I-80/SR 65 Interchange Improvements Project *AQSR*

Air Quality Study Report

I-80/SR 65 Interchange Improvements Project
Placer County, Interstate 80 and State Route 65
03-PLA-80-PM 1.9 to 6.1
03-PLA-65-PM R4.8 to R7.3

EA 03-4E3200

November 2014

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Air Quality Study Report

I-80/SR 65 Interchange Improvements Project

Placer County, Interstate 80 and State Route 65

03-PLA-80-PM 1.9 to 6.1
03-PLA-65-PM R4.8 to R7.3

EA 03-4E3200

November 2014

Prepared By: Laura E. Yoon Date: November 10, 2014
Laura Yoon
Air Quality and Climate Change Specialist
ICF International, Sacramento

Reviewed and
Approved By: Shannon Hatcher Date: November 10, 2014
Shannon Hatcher
Air Quality, Climate Change, and Noise Project Manager
ICF International, Sacramento

Contents

Tables

Figures

Acronyms and Abbreviations

µg/m^3	micrograms per cubic meter
AADT	annual average daily traffic
AB	Assembly Bill
air toxics	toxic air contaminants
ARB	California Air Resources Board
ATCMs	Airborne Toxic Control Measures
CAAQS	California Ambient Air Quality Standards
Cal/EPA	California Environmental Protection Agency
California CAA	California Clean Air Act
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CEQA Handbook	California Environmental Quality Act Air Quality Handbook
CFR	Code of Federal Regulations
CH_4	methane
Clean Air Plan	air quality attainment plan
CO	carbon monoxide
CO Protocol	Transportation Project-Level Carbon Monoxide Protocol
CO_2	carbon dioxide
DCP	Dust Control Plan
DOT	U.S. Department of Transportation
DPM	diesel particulate matter
EPA	United States Environmental Protection Agency
F	Fahrenheit
FCAA	Federal Clean Air Act
FHWA	Federal Highway Administration
FTIPs	Federal Transportation Improvement Programs
GHG	greenhouse gas
H_2S	hydrogen sulfide
HAP	hazardous air pollutant
HEPE	Office of Project Development and Environmental Review
HEPN	Office of Natural Environment
HOV	high-occupancy vehicle

I-80	Interstate 80
IPCC	Intergovernmental Panel on Climate Change
IRIS	Integrated Risk Information System
LOS	level of service
MOVES	Motor Vehicle Emissions Simulator
mph	miles per hour
MPO	Metropolitan Planning Organization
MSAT	Mobile source air toxics
MTIP	Metropolitan Transportation Improvement Program
MTP	Metropolitan Transportation Plan
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHTSA	National Highway Traffic Safety Administration
NO_2	nitrogen dioxide
NOA	naturally occurring asbestos
NO_X	nitrogen oxides
O_3	ozone
OPR	Office of Planning and Research
particulate matter	PM, broken down for regulatory purposes into particles of 10 micrometers or smaller – PM10 and particles of 2.5 micrometers and smaller – PM2.5
Pb	lead
PCAPCD	Placer County Air Pollution Control District
PCTPA	Placer County Transportation Planning Agency
PLCG	Project Level Conformity Group
PM10	particles of 10 micrometers or smaller
PM2.5	particles of 2.5 micrometers and smaller
POAQCs	projects of air quality concern
ppm	parts per million
RCEM	Road Construction Emissions Model
ROG	reactive organic gases
RTPs	Regional Transportation Plans
SACOG	Sacramento Area Council of Governments

SCS	Sustainable Communities Strategy
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District’s
SO_2	sulfur dioxide
SR 65	State Route 65
SVAB	Sacramento Valley Air Basin
TACs	Toxic air contaminants
TAR	Traffic Analysis Report
TCMs	Transportation Control Measures
VMT	vehicle miles travelled

Chapter 1 Introduction

1.1 Purpose of the Air Quality Study Report

This report was prepared for the Interstate 80/State Route 65 Interchange Improvements Project (project). The California Department of Transportation (Caltrans), in cooperation with the Placer County Transportation Planning Agency (PCTPA), Placer County, and the Cities of Roseville, Rocklin, and Lincoln, proposes to improve the Interstate 80/State Route 65 (I-80/SR 65) interchange to reduce future traffic congestion, improve operations and safety, and comply with current Caltrans and local agency design standards. The project is located in Placer County in the cities of Roseville and Rocklin at the I-80/SR 65 Interchange (Figure 1-1, Project Vicinity).

This report is intended to support the preparation of joint National Environmental Policy Act (NEPA)/California Environmental Quality Act (CEQA) documentation for Caltrans, which is the NEPA lead agency as delegated by the Federal Highway Administration (FHWA) and the CEQA lead agency. This report also supports efforts to obtain agreements, permits, and concurrence needed to construct the project. This report evaluates the effects of the project on air quality resources and climate change, based on system-wide measures of effectiveness and intersection traffic volumes under existing (2012), construction year (2020), and design-year (2040) conditions as reported in the traffic analysis report for this project (Fehr & Peers 2014).

Four alternatives, including the No Build Alternative, are analyzed in this document. Three build alternatives (Alternatives 1 through 3) are proposed, which would add capacity, a bi-directional high-occupancy vehicle (HOV) system, and high-speed connections. The No Build Alternative would not make any improvements to the I-80/SR 65 interchange. However, HOV and auxiliary lanes proposed on SR 65 north of Galleria Boulevard/Stanford Ranch Road, and other local improvements separately proposed and identified in the Metropolitan Transportation Plan (MTP), would be implemented according to their proposed schedules.

1.2 Scope and Content of the Report

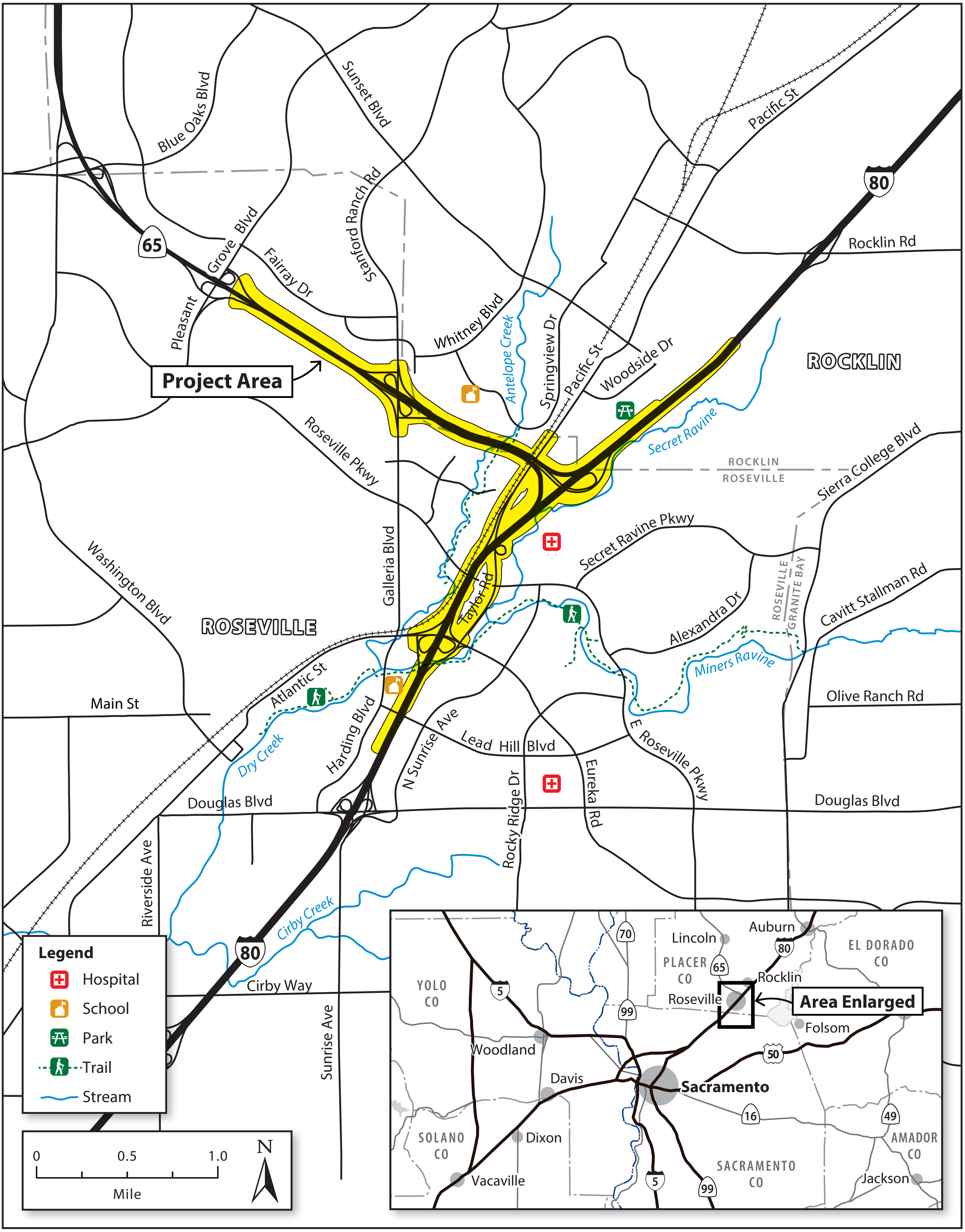
This report describes the project's regulatory and environmental setting, the environmental consequences of the project, and measures to avoid, minimize, or mitigate adverse impacts of the project on air quality resources. This report is organized as described here.

- Chapter 1, "Introduction," introduces the report and describes the purpose, scope, and content of the report, as well as provides a summary of the project impacts; avoidance, minimization and/or mitigation measures; and significance conclusions that are discussed later in the report.

- Chapter 2, “Project Description,” describes the project’s characteristics, including location, purpose, need, and the alternatives associated with the project.
- Chapter 3, “Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures,” describes the regulatory and physical setting, discloses the environmental effects of the alternatives and the methods used to evaluate them, and identifies measures to avoid, minimize, and/or mitigate adverse effects associated with the alternatives.
- Chapter 4, “References Cited,” describes the printed references and personal communications used to prepare this report.

1.3 Summary

Table 1 provides a summary of the impacts; avoidance, minimization, and/or measures; and significance conclusions discussed in this report.



Graphics ... 00189.11 (6-24-2014)

Figure 1-1
Project Vicinity

Table 1. Summary of Impacts and Avoidance, Minimization, and/or Mitigation Measures Associated with the Project

Impact	Conclusions	Avoidance, Minimization, and/or Mitigation Measures
AQ-1: Conformity of the Regional Transportation Plan with the State Implementation Plan	Phase 1 of the project is listed in the 2035 MTP/SCS and the 2013–2016 MTIP Air Quality Conformity analysis. The complete project will be included in the regional emissions and conformity analysis for the upcoming 2036 MTP/SCS and 2015-2018 MTIP.	None Required
AQ-2: Potential Violations of Carbon Monoxide NAAQS or CAAQS	The Build Alternatives are not anticipated to exceed 1- or 8-hour CO NAAQS or CAAQS.	None Required
AQ-3: Potential Violations of PM2.5, NAAQS, or CAAQS	Placer County is currently classified as a nonattainment area with regards to the federal PM2.5 NAAQS. However, due to minimal increases in AADT between the No Build and Build Alternatives, the project is determined not be a Project of Air Quality Concern. SACOG's PLCG issued concurrence that the project is not a POAQC on April 23, 2013 (see Appendix C).	None Required
AQ-4: Potential for Generation of Mobile Source Air Toxics (MSAT) Emissions	The project would result in incremental increases in MSATs under construction (2020) and design (2040) year conditions. Localized MSAT at highly trafficked intersections may also slightly increase.	None Required
AQ-5: Generation of Operation-Related Emissions of O_3 Precursors, Carbon Monoxide, and Particulate Matter	The project would result in minor increases in O_3 precursors, CO, PM10, and PM2.5 under construction (2020) and design (2040) year conditions. Emissions increases are a result of induced vehicle travel and growth in VMT under the Build Alternatives (Milam pers. comm.[c]).	None Required
AQ-6: Potential Temporary Increase in O_3 Precursors (ROG and NO_X), CO, and PM10 Emissions during Grading and Construction Activities	The project would result in temporary increases in O_3 precursors, CO, PM10, and PM2.5 during construction.	Addressed by construction-related PM10 emission minimization measures in Caltrans Standard Specifications Section 14
AQ-7: Potential for Generation of Greenhouse Gas Contaminant Emissions	The project would result in minor increases GHG emissions during construction and long-term operation. Operational emissions increases are a result of induced vehicle travel and growth in VMT under the Build Alternatives (Milam pers. comm.[c]).	Please review the section *Greenhouse Gas Reduction Strategies* in Chapter 3

AADT = annual average daily traffic
CAAQS = California's ambient air quality standards
Caltrans = California Department of Transportation
CO = carbon monoxide
GHG = Greenhouse Gas
MTIP = Metropolitan Transportation Improvement Program
MTP = Metropolitan Transportation Plan
NAAQS = National Ambient Air Quality Standards
NO_X = nitrogen oxides
O_3 = Ozone
PCTPA = Placer County Transportation Planning Agency
PM10 = particles of 10 micrometers or smaller
PM2.5 = particles of 2.5 micrometers and smaller
ROG = reactive organic gases
SACOG = Sacramento Area Council of Governments
SCS = Sustainable Communities Strategy
VMT = vehicle miles travelled

Chapter 2 Project Description

The project is proposed to improve the I-80/SR 65 interchange in Placer County, California, in order to reduce future traffic congestion, improve operations and safety, and comply with current Caltrans and local agency design standards. The proposed improvements and impacts generally consist of the following.

- Widening I-80, SR 65, and the East Roseville Viaduct.
- Removing the existing eastbound I-80 to northbound SR 65 loop connector and replacing it with a highway-speed, three lane flyover.
- Adding a direct connecting HOV ramp serving eastbound I-80 to northbound SR 65 and southbound SR 65 to westbound I-80.
- Modifying the existing I-80/Taylor Road ramp connections.
- Improving Taylor Road and other ramp and intersections of the I-80/Eureka Road/Atlantic Street Interchange, SR 65/Galleria Boulevard/Stanford Ranch Road Interchange, and the SR 65/Pleasant Grove Boulevard Interchange.

2.1 Project Location

The project limits consist of I-80 from the Douglas Boulevard interchange to the Rocklin Road interchange (post miles 1.9–6.1) and SR 65 from the I-80 separation to the Pleasant Grove Boulevard interchange (post miles R4.8–R7.3.). The total length of the project is 2.5 miles along SR 65 and 4.2 miles along I-80. The project area also includes various local roads—specifically, portions of Galleria Boulevard/Stanford Ranch Road, Pleasant Grove Boulevard, Eureka Road/Atlantic Street, East Roseville Parkway, and Taylor Road.

2.2 Purpose and Need

The project proposes to improve the I-80/SR 65 interchange in Placer County, California, in order to reduce future traffic congestion, improve operations and safety, and comply with current Caltrans and local agency design standards.

Project termini (i.e., limits) for the project were developed through an iterative process involving engineering design and traffic operations analysis. Preliminary design concepts were tested with the traffic operations analysis model to evaluate how lane transitions and vehicle weaving influenced peak hour conditions. Refinements were made to ensure that mainline lane balance was logical and that transitions did not cause unacceptable traffic operations such as extensive queuing or reduced speeds.

The purpose and objectives of the project are listed below.

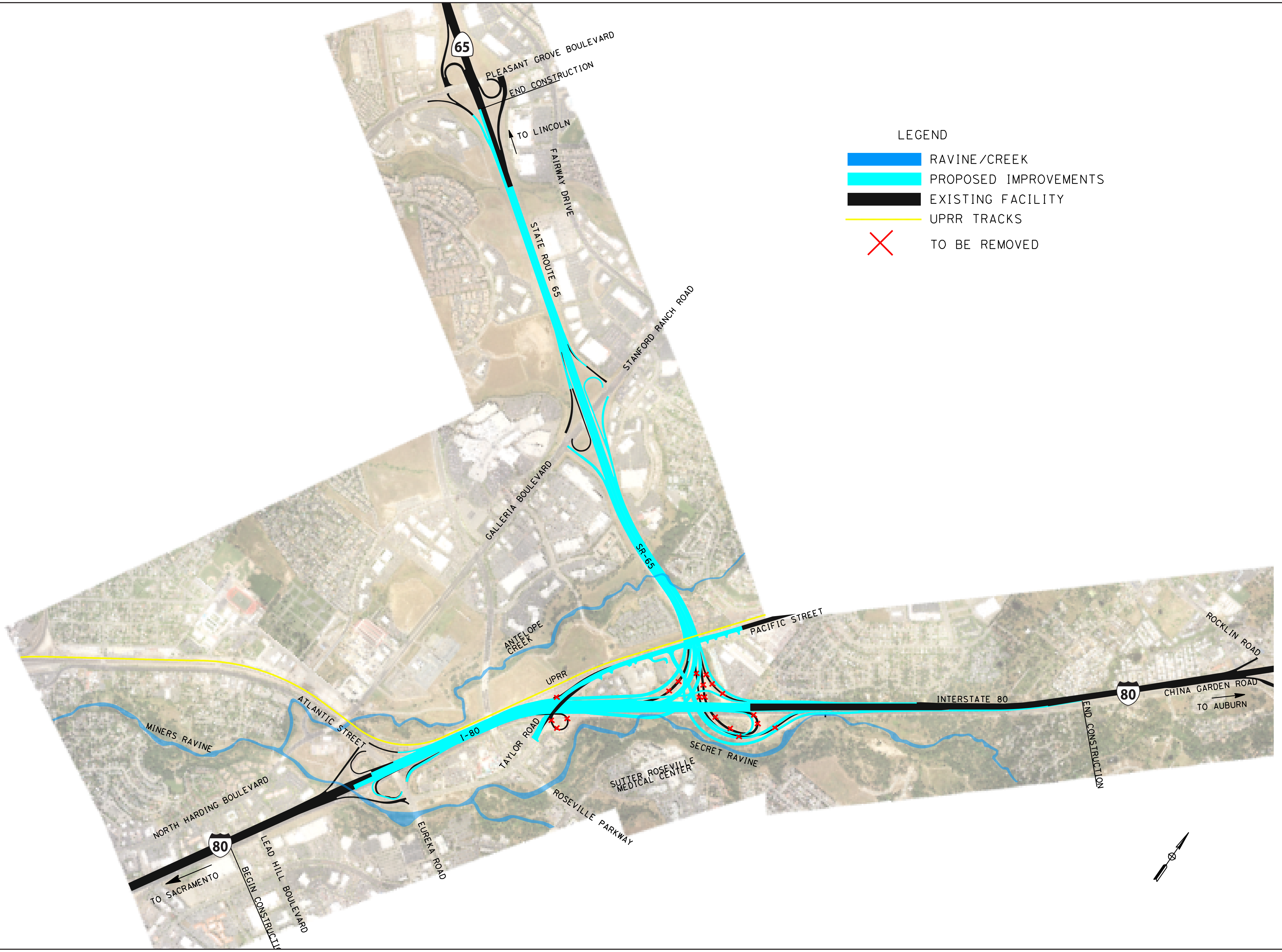
- Upgrade the I-80/SR 65 interchange and adjacent transportation facilities to reduce no build traffic congestion.
- Upgrade the I-80/SR 65 interchange and adjacent transportation facilities to comply with current Caltrans and local agency design standards for safer and more efficient traffic operations while maintaining and, where feasible, improving the current level of community access, at a minimum.
- Consider all travel modes and users in developing project alternatives.

The project is needed for the following reasons.

- Recurring morning and evening peak-period demand exceeds the current design capacity of the I-80/SR 65 interchange and adjacent transportation facilities, creating traffic operations and safety issues. These issues result in high delays and wasted fuel, both of which will be exacerbated by traffic from future population and employment growth.
- Interchange design features do not comply with current Caltrans design standards for safe and efficient traffic operations and limit existing community access to nearby land uses.
- Travel choices are limited in the project area because the transportation network does not include facilities for all modes and users consistent with the complete streets policies of Caltrans and local agencies.

2.3 Alternatives

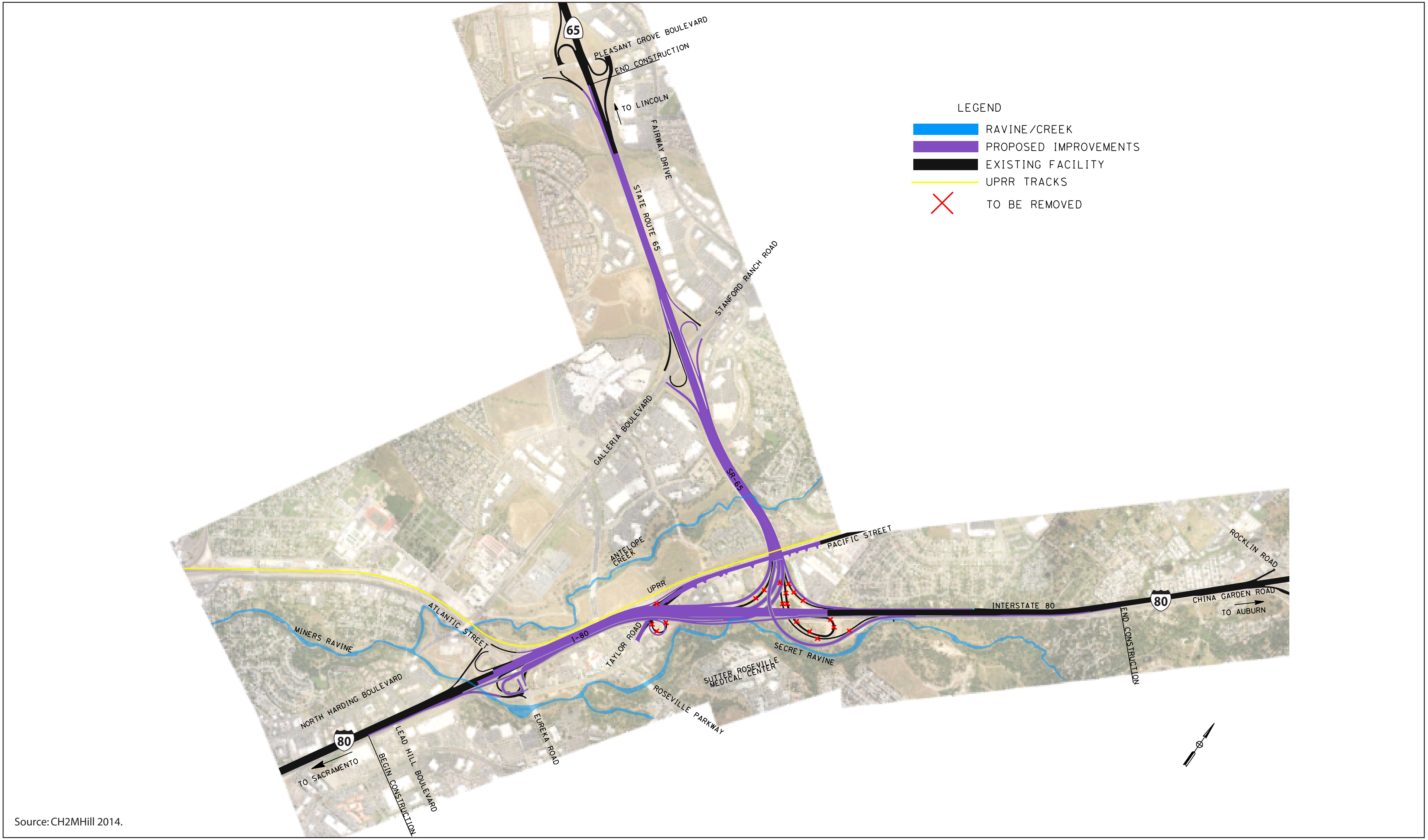
This section describes the project and the design alternatives that a multi-disciplinary team developed to achieve the project’s purpose and need, while avoiding or minimizing environmental impacts. Major features used to compare the project and its alternatives include project cost, level of service (LOS) and other traffic data, and specific environmental impacts. Final selection of an alternative will not be made until after the environmental impacts have been fully evaluated, consideration is given to public comments, and upon approval of the final environmental document. See Figures 2-1 – 2-3 for a depiction of each build alternative.



Source: CH2MHill 2014.

