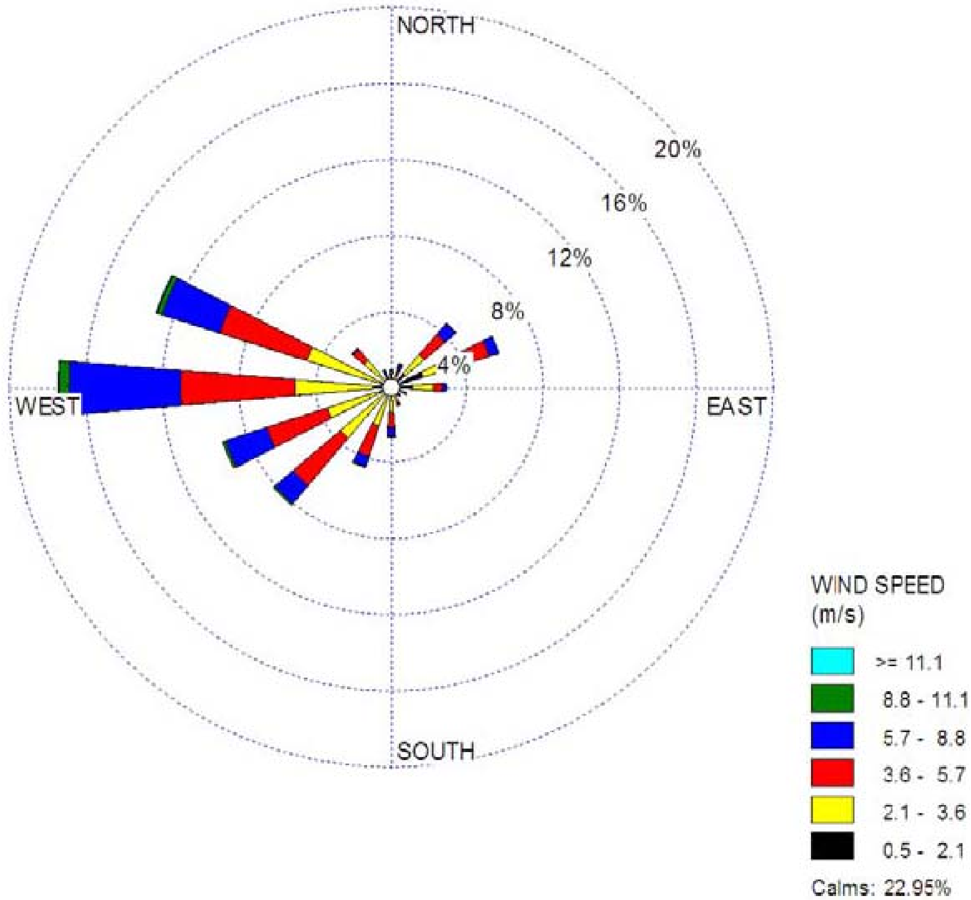
The Livermore Valley is a sheltered inland valley near the eastern border of San Francisco Bay Area Basin (SFBAAB). The western side of the valley is bordered by 1,000- to 1,500-foot hills with two gaps connecting the valley to the central SFBAAB, the Hayward Pass, and Niles Canyon. The eastern side of the valley also is bordered by 1,000- to 1,500-foot hills with one major passage to the San Joaquin Valley called the Altamont Pass and several secondary passages. To the north lie the Black Hills and Mount Diablo. A northwest-to-southeast channel connects the Diablo Valley to the Livermore Valley. The south side of the Livermore Valley is bordered by mountains approximately 3,000 to 3,500 feet high.

During the summer months, when there is a strong inversion with a low ceiling, air movement is weak and pollutants become trapped and concentrated. Figure 3-1 shows the predominant wind direction in Livermore. Maximum summer temperatures in the Livermore Valley range from the high 80s to low 90s, with extremes in the 100s. Average winter maximum temperatures range from the high 50s to low 60s, while minimum temperatures are from the mid to high 30s, with extremes in the high teens and low 20s.

Air pollution potential is high in the Livermore Valley, especially for photochemical pollutants (such as ozone) in the summer and fall. High temperatures increase the potential for ozone to build up. The valley not only traps locally generated pollutants but can be the receptor of ozone and ozone precursors from San Francisco, Alameda, Contra Costa and Santa Clara counties. On northeasterly wind flow days, most common in the early fall, ozone may be carried west from the San Joaquin Valley to the Livermore Valley.

