METROPOLITAN
TRANSPORTATION
COMMISSION

Summary of I-680 Northbound HOV/Express Lane Project in Santa Clara and Alameda Counties Final Environmental Impact Report/Environmental Assessment (EIR/EA) with Finding of No Significant Impact and Technical Analyses: Greenhouse Gas Emissions, Vehicle Miles Traveled and Use by Low-Income Populations

October 29, 2015

Metropolitan Transportation Commission
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Section 1: Overview

This report, prepared solely by the Metropolitan Transportation Commission (MTC), summarizes analyses of greenhouse gas (GHG) emissions effects, vehicle miles traveled (VMT) effects, and use of express lanes by low-income populations of the I-680 Northbound High Occupancy Vehicle (HOV)/Express Lane from south of State Route (SR) 237 (Calaveras Boulevard) in Santa Clara County to north of SR 84 (Vallecitos Road) in Alameda County (Project). As the lead agency, Caltrans prepared the Final Environmental Impact Report/Environmental Assessment (EIR/EA) and technical studies in accordance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). The Final EIR/EA and technical studies follow the formats and procedures outlined in Caltrans' Standard Environmental Reference.

This summary was prepared by MTC in accordance with the Settlement Agreement dated June 18, 2014 among MTC and the Association of Bay Area Governments (ABAG), and Communities for a Better Environment and the Sierra Club. This summary is solely the work of the MTC. Caltrans was not involved in the production of this summary.

1.1 Project Description

The purpose of the Final EIR/EA is to examine the potential environmental impacts of the two alternatives being considered for the Project, the Build Alternative and No Build Alternative. The Build Alternative, also referred to as the Project and Full Project, proposes to construct an approximately 15-mile HOV/express lane project on northbound I-680 from SR 237 at Calaveras Boulevard in Santa Clara County to SR 84 at Vallecitos Road in Alameda County (Figure 1). An HOV/express lane was constructed on the southbound side of this same I-680 corridor. The Build Alternative is anticipated to be constructed in multiple phases, and represents the long-term vision for build out of the HOV/express lane facility on northbound I-680 from SR 237 to SR 84.

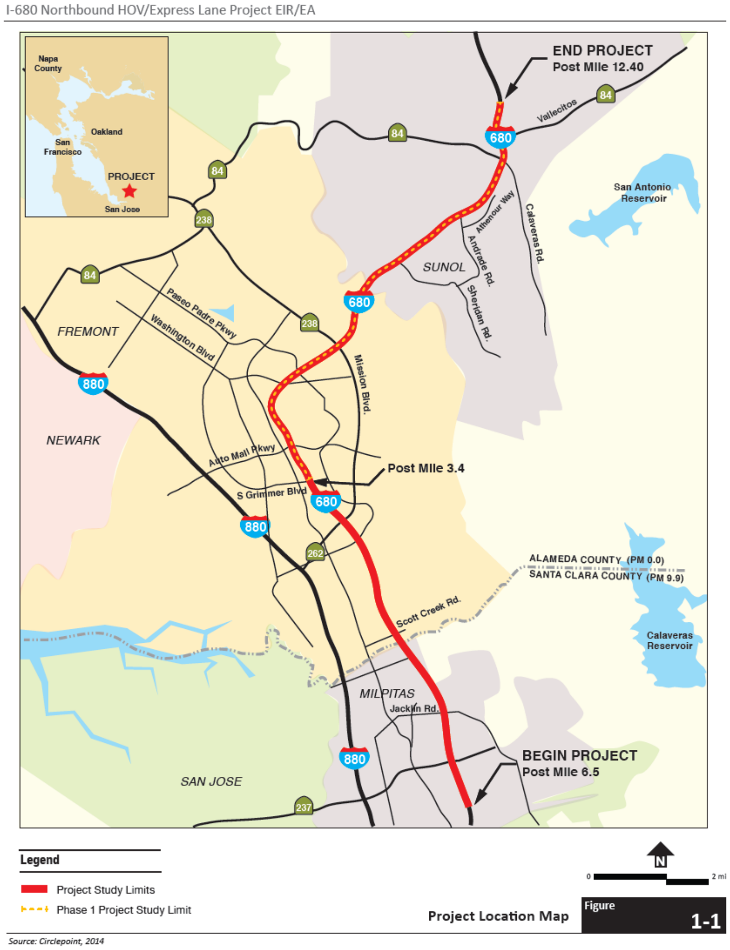
The Build Alternative would include the following improvements: addition of a new HOV/express lane from SR 237 to SR 84; installation of electronic tolling equipment and signage; widening of existing I-680 paved surfaces in the median and to the outside of the mainline; construction of auxiliary lanes at various locations to improve weaving operations at ramp locations and express lane access points; widening or modification of overcrossing and undercrossing structures to accommodate freeway widening; demolition and replacement of the Sheridan Road overcrossing; widening the east side of Alameda Creek Bridge; construction of retaining walls at various locations to accommodate the northbound widening; new and replacement soundwalls; modification of existing ramp metering and installation of Traffic Operations System (TOS) facilities; pavement rehabilitation on northbound I-680 between Auto Mall Parkway and Koopman Road. Phase 1 of the Build Alternative, also referred to as the Phase 1 Project, would include the construction of a new HOV/express lane facility on northbound I-680 from Auto Mall Parkway to SR 84 (Vallecitos Road), a distance of approximately 8 miles, and an auxiliary lane between Washington Boulevard on-ramp and SR 238 (Mission Road) off-ramp.