Graphics ... 00189.11 (7/23/14) AB

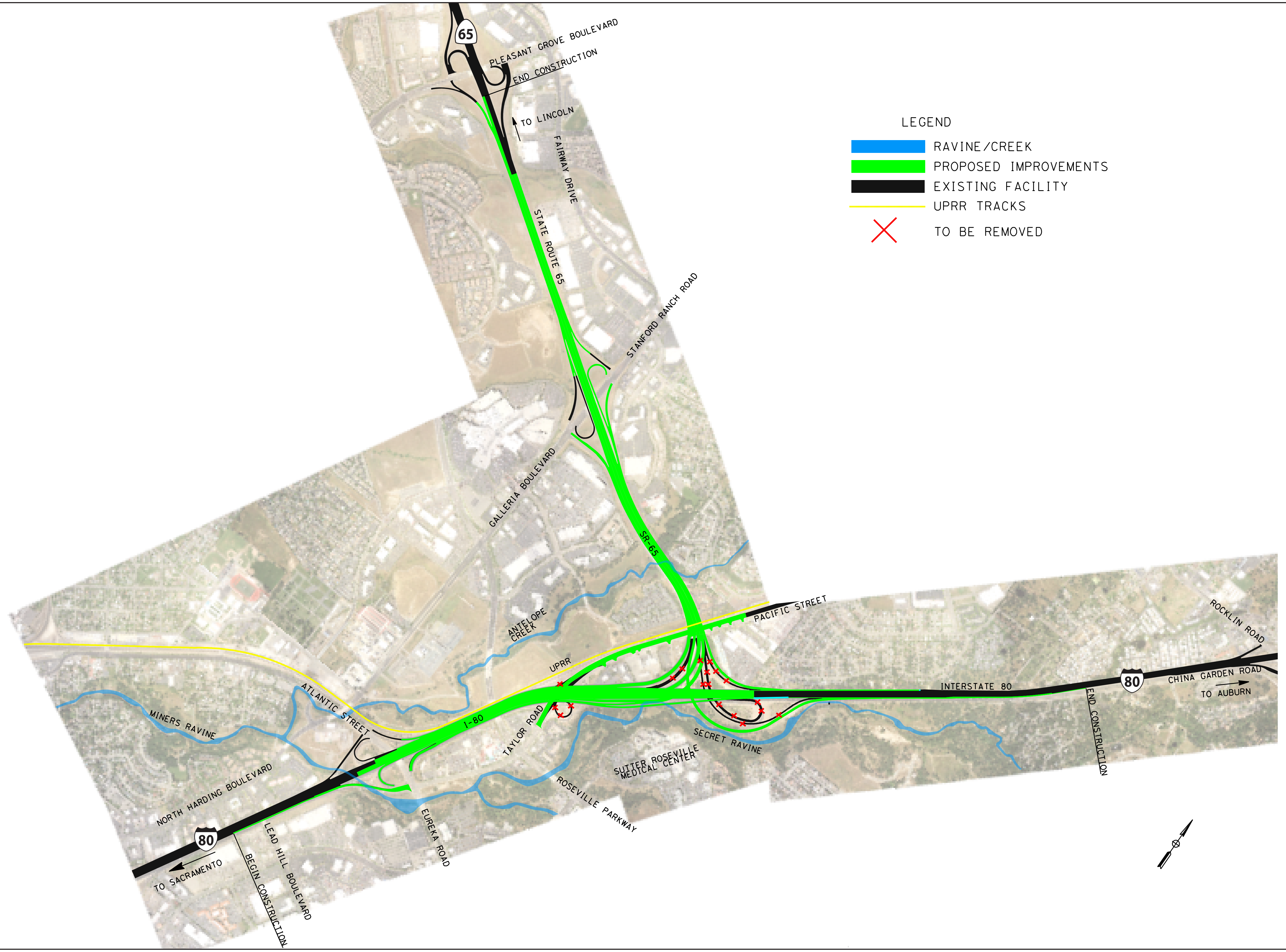
Figure 2-1
Alternative 1—Taylor Road Full Access Interchange



Source: CH2MHill 2014.

Graphics ... 00189.11 (7/23/14) AB

Figure 2-2
Alternative 2—Collector-Distributor System Ramps



Source: CH2MHill 2014.

Graphics ... 00189.11 (7/23/14) AB

Figure 2-3
Alternative 3—Taylor Road Interchange Eliminated

2.3.1 Alternative 1—Taylor Road Full Access Interchange

This alternative would improve spacing and weaving movements between interchanges on I-80. The two existing Taylor Road interchange ramps would be relocated to the east and reconstructed in a Type L-1/L-12 interchange configuration, providing two additional ramp connections and improving access between the local streets and freeway system. The interchange would be positioned within the I-80/SR 65 interchange footprint and use portions of the existing eastbound I-80 to northbound SR 65 loop connector as well as the existing southbound SR 65 to eastbound I-80 connector. The existing Taylor Road interchange ramps would be removed and the area would be re-graded.

2.3.2 Alternative 2—Collector-Distributor System Ramps

This alternative would improve spacing and weaving movements between interchanges on I-80 by collecting and redirecting eastbound ramp traffic onto a collector-distributor ramp system. The collector-distributor system would provide eastbound access to Taylor Road and from Eureka Road at the Atlantic Street/Eureka Road interchange and would restrict local traffic from leaving or entering I-80 mainline until after the critical weave area between Eureka Road and the I-80/SR 65 interchange. The two existing Taylor Road interchange ramps would remain in their current location but would be reconfigured to accommodate the surrounding improvements.

2.3.3 Alternative 3—Taylor Road Interchange Eliminated

Similar to Alternative 2, this alternative would improve spacing and weaving movements between interchanges on I-80 by collecting eastbound Eureka Road on-ramp traffic. Weaving on I-80 would be significantly improved because ramp traffic would be redirected to a ramp braid system and restricted from entering and exiting I-80 mainline until after the critical weave area between Eureka Road and the I-80/SR 65 interchange. Unique to Alternative 3, the two existing Taylor Road interchange ramps would be eliminated, and access to the Taylor Road area would be accommodated by the adjacent local interchanges at the Atlantic Street/Eureka Road, Rocklin Road, and Galleria Boulevard/Stanford Ranch Road interchanges. The connector ramps serving I-80 and SR 65 (SW, EN, SE, WN, and HOV) are the same between Alternatives 2 and 3.

2.3.4 No Build (No Project)

The No Build Alternative would not make any improvements to the I-80/SR 65 interchange or adjacent transportation facilities to satisfy the project’s purpose and need. HOV and auxiliary lanes proposed on SR 65 north of Galleria Boulevard/Stanford Ranch Road, and other local improvements separately proposed and identified in the Metropolitan Transportation Plan (MTP), would be implemented according to their proposed schedules.

Chapter 3 Affected Environment; Environmental Consequences; and Avoidance, Minimization, and/or Mitigation Measures

This chapter describes the environmental setting (regulatory setting and physical setting/existing conditions) for air quality and climate change as it relates to the project; the impacts on air quality that would result from the project; and avoidance, minimization, and/or mitigation measures that would reduce these impacts, if applicable.

3.1 Affected Environment

3.1.1 Regulatory Setting

Air Quality

The air quality management agencies of direct importance in Placer County include the United States Environmental Protection Agency (EPA), California Air Resources Board (ARB), and Placer County Air Pollution Control District (PCAPCD). The EPA has established federal standards for which the ARB and PCAPCD have primary implementation responsibility. The ARB and PCAPCD are also responsible for ensuring that state standards are met. Federal, state, and local regulations applicable to the proposed project are described below.

Federal Air Quality Standards

The Federal Clean Air Act (FCAA) as amended in 1990 is the federal law that governs air quality. The California Clean Air Act of 1988 is its companion state law, which is described further below. These laws and related regulations by the EPA and ARB set standards for the quantity of pollutants that can be in the air. At the federal level, the standards are called National Ambient Air Quality Standards (NAAQS). NAAQS have been established for six transportation-related 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, broken down for regulatory purposes into particles of 10 micrometers or smaller – PM10, and particles of 2.5 micrometers and smaller – PM2.5), lead (Pb), and sulfur dioxide (SO_2). In addition, state standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride.

The NAAQS and CAAQS are set at a level that protects public health with a margin of safety and are subject to periodic review and revision. The NAAQS and CAAQS are listed together in Table 2. Both state and federal regulations also cover toxic air contaminants (air toxics). Note that some criteria pollutants are air toxics or may include certain air toxics within their general definition. The federal and state air quality standards and regulations provide the basic scheme for project-level air quality analysis under NEPA and CEQA. In addition to this type of environmental analysis, a parallel "conformity" requirement under the FCAA also applies, as described below.

CAA Conformity Requirements for Transportation

FCAA Section 176(c) prohibits the U.S. Department of Transportation (DOT) and other federal agencies from funding, authorizing, or approving plans, programs, or projects that are not first found to conform to State Implementation Plan (SIP) for achieving the goals of FCAA requirements related to the NAAQS. The "Transportation Conformity" Act takes place on two levels: the regional, or planning and programming, level, and the project level. The proposed project must conform at both levels to be approved. Conformity requirements apply only in nonattainment and maintenance (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. EPA regulations at 40 CFR 93 govern the conformity process.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the standards set for CO, NO_2, O_3, PM10, and PM2.5, and in some areas SO_2. California is nonattainment or maintenance for all of these transportation-related criteria pollutants except SO_2, and also has a nonattainment area for lead. However, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs) that include all of the transportation projects planned for a region over a period of at least 20 years for the RTP and 4 years for the FTIP. RTP and FTIP conformity is based on use of travel demand and air quality models to determine whether or not implementation of those projects would conform to emission budgets or other tests showing that requirements of the FCAA and the SIP are met. The Metropolitan Planning Organization (MPO) and the Federal Highway Administration (FHWA) determine whether the RTP and FTIP conform to SIP goals for achieving the FCAA. If the RTP and FTIP do not conform to the SIP, the projects in the RTP and/or the FTIP must be modified until conformity is attained. If the design, concept, scope, and open to traffic schedule of a proposed transportation project are the same as described in the RTP and the FTIP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Table 2. National and California Ambient Air Quality Standards Applicable in California

Pollutant	Symbol	Average Time	Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria	
			California	**National**	**California**	**National**	**California**	**National**
Ozone	O_3	1 hour	0.09	NA	180	NA	If exceeded	NA
		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
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
(Lake Tahoe only)		8 hours	6	NA	7,000	NA	If equaled or exceeded	NA
Nitrogen dioxide	NO_2	Annual arithmetic mean	0.030	0.053	57	100	If exceeded	If exceeded on more than 1 day per year
		1 hour	0.18	0.100	339	188	If exceeded	NA
Sulfur dioxide	SO_2	Annual arithmetic mean	NA	0.030	NA	NA	NA	If exceeded
		24 hours	0.04	0.14	105	NA	If exceeded	If exceeded on more than 1 day per year
		1 hour	0.25	75	655	196	If exceeded	NA
Hydrogen sulfide	H_2S	1 hour	0.03	NA	42	NA	If equaled or exceeded	NA
Vinyl chloride	C_2H_3Cl	24 hours	0.01	NA	26	NA	If equaled or exceeded	NA
Inhalable PM	PM10	Annual arithmetic mean	NA	NA	20	NA	If exceeded	If exceeded at each monitor within area
		24 hours	NA	NA	50	150	If exceeded	If exceeded on more than 1 day per year
	PM2.5	Annual arithmetic mean	NA	NA	12	12.0	If exceeded	If 3-year average from single or multiple community-oriented monitors is exceeded
		24 hours	NA	NA	NA	35	NA	If 3-year average of 98th percentile at each population-oriented monitor within an area is exceeded
Sulfate particles	SO_4	24 hours	NA	NA	25	NA	If equaled or exceeded	NA
Lead particles	Pb	Calendar quarter	NA	NA	NA	1.5	NA	If exceeded no more than 1 day per year
		30-day average	NA	NA	1.5	NA	If equaled or exceeded	NA
		Rolling 3-Month average	NA	NA	NA	0.15	If equaled or exceeded	Averaged over a rolling 3-month period

Source: California Air Resources Board 2013

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

Conformity at the project-level also requires a "hot-spot" analysis if an area is nonattainment or maintenance for CO and/or particulate matter (PM10 and PM2.5). A region is *nonattainment* if one or more monitoring stations in the region measures violation of the relevant standard, and the EPA officially designates the area nonattainment. Areas that were previously designated as nonattainment areas but subsequently meet the standard may be officially redesignated to *attainment* by the EPA, and are then called *maintenance* areas. A 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 procedural and documentation standards for projects that require a hot-spot analysis. In general, projects must not cause the hot-spot related CO standard to be violated, and must not cause any increase in the number and severity of violations in nonattainment areas. 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 FCAA 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 NAAQS. Conformity requirements were made substantially more rigorous in the 1990 CAAA, and the transportation conformity regulation that details implementation of the new requirements was issued in November 1993.

The DOT and 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 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."

State Air Quality Standards

Responsibility for achieving the California ambient air quality standards (CAAQS) (see Table 2), which, for certain pollutants and averaging periods, are more stringent than federal standards, is placed on the ARB and local air pollution control districts. State standards are achieved through district-level air quality management plans that are incorporated into the SIP.

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 under the CEQA. It should be noted, however, that CALTRANS considers the use of locally adopted CEQA thresholds of significance for construction emissions as being not mandatory and help serve as guidance for scoping air quality studies. However, CALTRANS Standard Specification Section 14-9.02, which includes specifications relating to air pollution control by complying with air pollution control rules, regulations, ordinances, and statutes that apply to work performed under the Contract, including air pollution control rules, regulations, ordinances, and statutes provided in Government Code § 11017 (Pub Cont Code § 10231). In addition, CALTRANS does not have the authority to require use of specific equipment or to apply other direct restrictions on contractor equipment fleet emissions in excess of EPA, ARB, and possibly local air district regulations.

The California Clean Air Act (California CAA) of 1988 substantially added to the authority and responsibilities of air districts. The California CAA 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 California CAA focuses on attainment of the state ambient air quality standards and requires 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 (Clean Air Plan) if the district violates state air quality standards for O_3, CO, SO_2, or NO_2. 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; ARB is responsible for developing plans and projects that achieve compliance with the state PM10 standards.

The California CAA requires that the state air quality standards be met as expeditiously as practicable, but, unlike the federal CAA, 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 California CAA 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 Transportation Control Measures (TCMs). The

California CAA does not define the terms *indirect sources* and *area-wide sources*. However, Section 110(a)(5)(C)) of the FCAA 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….

The ARB defines area-wide source as sources of pollution where the emissions are spread over a wide area, such as consumer products, fireplaces, road dust and farming operations. Area-wide sources do not include mobile sources or stationary sources (California Air Resources Board n.d.), TCMs are defined in the California CAA as "any strategy to reduce trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing vehicle emissions."

Local and Regional Implementation of Federal and State Requirements

At the local level, air quality is managed through land use and development planning practices, which are implemented in Placer County through the general planning process. PCAPCD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws. The air district is also responsible for implementing strategies for air quality improvement and recommending mitigation measures for new growth and development.

PCAPCD (2012) has specified significance thresholds within its *CEQA Air Quality Handbook* (CEQA Handbook) to assist lead agencies in determining air quality impacts for projects located within the Placer County. Although not used to determine impacts associated with the proposed project, PCAPCD's thresholds of significance, as indicated in their CEQA Handbook are summarized in Table 3 for informational purposes. Thresholds for pollutants other than reactive organic gases (ROG), nitrogen oxides (NO_X), and PM10 are not specified in PCAPCD's CEQA handbook.

Table 3. Placer County Air Pollution Control District Thresholds of Significance (pounds per day)

	O_3 Precursor Emissions		
	ROG	**NO_X**	**PM10**
Construction (short-term)	82	82	82
Operational (long-term)	82	82	82

Source: Placer County Air Pollution Control District 2012

3.1.2 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 within which the project is located and offers an overview of conditions affecting pollutant ambient air concentrations in the basin.

Climate and Topography

The project is located in Placer County, California, which spans three air basins; however, the project is located entirely in the Sacramento Valley Air Basin (SVAB). The SVAB includes Sacramento, Shasta, Tehama, Butte, Glenn, Colusa, Sutter, Yuba, and Yolo Counties, as well as parts of Solano and Placer Counties. The SVAB is bounded on the west by the Coast Ranges and on the north and east by the Cascade Range and Sierra Nevada. The San Joaquin Valley Air Basin lies to the south.

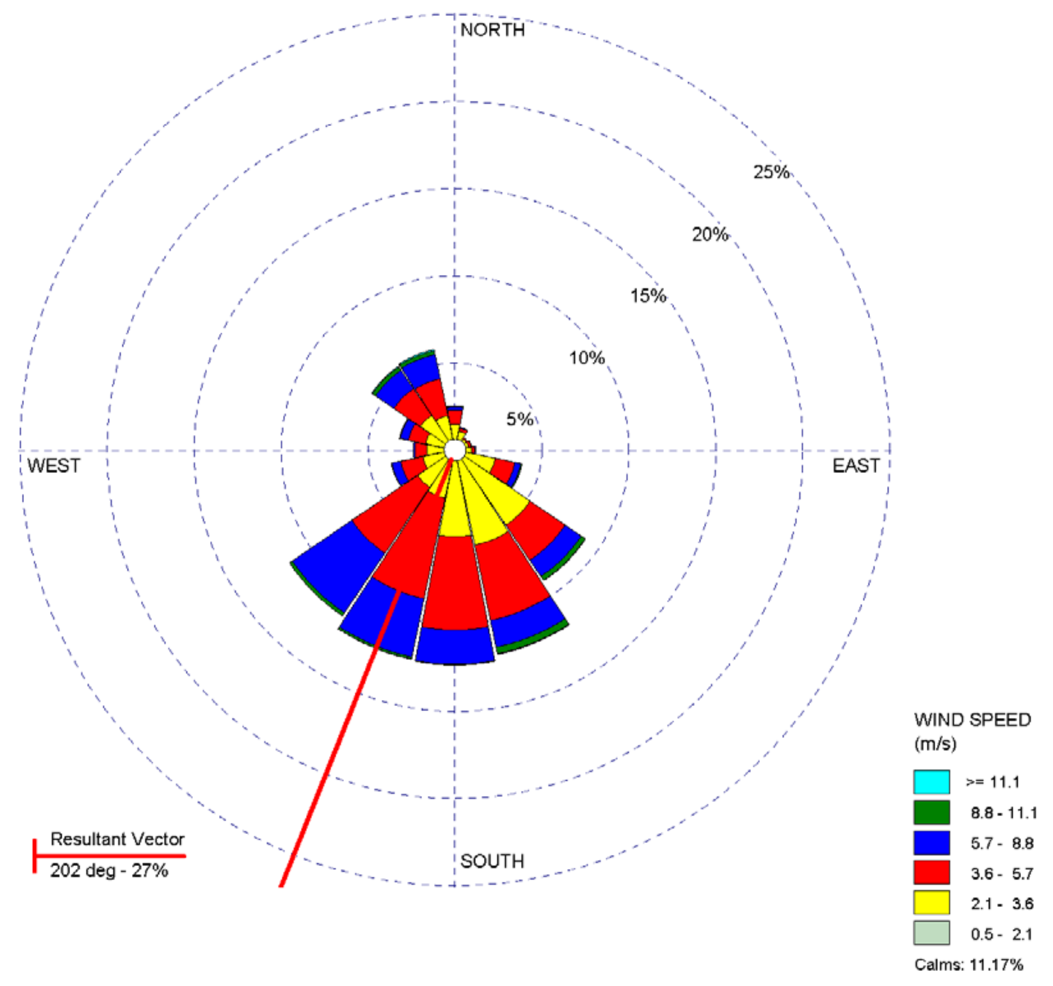
The SVAB has a Mediterranean climate characterized by hot, dry summers and cool, rainy winters. During the winter, the North Pacific storm track intermittently dominates valley weather, and fair-weather alternates with periods of extensive clouds and precipitation. Also characteristic of winter weather in the valley are periods of dense and persistent low-level fog that is most prevalent between storms. The frequency and persistence of heavy fog in the valley diminishes with the approach of spring. The average yearly temperature range for the Sacramento Valley is between 20 and 115° Fahrenheit (F), with summer high temperatures often exceeding 90°F and winter low temperatures occasionally dropping below freezing.

Prevailing wind in the Sacramento Valley is generally from the southwest due to marine breezes flowing through the Carquinez Strait. The Carquinez Strait is the major corridor for air moving into the Sacramento Valley from the west. Incoming airflow strength varies daily with a pronounced diurnal cycle. Figure 3-1 indicates the predominant wind direction in the region based on meteorological data from Sacramento Executive Airport (Webmet.com 2014). Influx strength is weakest in the morning and increases in the evening hours. Associated with the influx of air through the Carquinez Strait is the Schultz Eddy. The Schultz Eddy is an eddy formed when mountains on the valley's western side divert incoming marine air. The eddy contributes to the formation of a low-level southerly jet between 500 and 1,000 feet above the surface that is capable of speeds in excess of 35 miles per hour (mph). This jet is important for air quality in the Sacramento Valley because of its ability to transport air pollutants over large distances.

Figure 3-1. Wind Rose Plot—Sacramento Executive Airport

WIND ROSE PLOT:
1992 Wind patterns at Sacramento Executive Airport
SCRAM Surface Met Data

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:
Start Date: 1/1/1992 - 00:00
End Date: 12/31/1992 - 23:00

COMPANY NAME:

MODELER:

CALM WINDS:
11.17%

TOTAL COUNT:
8784 hrs.

AVG. WIND SPEED:
3.58 m/s

DATE:
1/28/2014

PROJECT NO.:

WRPLOT View - Lakes Environmental Software

The SVAB's climate and topography contribute to the formation and transport of photochemical pollutants throughout the region. The region experiences temperature inversions that limit atmospheric mixing and trap pollutants; high pollutant concentrations result near the ground surface. Generally, the lower the inversion base height from the ground and the greater the temperature increase from base to top, the more pronounced the inhibiting effect of the inversion will be on pollutant dispersion. Consequently, the highest concentrations of photochemical pollutants occur from late spring to early fall when photochemical reactions are greatest because of intensifying sunlight and lowering altitude of daytime inversion layers. Surface inversions (those at altitudes of 0 to 500 feet above sea level) are most frequent during winter, and subsidence inversions (those at 1,000 to 2,000 feet above sea level) are most common in the summer.

Description of Pollutants

The primary pollutants of concern in the project area are O_3 and its precursors, ROG and NO_X, as well as CO, PM10, and PM2.5. O_3, 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 O_3, while PM10 and PM2.5 can form from chemical reaction 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, are considered to be local pollutants because they tend to disperse rapidly with distance from the source. Although PM10 and PM2.5 are regional pollutants, they can also be localized pollutants, as direct emissions of PM10 from automobile exhaust can accumulate in the air locally near the emission source.

The following is a brief overview of O_3, CO, PM10, and PM2.5. Mobile source air toxics (MSAT) and carbon dioxide (CO_2) are also discussed, even though there are currently no adopted standards to control these pollutants.

Ozone

O_3 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. O_3 is not emitted directly into the air but is formed by a photochemical reaction in the atmosphere. The O_3 precursors ROG and NO_X react in the atmosphere in the presence of sunlight to form O_3. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, O_3 pollution is primarily a problem in the summer.

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.

Inhalable Particulate Matter

Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. Particulate matter less than 10 microns in diameter, about 1/7th the thickness of a human hair, is referred to as PM10. Particulate matter that is 2.5 microns or less in diameter, roughly 1/28th the diameter of a human hair, is referred to as PM2.5. Major sources of PM10 include motor vehicles; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. PM2.5 results from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, PM10 and PM2.5 can be formed in the atmosphere from gases such as SO_2, NO_X, and ROG.

PM10 and PM2.5 pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system’s natural defenses and damage the respiratory tract. PM10 and PM2.5 can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body’s ability to fight infections. Very small particles of substances, such as lead, sulfates, and nitrates, can cause lung damage directly. These substances can be absorbed into the blood stream and cause damage elsewhere in the body; they can also transport absorbed gases such as chlorides or ammonium into the lungs and cause injury. Whereas particles 2.5 to 10 microns in diameter tend to collect in the upper portion of the respiratory system, particles 2.5 microns or less are so tiny that they can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, and contribute to haze and reduce regional visibility.

Carbon Dioxide

CO_2 is the most important anthropogenic greenhouse gas (GHG) and accounts for more than 75% of all anthropogenic GHG emissions. Its long atmospheric lifetime (on the order of decades to centuries) ensures that atmospheric concentrations of CO_2 will remain elevated for decades after GHG mitigation efforts to reduce GHG concentrations are promulgated (Intergovernmental Panel on Climate Change 2007).

Increasing concentrations of CO_2 in the atmosphere are primarily a result of emissions from the burning of fossil fuels, gas flaring, cement production, and land use changes. Three quarters of anthropogenic CO_2 emissions are the result of fossil fuel burning (and to a very small extent, cement production), and approximately one quarter of emissions are the result of land use change (Intergovernmental Panel on Climate Change 2007).

Anthropogenic emissions of CO_2 have increased concentrations in the atmosphere, most notably since the industrial revolution; the concentration of CO_2 has increased from about 280 parts per million (ppm) to 390 ppm from 1750 to 2011 (Intergovernmental Panel on Climate Change 2013:161). The IPCC estimates that the present atmospheric concentration of CO_2 has not been exceeded in the last nearly 1 million years (Intergovernmental Panel on Climate Change 2007:100).

Toxic Air Contaminants/Mobile Source Air Toxics

Toxic air contaminants (TACs) are pollutants that may result in an increase in mortality or serious illness or that may pose a present or potential hazard to human health. Health effects of TACs include cancer, birth defects, neurological damage, damage to the body’s natural defense system, and diseases that lead to death. In 1998, following a 10-year scientific assessment process, ARB identified particulate matter from diesel-fueled engines as a TAC. Compared to other air toxics that ARB has identified and controlled, diesel particulate matter (DPM) emissions are estimated to be responsible for about 70% of the total ambient air toxics risk (California Air Resources Board 2000).

The California CAA made controlling air toxic emissions a national priority, by which Congress mandated that EPA regulate 188 air toxics. These substances are also known as hazardous air pollutants (HAPs). In EPA’s latest rule, *Control of Emissions of Hazardous Air Pollutants from Mobile Sources* (*Federal Registry, Vol. 72, No. 37, page 8430, February 2007*), it identified a group of 93 compounds emitted from mobile sources that are listed in its Integrated Risk Information System (IRIS). The IRIS is a comprehensive database of specific substances known to cause human health effects. In addition, EPA identified the following seven compounds as priority MSATs.

- Acrolein
- Benzene
- 1,3-Butadiene
- Diesel particulate matter/diesel exhaust organic gases
- Formaldehyde
- Naphthalene
- Polycyclic organic matter

While FHWA considers these the priority MSATs, the list is subject to change and may be adjusted in consideration of future rules. To address emissions of MSATs, EPA has issued a number of regulations, including the 2007 rule mentioned above, that will dramatically decrease MSATs through cleaner fuels and cleaner engines.

The issue of air toxics is an emerging area of analysis and continuing 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 currently 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 context of NEPA.

FHWA released guidance for factoring mobile source health risks into project-level decision making under NEPA in December 2012 (U.S. Federal Highway Administration 2012). However, EPA has not established regulatory concentration targets for the seven relevant MSAT pollutants appropriate for use in the project development process. The FHWA recommends MSAT analyses to be conducted using EPA’s latest version of Motor Vehicle Emissions Simulator (MOVES) model, released on October 30, 2012, which estimates on- and off-road MSAT emissions from motor vehicles. FHWA’s guidance advises the assessment of MSATs in NEPA documents (U.S. Federal Highway Administration 2012).