During the winter, the sheltering effect of the valley, its distance from moderating water bodies, and the presence of a strong high pressure system contribute to the development of strong, surface-based temperature inversions. Pollutants such as carbon monoxide and particulate matter generated by motor vehicles, fireplaces, and agricultural burning can become concentrated. Air pollution problems could intensify because of population growth and increased commuting through the subregion (BAAQMD 2010).

Figure 3-1. Predominant Wind Direction at Livermore Municipal Airport



Source: California Air Resources Board 2011 Livermore Municipal (ID24927, NCDC)

3.2.2.3 Trends in $PM_{2.5}$ Concentrations

Monitored $PM_{2.5}$ concentrations at the Livermore monitoring station for the past 4 years (2007-2010) are presented in Table 3-2. The data indicates that the 24-hour average $PM_{2.5}$ concentrations have exceeded the NAAQS for 2007-2009 but not 2010. However, the national annual average standard was not exceeded at the monitoring station in any of the past four years. The national 24-hour $PM_{2.5}$ standards estimated day exceedances are displayed in Table 3-2 as well.

Table 3-2. Ambient $PM_{2.5}$ Monitoring Data (µg/m^3) at the Livermore Rincon Ave. Monitoring Station (2007-2010)

Year	Estimated Days Over Standard	Annual Average (µg/m^3)		High 24-Hr Average (µg/m^3)	
	Nat'l	Nat'l	State	Nat'l	State
2010	**0.0**	7.6	7.6	34.7	34.7
2009	**4.0**	9.1	9.1	**45.7**	45.7
2008	**2.1**	10.0	10.0	**38.6**	52.7
2007	**9.0**	8.9	8.9	**54.9**	54.9

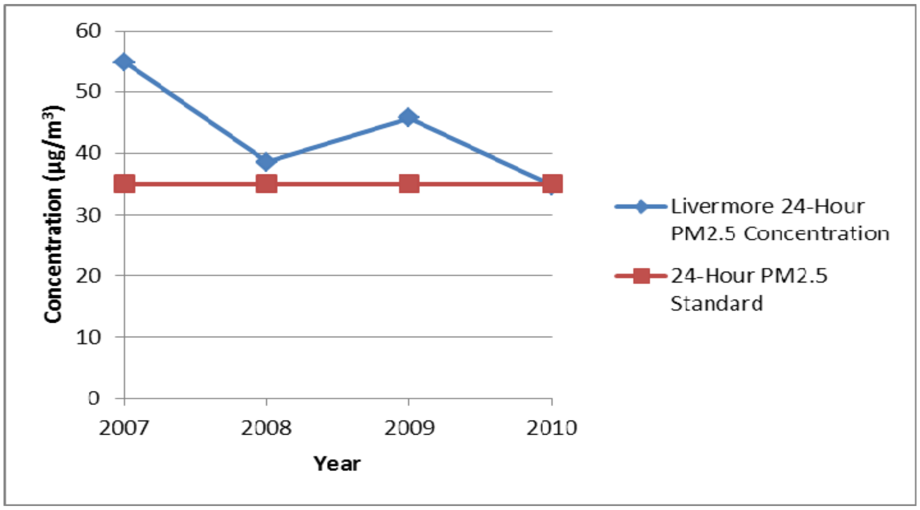
Source: CARB website, www.arb.ca.gov, accessed July 2011.
Notes:
µg/m^3 = micrograms per cubic meter
Exceedances of the State or National standard shown in **bold** text.
An exceedance is not necessarily a violation. California standards are not to be exceeded; National standards are not to be exceeded more than once per year.

As required by the applicable transportation conformity regulations for $PM_{2.5}$, a trend analysis has been conducted and compared to the current 24-hour and annual average NAAQS. The current 24-hour standard is based on the 3-year average of the 98th percentile of 24-hour average $PM_{2.5}$ concentrations. The current annual standard is based on a three-year average of annual mean $PM_{2.5}$ concentrations.

As shown in Figure 3-2, 24-hour average $PM_{2.5}$ concentrations at the Livermore monitoring station show a decreasing trend from 2007 to 2010. These values have remained above the current national standard of 35 µg/m^3 except for 2010, but below the old standard of 65 µg/m^3.