Under the No Build Alternative, also referred to as the No Project, none of project features described above would be constructed.

The I-680 Sunol Smart Carpool Lane Joint Powers Authority (SSCLJPA) would operate the express lane. Consistent with other express lanes that are currently being planned and implemented in the Bay Area, the Build Alternative would allow continuous access between the express lane and the adjacent mixed-flow (general purpose) lane. Under this configuration all eligible users, including HOVs, motorcycles, buses, decal vehicles as authorized by the California Air Resources Board, and toll-paying single occupancy vehicles will be able to access the express lane during the hours of operation. Eligible vehicles with HOV status will continue to use the express lane for free. Drivers of single-occupancy vehicles, who value time savings and who want a more convenient and reliable trip, can choose to use the new express lane for a fee. The toll rate would be variable depending on the level of traffic congestion and distance traveled. The tolling operation will be fully electronic, collected from registered motorists who carry in-vehicle-mounted FasTrak® transponders, with no requirement to stop and make cash payments for a trip. The new express lane will be designed to operate (with toll enforcement) from 5:00 a.m. to 8:00 p.m., Monday through Friday. Outside of these hours, the express lane would operate as a free, general purpose lane.[1]

[1] State legislation requires that the express lane hours of operation be consistent with the operating hours of the HOV lane. Therefore, the final decision on operating hours will be recommended by the HOV lane committee, which is comprised of representatives from Caltrans, California Highway Patrol (CHP) and MTC.

Figure 1: I-680 Project Location Map
(Figure 1-1 in the EIR/EA)



1.2 Environmental Review

As the lead agency, Caltrans prepared the Final EIR/EA, which examines the potential environmental impacts of the alternatives being considered for the Project. The Final EIR/EA, State Clearing House number SCH#2012092028, was posted on July 31, 2015 and Caltrans issued a Finding of No Significant Impact (FONSI). The Final EIR/EA and technical appendices are available at: http://www.dot.ca.gov/dist4/envdocs.htm.

Section 2: Greenhouse Gas (GHG) Emissions Effects

This section summarizes the results of the analysis of greenhouse gas emissions (GHG) as reported in the "I-680 Northbound HOV/Express Lane Project Final EIR/EA" (July 2015) and the "Interstate 680 Northbound Express Lane Project Air Quality Technical Report" (September 2013, Amended September 2014 and November 2014). The purpose of the Air Quality Technical Report is to assess the existing and future air quality impacts in the vicinity of the proposed modification from the construction and operation of the Project. The Final EIR/EA and the Air Quality Technical Report are collectively referred to in the GHG Emissions Effects section as "the documents."

2.1 Methodology

The GHG analysis methodology is described in Chapters 4 and 5 of the Air Quality Technical Report. The analysis of the operational phase involves a quantitative evaluation of GHG emissions without the Project (No Build), Phase 1 of the Build Alternative, and Build Alternative for the existing year (2011)[2], opening year (2020) and horizon year (2040). GHG emissions were modeled using the Caltrans Ct-Emfac (Version 5.0, May 2013) model with EMFAC2011 emission factors. The quantitative analysis is based on GHG emissions with the Pavley and Low Carbon Fuel Standard (LCFS) requirements; however, emissions were predicted both with and without the requirement. The analysis used the same peak and off-peak period traffic volumes and speeds from the traffic analysis.

The Caltrans Ct-EMFAC model was run using the procedures described in the UC Davis Methodology for Alameda County. Under the UC Davis Methodology, daily traffic volumes were split between peak and off-peak hours, and emissions were calculated for each of these periods using average travel speeds for each period. This procedure was followed for each segment between interchanges and then summed to estimate the total GHG emissions from the Project. This analysis included separate peak hour volumes for each of the six peak hour periods (i.e., 2p.m. – 3p.m., 3 p.m. – 4 p.m., 4 p.m. – 5 p.m., 5 p.m. – 6 p.m., 6 p.m. – 7 p.m., and 7 p.m. – 8 p.m.).

Caltrans' general procedures for construction analysis, including use of Sacramento Air Quality Managements District's Road Construction Model, Roadway Construction Emissions Model (RoadMod Version 6.3.2) were used for the construction period analysis. Construction period GHG emissions were modeled using the construction year 2017, total expected duration 17 months, and entire length of the project limits.

2.2 Analysis Results

The Project's effect on GHG emissions during operations is reported in Section 3.4 of the EIR/EA and Section 1.2 of the Addendum to the Air Quality Technical Report (November 2014). The Project's effect on GHG emissions during construction is reported in Section 3.4.3 in the EIR/EA and Chapter 5, Section 5.3.3 in the Air Quality Technical Report.