Existing Air Quality Conditions

Existing air quality conditions in the project area can be characterized in terms of the ambient air quality standards that the federal and state governments have established for various pollutants (Table 4) and by monitoring data collected in the region. Monitoring data concentrations are typically expressed in terms of ppm or micrograms per cubic meter ($\mu g/m^3$).

Table 4. Ambient Air Quality Monitoring Data Measured at the Roseville- North Sunrise Boulevard and North Highlands-Blackfoot Way Sacramento Monitoring Stations

Pollutant Standards	**2010**	**2011**	**2012**
O_3 (Roseville-North Sunrise Boulevard)			
Maximum 1-hour concentration (ppm)	0.124	0.109	0.108
Maximum 8-hour concentration (ppm)	0.105	0.094	0.092
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	9	11	9
CAAQS 8-hour (>0.070 ppm)	21	23	28
Nitrogen Dioxide (NO_2) (Roseville-North Sunrise Boulevard)			
State maximum 1-hour concentration (ppm)	0.071	0.066	0.055
State second-highest 1-hour concentration (ppm)	0.062	0.056	0.054
Annual average concentration (ppm)	0.010	0.011	0.010
Number of days standard exceeded			
CAAQS 1-hour (0.18 ppm)	0	0	0
Carbon Monoxide (CO) (North Highlands-Blackfoot Way)			
Maximum 8-hour concentration (ppm)	1.16	1.87	1.54
Maximum 1-hour concentration (ppm)[c]	3.1	2.3	2.1
Number of days standard exceeded[a]			
NAAQS 8-hour (≥9 ppm)	0	0	0
CAAQS 8-hour (≥9.0 ppm)	0	0	0
NAAQS 1-hour (≥35 ppm)[c]	0	0	0
Particulate Matter (PM10)[b] (Roseville-North Sunrise Boulevard)			
National[c] maximum 24-hour concentration ($\mu g/m^3$)	36.3	56.5	43.2
National[c] second-highest 24-hour concentration ($\mu g/m^3$)	33.1	30.8	28.0
State[d] maximum 24-hour concentration ($\mu g/m^3$)	35.1	58.8	44.8
State[d] second-highest 24-hour concentration ($\mu g/m^3$)	32.4	30.5	27.5
National annual average concentration ($\mu g/m^3$)	15.2	17.3	15.1
State annual average concentration ($\mu g/m^3$)[e]	15.4	17.5	15.3
Number of days standard exceeded[a]			
NAAQS 24-hour (>150 $\mu g/m^3$)[f]	0.0	0.0	0.0
CAAQS 24-hour (>50 $\mu g/m^3$)[f]	0.0	6.1	0.0
Particulate Matter (PM2.5) (Roseville-North Sunrise Boulevard)			
National[c] maximum 24-hour concentration ($\mu g/m^3$)	27.3	42.3	16.1
National[c] second-highest 24-hour concentration ($\mu g/m^3$)	20.3	23.0	14.9
State[d] maximum 24-hour concentration ($\mu g/m^3$)	60.1	50.4	28.0
State[d] second-highest 24-hour concentration ($\mu g/m^3$)	38.0	39.6	27.5
National annual average concentration ($\mu g/m^3$)	6.6	8.5	6.4
State annual average concentration ($\mu g/m^3$)[e]	10.9	10.7	9.5
Number of days standard exceeded[a]			
NAAQS 24-hour (>35 $\mu g/m^3$)	0.0	6.1	0.0

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

[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.

Source: California Air Resources Board 2014a; U.S. Environmental Protection Agency 2013a

The nearest air quality monitoring station in the vicinity of the project area that reported pollutant concentrations between 2010 and 2012 is the North Sunrise Boulevard monitoring station, located at 151 North Sunrise Boulevard in Roseville, which is approximately 0.65 mile south of the project. The North Sunrise Boulevard station monitors for O_3, NO_2, PM10, and PM2.5. As there are no monitors for CO located within Placer County, monitoring data for CO was taken from the nearest monitoring station, located at North Highlands-Blackfoot Way in Sacramento County (7 miles south of the project).

Air quality monitoring data from the North Sunrise Boulevard and North Highlands-Blackfoot Way monitoring stations are summarized in Table 4. These data represent air quality monitoring data for the last 3 years (2010 through 2012), in which complete data are available.

As shown in Table 4, the Roseville-North Sunrise Boulevard monitoring station has experienced 29 violations of the state 1-hour O_3 standard, 72 violations of the state 8-hour O_3 standard, no violations of the state NO_2 standards, no violations of the federal 24-hour PM10 standard, 6.1 violations of the state 24-hour PM10 standard, and 6.1 violations of the federal 24-hour PM2.5 standard during the 3-year monitoring period.

Attainment Status

EPA has classified the SVAB portion of Placer County as a severe nonattainment area with regards to the federal 8-hour O_3 standard. For the federal CO and PM2.5[1] standards, EPA has classified the SVAB portion of Placer County as a moderate maintenance and nonattainment area, respectively. EPA has classified all of Placer County as an attainment area for the federal PM10 standard (U.S. Environmental Protection Agency 2013b).

ARB has classified the SVAB portion of Placer County as a serious nonattainment area for the state 1-hour O_3 standard. ARB has classified all of Placer County as a nonattainment area for the state 8-hour O_3 and PM10 standards. With regards to the state CO and PM2.5 standards, ARB has classified the SVAB portion of Placer County as an attainment area (California Air Resources Board 2014b).

Sensitive Receptors

The PCAPCD defines *sensitive receptors* as facilities or land uses that include members of the population which are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of sensitive receptors include schools, hospitals, and residential areas. Primary pollutants of concern to sensitive receptors are CO, DPM, and, to a

---

[1] The 24-hour PM2.5 standard was lowered from 35 $\mu g/m^3$ to 12.0 $\mu g/m^3$ in 2012, and EPA issued its final attainment status designations for the 12.0 $\mu g/m^3$ standard on January 15, 2013.

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 O_3 precursors (ROG and NO_X).

The project area is located within an existing urban environment that is home to a number of sensitive receptors. Sensitive receptors in the vicinity of the project area that could be affected by the project are identified in Figure 3-2 and summarized below. Note the sensitive receptors indicated in Figure 3-2 are not representative of the receptors modeled in the CO ho-spot analysis presented in Impact AQ-2. 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.

Residential

- Single-family residences within 100 feet of the project site on the north corner of the I-80/SR 65 interchange. Residences are also located at the end of the cul-de-sacs on Woodcrest Court and Delwood Court.
- Multi-family residences within 100 feet of the project site on the southwest corner of the I-80/SR 65 interchange (Kobra Preserve at Creekside Apartments). Residences are also located on the north corner of the I-80/SR 65 interchange (Hearthstone Apartments).

Medical

- Sutter Roseville Medical Center approximately 350 feet east of the I-80/SR 65 interchange.
- Kaiser Permanente Roseville Center approximately 3,700 feet southeast of the I-80/SR 65 interchange.
- Various small clinics scattered within a mile of the project area.

Recreational

- Maidu Park Sports Courts approximately 1 mile south of the project off Maidu Drive.
- Golfland/Sunsplash adjacent to the Taylor Road off-ramp.
- Woodside Park adjacent to I-80.
- Bicycle Trails north and south of the I-80 as well as under SR 65.

Educational

- Antelope Creek Elementary School approximately 750 feet north of SR 65 on Springview Drive.
- Sierra Gardens Elementary School approximately 3,000 feet south of the project on Coloma Way.
- The Phoenix Schools Private Preschool and Catheryn Gates Elementary School approximately 4,800 feet southwest of the SR 65/Galleria Boulevard interchange.
- Warren T. Eich Intermediate School approximately 3,000 feet southeast of the project on Sierra Gardens Drive.
- John Adams Academy adjacent to I-80 (westbound) and 1.5 miles southwest of the I-80/SR 65 interchange.
- Adelante High School approximately 3,300 feet west of the I-80 on Atlantic Street.
- Roseville High School approximately 2,400 feet west of the I-80/SR 65 interchange on Berry Street.

Child Care Facilities

- Angels Nest Child Care and Preschool approximately 4,000 feet west of SR 65 on Dizhazy Court.
- Kids Park approximately 530 feet north of the SR 65/Galleria Boulevard interchange.
- Creative Day Preschool/Daycare approximately 3,300 feet north of the SR 65/Galleria Boulevard interchange.

3.2 Environmental Consequences

3.2.1 Methods

The build alternatives would generate construction-related and operational emissions. The methodology used to evaluate construction and operational effects is described below.

Operational Impact Assessment Methodology

The primary operational emissions associated with the build alternatives are ROG, NO_X, CO, PM10, PM2.5, and CO_2 emitted as vehicle exhaust. Transportation conformity with regards to criteria pollutants was evaluated by including the project in the most recent RTP. In addition, the effects of criteria pollutant and CO_2 emissions were quantified with Caltrans' CT-EMFAC

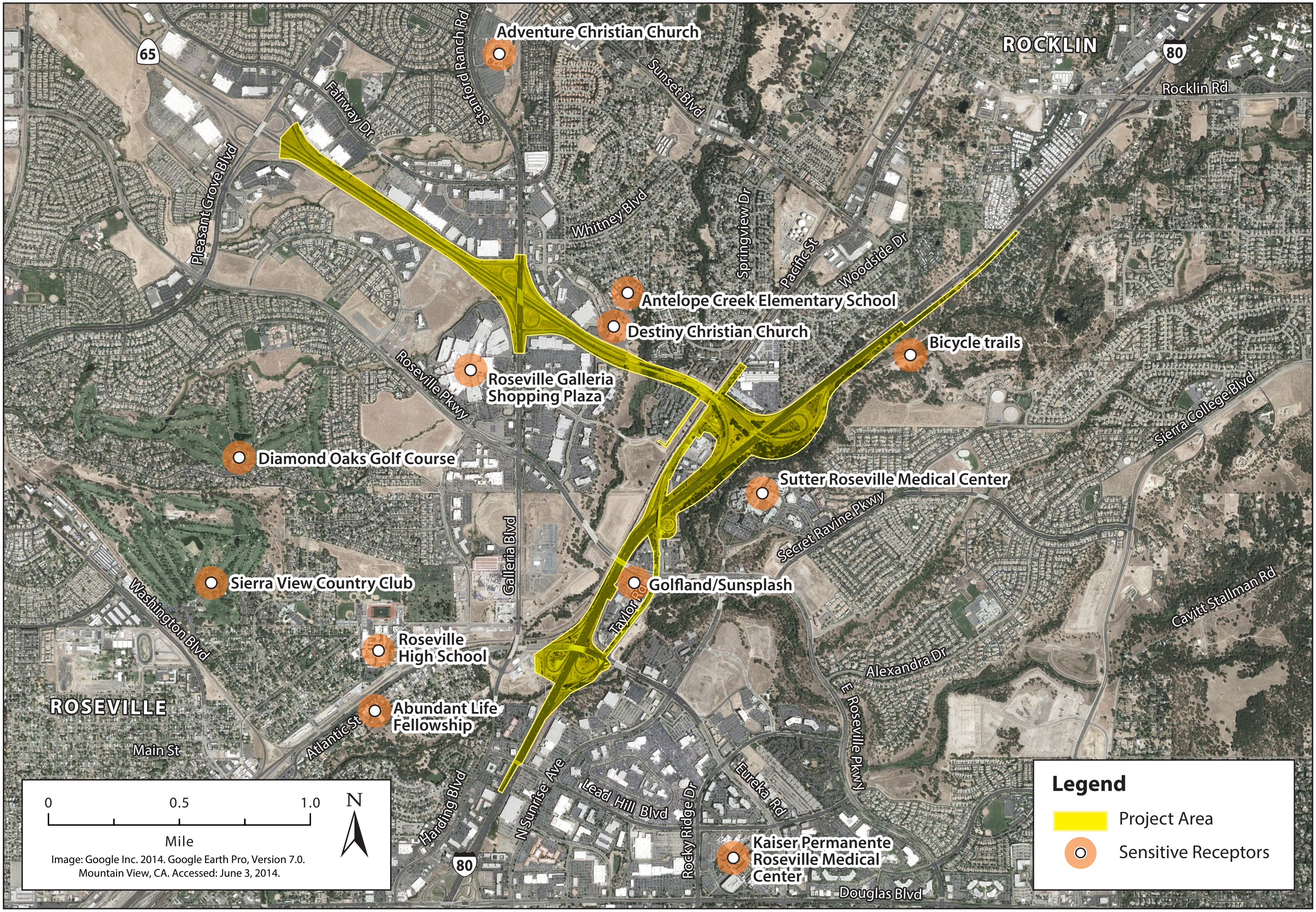


Image: Google Inc. 2014. Google Earth Pro, Version 7.0. Mountain View, CA. Accessed: June 3, 2014.

Graphics … 00189.11 (7-16-14) tm

Figure 3-2
Sensitive Receptors

emission modeling program (version 5.0) and traffic data provided by the project traffic engineers, Fehr & Peers (Milam pers. comm.[a]). The effects of localized CO hot-spot emissions were evaluated through CO dispersion modeling using the *Transportation Project-Level Carbon Monoxide Protocol* (CO Protocol) developed for Caltrans by the Institute of Transportation Studies at the University of California, Davis (Garza et al. 1997).

Transportation Conformity

Regional Conformity

The build alternatives are located in a severe nonattainment area with regards to the federal 8-hour O_3 standard. Because O_3 and its precursors are regional pollutants, the project must be evaluated under the transportation conformity requirements described in Section 3.1.1, *Regulatory Setting*. An affirmative regional conformity determination must be made before the project can proceed. Such a determination is not required if the project is described in an approved RTP and/or TIP and the project has not been altered in design concept or scope.

Project-Level Conformity

Carbon Monoxide

The build alternatives are located in a moderate maintenance area with regards to the federal CO standard. Consequently, the evaluation of transportation conformity for CO is required. The CO transportation conformity analysis is based on the CO Protocol (Garza et al. 1997). This CO Protocol details a step-by-step procedure to determine whether project-related CO concentrations have a potential to generate new air quality violations, worsen existing violations, or delay attainment of NAAQS for CO.

CO hot spots were evaluated at roadway intersections within the project area. Existing year (2012), construction year (2020), and design year (2040) conditions were modeled. Modeled traffic volumes and operating conditions were obtained from the traffic data prepared by the project traffic engineers, Fehr & Peers (2014). Ambient CO concentrations near the roadway under future project conditions were modeled using CALINE4 (Benson 1989). Only the p.m. peak hour traffic was modeled, as the modeled LOS and delays are worse in the p.m. peak hour than in the a.m. peak hour (Fehr & Peers 2014).

Appendix A summarizes intersection operational data (i.e., delay, LOS, and volumes) from the Traffic Analysis Report (TAR) (Fehr & Peers 2014). CO intersection modeling was conducted for the following four intersections. These intersections were chosen because they were identified in the TAR as the ones with the highest traffic volumes and/or worst delay in the vicinity of the project area.

- Stanford Ranch Road / Five Star Boulevard
- Creekside Ridge Drive / Roseville Parkway
- Taylor Road / Roseville Parkway
- I-80 eastbound / Eureka Road / Taylor Road

Vehicle emission rates were determined using the EMFAC2011 emission rate program. Free flow traffic speeds were adjusted to a speed of 5.0 mph for vehicles entering and exiting intersection segments to represent a worst-case scenario, as 5 mph is the lowest speed EMFAC allows. EMFAC2011 modeling procedures followed the guidelines recommended by Caltrans. The program assumed Placer County regional traffic data, averaged for each subarea, operating during the winter months. A January low temperature of 39° F was assumed. Appendix B presents the EMFAC2011 and CALINE4 model output files.

CO concentrations were estimated at 4 receptor locations located at each of the four intersections analyzed, for a total of 16 receptors. The receptors were placed at the edge of the mixing zone from the corner of each intersection, accounting for the intersection dimensions as determined by the number of lanes in each direction. The mixing zone is defined by a 3 meter buffer from the outer edge of a roadway. Receptors were modeled at the edge of the mixing zone to represent a worst-case scenario as the nearest location in which a receptor could potentially be located adjacent to a traveled roadway. The modeled receptors indicated in Table 11 (Receptors 1-16) are not representative of the actual sensitive receptors indicated in Figure 3-2. Receptors were chosen based on the CO Protocol (Garza et al. 1997). Receptor heights were set at 5.9 feet (or 1.8 meters).

Meteorological inputs to the CALINE4 model were determined using methodology recommended in Appendix B of the CO Protocol (Garza et al. 1997). The meteorological conditions used in the modeling represent a calm winter period. Worst-case wind angles were modeled to determine a worst-case concentration for each receptor. The meteorological inputs included: 0.5 meters per second wind speed, ground-level temperature inversion (atmospheric stability class G), wind direction standard deviation equal to 5 degrees, and a mixing height of 1.8 meters.

To account for sources of CO not included in the modeling, a background concentration of 2.5 ppm was added to the modeled cumulative 1-hour values, and a background concentration of 1.5

ppm was added to the modeled cumulative 8-hour values. Background concentration data for 1- and 8-hour CO values were obtained from EPA (2013a). Maximum monitored 1- and 8-hour CO values from the nearest monitoring station (North Highlands-Blackfoot Way) for the years 2010 through 2012 were averaged to obtain a background concentration. Eight-hour modeled values were calculated from the 1-hour values using a persistence factor of 0.7. Background concentrations for existing (2012), construction year (2020) with and without project conditions, and design year (2040) with and without project conditions were assumed to be the same as those for the current year. Actual 1- and 8-hour background concentrations in future years would likely be lower than those used in the CO modeling analysis because the trend in CO emissions and concentrations is decreasing because of continuing improvements in engine technology and the retirement of older, higher-emitting vehicles.

PM2.5

As previously indicated, the SVAB portion of Placer County, including the project area, was redesignated by EPA as a nonattainment area for the lowered PM2.5 standard on January 15, 2013. Consequently, the evaluation of transportation conformity for PM2.5 is required.

On March 10, 2006, EPA published a final rule that establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in PM2.5 and PM10 nonattainment and maintenance areas. For the assessment of PM hot spots, the final rule stipulates that a hot-spot analysis is to be performed only for projects of air quality concern (POAQCs). POAQCs are certain highway and transit projects that involve significant levels of diesel traffic or any other project identified in the PM2.5 or PM10 SIP as a localized air quality concern. Section 93.123(b)(1) of the Conformity Rule defines the following projects that require a PM2.5 or PM10 hot-spot analysis (Table 5).

Table 5. POAQC Projects as Defined by Section 93.123(b)(1) of the Conformity Rule

Section 93.123(b)(1) Subsection	Type of Project
i	New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of 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.
v	Projects in or affecting locations, areas, or categories of sites which are identified in the PM2.5 or PM10 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Source: 40 CFR 93.123(b)(1)

EPA noted in the March 2006 final rule that the examples below are considered to be the most likely projects that would be considered a POAQC under Section 93.123(b)(1)i and ii listed above.

- 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% (10,000 truck AADT) 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 (operated 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 busses and/or diesel trucks.

EPA noted in the March 2006 final rule that the examples below are considered to be the most likely projects that would be considered a POAQC under Section 93.123(b)(1)iii and iv listed above.

- A major new bus or intermodal terminal that is considered to be a "regionally significant project."
- An existing bus or intermodal terminal that has a large vehicle fleet where the number of diesel buses increases by 50% or more, as measured by bus arrivals.

EPA noted in the March 2006 final rule that the examples below are considered to be the most likely projects that would not be considered a POAQC under Section 93.123(b)(1)i and ii listed above.

- 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 PM2.5 or PM10 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 PM2.5 or PM10 emissions.

EPA noted in the March 2006 final rule that the examples below are considered to be the most likely projects that would not be considered a POAQC under Section 93.123(b)(1)iii and iv listed above:

- A new or expanded bus terminal that is serviced by non-diesel vehicles (e.g., compressed natural gas) or hybrid-electric vehicles.
- A 50% increase in daily arrivals at a small terminal (e.g., a facility with 10 buses in the peak hour).

For projects identified as not being a POAQC, PM2.5 and PM10 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 have been met without a hot-spot analysis since such projects have been found not to be of air quality concern under 40 CFR 93.123(b)(1). The project was identified as not being a POAQC (see Appendix C), thus no PM2.5 hot-spot analyses were performed.

Mobile-Source Air Toxics

FHWA has issued an updated interim guidance using a tiered approach on how MSATs should be addressed in NEPA documents for highway projects (U.S. Federal Highway Administration

2012). Depending on the specific project circumstances, FHWA has identified the following three levels of analysis.

1. No analysis for exempt projects or projects that have no potential for meaningful MSAT effects.
2. Qualitative analysis for projects with low potential MSAT effects.
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Exempt Projects or Projects with No Meaningful Potential MSAT Effects

The types of projects included in this category—those that are exempt of have no meaningful potential MSAT effects—are listed below.

- 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.

For projects that are categorically excluded under 23 CFR 771.117(c), or are exempt from all conformity requirements under the FCAA pursuant to 40 CFR 93.126, no analysis or discussion of MSAT is necessary. Documentation sufficient to demonstrate that the project qualifies as a categorical exclusion and/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 recommended.[2] However, the project record should document the basis for the determination of "no meaningful potential impacts" with a brief description of the factors considered.

Projects with Low Potential MSAT Effects

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

FHWA anticipates that most highway projects that need an MSAT assessment will fall into this category. Any projects not meeting the criteria for exempt projects/projects without meaningful

---

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

potential effects (discussed above) or projects with higher potential MSAT effects (discussed below) should be included in this category. Examples of these types of projects are minor widening projects, new interchanges, replacing a signalized intersection on a surface street, or projects where design year traffic is projected to be less than 140,000 to 150,000 AADT.

For these projects, a qualitative assessment of emissions projections should be conducted. This 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 MSAT for the project alternatives, including the No Build Alternative, based on vehicle miles travelled (VMT), vehicle mix, and speed. It would also discuss national trend data projecting substantial overall reductions in emissions due to stricter engine and fuel regulations issued by EPA. Because the emission effects of these projects typically are low, we expect there would be no appreciable difference in overall MSAT emissions among the various alternatives.

Projects with Higher Potential MSAT Effects

This category includes projects that have the potential for meaningful differences in MSAT emissions among project alternatives. It is expected a limited number of projects would meet the criteria to fall into this category, which are as follows.

- Projects that create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of DPM in a single location, involving a significant number of diesel vehicles for new projects or accommodating with a significant increase in the number of diesel vehicles for expansion projects; or
- Projects that create new capacity 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 150,000[3], or greater, by the design year.
- Projects that are proposed to be located in proximity to populated areas.

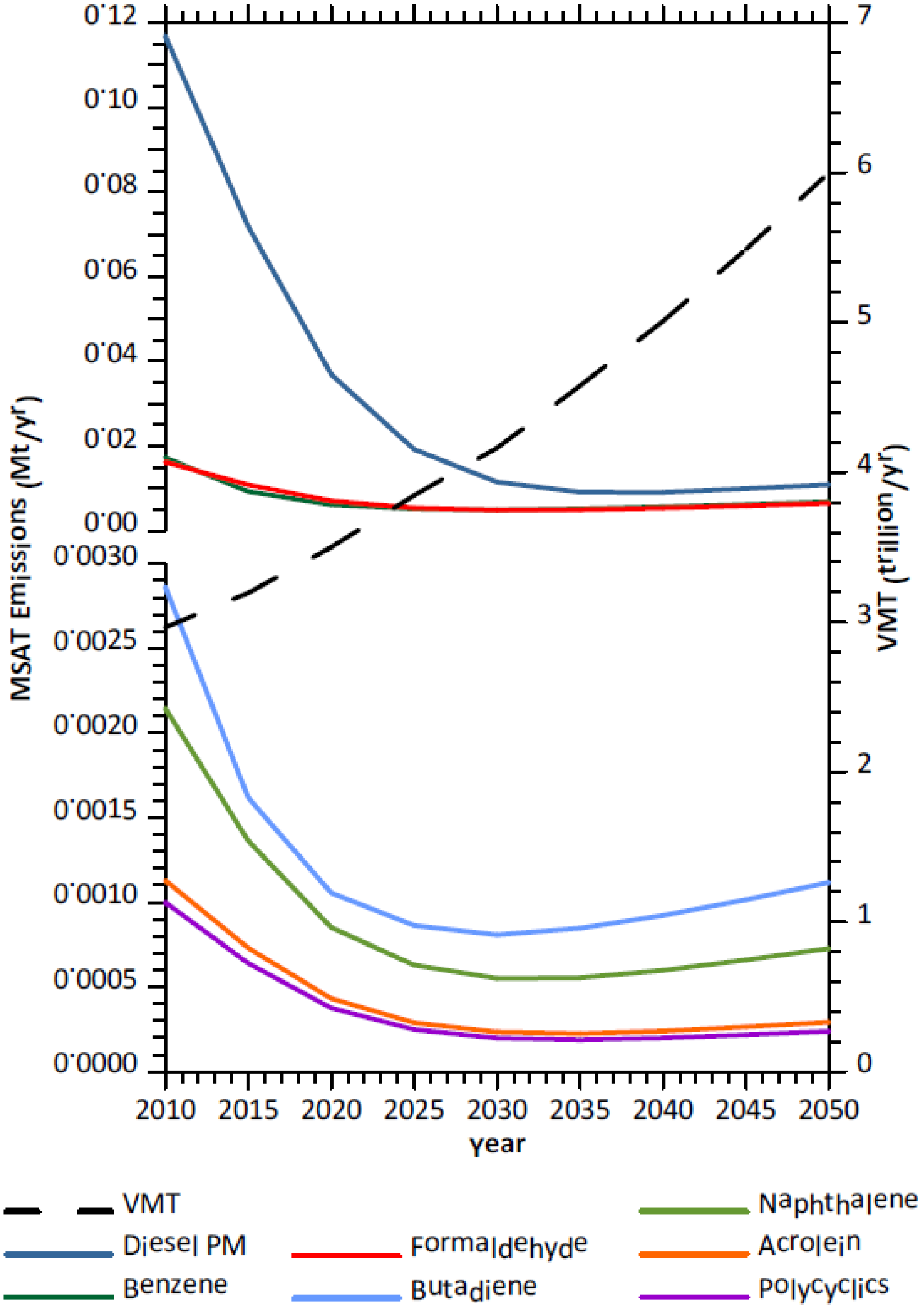
Projects falling within this category should be more rigorously assessed for impacts, including a quantitative analysis to forecast local-specific emission trends of the priority MSAT for each alternative. Based on regulations now in effect, an analysis of national trends with EPA's

---

[3] Using EPA's MOVES2010b emissions model, FHWA staff determined that this range of AADT would result in emissions significantly lower than the California CAA definition of a major hazardous air pollutant (HAP) source, i.e., 25 tons/yr. for all HAPs or 10 tons/yr. for any single HAP. Variations in conditions such as congestion or vehicle mix could warrant a different range for AADT; if this range does not seem appropriate for a proposed project, project proponents can consult with the contacts from Office of Natural Environment (HEPN) and Office of Project Development and Environmental Review (HEPE) identified in the FHWA interim MSAT guidance (U.S. Federal Highway Administration 2012).