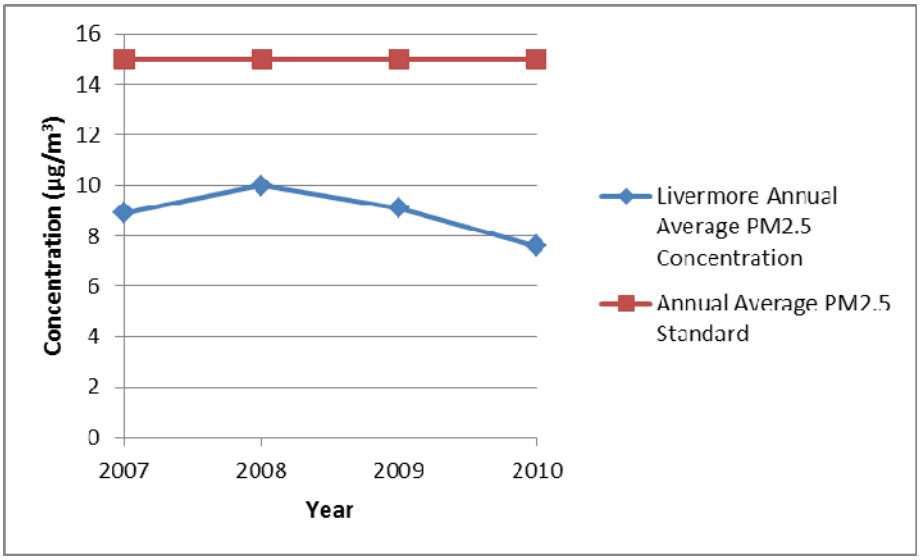
Figure 3-3 indicates that annual average $PM_{2.5}$ concentrations recorded at the Livermore monitoring station peaked in 2008 and decreased through 2010. These values have remained below the current national standard of 15.0 µg/m^3.

Figure 3-2. 24-Hour Average $PM_{2.5}$ Concentrations (µg/m^3) at the Livermore Rincon Ave. Monitoring Station (2007-2010)



Source: California Air Resources Board 2011

Figure 3-3. Annual Average $PM_{2.5}$ Concentrations (μg/m^3) at the Livermore Rincon Ave. Monitoring Station (2007-2001)



Source: California Air Resources Board 2011

3.2.2.4 Surrounding Land Uses

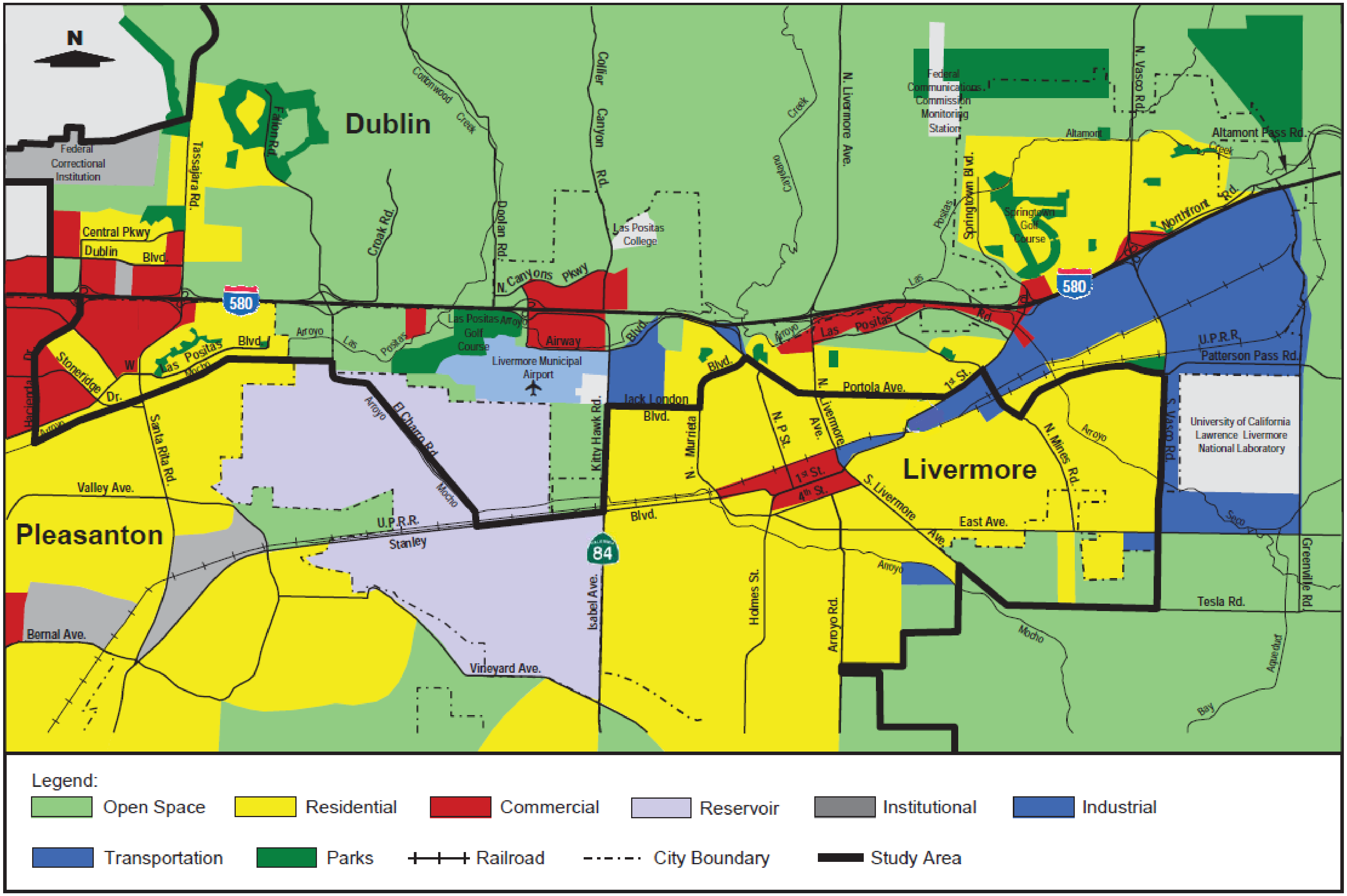
The BAAQMD generally defines a sensitive receptor as a facility or land use that houses or attracts members of the population, such as children, the elderly, and people with illnesses, who are particularly sensitive to the effects of air pollutants.