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[2] The reports used traffic results that assumed a base year of 2011 for the Project. There are references in the reports where the existing year is listed as 2013 which is an error.

2.2.1 Summary

The documents state that GHG emissions are predicted to be lower than the existing year emissions (2011) even with an increase in vehicular traffic mostly due to the Pavley and LCFS requirements[3]. The documents state that, when Pavley and LCFS requirements are not considered, both the future with the Build Alternative and future No Build Alternative show increases in CO_2 emissions over the existing levels, and the future Build Alternative CO_2 emissions are higher than the future No Build Alternative emissions. The documents state that there are limitations with the EMFAC modeling and with assessing what a given CO_2 emissions increase means for climate change. Therefore, it is Caltrans determination that in the absence of further regulatory or scientific information related to GHG emissions and CEQA significance, it is too speculative to make a determination regarding significance of the Project's direct impact and its contribution on the cumulative scale to climate change. Caltrans is committed to reducing potential effects of the Project, and identified strategies to reduce GHG emissions in Section 3.5.1 of the EIR/EA.

2.2.2 Context

The documents state that global climate change is a cumulative impact. An individual project does not generate enough GHG emissions to significantly influence global climate change. An individual project may, however, contribute to a potential impact through its incremental change in emissions when combined with the contributions of all other sources of GHG[4]. In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (CEQA Guidelines sections 15064(h) (1) and 15130). To make this determination, the incremental impacts of the Project must be compared with the effects of past, current, and probable future projects.

The documents state that Caltrans has created and is implementing a Climate Action Program that was published in December 2006[5]. One of the main strategies in Caltrans' Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide (CO_2) from mobile sources, such as automobiles, occur at stop-and-go speeds (0-25 mph) and speeds over 55 mph; the most severe emissions occur from 0-25 mph (see Figure 2). To the extent that a project relieves congestion by enhancing operations and improving travel times in high congestion travel corridors, GHG emissions, particularly CO_2, may be reduced.

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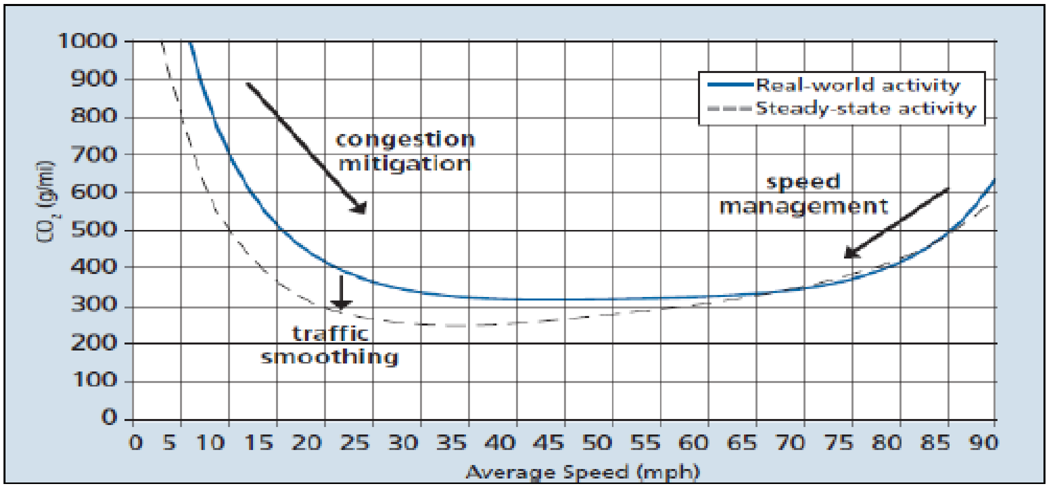
[3] This terminology refers to requirements resulting from Assembly Bill 1493 (AB1493) enacted in 2002 and Executive Order S-01-07. AB 1493, sponsored by assembly member Pavley, required the California Air Resources Board to develop and implement regulations to reduce automobile and light truck greenhouse gas emissions beginning in the 2009-model year. Executive Order S-01-07, signed by California Governor Arnold Schwarzenegger in 2007, established that the carbon intensity of California's transportation fuels was to be reduced by at least ten percent by the year 2020.

[4] This approach is supported by: Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents (March 5, 2007), as well as the South Coast Air Quality Management District (Chapter 6: The CEQA Guide, April 2011) and the US Forest Service (Climate Change Considerations in Project Level NEPA Analysis, July 13, 2009).

[5] Caltrans Climate Action Program is located at the following address: http://www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/State_Wide_Strategy/Caltrans_Climate_Action_Program.pdf

Figure 2: Possible Effect of Traffic Operation Strategies in Reducing On-Road CO_2 Emissions (Figure 5-2 in the Air Quality Technical Report)[6]



2.2.3 Operational Phase

Table 1 shows existing, Phase 1 of the Build Alternative, Build Alternative, and No Build Alternative GHG emissions expressed in metric tons per day of CO_2. GHG emissions are presented with and without the Pavley and LCFS requirements.