MOVES model, as shown in Figure 3-3, even if VMT increases by 102% as assumed from 2010 to 2050, a combined reduction of 83% in the total annual emissions for the priority MSAT is projected for the same time period.

Figure 3-3. Projected National MSAT Emission Trends 2010–2050 For Vehicles Operating On Roadways Using EPA's MOVES2010b Model



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

MSAT Category Assessment for the Project

The analysis of applicable MSAT category for the project is based on design year (2040) AADT, which represents the year with the greatest traffic volumes for Alternative 1, which is summarized in Table 6 and compared to the No Build Alternative. Alternative 1 was selected for the analysis as traffic volumes are forecasted to be highest under this alternative than any of the build alternatives (Fehr & Peers 2014).

Table 6 indicates that the AADT on SR 65 and I-80 under design year (2040) conditions for Alternative 1 would vary between 137,300 and 217,800, depending on the location. Based on this information, it is estimated that mainline AADT would be above FHWA's MSAT AADT threshold of 140,000. Consequently, based on FHWA's 2012 MSAT guidance, this project is considered to have higher potential MSAT effects, and an analysis of MSAT emissions is required (U.S. Federal Highway Administration 2012). Therefore, MSAT emissions are quantitatively evaluated in Section 3.2.2, *Impacts*.

Table 6. AADT Volumes and Truck Percentages under Design Year (2040) Conditions

		No Build			Alternative 1			Delta
Road	**Segments**	**AADT**	**Truck AADT**	**% Truck**	**AADT**	**Truck AADT**	**% Truck**	**Truck AADT**
I-80	Douglas Blvd to Eureka Rd	197,400	14,200	7.19%	204,200	14,300	7.00%	0.7%
	Eureka Rd to Taylor Rd	203,800	14,400	7.07%	217,800	14,400	6.61%	0.0%
	Taylor Rd to SR 65	194,200	13,900	7.16%	213,000	14,300	6.71%	2.9%
	SR 65 to Rocklin Rd	139,500	9,900	7.10%	137,300	9,700	7.06%	-2.0%
SR 65	I-80 to Galleria Blvd	151,500	6,000	3.96%	155,600	6,000	3.86%	0.0%
	Galleria Blvd to Pleasant Grove Blvd	159,100	6,600	4.15%	154,800	6,300	4.07%	-4.5%

Source: Milam pers. comm.(a)

Criteria Pollutants and Greenhouse Gas Emissions

The estimation of criteria pollutant emissions associated with the build alternatives was conducted using Caltrans' CT-EMFAC model and vehicle activity data provided by the project traffic engineer, Fehr & Peers (Milam pers. comm.[a]). CT-EMFAC is a California-specific project-level analysis tool developed for Caltrans by the University of California, Davis to model criteria pollutant, MSAT, and CO_2 emissions from on-road mobile sources. The model uses the latest version of ARB's EMFAC model to quantify running exhaust and running loss emissions using user-input traffic data, including peak-hour and off-peak-hour VMT data allocated into 5-mph speed bins.

Modeled traffic volumes and operating conditions for the project were obtained from the traffic data prepared by Fehr & Peers (Milam pers. comm.[a]). Emission of ROG, NO_X, CO, PM10, PM2.5, and CO_2 were modeled for existing year (2012), construction year (2020), and design year (2040) conditions. Fehr & Peers provided peak hour VMT data and VMT distribution by 5-mph speed bins (5 mph to 70 mph) for existing and 2040 year conditions. VMT data for 2020 interpolated from existing and 2040 VMT data, recommended by Fehr and Peers (Milam pers. comm.[c]). The data included vehicle activity for affected roadways in the immediate project region. The VMT distribution by speed bin is presented in Table 7.

Vehicle emission rates were determined using Caltrans' CT-EMFAC model. The CT-EMFAC program assumed project operating conditions during average annual conditions. Vehicle fleet mixes, including truck volumes, were based on traffic data provided by Fehr & Peers (Milam pers. comm.[a][b]). Appendix B presents the CT-EMFAC emission factors and calculation output files.

Construction Impact Assessment Methodology

Construction activity is a source of dust and exhaust emissions that can have substantial temporary impacts on local air quality (i.e., exceeding state air quality standards for O_3, CO, PM10, and PM2.5). Such emissions would result from earthmoving and use of heavy equipment, as well as land clearing, ground excavation, cut-and-fill operations, and roadway construction. Emissions can vary substantially from day to day, depending on the level of activity, the specific operations, and the prevailing weather. A major portion of dust emissions for the build alternatives would likely be caused by construction traffic on temporary areas.

Construction emissions of ROG, NO_X, CO, PM10, PM2.5, and CO_2 were estimated using the Sacramento Metropolitan Air Quality Management District's (SMAQMD) Road Construction Emissions Model (RCEM) (Version 7.1.5.1). The road construction model is a public-domain spreadsheet model formatted as a series of individual worksheets available to estimate construction-related emissions for roadway projects. The model enables users to estimate emissions using a minimum amount of project-specific information. The model estimates emissions for load hauling (on-road, heavy-duty vehicle trips), worker commute trips, construction site fugitive dust (PM10 and PM2.5), and off-road construction vehicles. This analysis is based on anticipated construction equipment calculated by the RCEM, which estimates construction equipment based on project size, duration of construction activities, and level of daily construction activities. While exhaust emissions are estimated for each activity, fugitive dust estimates are currently limited to major dust-generating activities, which include grubbing/land clearing and grading/excavation.

Table 7. Daily VMT Distribution by Speed Bin and Year

Speed	**Existing**	**Construction Year (2020)**[a]				**Design Year (2040)**			
		No Build	**Alt 1**	**Alt 2**	**Alt 3**	**No Build**	**Alt 1**	**Alt 2**	**Alt 3**
0–5	0	7	28	0	39	25	98	0	137
5–10	3,248	3,953	4,218	4,097	4,094	5,715	6,643	6,221	6,210
10–15	15,951	20,788	21,577	20,170	20,600	32,881	35,641	30,716	32,221
15–20	676,630	755,991	751,678	754,665	751,757	954,392	939,297	949,753	939,573
20–25	157,222	197,136	189,463	185,835	187,479	296,922	270,064	257,368	263,122
25–30	422,377	453,972	450,553	449,961	452,102	532,959	520,994	518,921	526,414
30–35	747,712	839,409	835,396	826,982	829,630	1,068,652	1,054,605	1,025,156	1,034,425
35–40	1,144,163	1,339,026	1,351,610	1,345,908	1,346,688	1,826,182	1,870,227	1,850,270	1,852,999
40–45	424,891	482,137	485,740	491,008	482,716	625,252	637,864	656,302	627,277
45–50	181,922	213,035	202,650	200,081	211,630	290,818	254,471	245,480	285,900
50–55	335,018	398,609	416,874	415,553	418,909	557,586	621,513	616,892	628,636
55–60	686,237	781,382	776,784	787,250	784,467	1,019,246	1,003,151	1,039,781	1,030,041
60–65	334,527	388,515	397,707	399,193	388,724	523,484	555,656	560,858	524,215
65–70	14,419	13,142	16,615	16,628	20,927	9,949	22,106	22,152	37,197
Total	5,144,317	5,887,102	5,900,892	5,897,332	5,899,760	7,744,063	7,792,330	7,779,870	7,788,367

Source: Milam pers. comm.[a]

[a] 2020 values were not provided by Fehr and Peers and were thus interpolated between the available estimated baseline (2012) and design year (2040) VMT

Construction of Alternatives 1 through 3 is expected to occur in four phases, with the first three phases divided into several subcomponents. Tables 8 through 10 summarize the construction phasing assumed in the modeling, including the schedule and primary construction activities. Bridge construction under Phases 1A, 1B, and 3C would occur concurrently in 2020, followed by roadway construction under Phases 1A and 1B in 2021. Roadway construction under Phase 3C would occur in 2032. Tables 8 through 10 identify the length, area, and soil import/export assumptions for each phase. It was conservatively assumed that a maximum of one-quarter the phase area would be disturbed on a daily basis. Equipment and vehicles required to construct each phase were developed using model defaults and the project-specific data summarized in Tables 8 through 10, as well as input from the project engineers (Higgins pers. comm.).

Table 8. Construction Modeling Assumptions for Alternative 1

Phase	Activity	Start Year	Months	Length (Miles)	Area (Acres)	Soil (cubic yards)
1A, 1B, 3C	East Roseville Viaduct, WB80/NB65 ramp (bridge work)	2020	12	2.5	18.5	0
1A, 1B	East Roseville Viaduct, WB80/NB65 ramp, and NB65 widening (roadways)	2021	18	2.5	18.5	137,298
2A	SB65/EB80 ramp	2022	30	1.50	7.3	48,917
2B	EB80/NB65 ramp	2025	24	0.5	4.0	16,497
3A	Taylor Rd Overcrossing	2027	24	0.1	0.9	2,529
3B	I-80 widening, SB65/WB80 ramp	2029	36	1.4	36.8	127,051
3C	SB65 widening	2032	18	1.7	15.3	37,108
3D	Taylor Rd, Taylor Rd ramps	2032	24	0.7	16.0	399,615
4	80/65 HOV Connector	2034	24	0.5	3.5	7,245

Source: Higgins pers. comm.
WB = westbound; NB = northbound; SB = southbound; EB = eastbound
HOV = high occupancy vehicle

Table 9. Construction Modeling Assumptions for Alternative 2

Phase	Activity	Start Year	Months	Length (Miles)	Area (Acres)	Soil (cubic yards)
1A, 1B, 3C	East Roseville Viaduct, WB80/NB65 ramp (bridge work)	2020	12	2.5	18.5	0
1A, 1B	East Roseville Viaduct, WB80/NB65 ramp, and NB65 widening (roadways)	2021	18	2.5	18.5	154,342
2A	SB65/EB80 ramp	2022	30	1.20	16.6	39,258
2B	EB80/NB65 ramp	2025	24	0.5	4.0	8,910
3A	Taylor Rd Overcrossing	2027	24	0.8	17.8	3,563
3B	I-80 widening, SB65/WB80 ramp	2029	30	1.4	32.9	186,876
3C	SB65 widening	2032	18	1.7	15.3	37,108
3D	Taylor Rd, Taylor Rd ramps	2027	24	0.8	8.0	30,711
3E	Collector Distributor	2032	30	1.5	11.1	206,167
4	80/65 HOV Connector	2034	24	0.5	3.4	11,823

Source: Higgins pers. comm.
WB = westbound; NB = northbound; SB = southbound; EB = eastbound
HOV = high occupancy vehicle

Table 10. Construction Modeling Assumptions for Alternative 3

Phase	Activity	Start Year	Months	Length (Miles)	Area (Acres)	Soil (cubic yards)
1A, 1B, 3C	East Roseville Viaduct, WB80/NB65 ramp (bridge work)	2020	12	2.5	18.5	0
1A, 1B	East Roseville Viaduct, WB80/NB65 ramp, and NB65 widening (roadways)	2021	18	2.5	18.5	154,342
2A	SB65/EB80 ramp	2022	30	1.6	6.7	39,258
2B	EB80/NB65 ramp	2025	24	0.5	4.1	8,910
3A	Taylor Rd Overcrossing	2027	24	0.1	0.9	3,563
3B	I-80 widening, SB65/WB80 ramp	2029	36	1.4	32.0	186,876
3C	SB65 widening	2032	18	1.7	15.3	27,508
3D	Taylor Rd	2032	24	0.8	8.0	28,344
3E	Collector Distributor	2032	24	1.5	9.6	163,226
4	80/65 HOV Connector	2034	24	0.5	3.5	11,823

Source: Higgins pers. comm.
WB = westbound; NB = northbound; SB = southbound; EB = eastbound
HOV = high occupancy vehicle

3.2.2 Impacts

This section discusses air quality and climate change impacts that could result from project implementation.

Impact AQ-1: Conformity of the Regional Transportation Plan with the State Implementation Plan

Phase 1 of the I-80/SR 65 Interchange Improvements Project is included in the regional emissions analysis conducted by Sacramento Area Council of Governments (SACOG) for the conforming 2035 Metropolitan Transportation Plan (MTP)/Sustainable Communities Strategy (SCS) and 2013–2016 MTIP (SACOG ID PLA25440*)*. The complete project (i.e., Phases 1 through 4) will be included in the regional emissions and conformity analysis for the upcoming 2036 MTP/SCS and 2015-2018 MTIP. Adoption and federal approval of the 2036 MTP/SCS and 2015-2018 MTIP is expected in early 2016, whereas the final environmental document for the project is expected in summer 2016. Accordingly, the regional emissions modeling conducted for the 2036 MTP/SCS and 2015-2018 MTIP would ensure that, prior to preparation of the final environmental document for the Project, the design, concept, and scope for the project will be consistent with the description in the 2036 MTP/SCS and 2015-2018 MTIP and the “open to traffic” assumptions in SACOG’s regional emissions analysis. The Project’s regional conformity determination requirement is satisfied.

Impact AQ-2: Potential Violations of Carbon Monoxide NAAQS or CAAQS

Existing year (2012), construction year (2020), and design year (2040) conditions were modeled to evaluate CO concentrations relative to the NAAQS and CAAQS. As previously discussed, CO concentrations were estimated at four roadway intersections within the project area. These roadway intersections and segments were modeled because they represent the roadway intersections that would have the worst LOS and highest traffic volumes. Traffic data provided by Fehr & Peers (2014) indicate that peak-period volumes and delay at the affected intersections would typically be highest under Alternative 3. Accordingly, CO concentrations were modeled for Alternative 3 to evaluate the highest potential CO impacts of all build alternatives. Since congestion and traffic volumes are forecasted to be lower under Alternatives 1 and 2, CO concentrations under these alternatives would likewise be lower than those estimated for Alternative 3.

Table 11 summarizes the results of the intersection CO modeling and indicate that CO concentrations are not anticipated to exceed the 1- or 8- hour NAAQS and CAAQS under Alternative 3 and the No Build Alternative. Consequently, CO concentrations under all build alternatives are not expected to exceed the 1- or 8- hour NAAQS and CAAQS.

Impact AQ-3: Potential Violations of PM2.5 NAAQS or CAAQS

The project would be within a nonattainment area for the federal PM2.5 standard. Therefore, per 40 CFR Part 93, a project-level PM2.5 analysis is required for conformity purposes.

As discussed in Section 3.1.1, *Regulatory Setting*, a quantitative hot-spot analysis is only required for projects identified as a POAQC, as defined in 40 CFR 93.123(b)(1). As described below, the project does not meet any of the project types considered to be POAQC by EPA’s final rule. Accordingly, the project is not considered to be a POAQC, and project-level PM conformity determination requirements are thus satisfied.

Table 11. CO Modeling Concentration Results (Parts per Million)

Intersection	Receptor[a]	Existing (2012)		Construction Year (2020) No Build		Construction Year (2020) Alternative 3		Design Year (2040) No Build		Design Year (2040) Alternative 3	
		1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]
Stanford Ranch Rd / Five Star Blvd	1	4.9	3.2	3.7	2.4	3.7	2.4	3.0	1.9	3.1	1.9
	2	5.2	3.4	3.9	2.5	3.9	2.5	3.1	1.9	3.2	2.0
	3	6.0	4.0	4.4	2.9	4.3	2.8	3.3	2.1	3.4	2.2
	4	5.8	3.8	4.3	2.8	4.2	2.7	3.3	2.1	3.4	2.2
Creekside Ridge Dr / Roseville Pkwy	5	7.1	4.7	4.9	3.2	4.5	2.9	3.6	2.3	3.5	2.2
	6	6.8	4.5	4.7	3.1	4.4	2.9	3.5	2.2	3.5	2.2
	7	6.3	4.2	4.4	2.9	4.1	2.6	3.3	2.1	3.3	2.1
	8	5.4	3.6	4.1	2.6	3.9	2.5	3.2	2.0	3.2	2.0
Taylor Rd / Roseville Pkwy	9	6.4	4.3	4.5	2.9	4.6	3.0	3.6	2.3	3.6	2.3
	10	6.1	4.0	4.3	2.8	4.3	2.8	3.5	2.2	3.5	2.2
	11	5.6	3.7	4.1	2.6	4.1	2.6	3.4	2.2	3.4	2.2
	12	5.2	3.4	3.9	2.5	4.0	2.6	3.3	2.1	3.3	2.1
I-80 EB / Eureka Rd / Taylor Rd	13	5.8	3.8	4.4	2.9	4.5	2.9	3.2	2.0	3.5	2.2
	14	5.9	3.9	4.6	3.0	4.7	3.1	3.3	2.1	3.6	2.3
	15	5.7	3.8	4.3	2.8	4.4	2.9	3.2	2.0	3.5	2.2
	16	5.3	3.5	3.9	2.5	4.0	2.6	3.1	1.9	4.3	2.8

NA: Not applicable.

[a] Consistent with Caltrans CO Protocol, receptors are located at 3 meters from the intersection, at each of the four corners to represent the nearest location in which a receptor could potentially be located adjacent to a traveled roadway. The modeled receptors indicated in Table 11 (Receptors 1-16) are not representative of the actual sensitive receptors indicated in Figure 3-2. All intersections modeled have two intersecting roadways.

[b] Average 1-hour background concentration between 2010 and 2012 was 2.5 ppm (California Air Resources Board 2014a).

[c] Average 8-hour background concentration between 2010 and 2012 was 1.5 ppm (U.S. Environmental Protection Agency 2013a).

CO = carbon monoxide; EB = eastbound

(i) **New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles**. The project would construct improvements on an existing freeway to freeway interchange. For existing freeway facilities, the effect of a project on truck volumes is typically the primary point on which this criterion is judged. A project may be located on a freeway with a substantial number of trucks, but if it does not change those truck volumes significantly, it may have a minimal effect on exhaust-related particulate matter. As shown in Table 6, the project would result in 2040 truck volumes increasing by less than 5% on all of the six freeway segments within the project limits. Looking at the segment of I-80 between Taylor Road and SR 65, the increase in the total number of vehicles between Alternative 1 and the No Build Alternative is 14,300 per day. However, as shown in Exhibit 2 in Appendix A, most trucks stay on the freeways under both no-project and with-project conditions. As a result, Table 6 shows that truck volumes on I-80 between Taylor Road and SR 65 would increase by only 400 trucks per day, which is less than a 3% increase.

(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 projec**t. Implementation of the project would relieve congestion on the local roadway network by redistributing traffic from the local roadways to the mainline I-80/SR 65 corridor. The traffic study evaluated 37 intersections during the a.m. and p.m. peak hours (Fehr & Peers 2014). The project would result in improved LOS and reduced vehicle delay at all but four study intersections (Stanford Ranch Road / Five Star Boulevard, Roseville Parkway / Creekside Ridge Drive, Roseville Parkway/Taylor Road [Alternative 3 only], and Eureka Road / Taylor Road / I-80 eastbound ramps). However, none of the study intersections has a significant number of trucks (less than 5%); therefore, the project would not affect any at-grade intersections with a high number of diesel vehicles.

(iii) **New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location**. The project does not include new bus or rail terminals and transfer points.

(iv) **Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location**. The project does not include expanded bus or rail terminals and transfer points.

(v) **Projects in or affecting locations, areas, or categories of sites which are identified in the PM2.5 or PM10 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation**. Currently, there is no SIP for the federal PM2.5 standard.

Based on the discussion above, the project would not be considered a POAQC, as defined by 40 CFR 93.123(b)(1). Therefore, FCAA and 40 CFR 93.116 requirements were met without a hot-spot analysis.

The project underwent interagency consultation through SACOG's Project Level Conformity Group (PLCG), which issued concurrence that the project is not a POAQC on April 23, 2013. Appendix C contains the documentation submitted to SACOG's PLCG used to support its concurrence, as well as concurrence letters from EPA and FHWA that the project is not a POAQC.

Impact AQ-4: Potential for Generation of Mobile Source Air Toxic Emissions

As discussed in Section 3.2.1, *Methods,* AADT on SR 65 and I-80 under 2040 design year conditions will vary between 137,300 and 217,800, depending on the location. Based on this information, it is estimated that mainline AADT would be above FHWA's MSAT AADT threshold of 140,000. Consequently, based on the FHWA's 2012 MSAT guidance, this project is considered a project with higher potential MSAT effects, and an analysis of MSAT emissions is required (U.S. Federal Highway Administration 2012). Therefore, an evaluation of MSAT emissions for existing (2012), construction year (2020), and design year (2040) conditions was performed using the CT-EMFAC model and the traffic data presented in Table 7.

Table 12 presents modeled MSAT emissions by scenario, as well as a comparison of build emissions to no build and existing conditions. The differences in emissions between with- and without-project conditions represent emissions generated directly as a result of implementation of the project. The build alternatives would have no effect on acetaldehyde, acrolein, or butadiene emissions relative to the No Build Alternative. However, they would slightly increase DPM emissions under 2020 conditions and benzene and DPM emissions under 2040 conditions. Implementation of Alternative 1 would also slightly increase formaldehyde emissions, relative to the No Build Alternative, under 2040 conditions.

Table 12. Estimated MSAT Emissions for the I-80/SR 65 Interchange Improvements Project (pounds per day)

Alternative	Acetaldehyde	Acrolein	Benzene	Butadiene	Formaldehyde	DPM
2012 Baseline	22	2	36	8	55	103
2012 + Alternative 1[a]	22	2	36	8	55	104
2012 + Alternative 2[a]	22	2	36	8	55	104
2012 + Alternative 3[a]	22	2	36	8	55	104
2020 No Build	9	1	17	4	23	24
2020 Alternative 1	9	1	17	4	23	24
2020 Alternative 2	9	1	17	4	23	24
2020 Alternative 3	9	1	17	4	23	24
2040 No Build	12	1	18	4	29	37
2040 Alternative 1	12	1	18	4	30	37
2040 Alternative 2	12	1	18	4	29	37
2040 Alternative 3	12	1	18	4	29	37
Comparison to Existing						
Alternative 1	0.1	0.0	0.2	0.0	0.2	1.1
Alternative 2	0.0	0.0	0.1	0.0	0.0	1.0
Alternative 3	0.0	0.0	0.1	0.0	0.0	1.0
Comparison to No Build						
2020 Alternative 1	0.0	0.0	0.0	0.0	0.0	0.1
2020 Alternative 2	0.0	0.0	0.0	0.0	0.0	0.1
2020 Alternative 3	0.0	0.0	0.0	0.0	0.0	0.1
2040 Alternative 1	0.0	0.0	0.1	0.0	0.1	0.3
2040 Alternative 2	0.0	0.0	0.1	0.0	0.0	0.3
2040 Alternative 3	0.0	0.0	0.1	0.0	0.0	0.3

DPM = diesel particulate matter

[a] Evaluates the net project impact on VMT under existing conditions. For this analysis, net VMT under the project was derived from the design (2040) year analysis and added to VMT under existing conditions. The analysis was undertaken to support the project-level CEQA document.

Impact AQ-5: Potential for Generation of Operation-Related Emissions of O_3 Precursors, Carbon Monoxide, and Particulate Matter

Long-term air quality impacts are those associated with motor vehicles operating on the roadway network, predominantly those operating in the project vicinity. Emission of ROG, NO_X, CO, PM10, and PM2.5 for existing year (2012), construction year (2020), and design year (2040) with- and without-project conditions were evaluated through modeling conducted using Caltrans' CT-EMFAC model and vehicle activity data provided by the project traffic engineer, Fehr & Peers (Milam pers. comm.[a]).

Table 13 summarizes the modeled emissions by scenario, as well as a comparison of build emissions to no build and existing conditions. The differences in emissions between with- and without-project conditions represent emissions generated directly as a result of implementation of the build alternatives. 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 13. Estimated Criteria Pollutant Emissions from Operation of 80/65 Interchange Improvements Project (pounds per day)

Alternative	Daily VMT	ROG	NO_X	CO	PM10	PM2.5
2012 Baseline	5,144,317	2,383	7,000	24,612	641	304
2012 + Alternative 1[a]	5,192,584	2,402	7,064	24,786	647	307
2012 + Alternative 2[a]	5,180,124	2,396	7,049	24,715	645	306
2012 + Alternative 3[a]	5,188,621	2,398	7,057	24,733	646	306
2020 No Build	5,887,102	1,527	2,929	14,005	670	290
2020 Alternative 1	5,900,892	1,530	2,935	14,028	671	290
2020 Alternative 2	5,897,332	1,529	2,934	14,016	671	290
2020 Alternative 3	5,899,760	1,530	2,935	14,020	671	290
2040 No Build	7,744,063	1,511	2,609	12,794	876	378
2040 Alternative 1	7,792,330	1,520	2,623	12,852	881	380
2040 Alternative 2	7,779,870	1,518	2,618	12,825	880	379
2040 Alternative 3	7,788,367	1,519	2,620	12,833	881	380
Comparison to Existing						
Alternative 1	48,267	19	65	173	6	3
Alternative 2	35,807	13	50	103	4	2
Alternative 3	44,304	15	58	121	5	2
Comparison to No Build						
2020 Alternative 1	13,791	3	6	22	2	1
2020 Alternative 2	10,231	2	5	11	1	0
2020 Alternative 3	12,658	3	6	15	1	1
2040 Alternative 1	48,267	9	14	58	5	2
2040 Alternative 2	35,807	7	10	30	4	2
2040 Alternative 3	44,304	8	12	39	5	2
PCAPCD Threshold	-	*82*	*82*	-	*82*	-

[a] Evaluates the net project impact on VMT under existing conditions. For this analysis, net VMT under the project was derived using design year (2040) conditions and added to VMT under existing conditions. The analysis was undertaken to support the project-level CEQA document.