Various sensitive receptors are located in the vicinity of the project area. Figure 3-4 shows the project area and shows residential neighborhoods which contain sensitive receptor sites. 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. Figure 3-4 does not include the locations of scattered or individual sensitive receptors.

Surrounding land uses include residential developments south and north of I-580 in Dublin, Pleasanton, and Livermore. As stated in Section 2.2, Phase III of the I-580 Eastbound HOV Lane Project would construct additional pavement at the eastbound on-ramp to Hacienda Drive (0 to 1.7 feet in width), between the Tassajara Road/Santa Rita Road and El Charro Road/Fallon Road interchanges (0 to 14.3 feet in width), and within the existing Caltrans right-of-way between 0.4 mile west of the Portola Avenue overcrossing and 0.2 mile west of First Street (18 feet in width). The additional pavement also would accommodate auxiliary lanes in the segment of I-580 between the Isabel Avenue and North Livermore Avenue interchanges, and between the North Livermore Avenue and First Street interchanges.

In most locations, the additional pavement would result in a minor (3 to 4 foot) shift of freeway lanes toward the receptors to the south; where the auxiliary lanes would be added, the lanes would be as much as 18 feet closer to receptors to the south. However, the only two residential

Figure 3-4. Land Uses In Project Area



developments that are adjacent to the south side of I-580 are partly or fully separated from the freeway by other roads (Pimlico Drive between Tassajara Road/Santa Rita Road and El Charro Road/Fallon Road, and East Airway Boulevard between the Portola/Isabel Avenue and North Livermore Avenue interchanges). Because of the relatively small distance of the shift and the presence of perimeter roads that provide a partial buffer zone between I-580 and the residences, the project is not expected to decrease air quality in those locations. In addition, the project would help to reduce congestion and improve traffic flow, especially in the period after the opening year. Since motor vehicle emissions tend to be reduced with increased speed and reduced congestion, the project would result in improvements to air quality in the vicinity of these nearby receptors.

3.2.2.5 Future Trends

Emission trend data for the SFBAAB from the 2009 edition of *The California Almanac of Emissions and Air Quality* published by the California Air Resources Board (CARB) was used to provide an estimate of potential $PM_{2.5}$ trends in the vicinity of the project area. While the CARB's Almanac does not provide emission trend data on the county level, the regional trend data can be used to provide insight on the general trends of air quality in the region, as implementation of emission standards and control requirements that have an effect on regional pollutant concentrations are likely to result in similar trends at the local level. Table 3-3 presents $PM_{2.5}$ emission trends in the SFBAAB for the years 1975-2020.