Table 1: CO_2 Emissions in Metric Tons per Day
(Table 3.4.1-1 in the EIR/EA)

CO_2 Emissions[A]	Existing (2011)	2020 No-Build	2020 Phase 1	2020 Build	2040 No-Build	2040 Phase 1	2040 Build
CO_2 without Pavley + LCFS[B]	487	543	545	545	667	748	703
CO_2 with Pavley +LCFS	479	411	411	411	454	508	477
Increase over Existing with Pavley +LCFS	--	-68	-68	-68	-25	29	-2

Notes:
A. CO_2 emissions were estimated using the Caltrans-Emfac model with EMFAC2011 emission factors and utilizing the average peak and off-peak period traffic volumes and speeds provided in the Traffic Operations Analysis Report prepared for the project (Caltrans, 2014n). Average peak period and off-peak period emission calculations were combined to generate an average daily emission total.
B. LCFS = Low Carbon Fuel Standard
Source: Caltrans, 2014a

After applying the Pavley and LCFS reductions to future emission rates, the documents state that the daily CO_2 GHG emissions under 2020 Phase 1 of the Build Alternative and Build Alternative conditions

[6] Traffic Congestion and Greenhouse Gases: Matthew Barth and Kanok Boriboonsomsin (TR News 268 May-June 2010) http://www.uctc.net/access/35/access35_Traffic_Congestion_and_Grenhouse_Gases.shtml

are estimated to be 68 metric tons per day less than emissions under existing conditions. In the future (year 2040), the reduction due to the Build Alternative would be less at 2 metric tons per day, because traffic would increase substantially. Under Phase 1 of the Build Alternative, the CO_2 GHG emissions would increase over the existing condition due to lower speeds and with higher traffic volumes. However, when compared to the No-Build future conditions, the Build Alternative would have slightly higher emissions (i.e., less than 0.5 percent) due to greater estimated traffic throughput.

The documents state that these computed CO_2 emissions are only useful for a comparison between alternatives. The numbers are not necessarily an accurate reflection of what the true CO_2 emissions will be because CO_2 emissions are dependent on other factors that are not part of the model, such as the fuel mix[7], rate of acceleration, and the aerodynamics and efficiency of the vehicles. The documents do not evaluate the changes in CO_2 emissions translated throughout the entire Bay Area transportation network, which is conducted at the regional transportation plan level. The documents state that the Project is included in the regional emissions analysis conducted by MTC for the Plan Bay Area. The design concept and scope of the proposed Build Alternative is consistent with the project description in the Plan Bay Area, and the traffic assumptions of the MTC's regional emissions analysis.

The documents find no avoidance, minimization, and/or mitigation measures are required during the operations phase, as the Project would not produce substantial operational air quality impacts for GHG emissions.

2.2.4 Construction Phase

The documents state that construction GHG emissions for transportation projects include emissions produced as a result of material processing, emissions produced by onsite construction equipment, and emissions arising from traffic delays due to construction.

The documents also state that currently, neither Caltrans nor the Bay Area Air Quality Management District (BAAQMD) have adopted GHG significance thresholds that apply to construction projects. For informational purposes, average construction period GHG emissions from project implementation were calculated using RoadMod. GHG emissions are estimated to be 1,110 metric tons of CO_2 over the course of the entire construction of the Build Alternative. With innovations such as longer pavement lives, improved traffic management plans, and changes in roadway construction materials, the GHG emissions produced during construction can be reduced to some degree by longer intervals between maintenance and rehabilitation events.

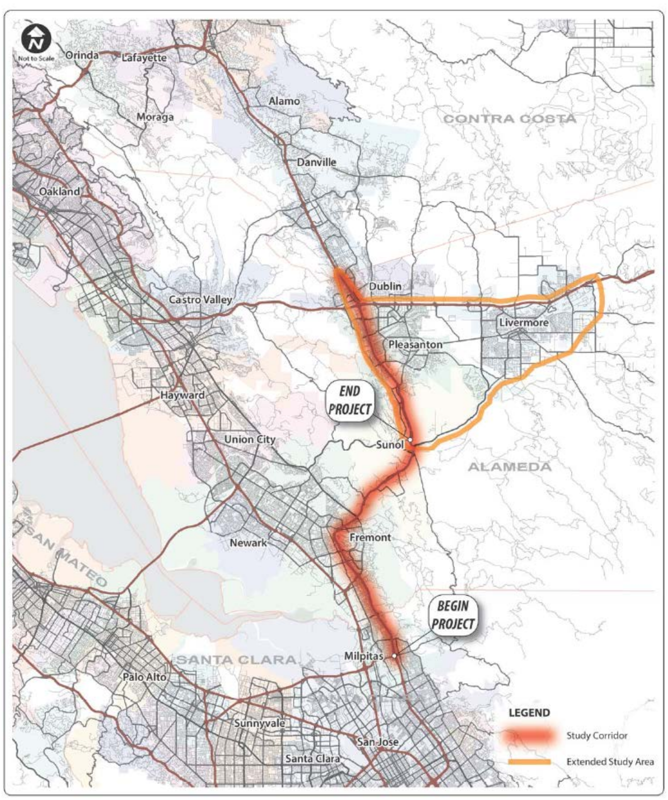
[7]EMFAC2011 model emission rates are only for direct engine-out CO2 emissions, not full fuel cycle; fuel cycle emission rates can vary dramatically depending on the amount of additives like ethanol and the source of the fuel components.