Emissions associated with implementation of the project were obtained by comparing with-project emissions to without-project emissions. Because Caltrans has statewide jurisdiction, and the setting for projects varies so extensively across the state, Caltrans has not and has no intention to develop thresholds of significance for CEQA. Further, because most air district thresholds have not been established by regulation or by delegation down from a federal or state agency with regulatory authority over Caltrans, Caltrans is not required to adopt those thresholds in Caltrans' documents. Nevertheless, project-level operational emissions are presented in Table 13. A comparison of existing plus project conditions is also presented.

Implementation of the build alternatives would increase all criteria pollutants compared to the existing conditions and the No Build Alternative in 2020 and 2040. This increase is due to improved traffic operations under the project, which in turn increases demand and associated VMT on the transportation network. Future year peak period traffic volumes are forecasted to exceed available capacity in many locations on I-80 and SR 65 under the No Build Alternative. The build alternatives would expand capacity in these locations, which reduces travel times and induces more vehicle travel. Accordingly, since delay would be reduced under the build alternatives, VMT and resultant vehicle emissions would increase.

Impact AQ-6: Potential for Temporary Increase in O_3 Precursors (ROG and NO_X), CO, and PM10 Emissions during Grading and Construction Activities

Implementation of Alternatives 1 through 3 would result in the construction of widened roads, overcrossings, and ramps, as well as intersection improvements and the removal of existing ramp connections. Temporary construction emissions would result from grubbing/land clearing, grading/excavation, drainage/utilities/subgrade construction, and paving activities and construction worker commuting patterns. Pollutant emissions would vary daily, depending on the level of activity, specific operations, and prevailing weather.

The SMAQMD’s RCEM (Version 7.1.5.1) was used to estimate construction-related O_3 precursors ROG and NO_X, CO, PM10, PM2.5, and CO_2 emissions from construction activities. As shown in Tables 8 thorough 10, several construction phases are anticipated to occur concurrently. To provide a realistic, yet conservative scenario, maximum daily emissions were estimated assuming all equipment would operate at the same time during periods of overlap among the various construction phases. Daily emissions estimates for overlapping construction phases were therefore added to obtain the maximum total project-related construction impact. Because of this conservative assumption, actual emissions could be less than those forecasted. If construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner burning construction equipment fleet mix, and/or (2) a less intensive build-out schedule (i.e., fewer daily emissions occurring over a longer time interval).

Tables 14 through 16 summarize maximum daily emissions levels in each of the 15 construction years for Alternatives 1 thorough 3, respectively. Because Caltrans has statewide jurisdiction, and the setting for projects varies so extensively across the state, Caltrans has not and has no intention to develop thresholds of significance for CEQA. Further, because most air district thresholds have not been established by regulation or by delegation down from a federal or state agency with regulatory authority over Caltrans, Caltrans is not required to adopt those thresholds in Caltrans’ documents. Nevertheless, PCAPCD thresholds of significance are provided for reference.

Table 14. Estimated Unmitigated Criteria Pollutant Emissions from Construction of Alternative 1 (pounds per day)[a]

Year	ROG	NO_X	CO	PM10			PM2.5		
				Dust	**Exhaust**	**Total**	**Dust**	**Exhaust**	**Total**
2020	11	115	80	0	5	5	0	5	5
2021	6	62	45	46	3	49	10	2	12
2022	9	86	80	46	4	48	10	3	12
2023	9	86	80	18	4	22	4	3	7
2024	6	53	52	18	2	21	4	2	6
2025	8	78	79	10	3	13	2	3	5
2026	6	49	52	10	2	12	2	2	4
2027	8	78	79	2	3	6	0	3	4
2028	6	49	52	2	2	4	0	2	2
2029	9	84	79	92	4	96	19	4	23
2030	9	84	79	92	4	96	19	4	23
2031	5	46	52	92	2	94	19	2	21
2032	10	90	90	78	5	83	16	4	20
2033	7	61	67	78	3	81	16	3	19
2034	8	78	79	9	3	12	2	3	5
2035	6	49	52	9	2	11	2	2	4
PCAPCD Threshold	*82*	*82*	-	-	-	*82*	-	-	-

[a] The RCEM only includes annual emission factors through 2025. Accordingly, emissions in 2026 through 2034 were modeled using 2025 emission factors. Since emission factors are expected to decline overtime as a result of regulations and continuing improvements in engine technology, emissions presented for 2026 through 2034 likely overestimate potential air quality impacts.

Table 15. Estimated Unmitigated Criteria Pollutant Emissions from Construction of Alternative 2 (pounds per day)[a]

Year	ROG	NO_X	CO	PM10			PM2.5		
				Dust	**Exhaust**	**Total**	**Dust**	**Exhaust**	**Total**
2020	11	115	80	0	5	5	0	5	5
2021	6	63	45	46	3	49	10	2	12
2022	9	86	80	46	4	48	10	3	12
2023	9	86	80	42	4	45	9	3	12
2024	6	53	52	42	2	44	9	2	11
2025	8	78	79	10	3	13	2	3	5
2026	6	49	52	10	2	12	2	2	4
2027	14	126	128	64	6	70	13	5	19
2028	8	73	79	64	3	68	13	3	16
2029	9	79	79	82	4	86	17	3	20
2030	9	79	79	82	4	86	17	3	20
2031	5	44	52	82	2	84	17	2	19
2032	13	121	124	66	6	72	14	5	19
2033	9	48	52	28	2	30	6	2	8
2034	9	85	90	36	4	39	8	3	10
2035	6	49	52	9	2	11	2	2	4
PCAPCD Threshold	*82*	*82*	-	-	-	*82*	-	-	-

[a] The RCEM only includes annual emission factors through 2025. Accordingly, emissions in 2026 through 2034 were modeled using 2025 emission factors. Since emission factors are expected to decline overtime as a result of regulations and continuing improvements in engine technology, emissions presented for 2026 through 2034 likely overestimate potential air quality impacts.

Table 16. Estimated Unmitigated Criteria Pollutant Emissions from Construction of Alternative 3 (pounds per day)[a]

Year	ROG	NO_X	CO	PM10			PM2.5		
				Dust	Exhaust	Total	Dust	Exhaust	Total
2020	11	115	80	0	5	5	0	5	5
2021	6	63	45	46	3	49	10	2	12
2022	9	86	80	46	4	48	10	3	12
2023	9	86	80	17	4	21	3	3	7
2024	6	53	52	17	2	19	3	2	6
2025	8	78	79	10	3	14	2	3	5
2026	6	49	52	10	2	12	2	2	4
2027	14	126	128	22	6	28	5	5	10
2028	8	73	79	22	3	26	5	3	8
2029	9	85	79	80	4	84	17	4	20
2030	9	85	79	80	4	84	17	4	20
2031	5	46	52	80	2	82	17	2	19
2032	13	123	124	62	6	68	13	5	18
2033	9	81	85	62	4	66	13	3	16
2034	8	78	52	9	3	12	2	3	5
2035	6	49	52	9	2	11	2	2	4
PCAPCD Threshold	*82*	*82*	-	-	-	*82*	-	-	-

[a] The RCEM only includes annual emission factors through 2025. Accordingly, emissions in 2026 through 2034 were modeled using 2025 emission factors. Since emission factors are expected to decline overtime as a result of regulations and continuing improvements in engine technology, emissions presented for 2026 through 2034 likely overestimate potential air quality impacts.

Construction activities are subject to requirements found in the *Standard Specifications for Construction of Local Streets and Roads* (California Department of Transportation 2010), Section 14-9.02, which includes specifications relating to air pollution control by complying with air pollution control rules, regulations, ordinances, and statutes that apply to work performed under the contract, including air pollution control rules, regulations, ordinances, and statutes provided in Government Code Section 11017 (Public Contract Code Section 10231) while standard specification Section 14-9.03 addresses dust control and palliative requirements. Implementation of Caltrans' standard specification and measures to control dust during construction would help to minimize air quality impacts from construction activities.

Naturally Occurring Asbestos

According to the California Department of Conservation's 2000 publication, *A General Location Guide for Ultramafic Rocks in California*, and PCAPCD mapping (Placer County Air Pollution Control District 2008), there are no geologic features normally associated with naturally occurring asbestos (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. However, construction activities that involve the demolition of any building or structure containing asbestos would be subject to EPA’s National Emissions Standards for Hazardous Air Pollutants (NESHAP) and ARB’s Airborne Toxic Control Measures (ATCMs).

Impact AQ-7: Potential for Generation of Greenhouse Gas Contaminant Emissions

The project would result in widened roads, overcrossings, and ramps, as well as intersection improvements and the removal of existing ramp connections that would reduce vehicle delay and address existing capacity constraints. These transportation improvements would induce more vehicle travel to the project area, resulting in increased VMT compared to no build conditions. Caltrans’ CT-EMFAC model was used to estimate CO_2 emissions for existing (2012), construction year (2020), and design year (2040 conditions) and evaluate potential emissions increases among the project alternatives. Table 17 summarizes the modeled emissions by scenario, as well as a comparison of build emissions to no build and existing conditions. Emissions are presented with and without state mandates to reduce GHG emissions from onroad vehicles and transportation fuels.[4]

Implementation of the build alternatives would increase GHG emissions compared to the existing conditions and the No Build Alternative in 2020 and 2040. This increase is due to improved traffic operations under the project, which in turn increases demand and associated VMT on the transportation network. As discussed in Impact AQ-5, future year peak period traffic volumes are forecasted to exceed available capacity in many locations on I-80 and SR 65 under the No Build Alternative. The build alternatives would expand capacity in these locations, which reduces travel times and induces more vehicle travel. Accordingly, since delay would be reduced under the build alternatives, VMT and resultant GHG emissions would increase.

Currently, there are no federal or state standards set for CO_2 emissions, therefore the estimated emissions shown in Table 17 are only useful for a comparison between alternatives. The numbers are not necessarily an accurate reflection of what the true CO_2 emissions would be because CO_2 emissions are dependent on other factors that are not part of the model, such as the fuel mix[5], rate of acceleration, and the aerodynamics and efficiency of the vehicles. Refer to Appendix D for a summary of limitations and uncertainties associated with the emissions modeling.

---

[4] Actions undertaken by the state will contribute to project-level GHG reductions. The state mandate analysis assumes implementation of Pavley and the Low Carbon Fuel Standard (LCFS). Pavley will improve the efficiency of automobiles and light duty trucks, whereas LCFS will reduce the carbon intensity of diesel and gasoline transportation fuels.

[5] CT-EMFAC model emission rates are only for direct engine-out CO_2 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.

Table 17. Estimated Greenhouse Gas Emissions from Operation of I-80/SR 65 Interchange Improvements Project (metric tons per year)

		Emissions without Pavley and LCFS			Emissions with Pavley and LCFS		
Alternative	**Annual VMT**	**CO_2**	**Other[a]**	**CO_2e**	**CO_2**	**Other[a]**	**CO_2e**
2012 Baseline	1,785,077,999	825,982	9,912	835,893	793,615	9,523	803,139
2012 + Alternative 1[b]	1,801,826,648	830,993	9,972	840,965	798,433	9,581	808,014
2012 + Alternative 2[b]	1,797,503,028	828,610	9,943	838,554	796,141	9,554	805,695
2012 + Alternative 3[b]	1,800,451,487	829,201	9,950	839,152	796,713	9,561	806,273
2020 No Build	2,042,824,245	920,519	11,046	931,565	687,066	8,245	695,310
2020 Alternative 1	2,047,609,574	921,917	11,063	932,980	688,112	8,257	696,369
2020 Alternative 2	2,046,374,254	921,268	11,055	932,324	687,626	8,252	695,877
2020 Alternative 3	2,047,216,670	921,407	11,057	932,464	687,733	8,253	695,986
2040 No Build	2,687,189,861	1,247,683	14,972	1,262,655	863,380	10,361	873,740
2040 Alternative 1	2,703,938,510	1,252,760	15,033	1,267,793	866,911	10,403	877,314
2040 Alternative 2	2,699,614,890	1,250,381	15,005	1,265,386	865,245	10,383	875,628
2040 Alternative 3	2,702,563,349	1,250,936	15,011	1,265,947	865,659	10,388	876,047
Comparison to Existing							
Alternative 1	16,748,649	5,011	60	5,071	4,818	58	4,876
Alternative 2	12,425,029	2,629	32	2,660	2,526	30	2,556
Alternative 3	15,373,488	3,219	39	3,258	3,098	37	3,135
Comparison to No Build							
2020 Alternative 1	4,785,328	1,398	17	1,415	1,046	13	1,059
2020 Alternative 2	3,550,008	750	9	759	560	7	567
2020 Alternative 3	4,392,425	889	11	899	668	8	676
2040 Alternative 1	16,748,649	5,077	61	5,138	3,531	42	3,574
2040 Alternative 2	12,425,029	2,698	32	2,731	1,866	22	1,888
2040 Alternative 3	15,373,488	3,253	39	3,292	2,280	27	2,307

[a] Includes methane (CH_4), nitrous oxide (N_2O), and other trace GHGs emissions emitted by typical passenger vehicles (U.S. Environmental Protection Agency 2013c, 2013d).

[b] Evaluates the net project impact on VMT under existing conditions. For this analysis, net VMT under the project was derived using design year (2040) conditions and added to VMT under existing conditions. The analysis was undertaken to support the project-level CEQA document.

Construction Emissions

Construction GHG emissions include emissions produced as a result of material processing, emissions produced by on-site construction equipment, and emissions arising from traffic delays due to construction. The SMAQMD's RCEM (Version 7.1.5.1) was used to estimate CO_2 emissions from construction activities. The RCEM does not include emission factors for CH_4 or N_2O for off-road diesel equipment. Emissions of CH_4 and N_2O from diesel-powered equipment were determined by scaling the CO_2 emissions quantified by the ratio of CH_4/CO_2 (0.000057) and N_2O/CO_2 (0.000025) (Climate Registry 2014). Emissions of CH_4, N_2O, and other trace GHGs from gasoline-powered vehicles were determined by dividing the CO_2 emissions quantified by Equation 22A-4 by 0.988 (U.S. Environmental Protection Agency 2013a and 2013b)

Table 18 summarizes estimated GHG emissions generated by on-site construction equipment over the 15-year construction period. These emissions would be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be mitigated to some degree by longer intervals between maintenance and rehabilitation events. Measures to reduce construction emissions include maintenance of construction equipment and vehicles, limiting of construction vehicle idling time, and scheduling and routing of construction traffic to reduce engine emissions.

Table 18. GHG Emissions from Construction of Alternatives 1 through 3 (metric tons per year)

	Diesel Equipment			**Gasoline Vehicles**		
Alternative	**CO_2**	**CH_4**	**N_2O**	**CO_2**	**Other[a]**	**CO_2e**
Alternative 1	19,568	1.1	0.5	1,497	18	21,246
Alternative 2	21,656	1.2	0.6	1,253	15	23,105
Alternative 3	21,517	1.2	0.5	1,275	15	22,987

[a] Includes CH_4, N_2O, and other trace GHGs emissions emitted by typical passenger vehicles (U.S. Environmental Protection Agency 2013c, 2013d).

3.3 Avoidance, Minimization, and/or Mitigation Measures

Implement California Department of Transportation Standard Specification Section 14

To control the generation of construction-related PM10 emissions, the project proponent will follow Standard Specification Section 14, “Environmental Stewardship,” which addresses the contractor’s responsibility on many items of concern, such as: air pollution; protection of lakes, streams, reservoirs, and other water bodies; use of pesticides; safety; sanitation; convenience for the public; and damage or injury to any person or property as a result of any construction operation. Section 14-9.02, which includes specifications relating to air pollution control by complying with air pollution control rules, regulations, ordinances, and statutes that apply to work performed under the contract, including air pollution control rules, regulations, ordinances, and statutes provided in Government Code Section 11017 (Public Contract Code Section 10231). Section 14-9.03 is directed at controlling dust.

Implement Additional Control Measures for Construction Emissions of Fugitive Dust

Additional measures to control dust will be borrowed from the PCAPCD Fugitive Dust Control Requirements and implemented to the extent practicable when the measures have not already been incorporated and do not conflict with requirements of Caltrans' Standard Specifications, Special Provisions, NPDES permit, and the Biological Opinions, Clean Water Act Section 404 permit, Clean Water Act Section 401 Certification, and other permits issued for the project. The following excerpt is taken from the PCAPCD Fugitive Dust Control Requirements Fact Sheet (PCAPCD 2013).

> For areas to be disturbed of any size, Rule 228, Fugitive Dust, Section 400 establishes standards to be met by activities generating fugitive dust. Minimum dust control requirements, summarized below, are to be initiated at the start and maintained throughout the duration of construction:
>
> 401.1 – Unpaved areas subject to vehicle traffic must be stabilized by being kept wet, treated with a chemical dust suppressant, or covered. In geographic ultramafic rock units, or when naturally occurring asbestos, ultramafic rock, or serpentine is to be disturbed, the cover material shall contain less than 0.25 percent asbestos as determined using the bulk sampling method for asbestos in Section 502.
>
> 401.2 – The speed of any vehicles and equipment traveling across unpaved areas must be no more than 15 miles per hour unless the road surface and surrounding area is sufficiently stabilized to prevent vehicles and equipment traveling more than 15 miles per hour from emitting dust exceeding Ringelmann 2 or visible emissions from crossing the project boundary line.
>
> 401.3 – Storage piles and disturbed areas not subject to vehicular traffic must be stabilized by being kept wet, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile.
>
> 401.4 – Prior to any ground disturbance, including grading, excavating, and land clearing, sufficient water must be applied to the area to be disturbed to prevent emitting dust exceeding Ringelmann 2 and to minimize visible emissions from crossing the boundary line.
>
> 401.5 – Construction vehicles leaving the site must be cleaned to prevent dust, silt, mud, and dirt from being released or tracked off site.
>
> 401.6 – When wind speeds are high enough to result in dust emissions crossing the boundary line, despite the application of dust mitigation measures, grading and earthmoving operations shall be suspended.

401.7 – No trucks are allowed to transport excavated material off-site unless the trucks are maintained such that no spillage can occur from holes or other openings in cargo compartments, and loads are either;

401.7.1 Covered with tarps; or

401.7.2 Wetted and loaded such that the material does not touch the front, back, or sides of the cargo compartment at any point less than six inches from the top and that no point of the load extends above the top of the cargo compartment.

402 – A person shall take actions such as surface stabilization, establishment of a vegetative cover, or paving, to minimize wind-driven dust from inactive disturbed surface areas.

In addition, Rule 228 requires that all projects must minimize and clean-up the track-out of bulk material or other debris onto public paved roadways. For 1 acre and less disturbed surface area in areas that are not “Most Likely” to contain NOA according to PCAPCD’s NOA Hazard maps, and where NOA has not been found, only these minimum dust measures must be met (i.e., no Dust Control Plan is required).

For projects where greater than 1 acre of the site’s surface will be disturbed, a Dust Control Plan (DCP) must be submitted to PCAPCD for approval prior to the start of earth-disturbing activities if this requirement has been established as a Condition of Approval of a discretionary permit.

Chapter 4 References Cited

4.1 Printed References

Benson, Paul. 1989. CALINE4—A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadways. Sacramento, CA: California Department of Transportation.

California Air Resources Board. n.d. Glossary of Air Pollution Terms. Available: <http://www.arb.ca.gov/html/gloss.htm#A>. Accessed: July 1, 2014.

California Air Resources Board. 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. Stationary Source Division, Mobile Source Control Division. Sacramento, CA. October.

California Air Resources Board. 2013. Ambient Air Quality Standards. Last Revised: June 4, 2013. Available: <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. Accessed: May 14, 2014.

California Air Resources Board. 2014a. Aerometric Data Analysis and Management System (ADAM): Top 4 Summary. Available: < http://www.arb.ca.gov/adam/topfour/topfour1.php>. Accessed: January 21, 2014.

California Air Resources Board. 2014b. Area Designations Maps/ State and National. Last Revised: April 17, 2014. Available: <http://www.arb.ca.gov/desig/adm/adm.htm>. Accessed: May 14, 2014.

California Department of Conservation. 2000. A General Location Guide for Ultramafic Rock in California. Division of Mines and Geology. OPEN-FILE REPORT 2000-19. August.

California Department of Transportation. 2006. Climate Action Program at Caltrans. December 2006. Available: <http://www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/State_Wide_Strategy/Caltrans_Climate_Action_Program.pdf>. Accessed: February 12, 2014.

California Department of Transportation. 2010. Standard Specifications. Available: <http://www.dot.ca.gov/hq/esc/oe/construction_contract_standards/std_specs/2010_StdSpecs/2010_StdSpecs.pdf>. Accessed: July 22, 2014.

California Department of Transportation. 2013. Caltrans Activities to Address Climate Change - Reducing Greenhouse Gas Emissions and Adapting to Impacts. April 2013. Available:< http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/projects_and_studies.shtml>. Accessed: February 12, 2014.

Fehr & Peers. 2014. I-80/SR-65 Interchange Improvements Project Transportation Analysis Report. February.

Garza, V. J., P. Graney, and D. Sperling. 1997. Transportation Project-Level Carbon Monoxide Protocol. Davis, CA: Institute of Transportation Studies, University of California, Davis.

Intergovernmental Panel on Climate Change. 2007. Historical Overview of Climate Change Science. In: Climate Change 2007: Working Group I: The Physical Science Basis: Fourth Assessment Report. Available: < http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter1.pdf>. Accessed: January 30, 2014.

Intergovernmental Panel on Climate Change. 2013. Observations: Atmospheric and Surface. In: Climate Change 2013: Working Group I: The Physical Science Basis. Fifth Assessment Report. Available: <http://www.climatechange2013.org/images/report/WG1AR5_Chapter02_FINAL.pdf>. Accessed: January 30, 2014.

Placer County Air Pollution Control District. 2008. Naturally Occurring Asbestos Hazard: Areas of relative likelihood for the presence of NOA. November 4, 2008. Map. Available: <http://www.placer.ca.gov/~/media/apc/documents/NOA/NaturallyOccuringAsbestosMapIndexMap092908.pdf>. Accessed: February 11, 2014.

Placer County Air Pollution Control District. 2012. CEQA Air Quality Handbook. Available: <http://www.placer.ca.gov/~/media/apc/documents/Planning/CEQAHandbook/Final/PCAPCDCEQAHandbookComplete.pdf >. Accessed: May 14, 2014.

Placer County Air Pollution Control District. 2013. Fugitive Dust Control Requirements Fact Sheet. Available: <http://www.placer.ca.gov/~/media/apc/documents/DustControl/FugitiveDustRequirementsFactSheet.pdf>. Accessed: January 27, 2014.

U.S. Council on Environmental Quality. 2013. Climate Change Resilience. Available:< http://www.whitehouse.gov/administration/eop/ceq/initiatives/resilience>. Accessed: February 12, 2014.

U.S. Environmental Protection Agency. 2013a. Air Data. Monitor Values Report. Last Revised: September 9, 2013. Available: <http://www.epa.gov/airdata/ad_rep_mon.html>. Accessed: January 22, 2014.

U.S. Environmental Protection Agency. 2013b. The Green Book Nonattainment Areas for Criteria Pollutants. Last Revised: December 05, 2013. Available: <http://www.epa.gov/oar/oaqps/greenbk/>. Accessed: May 8, 2014.

U.S. Environmental Protection Agency. 2013c. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011. Chapter 3 (Energy), Tables 3-12, 3-13, and 3-14. Washington, DC. U.S. EPA #430-R-13-001.

U.S. Environmental Protection Agency. 2013d. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011. Annex 6 (Additional Information), Table A-275. Washington DC. U.S. EPA #430-R-13-001.

U.S. Federal Highway Administration. 2012. Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents. Available: <http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm>. Accessed: May 8, 2014.

Webmet.com. 2014. Scram Surface Met Data. Available: <http://www.webmet.com/State_pages/SURFACE/23232_sur.html>. Accessed: January 28, 2014.

4.2 Personal Communications

Higgins, Mike. Transportation Engineer. CH2MHill, Sacramento, CA. June 5, 2014 — Email message to Laura Yoon of ICF International regarding I-80/SR 65 Interchange Improvements Project Construction Assumptions.

Milam, Ronald T (a). Principal in Charge of Technical Development. Fehr & Peers, Roseville, CA. March 17, 2014 — Email message to Claire Bromund of ICF International regarding I-80/SR 65 Updated SACMET VMT runs.

Milam, Ronald T (b). Principal in Charge of Technical Development. Fehr & Peers, Roseville, CA. June 5, 2014 — Email message to Laura Yoon of ICF International regarding I-80/SR 65 Interchange Improvements Project AADT.

Milam, Ronald T (c). Principal in Charge of Technical Development. Fehr & Peers, Roseville, CA. June 4, 2014 — Email message to Laura Yoon of ICF International regarding I-80/SR 65 Interchange Improvements Project TAR Questions.