Table 3-3. $PM_{2.5}$ Emission Trends in the San Francisco Bay Area Air Basin (tons per day)

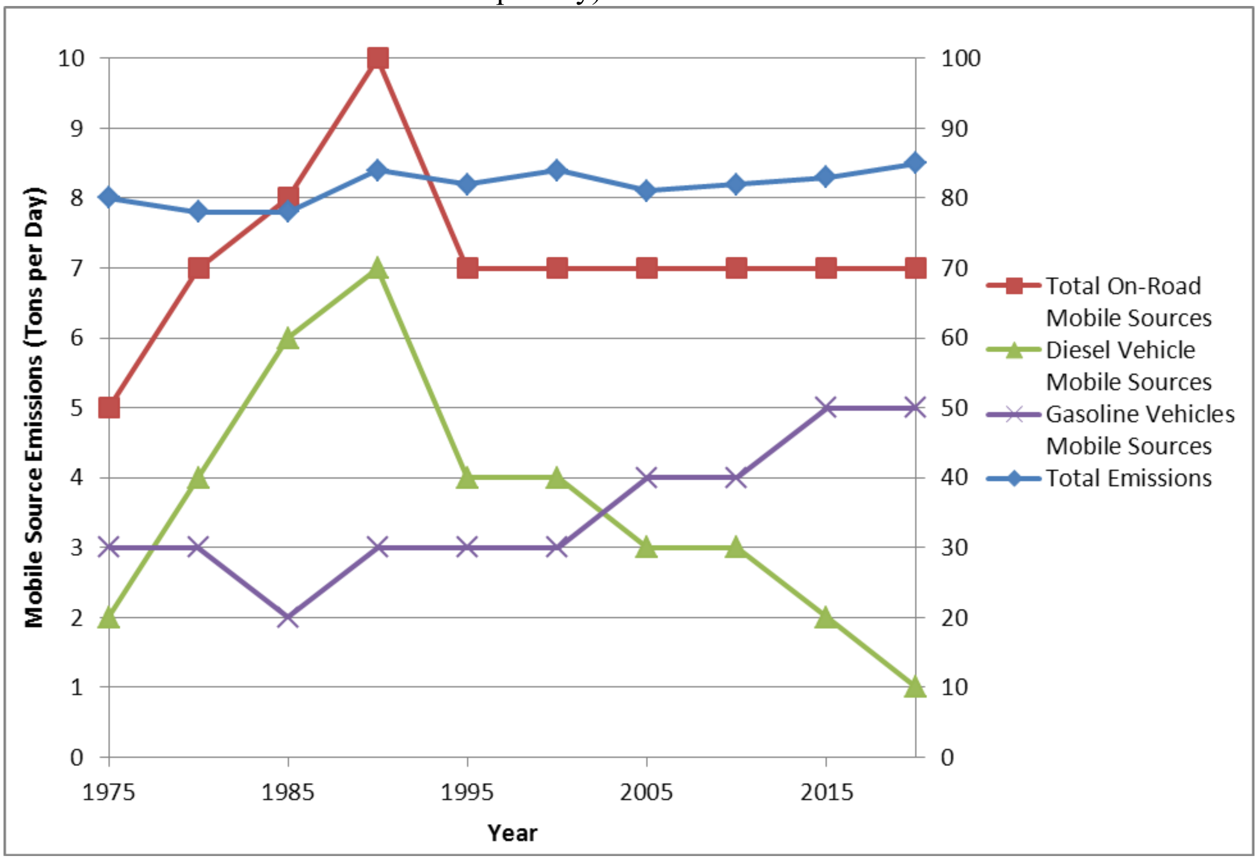
Year	Total Emissions	Total On-Road Mobile Sources	Diesel Vehicle Mobile Sources	Gasoline Vehicles Mobile Sources
1975	80	5	2	3
1980	78	7	4	3
1985	78	8	6	2
1990	84	10	7	3
1995	82	7	4	3
2000	84	7	4	3
2005	81	7	3	4
2010	82	7	3	4
2015	83	7	2	5
2020	85	7	1	5

Source: California Air Resources Board 2010

Figure 3-5 presents emissions associated with on-road emissions and indicates that total on-road emissions are expected to remain constant through 2020, with increases in emissions from on-road gasoline vehicles offset by substantial decreases in emissions from on-road diesel vehicles. Emissions of directly emitted $PM_{2.5}$ from diesel motor vehicles have been decreasing since 1990 due to adoption of more stringent emission standards, even though population and vehicles miles traveled

(VMT) have been increasing. Figure 3-5 indicates that total $PM_{2.5}$ emissions have remained relatively constant in the SFBAAB between 1975 and 2005 and are projected to increase slightly through 2020. However, because total on-road emissions are expected to remain constant, the slight increases expected in overall $PM_{2.5}$ are likely not the result of on-road sources.

Figure 3-5. $PM_{2.5}$ Emission trends in the San Francisco Bay Area Air Basin (tons per day)



Source: California Air Resources Board 2011

3.2.3 Transportation and Traffic Analysis

3.2.3.1 Transportation and Traffic

With population and employment growth expected to occur regionally, this anticipated growth could result in increased traffic within the project area. Modeled traffic volumes and operating conditions were obtained from the traffic data prepared by the project traffic engineers (URS 2010). URS provided peak hour VMT data for the No Build and Build scenarios.