Section 3: Vehicle Miles Traveled (VMT) Effects

This section summarizes vehicle miles traveled (VMT) estimates as reported in the “I-680 Northbound HOV/Express Lane Project Final EIR/EA” (July 2015) and the “Final Draft Traffic Operations Analysis Report: I-680 Northbound (SR 237 to SR 84) Express Lane Project” (October 2013, Amended August 2014). The traffic operations analysis report (TOAR) documents the existing and future conditions related to transportation without and with the HOV/express lane on the I-680 northbound corridor, between SR 237 and SR 84. The results in the TOAR serve as the basis for the traffic operations section of the Project Approval/Environmental Document (PA/ED). The majority of detailed information relating to VMT is located in the TOAR. For the instances where the information presented in this summary was included in both the Final EIR/EA and the TOAR, these two reports will be referred to as “the documents” in the VMT Effects section.

The TOAR includes VMT as one of the System-wide Measures of Effectiveness (MOE), and is not the single focus of the report. The geographic area considered in the TOAR extends beyond project limits in order to capture the effects of the proposed Express Lane on the surrounding area. The traffic study area encompasses the northbound I-680 corridor from SR 237 to the Alcosta Boulevard interchange in the City of San Ramon (Figure 3). This section of the summary uses the terms “Northbound I-680 study corridor” and “study area” to refer to the traffic study area.

Figure 3: Map of Traffic Study Area
(Figure 1-1 in the TOAR)



3.1 Methodology

The traffic analysis methodology is described in Sections 2.4 and 4.0 of the TOAR. Freeway analyses were conducted using procedures and methodologies consistent with the Highway Capacity Manual 2010 (Transportation Research Board, 2011) and applied using VISSIM traffic analysis software. The existing conditions traffic analysis model was validated to observed traffic counts, travel times, and observed queues. The procedures used are consistent with Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software (FHWA, 2004).

VMT, one of the Measures of Effectiveness (MOE), was computed with VISSIM models to quantify traffic operations of the northbound I-680 study corridor. The system-wide MOEs are presented for the entire six-hour northbound p.m. peak period to provide a comprehensive understanding of overall traffic operations during this period. VMT is a measure of the total vehicle throughput of the corridor. This measure takes into consideration the actual volume served versus the demand and the trip lengths of those vehicles and travelers.

The traffic forecasts presented in the documents are based on applications of the Alameda County Transportation Commission (ACTC) Travel Demand Forecasting Model. The ACTC Model is a regional travel demand model that covers the entire Bay Area, with a higher geographic detail within Alameda County. The model receives its demographic inputs from the Association of Bay Area Governments (ABAG) regional land use projections, and produces estimates of regional travel flows based on a standard four step modeling process. To ensure a high level of confidence in the forecasting process, the ACTC Model was first refined and validated within the project study area.

The TOAR states that for the purposes of establishing forecasted traffic levels for this study, the ACTC Model is used to estimate the demand for travel if an HOV lane were added to the corridor. The number of toll-paying drive-alone vehicles that would utilize the HOV/Express Lane is then estimated through a separate procedure using the demand volumes from the forecasting model and the capabilities of the traffic operations mircosimulation model, reflecting both the amount of capacity available in the HOV lane and the relative congestion of the adjacent mixed-flow lanes within each time period. It is assumed that the full capacity of the Lane (a maximum of 1,650 vehicles per hour) would be utilized at the point of peak congestion along the corridor. For example, if the ACTC model forecasts HOV demand of 1,450 vehicles per hour, and if the VISSIM model indicates the adjacent mixed-flow lanes experience congestion during that hour, it would be estimated that an additional 200 drive-alone vehicles would pay a toll to utilize the HOV lane.

Origin-Destination (O-D) trip matrices were extracted from the ACTC Model and refined during assignment to match observed traffic volumes. The I-680 corridor experiences high levels of travel demand in the southbound direction during the morning commute period, and in the northbound direction during the afternoon/evening commute period. The traffic analyses in the documents focuses on the evening (p.m.) peak period (from 2:00 p.m. to 8:00 p.m.), because that is the time period during which the northbound corridor experiences the heaviest traffic demand. The documents state that a p.m. peak period analysis encompasses the broadest range of potential project impacts, and thus an evaluation of the morning (a.m.) peak period was not necessary.

The forecast used a design year of 2040 and a construction year of 2020.[8] The TOAR provided VMT forecasts for the No Project, Phase 1 Project (defined previously as the construction of a new HOV/express lane facility on northbound I-680 from Auto Mall Parkway to SR 84 and an auxiliary lane between Washington Boulevard on-ramp and SR 238 off-ramp), Full Project (defined previously as the Build Alternative) scenarios for the construction and design years (Sections 6.2.2 and 7.2.2 of the TOAR).