Appendix A Traffic Analysis Report

I-80/SR 65 Interchange Improvements

Intersection Volumes, Delay, and LOS

Existing Conditions

Approach	10. Stanford Ranch Rd / Five Star Blvd	15. Creekside Ridge Dr / Roseville Pkwy	16. Taylor Road / Roseville Pkwy	20. I-80 EB / Eureka Rd / Taylor Rd
Eastbound				
Left Turn	95	80	132	174
Through	95	1524	1452	873
Right Turn	337	13	251	229
Westbound				
Left Turn	377	261	245	0
Through	114	2133	1818	1660
Right Turn	66	47	522	253
Southbound				
Left Turn	88	278	300	225
Through	902	9	121	0
Right Turn	65	88	148	462
Northbound				
Left Turn	573	24	467	142
Through	1273	6	260	459
Right Turn	326	21	159	341

Construction Year (2020) No Build

Approach	10. Stanford Ranch Rd / Five Star Blvd	15. Creekside Ridge Dr / Roseville Pkwy	16. Taylor Road / Roseville Pkwy	20. I-80 EB / Eureka Rd / Taylor Rd
Eastbound				
Left Turn	95	95	90	110
Through	75	1585	1640	1245
Right Turn	310	15	190	300
Westbound				
Left Turn	420	30	195	0
Through	90	2345	2045	2105
Right Turn	125	270	550	240
Southbound				
Left Turn	75	305	360	95
Through	1073	5	65	0
Right Turn	5	85	145	430
Northbound				
Left Turn	575	15	460	330
Through	1425	5	145	380
Right Turn	380	30	125	410

Construction Year (2020) Build

Approach	10. Stanford Ranch Rd / Five Star Blvd	15. Creekside Ridge Dr / Roseville Pkwy	16. Taylor Road / Roseville Pkwy	20. I-80 EB / Eureka Rd / Taylor Rd
Eastbound				
Left Turn	95	70	130	215
Through	50	1455	1460	1230
Right Turn	335	15	30	230
Westbound				
Left Turn	275	35	175	0
Through	90	1705	1630	2315
Right Turn	205	270	925	130
Southbound				
Left Turn	55	135	625	90
Through	1075	5	260	0
Right Turn	5	235	165	450
Northbound				
Left Turn	565	15	215	280
Through	1420	5	540	540
Right Turn	370	25	110	625

Design Year (2040) No Build

Approach	10. Stanford Ranch Rd / Five Star Blvd	15. Creekside Ridge Dr / Roseville Pkwy	16. Taylor Road / Roseville Pkwy	20. I-80 EB / Eureka Rd / Taylor Rd
Eastbound				
Left Turn	95	175	130	174
Through	90	1860	1790	873
Right Turn	285	15	325	229
Westbound				
Left Turn	260	35	225	0
Through	90	2595	2240	1660
Right Turn	345	265	915	253
Southbound				
Left Turn	180	360	855	225
Through	1340	5	140	0
Right Turn	5	55	145	462
Northbound				
Left Turn	530	15	515	142
Through	1425	5	320	459
Right Turn	295	30	160	341

Design Year (2040) Build

Approach	10. Stanford Ranch Rd / Five Star Blvd	15. Creekside Ridge Dr / Roseville Pkwy	16. Taylor Road / Roseville Pkwy	20. I-80 EB / Eureka Rd / Taylor Rd
Eastbound				
Left Turn	95	180	130	215
Through	75	1695	1690	1360
Right Turn	300	15	60	340
Westbound				
Left Turn	265	35	210	0
Through	90	2055	2005	2440
Right Turn	355	265	1110	475
Southbound				
Left Turn	155	160	765	325
Through	1530	5	405	0
Right Turn	5	190	155	500
Northbound				
Left Turn	525	15	190	390
Through	1520	5	630	485
Right Turn	380	25	130	460

Construction Year PM Peak Hour Conditions

Intersection	Alternative 1	Alternative 2	Alternative 3	Alternative 5
6. Blue Oaks Blvd / Washington Blvd	**D / 39**	**D / 43**	**D / 40**	**F / 188**
7. Blue Oaks Blvd / SR 65 NB Ramps	B / 11	B / 12	B / 12	C / 26
10. Stanford Ranch Rd / Five Star Blvd	**D / 43**	**D / 37**	**D / 37**	**F / 107**
11. Stanford Ranch Rd / SR 65 NB Ramps	B / 11	A / 10	B / 10	D / 45
12. Galleria Blvd / SR 65 SB Ramps	B / 17	B / 16	B / 17	D / 43
14. Galleria Blvd / Roseville Pkwy	E / 61	E / 56	E / 58	**F / 227**
16. Roseville Pkwy / Taylor Rd	D / 48	D / 42	D / 53	D / 37
19. Atlantic St / I-80 WB Ramps	B / 17	B / 12	C / 29	**D / 36**
20. Eureka Rd / Taylor Rd / I-80 EB Ramps	E / 63	E / 77	E / 78	D / 42
21. Eureka Rd / Sunrise Ave	**D / 52**	**E / 63**	**D / 48**	**D / 49**
23. Douglas Blvd / Harding Blvd	D / 42	D / 39	D / 49	**F / 123**
26. Douglas Blvd / Sunrise Ave	D / 50	**E / 56**	D / 47	**F / 203**
28. Pacific St / Sunset Blvd	**D / 39**	**D / 43**	C / 24	C / 30
29. Rocklin Rd / Granite Dr	**F / 101**	**F / 91**	**F / 110**	**F / 170**

Notes: Bold and underline font indicate unacceptable operations. Shaded cells indicate a project impact. The LOS
Source: Fehr & Peers, 2014

Design Year PM Peak Hour Conditions

Intersection	Alternative 1	Alternative 2	Alternative 3	Alternative 5
6. Blue Oaks Blvd / Washington Blvd	**F / 165**	**F / 164**	**F / 175**	**F / >240**
7. Blue Oaks Blvd / SR 65 NB Ramps	**F / 85**	**E / 69**	**E / 80**	**F / 115**
10. Stanford Ranch Rd / Five Star Blvd	**E / 56**	**E / 55**	**E / 59**	**D / 36**
11. Stanford Ranch Rd / SR 65 NB Ramps	C / 26	C / 22	C / 22	D / 36
12. Galleria Blvd / SR 65 SB Ramps	C / 24	C / 23	C / 25	C / 29
14. Galleria Blvd / Roseville Pkwy	**F / 91**	**F / 131**	**F / 102**	**F / 213**
15. Roseville Pkwy / Creekside Ridge Dr	**E / 77**	**E / 72**	**D / 40**	C / 24
16. Roseville Pkwy / Taylor Rd	D / 54	D / 53	**E / 71**	D / 48
19. Atlantic St / I-80 WB Ramps	B / 15	B / 18	C / 34	**D / 51**
20. Eureka Rd / Taylor Rd / I-80 EB Ramps	**F / 104**	**F / 103**	**F / 104**	**F / 92**
21. Eureka Rd / Sunrise Ave	**F / 99**	**F / 132**	**F / 113**	**F / 184**
23. Douglas Blvd / Harding Blvd	**F / 81**	E / 80	**F / 111**	**F / >240**
26. Douglas Blvd / Sunrise Ave	**F / 158**	**F / 240**	**F / 166**	**F / >240**
29. Rocklin Rd / Granite Dr	**F / 83**	**F / 97**	**F / 105**	**F / >240**

Notes: Bold and underline font indicate unacceptable operations. Shaded cells indicate a project impact. The LOS
Source: Fehr & Peers, 2014

I-80/SR 65 Interchange Improvements

Volume Exhibits

Exhibit 1: Year 2040 Volume Differences for All Vehicles - PM Peak Hour

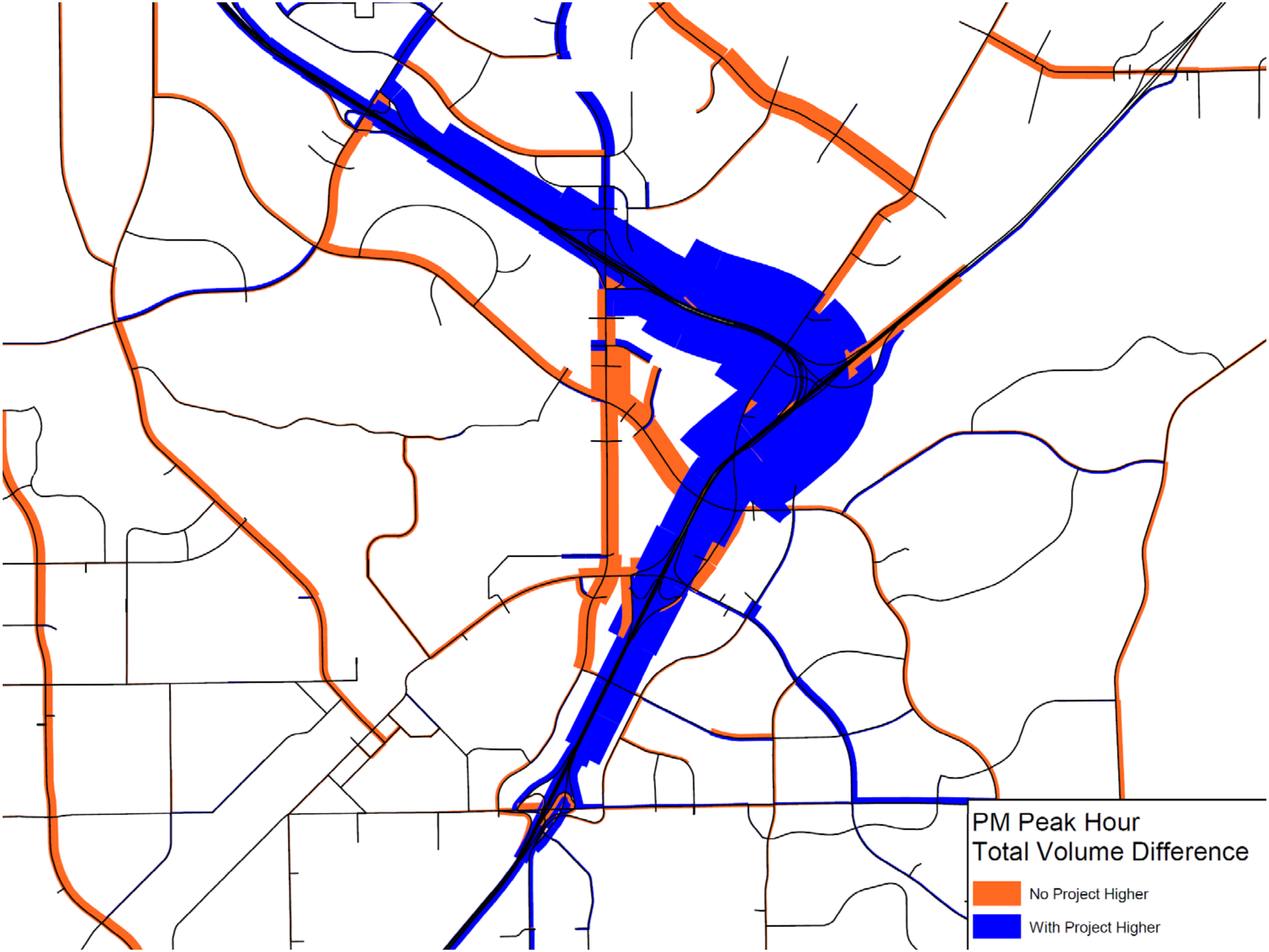
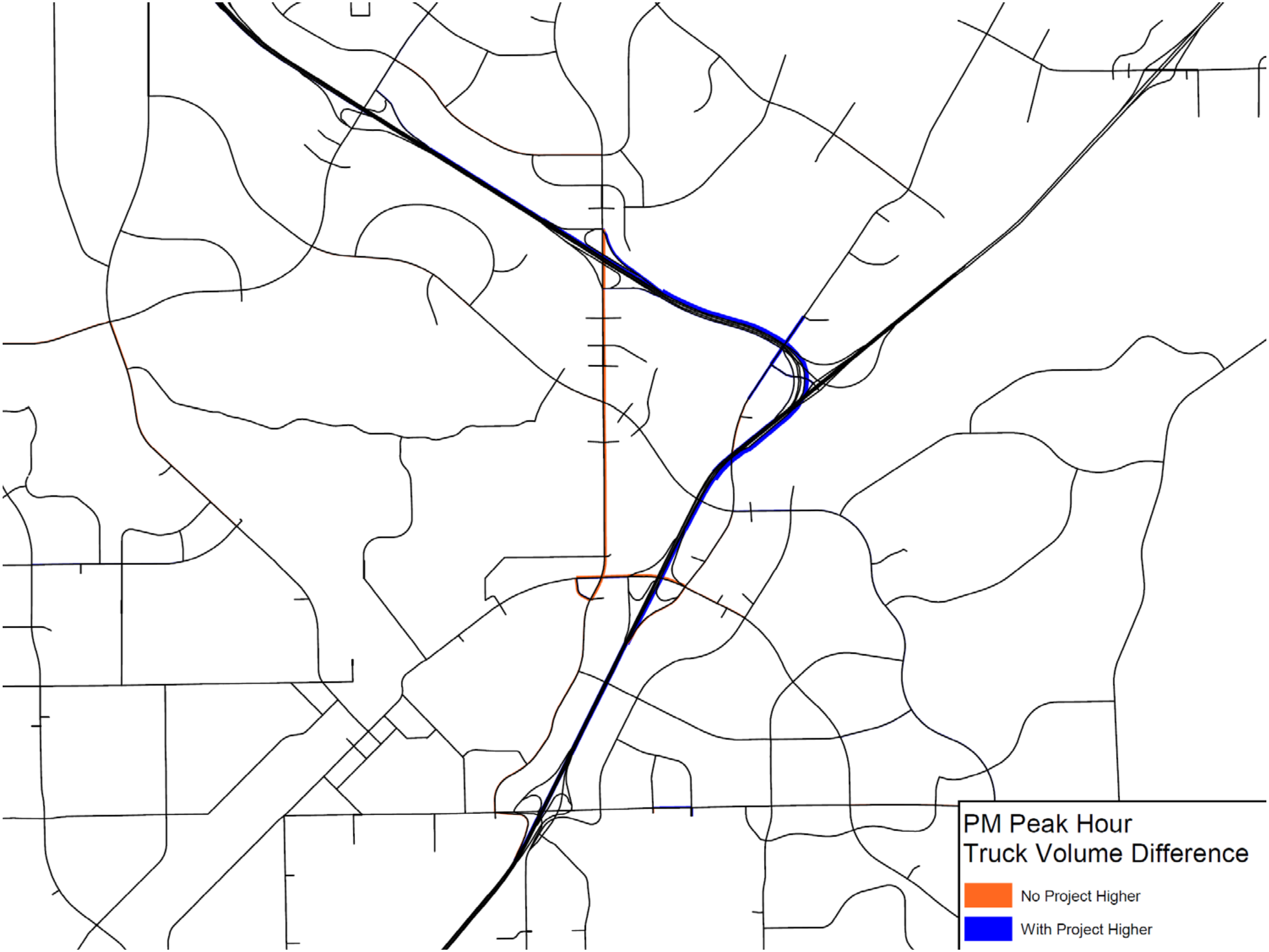


Exhibit 2: Year 2040 Volume Differences for Trucks - PM Peak Hour



Appendix B AQ Model Output

```
     File Name:     80-65 2012 EF.EF
CT-EMFAC Version:     5.0.0.14319
      Run Date:     6/5/2014 1:19:23 PM
          Area:   Placer (SV)
  Analysis Year:     2012
        Season:  Annual

============================================================================

Vehicle Category    VMT Fraction     Diesel VMT Fraction
                Across Category       Within Category
      Truck 1        0.044              0.490
      Truck 2        0.017              0.930
     Non-Truck            0.939              0.005

============================================================================

Fleet Average Running Exhaust Emission Factors (grams/mile)

     Pollutant Name     5 mph          10 mph          15 mph          20 mph          25 mph          30 mph          35 mph
         40 mph          45 mph          50 mph          55 mph          60 mph          65 mph          70 mph          75 mph
             ROG       0.448632        0.305146        0.207469        0.145982        0.115604        0.095979
0.083260    0.075664        0.072285        0.072898        0.076617        0.085386        0.102368        0.102368
0.102368
             TOG       0.590038        0.397686        0.269006        0.189238        0.148497        0.122222
0.105302    0.095153        0.090344        0.090440        0.094757        0.105048        0.124391        0.124391
0.124391
              CO       4.761556        3.976380        3.328281        2.869640        2.546959        2.311693
2.132019    2.007710        1.929647        1.911370        1.947408        2.052223        2.300151        2.300151
2.300151
             NOx       1.013947        0.812856        0.661668        0.559407        0.518335        0.488911
0.470314    0.460589        0.459263        0.467718        0.485114        0.499002        0.525709        0.525709
0.525709
             CO2      1412.371094   1066.726196    817.813660     653.354675     545.226563     472.496307
423.989044      394.559509     379.830566     378.831177     392.703308     417.417694     450.884338     450.884338
450.884338
CO2 (Pavley I + LCFS)  1352.403809   1021.910645    783.523071     625.941040     522.493591     452.908813
406.497345      378.329559     364.224640     363.249939     376.490448     400.070160     432.042847     432.042847
432.042847
            PM10       0.032863        0.023396        0.016536        0.011708        0.009640        0.008250
0.007372    0.006918        0.006833        0.007091        0.007678        0.008613        0.009856        0.009856
0.009856
           PM2.5       0.030139        0.021454        0.015158        0.010728        0.008833        0.007558
0.006755    0.006338        0.006261        0.006497        0.007035        0.007893        0.009031        0.009031
0.009031
          Benzene      0.015024        0.010193        0.006970        0.004973        0.003907        0.003223
0.002788    0.002530        0.002415        0.002432        0.002562        0.002857        0.003409        0.003409
0.003409
         Acrolein      0.000685        0.000472        0.000332        0.000247        0.000193        0.000158
0.000138    0.000125        0.000120        0.000121        0.000129        0.000145        0.000174        0.000174
0.000174
      Acetaldehyde     0.010969        0.007029        0.004187        0.002398        0.001954        0.001633
```

```
0.001403    0.001245        0.001150        0.001113        0.001131        0.001221        0.001391        0.001391
0.001391
       Formaldehyde         0.026616        0.017269        0.010631        0.006464        0.005208        0.004336
0.003728    0.003329        0.003101        0.003038        0.003119        0.003398        0.003927        0.003927
0.003927
          Butadiene      0.003167        0.002167        0.001508        0.001100        0.000863        0.000711
0.000617    0.000561        0.000538        0.000545        0.000576        0.000645        0.000774        0.000774
0.000774
        Naphthalene     0.001131        0.000738        0.000502        0.000359        0.000272        0.000216
0.000180    0.000159        0.000146        0.000143        0.000145        0.000156        0.000176        0.000176
0.000176
              POM       0.000243        0.000166        0.000116        0.000082        0.000066        0.000055
0.000048    0.000044        0.000042        0.000043        0.000045        0.000050        0.000057        0.000057
0.000057
          Diesel PM      0.020312        0.015249        0.010996        0.007742        0.006654        0.005883
0.005401    0.005192        0.005246        0.005555        0.006117        0.006944        0.007980        0.007980
0.007980
             DEOG       0.116170        0.072703        0.040702        0.020487        0.017025        0.014292
0.012161    0.010570        0.009473        0.008843        0.008657        0.008994        0.009657        0.009657
0.009657

===============================================================================

Fleet Average Idling Exhaust Emission Factors (grams/vehicle-idle-hour)

     Pollutant NameEmission Factor
              ROG           1.901828
              TOG           2.561608
               CO          23.701181
              NOx           4.308776
              CO2         6899.242676
CO2 (Pavley I + LCFS)      6600.219238
             PM10           0.096131
            PM2.5           0.087969
           Benzene          0.005713
          Acrolein          0.000119
       Acetaldehyde         0.013168
       Formaldehyde              0.027237
          Butadiene         0.000827
        Naphthalene         0.005569
              POM           0.000921
          Diesel PM         0.033378
             DEOG           0.192266

===============================================================================

Fleet Average Running Loss Emission Factors (grams/mile)

     Pollutant NameEmission Factor
              ROG           0.117901
              TOG           0.117901
           Benzene          0.001179
          Acrolein          0.000000
       Acetaldehyde         0.000000
```

```
      Formaldehyde          0.000000
        Butadiene         0.000000
       Naphthalene        0.000047

======================================================================

Fleet Average Tire Wear and Brake Wear Factors (grams/mile)

     Pollutant NameEmission Factor
            PM10          0.048194
           PM2.5          0.019161

=============================END========================================
```

```
     File Name:      80-65 2020 EF.EF
CT-EMFAC Version:    5.0.0.14319
      Run Date:      6/5/2014 1:13:23 PM
          Area:  Placer (SV)
  Analysis Year:     2020
        Season:  Annual

============================================================================

Vehicle Category    VMT Fraction     Diesel VMT Fraction
                  Across Category      Within Category
      Truck 1         0.041              0.488
      Truck 2         0.018              0.933
     Non-Truck            0.941              0.006

============================================================================

Fleet Average Running Exhaust Emission Factors (grams/mile)

     Pollutant Name     5 mph         10 mph         15 mph         20 mph         25 mph         30 mph         35 mph
         40 mph         45 mph         50 mph         55 mph         60 mph         65 mph         70 mph         75 mph
             ROG       0.149081       0.132186       0.090027       0.064365       0.051380       0.043165
0.037985    0.035101       0.034143       0.034981       0.037653       0.042907       0.051977       0.051977
0.051977
             TOG       0.203812       0.184420       0.125052       0.089049       0.070072       0.058072
0.050525    0.046192       0.044491       0.045112       0.048170       0.054387       0.065020       0.065020
0.065020
              CO       1.875156       1.818385       1.580199       1.400765       1.265312       1.161275
1.076812    1.010029       0.967493       0.941824       0.940840       0.969065       1.049175       1.049175
1.049175
             NOx       0.431843       0.377299       0.310595       0.264517       0.242533       0.226605
0.215987    0.210510       0.208648       0.212089       0.220823       0.227197       0.237617       0.237617
0.237617
             CO2      1085.710327   1062.520874    819.080078    653.965881    545.607056    472.824951
424.615753     394.475281    380.713104    379.420929    392.516815    418.083313    455.085632    455.085632
455.085632
CO2 (Pavley I + LCFS)   811.547119     790.676819     609.684753     486.708893     406.688385     352.925476
317.292633     294.995209    284.754486    283.733093    293.313141    311.925171    338.951447    338.951447
338.951447
            PM10       0.010530       0.009978       0.007107       0.005287       0.004206       0.003527
0.003112    0.002889       0.002815       0.002867       0.003037       0.003336       0.003750       0.003750
0.003750
           PM2.5       0.009736       0.009228       0.006571       0.004887       0.003886       0.003257
0.002873    0.002667       0.002598       0.002646       0.002801       0.003077       0.003459       0.003459
0.003459
         Benzene       0.004522       0.004132       0.002829       0.002038       0.001615       0.001348
0.001182    0.001091       0.001061       0.001086       0.001172       0.001337       0.001619       0.001619
0.001619
        Acrolein       0.000191       0.000189       0.000133       0.000099       0.000077       0.000065
0.000057    0.000053       0.000052       0.000053       0.000059       0.000068       0.000083       0.000083
0.000083
      Acetaldehyde    0.004104       0.002816       0.001702       0.001024       0.000855       0.000731
```

```
0.000640    0.000575        0.000533        0.000511        0.000511        0.000539        0.000597        0.000597
0.000597
       Formaldehyde         0.009599        0.007006        0.004365        0.002761        0.002265        0.001922
0.001683    0.001521        0.001428        0.001395        0.001426        0.001543        0.001759        0.001759
0.001759
         Butadiene      0.000896        0.000853        0.000594        0.000437        0.000346        0.000289
0.000254    0.000236        0.000230        0.000238        0.000259        0.000298        0.000365        0.000365
0.000365
        Naphthalene     0.000596        0.000594        0.000397        0.000280        0.000209        0.000164
0.000135    0.000118        0.000108        0.000104        0.000105        0.000113        0.000128        0.000128
0.000128
              POM       0.000099        0.000097        0.000067        0.000048        0.000037        0.000030
0.000026    0.000023        0.000022        0.000021        0.000023        0.000025        0.000028        0.000028
0.000028
         Diesel PM      0.003817        0.003288        0.002636        0.002137        0.001868        0.001696
0.001602    0.001577        0.001615        0.001711        0.001863        0.002078        0.002331        0.002331
0.002331
             DEOG       0.048479        0.031037        0.017923        0.009966        0.008429        0.007225
0.006268    0.005514        0.004934        0.004510        0.004228        0.004139        0.004128        0.004128
0.004128

==========================================================================

Fleet Average Idling Exhaust Emission Factors (grams/vehicle-idle-hour)

     Pollutant NameEmission Factor
              ROG            1.141148
              TOG            1.604645
               CO           13.526389
              NOx            2.789165
              CO2          6821.912109
CO2 (Pavley I + LCFS)      5094.998047
             PM10            0.072189
            PM2.5            0.066822
           Benzene           0.003464
          Acrolein           0.000044
       Acetaldehyde          0.009775
       Formaldehyde                0.019895
         Butadiene           0.000436
        Naphthalene          0.005136
              POM            0.000781
         Diesel PM           0.014047
             DEOG            0.144506

==========================================================================

Fleet Average Running Loss Emission Factors (grams/mile)

     Pollutant NameEmission Factor
              ROG            0.074670
              TOG            0.074670
           Benzene           0.000746
          Acrolein           0.000000
       Acetaldehyde          0.000000
```

```
     Formaldehyde          0.000000
      Butadiene       0.000000
     Naphthalene      0.000030

=========================================================================

Fleet Average Tire Wear and Brake Wear Factors (grams/mile)

    Pollutant NameEmission Factor
          PM10          0.048137
          PM2.5         0.019135

==============================END========================================
```

```
      File Name:       80-65 2040 EF.EF
CT-EMFAC Version:     5.0.0.14319
       Run Date:       6/5/2014 1:13:37 PM
           Area:   Placer (SV)
   Analysis Year:     2035
         Season:  Annual

=============================================================================

Vehicle Category    VMT Fraction     Diesel VMT Fraction
                 Across Category       Within Category
        Truck 1        0.041              0.490
        Truck 2        0.018              0.937
      Non-Truck             0.941              0.005

=============================================================================

Fleet Average Running Exhaust Emission Factors (grams/mile)

      Pollutant Name      5 mph            10 mph           15 mph           20 mph           25 mph           30 mph           35 mph
           40 mph           45 mph           50 mph           55 mph           60 mph           65 mph           70 mph           75 mph
                 ROG        0.110464         0.095935         0.064797         0.045985         0.037186         0.031642
0.028254    0.026508         0.026159         0.027198         0.029773         0.034480         0.042432         0.042432
0.042432
                 TOG        0.152511         0.135828         0.091319         0.064537         0.051223         0.042865
0.037708    0.034887         0.034023         0.034963         0.037876         0.043387         0.052706         0.052706
0.052706
                  CO        1.267518         1.228513         1.082764         0.969826         0.884333         0.817108
0.761377    0.716548         0.687926         0.670812         0.671610         0.694673         0.759009         0.759009
0.759009
                 NOx        0.239707         0.212179         0.176492         0.150679         0.137693         0.128026
0.121152    0.117101         0.115003         0.115770         0.119075         0.122458         0.128226         0.128226
0.128226
                 CO2      1084.932739   1061.885986    818.564087     653.525452     545.204956     472.448395
424.257538      394.131439     380.381653     379.101135     392.209229     417.792908     454.821381     454.821381
454.821381
CO2 (Pavley I + LCFS)   734.820618     714.078613     550.689026     439.547241     367.592987     319.244629
287.189056      267.118286     257.878235     256.930145     265.511597     282.114899     306.239868     306.239868
306.239868
                PM10        0.010273         0.010020         0.007016         0.005169         0.004046         0.003350
0.002933    0.002710         0.002635         0.002683         0.002844         0.003128         0.003533         0.003533
0.003533
               PM2.5        0.009514         0.009281         0.006496         0.004785         0.003743         0.003099
0.002712    0.002505         0.002436         0.002479         0.002627         0.002889         0.003263         0.003263
0.003263
             Benzene        0.003377         0.003042         0.002071         0.001485         0.001188         0.001002
0.000889    0.000830         0.000817         0.000848         0.000928         0.001074         0.001319         0.001319
0.001319
            Acrolein        0.000136         0.000135         0.000096         0.000071         0.000057         0.000047
0.000043    0.000040         0.000040         0.000042         0.000046         0.000055         0.000068         0.000068
0.000068
        Acetaldehyde    0.003500         0.002314         0.001347         0.000768         0.000647         0.000558
```

```
0.000492	0.000444	0.000412	0.000396	0.000396	0.000418	0.000467	0.000467	
0.000467
      Formaldehyde	0.007988	0.005611	0.003385	0.002050	0.001700	0.001456	
0.001284	0.001168	0.001102	0.001083	0.001113	0.001210	0.001394	0.001394	
0.001394
        Butadiene	0.000653	0.000620	0.000432	0.000318	0.000254	0.000214	
0.000191	0.000180	0.000178	0.000186	0.000206	0.000240	0.000298	0.000298	
0.000298
       Naphthalene	0.000703	0.000702	0.000467	0.000327	0.000242	0.000189	
0.000156	0.000135	0.000124	0.000119	0.000122	0.000131	0.000149	0.000149	
0.000149
              POM	0.000109	0.000107	0.000073	0.000053	0.000040	0.000032	
0.000027	0.000024	0.000023	0.000022	0.000024	0.000025	0.000029	0.000029	
0.000029
        Diesel PM	0.002314	0.002069	0.001736	0.001471	0.001313	0.001219	
0.001181	0.001191	0.001246	0.001342	0.001478	0.001661	0.001871	0.001871	
0.001871
             DEOG	0.042316	0.026211	0.014508	0.007516	0.006422	0.005542	
0.004825	0.004244	0.003786	0.003438	0.003196	0.003084	0.003044	0.003044	
0.003044

===========================================================================

Fleet Average Idling Exhaust Emission Factors (grams/vehicle-idle-hour)

    Pollutant NameEmission Factor
              ROG	    0.693515
              TOG	    1.026538
               CO	    7.910680
              NOx	    1.609140
              CO2	 6833.008789
CO2 (Pavley I + LCFS)	 4549.236816
             PM10	    0.071834
            PM2.5	    0.066586
          Benzene	    0.002698
         Acrolein	    0.000013
      Acetaldehyde	    0.009057
      Formaldehyde	        0.018219
        Butadiene	    0.000288
       Naphthalene	    0.005608
              POM	    0.000825
        Diesel PM	    0.008234
             DEOG	    0.131577

===========================================================================

Fleet Average Running Loss Emission Factors (grams/mile)

    Pollutant NameEmission Factor
              ROG	    0.055974
              TOG	    0.055974
          Benzene	    0.000559
         Acrolein	    0.000000
      Acetaldehyde	    0.000000
```

```
    Formaldehyde        0.000000
      Butadiene     0.000000
     Naphthalene    0.000022

=========================================================================

Fleet Average Tire Wear and Brake Wear Factors (grams/mile)

   Pollutant NameEmission Factor
          PM10         0.048028
          PM2.5        0.019088

==============================END========================================
```