VMT data included vehicle activity for affected roadways in the immediate project region. The traffic data used for emissions modeling is summarized in Table 3-4. Table 3-4 presents peak period VMT distribution and speed.

Table 3-4. Peak Hour VMT and Speeds

Peak Hour Scenario	VMT	Speed (mph)
No Build 2015	68,317	40
No Build 2030	55,384	18
Build 2015	76,578	42
Build 2030	81,260	35

Mainline Average Daily Traffic Volumes and Mainline Truck Volumes

Tables 3-5 and 3-6 present the Annual Average Daily Traffic (AADT) volumes as well as truck AADT volumes for the I-580 corridor in the project vicinity used for the emissions analysis. Volumes are presented for eastbound I-580 only, as the project would not affect operations in the westbound direction.

Table 3-5. No Build and Build Total AADT and Truck AADT, 2015 (Eastbound Direction Only)

Segments	**NO BUILD**		**BUILD**	
	Total AADT	**Truck AADT***	**Total AADT**	**Truck AADT***
Mainline East of Eden Canyon	78,830	15,766	78,830	15,766
Mainline East of San Ramon Road	79,150	15,830	79,100	15,820
Mainline East of Hopyard Road Off	43,010	8,602	42,690	8,538
Mainline East of 680	72,650	14,530	75,850	15,170
Mainline East of Hopyard Road	86,070	17,214	89,930	17,986
Mainline East of Hacienda Drive	82,190	16,438	92,750	18,550
Mainline East of Tassajara Road	90,800	18,160	102,500	20,500
Mainline East of El Charro Road	93,420	18,684	105,120	21,024
Mainline East of Airway Boulevard	90,120	18,024	104,290	20,858
Mainline East of NB Isabel Ave	98,880	19,776	108,880	21,776
Mainline East of Portola Avenue	98,880	19,776	108,880	21,776
Mainline East of Livermore Avenue	90,680	18,136	102,740	20,548
Mainline East of Route 84	94,640	18,928	106,010	21,202
Mainline East of Vasco Road	82,500	16,500	90,720	18,144
Mainline East of Truck Scale	81,970	16,394	90,300	18,060
Mainline East of Greenville Road	91,790	18,358	90,920	18,184

Source: URS 2010

* The Alameda County Travel Demand Model (ACCMA 2005) and other studies conducted along the I-580 corridor project that trucks will represent 20 percent of future traffic under both No Build and Build conditions. Current truck percentages in the project area range from 8 to 12 percent (Caltrans 2008).

Table 3-6. No Build and Build Total AADT and Truck AADT, 2030 (Eastbound Direction Only)

Segments	NO BUILD		BUILD	
	Total AADT	Truck AADT*	Total AADT	Truck AADT*
Mainline East of Eden Canyon	81,560	16,312	80,130	16,026
Mainline East of San Ramon Road	84,460	16,892	82,490	16,498
Mainline East of Hopyard Road Off	49,230	9,846	47,610	9,522
Mainline East of 680	93,830	18,766	91,460	18,292
Mainline East of Hopyard Road	109,480	21,896	108,960	21,792
Mainline East of Hacienda Drive	100,380	20,076	105,410	21,082
Mainline East of Tassajara Road	104,700	20,940	114,250	22,850
Mainline East of El Charro Road	113,480	22,696	122,410	24,482
Mainline East of Airway Boulevard	113,570	22,714	123,760	24,752
Mainline East of NB Isabel Ave	125,050	25,010	133,980	26,796
Mainline East of Portola Avenue	125,050	25,010	133,980	26,796
Mainline East of Livermore Avenue	113,320	22,664	123,570	24,714
Mainline East of Route 84	112,890	22,578	122,120	24,424
Mainline East of Vasco Road	105,420	21,084	113,250	22,650
Mainline East of Truck Scale	104,750	20,950	112,690	22,538
Mainline East of Greenville Road	122,060	24,412	121,090	24,218

Source: URS 2010

* The Alameda County Travel Demand Model (ACCMA 2005) and other studies conducted along the I-580 corridor project that trucks will represent 20 percent of future traffic under both No Build and Build conditions. Current truck percentages in the project area range from 8 to 12 percent (Caltrans 2008).

Mainline Level of Service

Appendix A presents mainline LOS data for the years 2015 and 2030. Project implementation would have a negligible impact on overall a.m. peak hour operations but would dramatically improve system-wide operations in the p.m. peak hour, particularly in 2030.