The TOAR also included supplemental analysis of Phase 1 for the construction year (2020) to reflect the "ramp-up" period during which time all corridor users get accustomed to the new lane, and in particular single occupant vehicle (SOV) users experiment with the lane to learn whether paying the toll results in time savings for their particular trip (Section 6.2.3 of the TOAR). During this period, the usage of the Express Lane by toll-paying customers may be quite variable, and it may gradually increase over time until it reaches a fairly stable level. For the supplemental analysis in the construction year, the number of SOVs assumed to use the Express Lane was reduced by about one-third to see what effect that would have on the operational analysis results.

The TOAR also included a preliminary operational assessment for the design year (2040) to evaluate the effects of additional potential future improvements along the corridor (Section 8.1.2 of the TOAR). The potential future improvements evaluated in the TOAR include: 1) constructing an auxiliary lane on northbound I-680 between Bernal and Stoneridge; 2) extending the HOV/express lane on northbound I-680 from SR 84 to Alcosta Blvd; or 3) widening SR 84 to two lanes in each direction between I-680 and Pigeon Pass. These potential future improvements have been identified in previous planning studies as being potentially beneficial to the corridor; however, they are not currently programmed or funded. The TOAR states that none of these future improvements are part of the current project; the intent of the assessment is only to provide additional information about how the northbound I-680 corridor might operate in the future with the implementation of one or more of these future improvements.

3.2 Analysis Results

The documents state that VMT estimated for the Build Alternative is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network.

3.2.1 Existing Year (2011) VMT Forecasts

The documents summarize the VMT findings with other MOEs. Existing year (2011) VMT forecasts for the six-hour p.m. peak period are shown in Appendix A; Table 3-6.

3.2.2 Construction Year (2020) VMT Forecasts

[8] The TOAR states that the ACTC model contains a scenario reflecting the year 2035, consistent with ABAG Projections 2009, but the regional ABAG projections do not yet extend beyond 2035, thus requiring the use of linear extrapolation to obtain the desired design year of 2040.

The documents summarize the VMT findings with other MOEs. They state that for the construction year (2020) northbound p.m. study period with the Project, the corridor accommodates somewhat more traffic volume (a 5 percent increase) and vehicle miles of travel (an 8 percent increase), but the overall time spent traveling is reduced by 28 percent. Construction year (2020) VMT forecasts are shown in Appendix A; Table 6-3.

3.2.3 Supplemental Analysis with Reduced Express Lane Usage

The TOAR summarizes the VMT findings for the "ramp-up" period during which time all corridor users get accustomed to the new lane with other MOEs. Construction year (2020) VMT Reduced Usage Lane forecasts are in Appendix A; Table 6-4.

3.2.4 Design Year (2040) VMT Forecasts

The documents state that for the design year (2040) northbound p.m. peak period with the Project, the corridor accommodates more traffic, with the vehicle miles of travel increasing between 11 percent and 14 percent, while the overall time spent traveling is reduced by between 4 percent and 13 percent. Design year (2040) VMT forecasts are shown with other MOEs in Appendix A; Table 7-3.

3.2.5 Full Project with Additional Future Corridor Improvements

The TOAR includes MOEs across the project study area for the six-hour p.m. peak period for the full project with three potential future improvements included. Design year (2040) with additional future corridor improvements VMT forecasts are shown with other MOEs in Appendix A; Table 8-3.

Section 4: Use of Express Lanes by Low-Income Populations

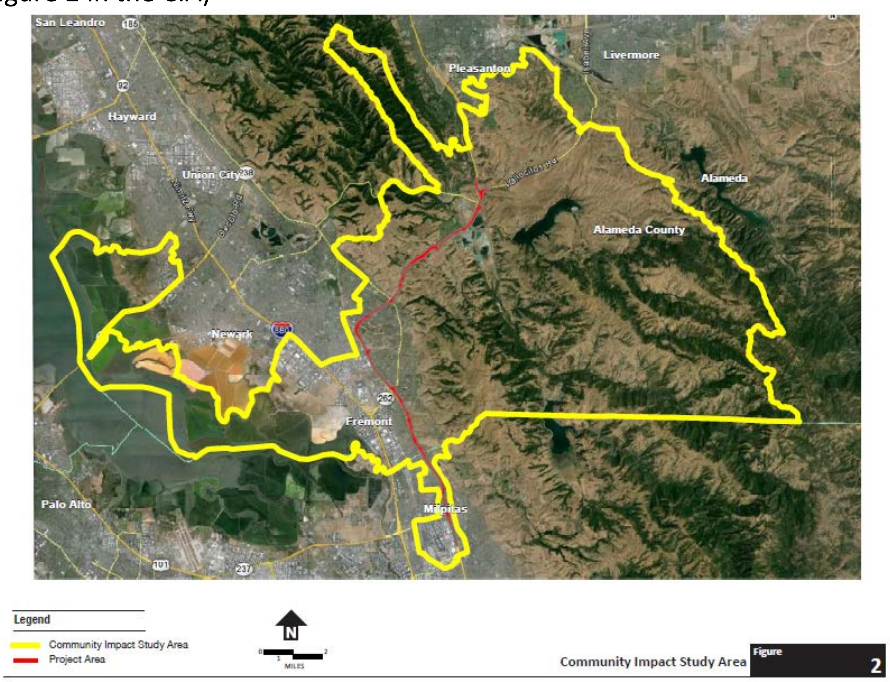
This section summarizes information on the use of the Project by low-income populations as reported in the "I-680 Northbound HOV/Express Lane Project Final EIR/EA" (July 2015)" and the "I-680 Northbound HOV/Express Lane Project Community Impact Assessment (CIA)" (April 2014; Amended August 2014). The purpose of the CIA is to provide information about the socioeconomic and community-level effects of the Project. Potential adverse and beneficial effects are discussed in the Final EIR/EA and CIA. All projects involving a federal action (funding, permit or land) must comply with Executive Order (EO) 12898.[9] The Final EIR/EA and the CIA are collectively referred to in this section as "the documents." The summary focuses on portions of the Final EIR/EA and CIA that relate to the use of the Project by low-income populations.