EMFAC2011 Emission Rates
Region Type: County
Region: Placer
Calendar Year: 2035
Season: Winter
Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed (miles/hr)	VMT (miles/day	ROG_RUNE (gms/mile)	TOG_RUNE (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNE (gms/mile)	CO2_RUNE (gms/mile)	CO2_RUNE (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)
Placer	2035	Winter	LDA	GAS	Aggregated	5	0	0	0	0	0	0	0	0	0
Placer	2035	Winter	LDA	DSL	Aggregated	5	0	0	0	0	0	0	0	0	0
Placer	2035	Winter	LDT1	GAS	Aggregated	5	0	0	0	0	0	0	0	0	0
Placer	2035	Winter	LDT1	DSL	Aggregated	5	0	0	0	0	0	0	0	0	0
Placer	2035	Winter	LDT2	GAS	Aggregated	5	0	0	0	0	0	0	0	0	0
Placer	2035	Winter	LDT2	DSL	Aggregated	5	0	0	0	0	0	0	0	0	0
Placer	2035	Winter	LHD1	GAS	Aggregated	5	13953.01	0.047158	0.077516	0.732794	0.11052	2513.497	2262.148	0.001395	0.001294
Placer	2035	Winter	LHD1	DSL	Aggregated	5	7974.956	0.20731	0.236008	2.510485	1.5895	519.0508	467.1457	0.055599	0.051151
Placer	2035	Winter	LHD2	GAS	Aggregated	5	1101.074	0.033125	0.060563	0.516628	0.081108	2513.497	2262.147	0.001033	0.000959
Placer	2035	Winter	LHD2	DSL	Aggregated	5	1635.09	0.183701	0.209132	2.292815	1.420013	519.0781	467.1703	0.050173	0.046159
Placer	2035	Winter	MCY	GAS	Aggregated	5	0	0	0	0	0	0	0	0	0
Placer	2035	Winter	MDV	GAS	Aggregated	5	0	0	0	0	0	0	0	0	0
Placer	2035	Winter	MDV	DSL	Aggregated	5	0	0	0	0	0	0	0	0	0
Placer	2035	Winter	MH	GAS	Aggregated	5	387.376	0.054194	0.096575	0.752364	0.131379	2513.497	2262.148	0.001025	0.000951
Placer	2035	Winter	MH	DSL	Aggregated	5	89.06197	1.061453	1.208394	1.865149	10.76188	2408.689	2167.82	0.112549	0.103545
Placer	2035	Winter	Motor Coa	DSL	Aggregated	5	19.82838	2.3591	2.685655	4.712242	6.068083	3956.383	3560.744	0.069697	0.064121
Placer	2035	Winter	OBUS	GAS	Aggregated	5	135.3024	0.071924	0.115862	1.042829	0.137664	2513.497	2262.148	0.00099	0.000919
Placer	2035	Winter	SBUS	GAS	Aggregated	5	19.90691	0.654186	0.773915	9.108072	0.853272	2513.497	2262.147	0.004389	0.004072
Placer	2035	Winter	SBUS	DSL	Aggregated	5	46.71976	2.281405	2.597206	4.045577	12.56862	2617.434	2355.691	0.064331	0.059184
Placer	2035	Winter	T6 Ag	DSL	Aggregated	5	39.67927	1.199057	1.365035	2.126267	3.877313	2560.316	2304.285	0.046345	0.042637
Placer	2035	Winter	T6 Public	DSL	Aggregated	5	104.9525	0.887145	1.009947	1.568143	3.121741	2562.97	2306.673	0.034551	0.031787
Placer	2035	Winter	T6 CAIRP h	DSL	Aggregated	5	1.714406	1.047124	1.192071	1.856847	3.179918	2559.771	2303.794	0.038962	0.035845
Placer	2035	Winter	T6 CAIRP s	DSL	Aggregated	5	5.935137	0.995141	1.132892	1.764666	2.924044	2559.758	2303.782	0.036386	0.033475
Placer	2035	Winter	T6 OOS he	DSL	Aggregated	5	0.982905	1.047124	1.192071	1.856847	3.179918	2559.771	2303.794	0.038962	0.035845
Placer	2035	Winter	T6 OOS sm	DSL	Aggregated	5	3.402738	0.995141	1.132892	1.764666	2.924044	2559.758	2303.782	0.036386	0.033475
Placer	2035	Winter	T6 instate	DSL	Aggregated	5	66.3747	1.137353	1.29479	2.01685	3.619596	2559.83	2303.847	0.043423	0.039949
Placer	2035	Winter	T6 instate	DSL	Aggregated	5	194.8438	1.035935	1.179334	1.837007	3.12387	2559.773	2303.796	0.038406	0.035334
Placer	2035	Winter	T6 instate	DSL	Aggregated	5	276.5357	1.141365	1.299357	2.023964	3.638817	2559.839	2303.855	0.043619	0.04013
Placer	2035	Winter	T6 instate	DSL	Aggregated	5	806.5079	1.037949	1.181626	1.840577	3.133763	2559.775	2303.798	0.038505	0.035425
Placer	2035	Winter	T6 utility	DSL	Aggregated	5	7.018945	0.838258	0.954293	1.486469	2.149032	2559.765	2303.789	0.028595	0.026308
Placer	2035	Winter	T6TS	GAS	Aggregated	5	233.7801	0.072552	0.117002	1.061929	0.139518	2513.497	2262.148	0.00104	0.000965
Placer	2035	Winter	T7 Ag	DSL	Aggregated	5	49.37253	2.497298	2.842984	4.986957	6.566654	3956.995	3561.296	0.074674	0.0687
Placer	2035	Winter	T7 CAIRP	DSL	Aggregated	5	612.3156	2.572821	2.928961	5.142669	6.937884	3956.349	3560.714	0.078127	0.071877
Placer	2035	Winter	T7 CAIRP c	DSL	Aggregated	5	24.4201	2.57297	2.929131	5.142971	6.938994	3956.349	3560.714	0.078133	0.071882
Placer	2035	Winter	T7 NNOOS	DSL	Aggregated	5	688.8322	2.233784	2.542993	4.460214	5.565072	3956.346	3560.711	0.064801	0.059617
Placer	2035	Winter	T7 NOOS	DSL	Aggregated	5	222.9898	2.572821	2.928961	5.14267	6.937883	3956.349	3560.714	0.078127	0.071877
Placer	2035	Winter	T7 other p	DSL	Aggregated	5	1.923671	3.095829	3.524366	6.195514	9.074166	3956.344	3560.709	0.098693	0.090798
Placer	2035	Winter	T7 POAK	DSL	Aggregated	5	57.50259	3.095829	3.524366	6.195514	9.053272	3956.344	3560.709	0.098693	0.090798
Placer	2035	Winter	T7 POLA	DSL	Aggregated	5	0	0	0	0	0	0	0	0	0
Placer	2035	Winter	T7 Public	DSL	Aggregated	5	43.91012	1.689947	1.923876	3.297875	12.00744	3984.098	3585.688	0.085803	0.078938
Placer	2035	Winter	T7 Single	DSL	Aggregated	5	205.0613	2.164196	2.463773	4.319045	5.268575	3956.584	3560.926	0.061922	0.056969
Placer	2035	Winter	T7 single c	DSL	Aggregated	5	63.17158	2.145191	2.442137	4.280961	5.195347	3956.546	3560.892	0.061198	0.056302
Placer	2035	Winter	T7 SWCV	DSL	Aggregated	5	27.36172	1.932912	2.200473	3.850255	4.795914	3959.615	3563.653	0.053367	0.049098
Placer	2035	Winter	T7 tractor	DSL	Aggregated	5	264.3666	2.723214	3.100172	5.444225	7.531767	3956.538	3560.884	0.083884	0.077173
Placer	2035	Winter	T7 tractor	DSL	Aggregated	5	47.09908	2.754291	3.13555	5.506675	7.65239	3956.555	3560.899	0.085092	0.078284
Placer	2035	Winter	T7 utility	DSL	Aggregated	5	2.384217	1.692269	1.926519	3.37008	3.376063	3956.396	3560.756	0.043503	0.040022
Placer	2035	Winter	T7IS	GAS	Aggregated	5	13.35405	2.468702	3.119634	116.8445	3.938737	2513.497	2262.147	0.001008	0.000936
Placer	2035	Winter	UBUS	GAS	Aggregated	5	42.80168	1.442945	1.601118	17.58666	1.699865	2513.497	2262.147	0.001822	0.00169
Placer	2035	Winter	UBUS	DSL	Aggregated	5	117.3083	0.810097	0.922242	5.65711	10.67909	2303.905	2073.514	0.299256	0.275316
Placer	2035	Winter	All Other B	DSL	Aggregated	5	42.97031	1.229527	1.399723	2.180299	4.068706	2559.919	2303.927	0.04797	0.044133

EMFAC2011 Emission Rates
Region Type: County
Region: Placer
Calendar Year: 2020
Season: Winter
Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed (miles/hr)	VMT (miles/day	ROG_RUNE (gms/mile)	TOG_RUNE (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNE (gms/mile)	CO2_RUNE (gms/mile)	CO2_RUNE (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)
Placer	2020	Winter	LDA	GAS	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2020	Winter	LDA	DSL	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2020	Winter	LDT1	GAS	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2020	Winter	LDT1	DSL	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2020	Winter	LDT2	GAS	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2020	Winter	LDT2	DSL	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2020	Winter	LHD1	GAS	Aggregatec	5	11857.93	0.357786	0.424995	4.314903	0.294377	2513.497	2262.148	0.005429	0.005033
Placer	2020	Winter	LHD1	DSL	Aggregatec	5	6937.612	0.416407	0.474052	3.130002	4.242457	520.9447	468.8502	0.08764	0.080629
Placer	2020	Winter	LHD2	GAS	Aggregatec	5	901.6011	0.124053	0.169463	1.830226	0.193557	2513.497	2262.148	0.003255	0.003015
Placer	2020	Winter	LHD2	DSL	Aggregatec	5	1370.218	0.354932	0.404066	2.848973	3.836528	520.0415	468.0373	0.078361	0.072092
Placer	2020	Winter	MCY	GAS	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2020	Winter	MDV	GAS	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2020	Winter	MDV	DSL	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2020	Winter	MH	GAS	Aggregatec	5	334.3768	0.3192	0.420806	6.352573	0.423125	2513.497	2262.147	0.00561	0.005189
Placer	2020	Winter	MH	DSL	Aggregatec	5	74.94922	1.509904	1.718925	2.39988	16.10568	2389.476	2150.528	0.414082	0.380956
Placer	2020	Winter	Motor Coa	DSL	Aggregatec	5	15.2852	2.421865	2.757109	4.802255	11.65812	3981.589	3583.43	0.082186	0.075611
Placer	2020	Winter	OBUS	GAS	Aggregatec	5	117.014	0.407281	0.501949	5.636887	0.504468	2513.497	2262.147	0.002012	0.001867
Placer	2020	Winter	SBUS	GAS	Aggregatec	5	17.25806	2.866684	3.219286	39.49084	1.934284	2513.497	2262.147	0.018525	0.017188
Placer	2020	Winter	SBUS	DSL	Aggregatec	5	49.50327	1.309685	1.490976	1.99049	25.77931	2632.233	2369.01	0.231237	0.212738
Placer	2020	Winter	T6 Ag	DSL	Aggregatec	5	41.59436	2.313415	2.633647	3.506768	10.12172	2584.145	2325.73	0.367431	0.338037
Placer	2020	Winter	T6 Public	DSL	Aggregatec	5	77.98124	0.836999	0.952859	1.39629	12.74817	2603.121	2342.809	0.085679	0.078825
Placer	2020	Winter	T6 CAIRP h	DSL	Aggregatec	5	1.391484	1.058776	1.205335	1.856711	6.319983	2573.548	2316.193	0.051007	0.046926
Placer	2020	Winter	T6 CAIRP s	DSL	Aggregatec	5	4.759123	1.084687	1.234833	1.923457	3.571197	2563.519	2307.167	0.043517	0.040036
Placer	2020	Winter	T6 OOS hea	DSL	Aggregatec	5	0.797767	1.058776	1.205335	1.856711	6.319983	2573.548	2316.193	0.051007	0.046926
Placer	2020	Winter	T6 OOS sm	DSL	Aggregatec	5	2.728505	1.084687	1.234833	1.923457	3.571197	2563.519	2307.167	0.043517	0.040036
Placer	2020	Winter	T6 instate	DSL	Aggregatec	5	52.46013	1.142206	1.300315	1.966523	11.10869	2590.115	2331.103	0.076233	0.070134
Placer	2020	Winter	T6 instate	DSL	Aggregatec	5	140.1396	1.271995	1.448069	2.255607	4.846698	2568.647	2311.782	0.05841	0.053737
Placer	2020	Winter	T6 instate	DSL	Aggregatec	5	223.1275	1.134864	1.291956	1.964744	10.0395	2586.661	2327.995	0.069825	0.064239
Placer	2020	Winter	T6 instate	DSL	Aggregatec	5	625.0797	1.233637	1.404402	2.187588	4.572565	2567.476	2310.728	0.055152	0.050739
Placer	2020	Winter	T6 utility	DSL	Aggregatec	5	5.066328	0.815818	0.928746	1.439114	5.767122	2579.588	2321.629	0.035192	0.032377
Placer	2020	Winter	T6TS	GAS	Aggregatec	5	197.8882	0.523094	0.631678	7.16767	0.530648	2513.497	2262.147	0.003188	0.002951
Placer	2020	Winter	T7 Ag	DSL	Aggregatec	5	51.75546	3.867006	4.402292	7.176022	18.57925	4000.431	3600.388	0.459345	0.422598
Placer	2020	Winter	T7 CAIRP	DSL	Aggregatec	5	469.3559	2.662913	3.031523	5.30627	8.574062	3964.755	3568.279	0.082993	0.076353
Placer	2020	Winter	T7 CAIRP c	DSL	Aggregatec	5	20.89206	2.663583	3.032287	5.30608	8.712187	3965.34	3568.806	0.083483	0.076804
Placer	2020	Winter	T7 NNOOS	DSL	Aggregatec	5	528.0079	2.26303	2.576288	4.514954	5.814729	3958.594	3562.734	0.064999	0.059799
Placer	2020	Winter	T7 NOOS	DSL	Aggregatec	5	170.9275	2.661998	3.030482	5.303974	8.585729	3964.772	3568.295	0.083121	0.076471
Placer	2020	Winter	T7 other p	DSL	Aggregatec	5	1.516091	5.980481	6.808323	11.89675	26.23109	4084.476	3676.029	0.124146	0.114214
Placer	2020	Winter	T7 POAK	DSL	Aggregatec	5	27.65973	5.999852	6.830374	11.93528	26.29847	4085.555	3677	0.124175	0.114241
Placer	2020	Winter	T7 POLA	DSL	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2020	Winter	T7 Public	DSL	Aggregatec	5	32.62586	1.313796	1.495657	2.431427	32.69859	4088.322	3679.489	0.230158	0.211745
Placer	2020	Winter	T7 Single	DSL	Aggregatec	5	157.1849	1.955525	2.226216	3.791054	17.84161	4007.021	3606.319	0.100993	0.092914
Placer	2020	Winter	T7 single c	DSL	Aggregatec	5	54.04502	1.955354	2.226022	3.791188	18.00102	4007.878	3607.09	0.100953	0.092877
Placer	2020	Winter	T7 SWCV	DSL	Aggregatec	5	20.33016	1.653311	1.882169	3.115672	23.81535	4016.504	3614.854	0.156744	0.144204
Placer	2020	Winter	T7 tractor	DSL	Aggregatec	5	202.6439	2.825352	3.216448	5.545632	17.48559	3997.189	3597.47	0.117369	0.107979
Placer	2020	Winter	T7 tractor	DSL	Aggregatec	5	40.29456	2.853081	3.248016	5.569696	20.0685	4005.44	3604.896	0.129741	0.119362
Placer	2020	Winter	T7 utility	DSL	Aggregatec	5	1.61596	1.471607	1.675312	2.894027	13.36848	4000.234	3600.21	0.0637	0.058604
Placer	2020	Winter	T7IS	GAS	Aggregatec	5	15.2013	4.932785	5.732246	133.6094	4.687909	2513.497	2262.148	0.002976	0.002662
Placer	2020	Winter	UBUS	GAS	Aggregatec	5	36.25494	3.579021	3.882648	29.37059	2.310969	2513.497	2262.147	0.004592	0.004261
Placer	2020	Winter	UBUS	DSL	Aggregatec	5	99.36538	1.146553	1.305275	7.287798	16.41383	2398.518	2158.666	0.411182	0.378288
Placer	2020	Winter	All Other B	DSL	Aggregatec	5	33.12472	1.232716	1.403353	2.128714	9.610592	2581.803	2323.623	0.077148	0.070976