Congestion Relief and System-Wide Improvements

The project would provide congestion relief and improve system-wide operations by improving traffic flow and reducing vehicle hours of delay. During the p.m. peak hour, the project would increase average speeds by approximately 2 miles per hour in 2015 and 17 miles per hour in 2030. System-wide congestion would improve in both the horizon year a.m. and p.m. peak hours, as increased average network speeds would decrease delay with compared with No Build conditions.

3.2.3.2 Transportation and Traffic Analysis

Vehicle emission rates were determined using EMFAC2007. VMT and speed are presented in Table 3-4. The EMFAC2007 program assumed the SFBAAB Alameda County regional traffic data. The vehicle fleet mix on I-580 was based on the data in Tables 3-5 and 3-6 using conversion factors in Table B.5 from the Caltrans CO protocol (Garza, Graney, and Sperling 1997).

Table 3-7 summarizes the modeled daily $PM_{2.5}$ emissions. The differences in emissions between the Build and No Build conditions represent emissions generated directly as a result of implementation of the Build Alternative in the construction interim year (2015) and the design/future year (2030). Vehicular emission rates are anticipated to lessen in future years due to continuing improvements in engine technology and the retirement of older, higher-emitting vehicles.

Table 3-7. Daily Modeled $PM_{2.5}$ Emissions

	Peak Hour VMT	**$PM_{2.5}$ Emission Factor (grams/mile)**	**Pounds/Day $PM_{2.5}$**
Build 2015	76,578	0.020	81.04
No Build 2015	68,317	0.021	75.91
Build 2030	81,260	0.014	60.19
No Build 2030	55,384	0.031	90.84

Overall, the Build Alternative would result in a net decrease in $PM_{2.5}$ emissions over the life of the project, compared with the No Build Alternative. As indicated in Table 3-7, the Build Alternative would decrease $PM_{2.5}$ emissions by approximately 30 pounds per day in 2030 compared to the No Build Alternative. The decrease would result from improvements in traffic operations and overall system efficiency.

In 2015, the $PM_{2.5}$ emissions would be approximately 5 pounds per day higher in the Build scenario compared to No Build. Traffic flow would increase and, although the emission factor is lower in the Build scenario due to increased speeds, the traffic increase would offset the emission factor decrease. It should be noted, however, that the emissions calculated are extremely conservative because they assume that daily VMT equals peak hour VMT multiplied by 24 hours a day (daily VMT data are not available). Therefore, the 7% increase in emissions for the 2015 Build scenario compared to the No Build scenario is likely overstated.

3.3 CONCLUSION

AADT on I-580 in the project limits exceeds the FHWA and EPA's POAQC threshold of 125,000 and 8 percent trucks (10,000 truck AADT). Implementation of the Build Alternative would not significantly affect diesel truck percentages as the estimated percentage of diesel trucks is the same in the build and no build scenarios. As indicated in Table 3-7, $PM_{2.5}$ emissions in 2030 would decrease when compared to the No Build Alternative. This is primarily due to travel time savings, decreases in hours of delay, and improvements in average network speed under the Build Alternative when compared to the No Build Alternative. Modeling of $PM_{2.5}$ exhaust emissions indicate that implementation of the project would result in decreases in daily $PM_{2.5}$ exhaust emissions over No Build conditions in 2030.

Transportation conformity is required under CAA Section 176(c) (42 U.S.C. 7506(c)) and 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. As required by Final EPA rule published on March 10, 2006, this qualitative assessment demonstrates that the I-580 Eastbound Express Lanes Project meets the CAA conformity requirements and will not conflict with state and local measures to improve regional air quality. Implementation of the propose project will not result in new violations of the federal $PM_{2.5}$ air quality standards for the following reasons:

- Based on representative monitoring data, ambient 24-hour average and annual average $PM_{2.5}$ concentrations are declining (see Figures 3-2 and 3-3).
- Based on representative monitoring data, monitored annual average $PM_{2.5}$ concentrations have not exceed the national standard of 15.0 $\mu g/m^3$ in the past four years (2007-2010) (see Table 3-2).
- Based on representative monitoring data, monitored 24-hour average $PM_{2.5}$ concentrations exceeded the federal standard of 35 $\mu g/m^3$ nine times in 2007, twice in 2008, four times in 2009, and zero times in 2010, indicating that 24-hour $PM_{2.5}$ concentrations are likely decreasing.
- In general, construction of the Build Alternative would result in improved level of service and reduced delay on I-580.
- Construction of the Build Alternative would increase overall speeds during both the opening and horizon years.
- Although the analysis shows a 7% increase in $PM_{2.5}$ emissions with the 2015 Build condition, the increase is likely overstated because of the emissions calculation method (see Table 3-7).
- The analysis shows that $PM_{2.5}$ emissions would decrease with the 2030 Build condition when compared to No Build, thereby reducing total $PM_{2.5}$ emissions generated within the project region (see Table 3-7).
- Compared with the No Build Alternative, the Build Alternative would result in a net decrease in $PM_{2.5}$ emissions over the life of the project.
- Implementation of the proposed project would not significantly affect diesel truck percentages between Build and No Build alternatives (assumed 20% in both cases).