4.1 Methodology

4.1.1 Identification of Low-Income Populations

The methodology follows the guidelines provided by the Department's Environmental Handbook Volume 4-Community Impact Assessment (October 2011), and by the US Department of Transportation and FHWA's Community Impact Assessment: A Quick Reference for Transportation (September 1996). The detailed methodology can be found in Chapter 3 of the CIA. The study area is defined by census tract block groups that encompass or are adjacent to the I-680 corridor, within the study area (Figure 4).

Figure 4: Community Impact Study Area
(Figure 2 in the CIA)



[9] EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations directs federal agencies to take the appropriate and necessary steps to identify and address disproportionally high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law.

Environmental justice is defined as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, adoption, implementation and enforcement of environmental law policies." (California Senate Bill 115, Solis.) Environmental Justice is defined in accordance with EO 12898 and agency guidance as a person with household median income at or below the US Department of Health and Human Services poverty guidelines. The documents state that a population, as evaluated by U.S. census block groups, is subject to environmental justice analysis if it meets at least one of the following criteria: a low-income population that is greater than 25 percent of the total population of the community, or a minority population that is greater than 50 percent of the total population of the community; or a low-income and/or minority population that is more than 10 percentage points higher than the City or County average. Due to the high percentage of minority population and low percentage of low-income population in the region, the latter criteria were used for the analysis.

4.1.2 Data Sources

The documents state that income and poverty level data was not available at the block group level for the 2010 Census; therefore, 2000 Census data was used for the analysis. The 2006-2010 American Community Survey is used to analyze regional poverty trends as well. The 2013 ABAG projections were used for future conditions.

4.2 Analysis Results

4.2.1 Existing Conditions

The documents state that the percentage of population below poverty level in the study area combined is lower than in the respective cities and counties (Table 2). The population below poverty in Census Tract 4415.03, Block Group 1 in Fremont is 22 percent, which is more than 10 percentage points above the city-wide average. It is the only Block Group that is identified as an Environmental Justice population based on income.

Table 2: Median Household Income and Population below Poverty Level (%), 2000
(Table 12 in the CIA)

Geographic Area	Median Household Income	% Population Below Poverty Level
Study Area	$105,995	4%
Santa Clara County	$74,335	7.5%
City of Milpitas	$84,429	5%
Alameda County	$55,946	11%
City of Fremont	$76,579	5.4%
City of Pleasanton	$90,859	2.6%
Bay Area	$62,024	8.6%

Sources: ABAG Census Summary, US Census 2000; Dataset P053

4.2.2 Impact Analysis Results[10]

The documents state that the Build Alternative would occur within areas with high minority populations and some low- income populations, portions of which qualify as environmental justice communities. As such, the project's impacts, including increase in noise levels and temporary construction-period impacts (e.g., dust and noise impacts), would be borne by these communities. However, as the project's purpose is to relieve congestion and improve traffic flow on I-680 within the project limits, the Build Alternative would directly benefit these same communities. These same effects of the Build Alternative, both negative and beneficial, would also occur in non-environmental justice communities along the corridor.

The documents state that the Build Alternative would not result in disproportionate impacts to environmental justice communities, including the displacement of any minority or low-income residences, businesses, or employees. There would be no disruption or effect on the existing land uses or community features in the surrounding areas. The CIA reported on the following potential effects of the Project related to usage of the Express Lanes:

Transit: The CIA states that the Build Alternative would add a combined HOV/express lane that could be used by transit buses thereby reducing congestion and improving operations of bus transit in the study area. These changes would have a positive effect on surrounding communities, including environmental justice communities.

Pedestrian and Bicycle Facilities: The CIA states that the Build Alternative would involve construction of Class II bicycle lanes and additional pedestrian improvements. These elements would create an overall beneficial effect to pedestrian and bicycle facilities in the surrounding communities, including environmental justice communities.

[10]Because low-income falls under the environmental justice definition, all environmental justice impact results from the documents are listed in the summary. The documents analyze all environmental census track block groups and do not separately analyze impacts or use by low-income and minority populations. The documents identified five other environmental justice census tract block groups based on their shares of minority populations.