For these reasons, future or worsened $PM_{2.5}$ violations of any standards are not anticipated. Therefore, the proposed I-580 Eastbound Express Lanes Project meets the conformity hot spot requirements in 40 CFR 93.116 and 93.126 for $PM_{2.5}$.

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Appendix A
Mainline Levels of Service

No Build and Build LOS, 2015

Segments	NO BUILD				BUILD[1]			
	AM		PM		AM		PM	
	HOV	Mixed Flow	HOV	Mixed Flow	HOV	Mixed Flow[2]	HOV	Mixed Flow[2]
San Ramon Rd. – Interstate 680/580 Interchange	-	F	-	F	-	F	-	F
Interstate 680/580 Interchange – Hopyard Rd./Dougherty Rd.	-	C	-	C	-	**B**	-	C
Hopyard Road/Dougherty Rd. – Hacienda Dr.	-	E	-	D	-	**D**	-	E
Hacienda Dr. – Santa Rita Rd./Tassajara Rd.	A	D	A	D	B	D	C	E
Santa Rita Rd./Tassajara Rd. – El Charro Rd./Fallon Rd.	A	D	A	D	B	D	C	D
El Charro Rd./Fallon Rd. – Airway Blvd.	A	D	A	D	B	D	C	D
Airway Blvd. – Isabel Ave.	A	D	A	E	A	**C**	C	**D**
Isabel Ave. - Livermore Ave.	A	C	A	D	A	**B**	B	D
Livermore Ave. – First St.	A	C	A	D	A	C	B	D
First St. – Vasco Rd.	A	D	A	D	A	**C**	B	E
Vasco Rd. – Greenville Rd.	A	C	A	D	A	C	B	D
East of Greenville Rd.		B	-	C	-	**A**	-	C

Source: URS 2010

1. The project will implement dynamic pricing, where toll rates for single-occupant vehicles will vary based on the level of congestion. Vehicle detection systems will automatically adjust tolls to maintain free-flowing conditions (LOS C/D) in the express lanes.

2. **Boldfaced** LOS letters indicate improvement in Level of Service compared with the No Build Alternative.

No Build and Build LOS, 2030

Segments	NO BUILD				BUILD[1]			
	AM		PM		AM		PM	
	HOV	Mixed Flow	HOV	Mixed Flow	HOV	Mixed Flow[2]	HOV	Mixed Flow[2]
San Ramon Rd. – Interstate 680/580 Interchange	-	F	-	F	-	F	-	F
Interstate 680/580 Interchange – Hopyard Rd./Dougherty Rd.	-	C	-	F	-	C	-	**C**
Hopyard Road/Dougherty Rd. – Hacienda Dr.	-	D	-	F	-	D	-	F
Hacienda Dr. – Santa Rita Rd./Tassajara Rd.	A	D	A	F	C	D	C	F
Santa Rita Rd./Tassajara Rd. – El Charro Rd./Fallon Rd.	A	D	A	D	C	D	C	E
El Charro Rd./Fallon Rd. – Airway Blvd.	A	D	A	D	B	D	C	D
Airway Blvd. – Isabel Ave.	A	C	A	F	B	C	C	**E**
Isabel Ave. - Livermore Ave.	A	C	A	F	B	C	C	**D**
Livermore Ave. – First St.	A	C	A	F	B	C	C	**D**
First St. – Vasco Rd.	A	D	A	F	B	**C**	B	**E**
Vasco Rd. – Greenville Rd.	A	B	A	F	B	B	B	**E**
East of Greenville Rd.	-	C	-	C	-	**B**	-	C

Source: URS 2010

1. The project will implement dynamic pricing, where toll rates for single-occupant vehicles will vary based on the level of congestion. Vehicle detection systems will automatically adjust tolls to maintain free-flowing conditions (LOS C/D) in the express lanes.

2. Boldfaced letters indicate improvement in Level of Service compared with the No Build Alternative.