Appendix A: Measures of Effectiveness from the TOAR

TABLE 3-6
EXISTING PEAK PERIOD NETWORK MEASURES OF EFFECTIVENESS

Measure	Results
Total Volume Served	98,964
Vehicle Miles of Travel	883,320
Person Miles of Travel	1,030,280
Total Travel Time (hours)	19,310
Average Travel Speed (mph)	45.8
Vehicle Hours of Delay	6,620
Person Hours of Delay	7,700

Source: Fehr & Peers, 2012.

(Table 2.1.7-3 in the EIR/EA)

TABLE 6-3
YEAR 2020 PM PEAK PERIOD MEASURES OF EFFECTIVENESS

Measure	No Project	Phase 1 Project	Full Project
Freeway Volume Served	106,500	111,500 (+5%)	111,500 (+5%)
Percent Demand Served	98%	100%	100%
Vehicle Miles of Travel	914,700	990,400 (+8%)	990,400 (+8%)
Person Miles of Travel	1,079,100	1,175,300 (+8%)	1,175,300 (+8%)
Total Travel Time (hours)	24,900	17,900 (-28%)	17,900 (-28%)
Average Travel Speed (mph)	37	55 (+49%)	55 (+49%)
Vehicle Hours of Delay	11,900	3,900 (-67%)	3,900 (-67%)
Person Hours of Delay	14,000	4,600 (-67%)	4,600 (-67%)

Notes: Table presents area-wide MOEs for all vehicle types combined; assumed vehicle occupancy, which is used to convert vehicle-based metrics to person-based metrics, is 2.1 for HOVs, 1.05 for trucks, and 1.0 for SOVs. The percentages shown in parentheses are the percentage change as compared to the No Project values.
Source: Fehr & Peers, 2013

(Table 2.1.7-10 in the EIR/EA)

TABLE 6-4
YEAR 2020 PM PEAK PERIOD MEASURES OF EFFECTIVENESS

Measure	Phase 1 Project	Phase 1 Project with Reduced Express Lane Usage
Freeway Volume Served	111,500	111,500 (0%)
Percent Demand Served	100%	100%
Vehicle Miles of Travel	990,400	990,600 (0%)
Person Miles of Travel	1,175,300	1,175,400 (0%)
Total Travel Time (hours)	17,900	18,100 (+1%)
Average Travel Speed (mph)	55	55 (0%)
Vehicle Hours of Delay	3,900	4,100 (+5%)
Person Hours of Delay	4,600	4,700 (+2%)

TABLE 7-3
YEAR 2040 PM PEAK PERIOD MEASURES OF EFFECTIVENESS

Measure	No Project	Phase 1 Project	Full Project
Freeway Volume Served	117,300	127,800 (+9%)	131,300 (+12%)
Percent Demand Served	88%	89%	92%
Vehicle Miles of Travel	1,525,900	1,698,700 (+11%)	1,735,100 (+14%)
Person Miles of Travel	1,803,400	2,074,000 (+15%)	2,117,800 (+17%)
Total Travel Time (hours)	62,500	60,300 (-4%)	54,400 (-13%)
Average Travel Speed (mph)	24	28 (+17%)	32 (+33%)
Vehicle Hours of Delay	41,200	36,600 (-11%)	30,200 (+27%)
Person Hours of Delay	48,400	42,900 (-11%)	34,400 (-29%)

Notes: Table presents area-wide MOEs for all vehicle types combined; assumed vehicle occupancy, which is used to convert vehicle-based metrics to person-based metrics, is 2.1 for HOVs, 1.05 for trucks, and 1.0 for SOVs. The percentages shown in parentheses are the percentage change as compared to the No Project values.
Source: Fehr & Peers, 2013

(Table 2.1.7-10 in the EIR/EA)

TABLE 8-3
YEAR 2040 FULL PROJECT PM PEAK PERIOD MEASURES OF EFFECTIVENESS, WITH ADDITIONAL FUTURE CORRIDOR IMPROVEMENTS

Measure	Full Project	Full Project plus Bernal-Stoneridge Auxiliary Lane	Full Project plus Express Lane to Alcosta Blvd	Full Project plus SR 84 Widening
Freeway Volume Served	131,300	132,500 (+1%)	136,400 (+4%)	137,700 (+5%)
Percent Demand Served	92%	93%	95%	98%
Vehicle Miles of Travel	1,735,100	1,750,500 (+1%)	1,793,400 (+3%)	1,822,100 (+5%)
Person Miles of Travel	2,117,800	2,136,400 (+1%)	2,187,200 (+3%)	2,222,000 (+5%)
Total Travel Time (hours)	54,400	51,300 (-6%)	42,900 (-21%)	44,400 (-18%)
Average Travel Speed (mph)	32	34 (+6%)	42 (+31%)	41 (+28%)
Vehicle Hours of Delay	30,200	26,900 (-11%)	17,900 (-41%)	19,100 (-37%)
Person Hours of Delay	34,400	30,500 (-11%)	20,500 (-40%)	22,200 (-35%)