EMFAC2011 Emission Rates
Region Type: County
Region: Placer
Calendar Year: 2012
Season: Winter
Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	VMT	ROG_RUNE	TOG_RUNE	CO_RUNEX	NOX_RUNE	CO2_RUNE	CO2_RUNE	PM10_RUN	PM2_5_RUNEX
						(miles/hr)	(miles/day)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)
Placer	2012	Winter	LDA	GAS	Aggregatec	5	1787.465	0.259841	0.356084	3.47548	0.255451	1072.355	1010.72	0.012445	0.011327
Placer	2012	Winter	LDA	DSL	Aggregatec	5	7.562396	0.171281	0.194992	1.268236	1.141819	432.0839	397.5908	0.123489	0.11361
Placer	2012	Winter	LDT1	GAS	Aggregatec	5	252.0735	0.606338	0.774473	8.078247	0.605356	1243.601	1173.304	0.023764	0.02156
Placer	2012	Winter	LDT1	DSL	Aggregatec	5	0.264174	0.279219	0.317872	1.667315	1.187555	436.291	397.3121	0.235638	0.216787
Placer	2012	Winter	LDT2	GAS	Aggregatec	5	725.5092	0.267629	0.389139	3.932171	0.472851	1471.01	1407.138	0.012045	0.011031
Placer	2012	Winter	LDT2	DSL	Aggregatec	5	0.250238	0.257803	0.293491	1.56748	1.371712	424.4659	396.942	0.213379	0.196309
Placer	2012	Winter	LHD1	GAS	Aggregatec	5	10520.96	0.850756	0.969321	10.30109	0.567364	2513.497	2500.93	0.011564	0.010666
Placer	2012	Winter	LHD1	DSL	Aggregatec	5	6276.477	0.599793	0.682824	3.690851	7.552268	524.1788	521.5579	0.125885	0.115814
Placer	2012	Winter	LHD2	GAS	Aggregatec	5	794.1564	0.602448	0.695036	9.662195	0.403893	2513.497	2500.93	0.009421	0.008425
Placer	2012	Winter	LHD2	DSL	Aggregatec	5	1262.65	0.495545	0.564145	3.243424	6.731915	521.8	519.191	0.107326	0.098739
Placer	2012	Winter	MCY	GAS	Aggregatec	5	29.69706	5.393435	5.905841	35.64708	1.280419	249.5459	248.2981	0.001768	0.001408
Placer	2012	Winter	MDV	GAS	Aggregatec	5	701.3501	0.388751	0.57612	5.352142	0.715083	1867.75	1809.963	0.013012	0.011955
Placer	2012	Winter	MDV	DSL	Aggregatec	5	0.571929	0.142318	0.16202	0.94873	0.760802	463.5335	442.2013	0.118814	0.109308
Placer	2012	Winter	MH	GAS	Aggregatec	5	289.2822	1.624138	1.871303	36.16488	0.996462	2513.497	2500.93	0.017286	0.01535
Placer	2012	Winter	MH	DSL	Aggregatec	5	67.23698	1.733289	1.973235	2.603248	20.23608	2377.037	2365.152	0.638626	0.587536
Placer	2012	Winter	Motor Coa	DSL	Aggregatec	5	12.30506	6.472582	7.368542	11.25481	37.19751	4015.39	3995.313	1.084397	0.997645
Placer	2012	Winter	OBUS	GAS	Aggregatec	5	116.1394	0.920771	1.103139	12.9235	1.105926	2513.497	2500.93	0.004329	0.003993
Placer	2012	Winter	SBUS	GAS	Aggregatec	5	14.95158	6.832181	7.515106	113.4969	3.037438	2513.497	2500.93	0.043649	0.038102
Placer	2012	Winter	SBUS	DSL	Aggregatec	5	47.54645	4.427373	5.040227	5.404886	30.30737	2625.474	2612.347	1.376329	1.266222
Placer	2012	Winter	T6 Ag	DSL	Aggregatec	5	39.83015	5.940001	6.762238	7.37861	27.06914	2631.743	2618.585	1.642537	1.511134
Placer	2012	Winter	T6 Public	DSL	Aggregatec	5	62.15105	3.065273	3.48958	3.985021	25.72829	2615.804	2602.725	1.058278	0.973616
Placer	2012	Winter	T6 CAIRP h	DSL	Aggregatec	5	1.165915	3.06494	3.489201	4.518595	19.39582	2604.773	2591.749	0.657246	0.604666
Placer	2012	Winter	T6 CAIRP s	DSL	Aggregatec	5	3.902308	2.549647	2.902579	4.02073	15.43871	2602.522	2589.509	0.422823	0.388997
Placer	2012	Winter	T6 OOS hea	DSL	Aggregatec	5	0.668443	3.06494	3.489201	4.518595	19.39582	2604.773	2591.749	0.657246	0.604666
Placer	2012	Winter	T6 OOS sm	DSL	Aggregatec	5	2.237275	2.549647	2.902579	4.02073	15.43871	2602.522	2589.509	0.422823	0.388997
Placer	2012	Winter	T6 instate c	DSL	Aggregatec	5	29.35672	4.892466	5.5697	6.495927	26.2847	2608.291	2595.25	1.342738	1.235319
Placer	2012	Winter	T6 instate c	DSL	Aggregatec	5	80.06686	3.552352	4.044082	5.159724	19.81183	2603.45	2590.433	0.786456	0.72354
Placer	2012	Winter	T6 instate h	DSL	Aggregatec	5	178.0733	4.782136	5.444098	6.352193	25.50526	2607.146	2594.11	1.305423	1.200989
Placer	2012	Winter	T6 instate s	DSL	Aggregatec	5	492.9218	3.432303	3.907416	4.994499	19.00181	2601.473	2588.466	0.752976	0.692738
Placer	2012	Winter	T6 utility	DSL	Aggregatec	5	3.87453	1.865515	2.123747	2.771382	20.10772	2602.847	2589.833	0.526954	0.484798
Placer	2012	Winter	T6TS	GAS	Aggregatec	5	156.3598	2.265124	2.591423	35.00275	1.711588	2513.497	2500.93	0.013215	0.011752
Placer	2012	Winter	T7 Ag	DSL	Aggregatec	5	49.87115	9.484757	10.79767	15.85816	46.71018	4055.306	4035.029	2.412598	2.21959
Placer	2012	Winter	T7 CAIRP	DSL	Aggregatec	5	346.4879	6.99333	7.961374	12.91996	32.70234	4020.441	4000.338	0.786934	0.723979
Placer	2012	Winter	T7 CAIRP c	DSL	Aggregatec	5	8.701616	7.080503	8.060614	13.07596	33.20823	4021.476	4001.369	0.79985	0.735862
Placer	2012	Winter	T7 NNOOS	DSL	Aggregatec	5	389.786	4.64301	5.285713	8.789516	19.87101	4002.43	3982.418	0.387362	0.356373
Placer	2012	Winter	T7 NOOS	DSL	Aggregatec	5	126.1821	6.882913	7.835672	12.75434	32.70234	4020.982	4000.877	0.759215	0.698478
Placer	2012	Winter	T7 other p	DSL	Aggregatec	5	1.256646	3.373153	3.840078	6.025025	51.45719	4060.66	4040.357	0.472297	0.434513
Placer	2012	Winter	T7 POAK	DSL	Aggregatec	5	16.81924	3.222141	3.668162	5.611104	53.94117	4064.203	4043.882	0.494374	0.454824
Placer	2012	Winter	T7 POLA	DSL	Aggregatec	5	0	0	0	0	0	0	0	0	0
Placer	2012	Winter	T7 Public	DSL	Aggregatec	5	26.16592	6.260985	7.127655	10.62795	46.67194	4097.513	4077.025	2.353519	2.165237
Placer	2012	Winter	T7 Single	DSL	Aggregatec	5	116.037	7.757346	8.831148	12.76552	43.61873	4029.07	4008.924	2.14006	1.968855
Placer	2012	Winter	T7 single c	DSL	Aggregatec	5	22.50994	7.444021	8.474451	12.26483	42.64522	4023.88	4003.761	2.001191	1.841096
Placer	2012	Winter	T7 SWCV	DSL	Aggregatec	5	16.30478	1.318212	1.500684	2.299832	42.1966	4090.744	4070.29	0.298861	0.274952
Placer	2012	Winter	T7 tractor	DSL	Aggregatec	5	149.5958	10.85318	12.35552	18.05622	46.05804	4030.357	4010.205	2.363742	2.174643
Placer	2012	Winter	T7 tractor c	DSL	Aggregatec	5	16.78282	11.43354	13.01621	18.8641	47.3348	4029.967	4009.817	2.561796	2.356852
Placer	2012	Winter	T7 utility	DSL	Aggregatec	5	1.17532	3.451184	3.92891	5.87924	36.8196	4015.879	3995.799	0.976562	0.898437
Placer	2012	Winter	T7IS	GAS	Aggregatec	5	13.00931	13.99711	15.29727	232.8801	7.777982	2513.497	2500.93	0.01313	0.011155
Placer	2012	Winter	UBUS	GAS	Aggregatec	5	30.5859	4.038265	4.396655	34.92805	2.678504	2513.497	2500.93	0.005791	0.005373
Placer	2012	Winter	UBUS	DSL	Aggregatec	5	83.828	1.425644	1.623001	8.152289	20.41997	2461.297	2448.99	0.493018	0.453577
Placer	2012	Winter	All Other B	DSL	Aggregatec	5	27.0927	4.830698	5.499382	6.471855	26.94113	2621.003	2607.898	1.219026	1.121504

```
         CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
              JUNE 1989 VERSION
              PAGE   1


           RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

        U=   0.5 M/S             Z0= 100. CM           ALT=    42. (M)
      BRG= WORST CASE            VD=  0.0 CM/S
     CLAS=     7 (G)             VS=  0.0 CM/S
     MIXH= 1000. M              AMB=  0.0 PPM
    SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000    -7     0    -7 *  AG   2045   1.8    1.0  20.6
 B. Link_2       *     0    -4  1000    -4 *  AG   2110   1.8    1.0  13.3
 C. Link_3       *  1000     9     0     9 *  AG   2945   1.8    1.0  24.3
 D. Link_4       *     0     7 -1000     7 *  AG   3330   1.8    1.0  20.6
 E. Link_5       *    -5  1000    -5     0 *  AG    795   1.8    1.0  17.0
 F. Link_6       *     0     0     0 -1000 *  AG    340   1.8    1.0  10.0
 G. Link_7       *     4 -1000     4     0 *  AG    995   1.8    1.0  13.3
 H. Link_8       *     4     0     4  1000 *  AG   1000   1.8    1.0  13.3


 III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -15     19   1.8
 2. R_002    *     11    -11   1.8
 3. R_003    *     11     22   1.8
 4. R_004    *     -7    -19   1.8


1
```

```
           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   2

              RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

            *       * PRED  *               CONC/LINK
            *  BRG  * CONC  *                 (PPM)
   RECEPTOR   * (DEG) * (PPM) *    A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   96. *   1.0 *  0.0  0.2  0.6  0.1  0.1  0.0  0.0  0.1
  2. R_002    *  276. *   1.0 *  0.5  0.1  0.0  0.4  0.0  0.0  0.1  0.0
  3. R_003    *  262. *   0.9 *  0.2  0.0  0.1  0.5  0.1  0.0  0.0  0.1
  4. R_004    *    4. *   0.8 *  0.2  0.0  0.0  0.2  0.2  0.0  0.0  0.2


1
EXIT
```

```
         CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                  JUNE 1989 VERSION
                  PAGE   1


           RUN: CALINE4 RUN      (WORST CASE ANGLE)
       POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

      U=   0.5 M/S            Z0= 100. CM           ALT=    42. (M)
     BRG= WORST CASE           VD=  0.0 CM/S
    CLAS=     7 (G)            VS=  0.0 CM/S
    MIXH= 1000. M             AMB=  0.0 PPM
   SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


 II.  LINK VARIABLES

    LINK      *  LINK COORDINATES (M)   *              EF     H     W
  DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000   -11     0   -11 *  AG   2375   1.8    1.0  27.9
 B. Link_2       *     0    -5  1000    -5 *  AG   2620   1.8    1.0  17.0
 C. Link_3       *  1000    11     0    11 *  AG   3375   1.8    1.0  27.9
 D. Link_4       *     0     7 -1000     7 *  AG   3205   1.8    1.0  20.6
 E. Link_5       *    -9  1000    -9     0 *  AG    865   1.8    1.0  24.3
 F. Link_6       *    -4     0    -4 -1000 *  AG    715   1.8    1.0  13.3
 G. Link_7       *     9 -1000     9     0 *  AG   1160   1.8    1.0  24.3
 H. Link_8       *     4     0     4  1000 *  AG   1235   1.8    1.0  13.3


 III.  RECEPTOR LOCATIONS

           *    COORDINATES (M)
  RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -22     18   1.8
 2. R_002    *     22    -15   1.8
 3. R_003    *     11     25   1.8
 4. R_004    *    -11    -26   1.8


1
```

```
        CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
              JUNE 1989 VERSION
              PAGE   2


          RUN: CALINE4 RUN      (WORST CASE ANGLE)
      POLLUTANT: Carbon Monoxide


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

           *       * PRED  *               CONC/LINK
           *  BRG  * CONC  *                 (PPM)
  RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   95. *   1.1 *  0.0  0.2  0.6  0.2  0.1  0.0  0.0  0.1
  2. R_002    *  276. *   1.0 *  0.4  0.2  0.0  0.3  0.0  0.0  0.1  0.0
  3. R_003    *  261. *   0.9 *  0.2  0.0  0.1  0.4  0.1  0.0  0.0  0.1
  4. R_004    *   81. *   0.8 *  0.0  0.3  0.3  0.0  0.0  0.1  0.1  0.0


1
EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   1


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

        U=   0.5 M/S             Z0= 100. CM            ALT=    42. (M)
      BRG= WORST CASE            VD=  0.0 CM/S
     CLAS=     7 (G)             VS=  0.0 CM/S
     MIXH= 1000. M              AMB=  0.0 PPM
    SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
  ----------------*-------------------------*------------------------------
  A. Link_1       * -1000    -5     0    -5 *  AG   2210   1.8    1.0  17.0
  B. Link_2       *     0    -2  1000    -2 *  AG   2375   1.8    1.0  10.0
  C. Link_3       *  1000     5     0     5 *  AG   3205   1.8    1.0  17.0
  D. Link_4       *     0     4 -1000     4 *  AG   2965   1.8    1.0  13.3
  E. Link_5       *    -7  1000    -7     0 *  AG    410   1.8    1.0  20.6
  F. Link_6       *    -5     0    -5 -1000 *  AG     60   1.8    1.0  17.0
  G. Link_7       *     9 -1000     9     0 *  AG     50   1.8    1.0  24.3
  H. Link_8       *     5     0     5  1000 *  AG    475   1.8    1.0  17.0


  III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
  ------------*---------------------
  1. R_001    *    -18     10   1.8
  2. R_002    *     22     -7   1.8
  3. R_003    *     14     14   1.8
  4. R_004    *    -15    -15   1.8


 1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   2

             J
             RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

             *       * PRED  *                 CONC/LINK
             *  BRG  * CONC  *                   (PPM)
  RECEPTOR   * (DEG) * (PPM) *    A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   95. *   1.3 *  0.0  0.3  0.6  0.3  0.0  0.0  0.0  0.0
  2. R_002    *   83. *   1.2 *  0.0  0.7  0.5  0.0  0.0  0.0  0.0  0.0
  3. R_003    *  262. *   1.0 *  0.3  0.0  0.2  0.5  0.0  0.0  0.0  0.0
  4. R_004    *  277. *   0.9 *  0.5  0.0  0.0  0.3  0.0  0.0  0.0  0.0


1
EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                  JUNE 1989 VERSION
                  PAGE   1


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

         U=   0.5 M/S             Z0= 100. CM            ALT=    42. (M)
       BRG= WORST CASE            VD=  0.0 CM/S
      CLAS=     7 (G)             VS=  0.0 CM/S
      MIXH= 1000. M              AMB=  0.0 PPM
     SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

      LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
  ----------------*-------------------------*------------------------------
  A. Link_1       * -1000    -7     0    -7 *  AG   1276   1.8    1.0  20.6
  B. Link_2       *     0    -4  1000    -4 *  AG   1439   1.8    1.0  13.3
  C. Link_3       *  1000     9     0     9 *  AG   1913   1.8    1.0  24.3
  D. Link_4       *     0     7 -1000     7 *  AG   2264   1.8    1.0  20.6
  E. Link_5       *    -5  1000    -5     0 *  AG    687   1.8    1.0  17.0
  F. Link_6       *     0     0     0 -1000 *  AG    229   1.8    1.0  10.0
  G. Link_7       *     4 -1000     4     0 *  AG    942   1.8    1.0  13.3
  H. Link_8       *     4     0     4  1000 *  AG    886   1.8    1.0  13.3


  III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
  ------------*---------------------
  1. R_001    *    -15     19   1.8
  2. R_002    *     11    -11   1.8
  3. R_003    *     11     22   1.8
  4. R_004    *     -7    -19   1.8


 1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *       * PRED  *                CONC/LINK
              *  BRG  * CONC  *                  (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   96. *   0.7 *  0.0  0.2  0.4  0.1  0.1  0.0  0.0  0.1
  2. R_002    *  276. *   0.8 *  0.3  0.0  0.0  0.3  0.0  0.0  0.1  0.0
  3. R_003    *  262. *   0.7 *  0.1  0.0  0.0  0.4  0.1  0.0  0.0  0.1
  4. R_004    *    4. *   0.6 *  0.1  0.0  0.0  0.1  0.2  0.0  0.0  0.2


1
EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                 JUNE 1989 VERSION
                 PAGE   1


            RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

        U=   0.5 M/S             Z0= 100. CM           ALT=    42. (M)
      BRG= WORST CASE            VD=  0.0 CM/S
     CLAS=     7 (G)             VS=  0.0 CM/S
     MIXH= 1000. M              AMB=  0.0 PPM
    SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
  ----------------*-------------------------*------------------------------
  A. Link_1       * -1000   -11     0   -11 *  AG   2245   1.8    1.0  27.9
  B. Link_2       *     0    -5  1000    -5 *  AG   2805   1.8    1.0  17.0
  C. Link_3       *  1000    11     0    11 *  AG   3380   1.8    1.0  27.9
  D. Link_4       *     0     7 -1000     7 *  AG   2900   1.8    1.0  20.6
  E. Link_5       *    -9  1000    -9     0 *  AG   1140   1.8    1.0  24.3
  F. Link_6       *    -4     0    -4 -1000 *  AG    690   1.8    1.0  13.3
  G. Link_7       *     9 -1000     9     0 *  AG    995   1.8    1.0  24.3
  H. Link_8       *     4     0     4  1000 *  AG   1365   1.8    1.0  13.3


  III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
  ------------*---------------------
  1. R_001    *    -22     18   1.8
  2. R_002    *     22    -15   1.8
  3. R_003    *     11     25   1.8
  4. R_004    *    -11    -26   1.8


 1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                 JUNE 1989 VERSION
                 PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

            *       * PRED  *               CONC/LINK
            *  BRG  * CONC  *                 (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   95. *   1.1 *  0.0  0.2  0.6  0.1  0.1  0.0  0.0  0.1
  2. R_002    *   83. *   1.0 *  0.0  0.7  0.3  0.0  0.0  0.0  0.0  0.0
  3. R_003    *  261. *   0.9 *  0.2  0.0  0.1  0.4  0.1  0.0  0.0  0.1
  4. R_004    *   81. *   0.8 *  0.0  0.3  0.3  0.0  0.0  0.1  0.1  0.0


1
EXIT
```

```
        CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   1


            RUN: CALINE4 RUN      (WORST CASE ANGLE)
       POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

        U=   0.5 M/S            Z0= 100. CM           ALT=    42. (M)
      BRG= WORST CASE           VD=  0.0 CM/S
     CLAS=     7 (G)            VS=  0.0 CM/S
     MIXH= 1000. M             AMB=  0.0 PPM
    SIGTH=   10. DEGREES      TEMP=  3.9 DEGREE (C)


 II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *             EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000    -5     0    -5 *  AG   1695   1.8    1.0  17.0
 B. Link_2       *     0    -2  1000    -2 *  AG   1920   1.8    1.0  10.0
 C. Link_3       *  1000     5     0     5 *  AG   2645   1.8    1.0  17.0
 D. Link_4       *     0     4 -1000     4 *  AG   2445   1.8    1.0  13.3
 E. Link_5       *    -7  1000    -7     0 *  AG    395   1.8    1.0  20.6
 F. Link_6       *    -5     0    -5 -1000 *  AG     50   1.8    1.0  17.0
 G. Link_7       *     9 -1000     9     0 *  AG     50   1.8    1.0  24.3
 H. Link_8       *     5     0     5  1000 *  AG    370   1.8    1.0  17.0


 III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -18     10   1.8
 2. R_002    *     22     -7   1.8
 3. R_003    *     14     14   1.8
 4. R_004    *    -15    -15   1.8


1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                 JUNE 1989 VERSION
                 PAGE   2

             J
             RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

            *       * PRED  *               CONC/LINK
            *  BRG  * CONC  *                  (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   95. *   1.1 *  0.0  0.3  0.5  0.2  0.0  0.0  0.0  0.0
  2. R_002    *   83. *   1.0 *  0.0  0.6  0.4  0.0  0.0  0.0  0.0  0.0
  3. R_003    *  262. *   0.8 *  0.2  0.0  0.1  0.4  0.0  0.0  0.0  0.0
  4. R_004    *  277. *   0.7 *  0.4  0.0  0.0  0.3  0.0  0.0  0.0  0.0


 1
 EXIT
```

```
        CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
             JUNE 1989 VERSION
             PAGE   1


         RUN: CALINE4 RUN      (WORST CASE ANGLE)
      POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

       U=   0.5 M/S             Z0= 100. CM           ALT=    42. (M)
      BRG= WORST CASE           VD=  0.0 CM/S
     CLAS=     7 (G)            VS=  0.0 CM/S
     MIXH= 1000. M             AMB=  0.0 PPM
    SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
  ----------------*-------------------------*------------------------------
  A. Link_1      * -1000    -5     0    -5 *  AG    485   1.8    1.0  17.0
  B. Link_2      *     0    -4  1000    -4 *  AG    610   1.8    1.0  13.3
  C. Link_3      *  1000     5     0     5 *  AG    680   1.8    1.0  17.0
  D. Link_4      *     0     4 -1000     4 *  AG    635   1.8    1.0  13.3
  E. Link_5      *   -11  1000   -11     0 *  AG   1600   1.8    1.0  27.9
  F. Link_6      *    -4     0    -4 -1000 *  AG   1995   1.8    1.0  13.3
  G. Link_7      *    11 -1000    11     0 *  AG   2510   1.8    1.0  27.9
  H. Link_8      *     5     0     5  1000 *  AG   2035   1.8    1.0  17.0


  III.  RECEPTOR LOCATIONS

           *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
  ------------*---------------------
  1. R_001    *    -26     11   1.8
  2. R_002    *     25    -11   1.8
  3. R_003    *     14     14   1.8
  4. R_004    *    -11    -15   1.8


 1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   2


            RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

           *       * PRED  *              CONC/LINK
           *  BRG  * CONC  *                (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *  171. *   0.6 *  0.0  0.0  0.0  0.1  0.0  0.2  0.2  0.0
  2. R_002    *  187. *   0.7 *  0.0  0.0  0.0  0.0  0.0  0.2  0.5  0.0
  3. R_003    *  184. *   0.9 *  0.0  0.0  0.1  0.0  0.0  0.2  0.5  0.1
  4. R_004    *  173. *   0.9 *  0.0  0.0  0.0  0.0  0.0  0.5  0.3  0.0


 1
 EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
       POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

        U=   0.5 M/S             Z0= 100. CM            ALT=    42. (M)
      BRG= WORST CASE            VD=  0.0 CM/S
     CLAS=     7 (G)             VS=  0.0 CM/S
     MIXH= 1000. M              AMB=  0.0 PPM
    SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


 II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000    -5     0    -5 *  AG    470   1.8    1.0  17.0
 B. Link_2       *     0    -4  1000    -4 *  AG    565   1.8    1.0  13.3
 C. Link_3       *  1000     5     0     5 *  AG    695   1.8    1.0  17.0
 D. Link_4       *     0     4 -1000     4 *  AG    625   1.8    1.0  13.3
 E. Link_5       *   -11  1000   -11     0 *  AG   1525   1.8    1.0  27.9
 F. Link_6       *    -4     0    -4 -1000 *  AG   1885   1.8    1.0  13.3
 G. Link_7       *    11 -1000    11     0 *  AG   2250   1.8    1.0  27.9
 H. Link_8       *     5     0     5  1000 *  AG   1865   1.8    1.0  17.0


 III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -26     11   1.8
 2. R_002    *     25    -11   1.8
 3. R_003    *     14     14   1.8
 4. R_004    *    -11    -15   1.8


1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


    IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *        * PRED  *                 CONC/LINK
              *  BRG  * CONC  *                   (PPM)
    RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
   -------------*-------*-------*----------------------------------------
    1. R_001    *  171. *   0.5 *  0.0  0.0  0.0  0.1  0.0  0.2  0.2  0.0
    2. R_002    *  187. *   0.6 *  0.0  0.0  0.0  0.0  0.0  0.2  0.5  0.0
    3. R_003    *  185. *   0.8 *  0.0  0.0  0.1  0.0  0.0  0.2  0.4  0.1
    4. R_004    *  173. *   0.8 *  0.0  0.0  0.0  0.0  0.0  0.5  0.3  0.0


  1
  EXIT
```

```
         CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   1


            RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

         U=   0.5 M/S             Z0= 100. CM            ALT=    42. (M)
       BRG= WORST CASE            VD=  0.0 CM/S
      CLAS=     7 (G)             VS=  0.0 CM/S
      MIXH= 1000. M              AMB=  0.0 PPM
     SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

      LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *    X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
  ----------------*-------------------------*------------------------------
  A. Link_1       * -1000    -7     0    -7 *  AG   1675   4.0    1.0  20.6
  B. Link_2       *     0    -4  1000    -4 *  AG   1945   4.0    1.0  13.3
  C. Link_3       *  1000     9     0     9 *  AG   2445   4.0    1.0  24.3
  D. Link_4       *     0     7 -1000     7 *  AG   3045   4.0    1.0  20.6
  E. Link_5       *    -5  1000    -5     0 *  AG    540   4.0    1.0  17.0
  F. Link_6       *     0     0     0 -1000 *  AG    230   4.0    1.0  10.0
  G. Link_7       *     4 -1000     4     0 *  AG   1445   4.0    1.0  13.3
  H. Link_8       *     4     0     4  1000 *  AG    885   4.0    1.0  13.3


  III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
  ------------*---------------------
  1. R_001    *    -15     19   1.8
  2. R_002    *     11    -11   1.8
  3. R_003    *     11     22   1.8
  4. R_004    *     -7    -19   1.8


 1
```

```
         CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   2


            RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

           *       * PRED  *              CONC/LINK
           *  BRG  * CONC  *                 (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   96. *   2.0 *  0.0  0.5  1.1  0.2  0.1  0.0  0.0  0.1
  2. R_002    *  276. *   2.2 *  0.8  0.1  0.0  0.8  0.0  0.0  0.3  0.0
  3. R_003    *  262. *   1.9 *  0.4  0.0  0.1  1.1  0.1  0.0  0.0  0.2
  4. R_004    *   82. *   1.5 *  0.0  0.6  0.6  0.0  0.0  0.1  0.3  0.0


 1
 EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                 JUNE 1989 VERSION
                 PAGE   1


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


    I.  SITE VARIABLES

          U=   0.5 M/S             Z0= 100. CM            ALT=    42. (M)
        BRG= WORST CASE            VD=  0.0 CM/S
       CLAS=     7 (G)             VS=  0.0 CM/S
       MIXH= 1000. M              AMB=  0.0 PPM
      SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


   II.  LINK VARIABLES

       LINK      *  LINK COORDINATES (M)   *              EF     H     W
    DESCRIPTION  *    X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
  -----------------*-------------------------*-------------------------------
  A. Link_1       * -1000   -11     0   -11 *  AG   1620   4.0    1.0  27.9
  B. Link_2       *     0    -5  1000    -5 *  AG   2195   4.0    1.0  17.0
  C. Link_3       *  1000    11     0    11 *  AG   2730   4.0    1.0  27.9
  D. Link_4       *     0     7 -1000     7 *  AG   2010   4.0    1.0  20.6
  E. Link_5       *    -9  1000    -9     0 *  AG   1050   4.0    1.0  24.3
  F. Link_6       *    -4     0    -4 -1000 *  AG    465   4.0    1.0  13.3
  G. Link_7       *     9 -1000     9     0 *  AG    865   4.0    1.0  24.3
  H. Link_8       *     4     0     4  1000 *  AG   1595   4.0    1.0  13.3


  III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
    RECEPTOR  *    X      Y      Z
  ------------*---------------------
  1. R_001    *    -22     18   1.8
  2. R_002    *     22    -15   1.8
  3. R_003    *     11     25   1.8
  4. R_004    *    -11    -26   1.8


 1
```

```
           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   2


              RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *       * PRED  *                CONC/LINK
              *  BRG  * CONC  *                  (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   95. *   2.1 *  0.0  0.5  1.1  0.2  0.2  0.0  0.0  0.2
  2. R_002    *   83. *   1.8 *  0.0  1.2  0.6  0.0  0.0  0.0  0.0  0.0
  3. R_003    *  261. *   1.6 *  0.3  0.0  0.1  0.6  0.2  0.0  0.0  0.4
  4. R_004    *    5. *   1.5 *  0.3  0.0  0.0  0.2  0.4  0.1  0.0  0.5


1
EXIT
```

```
     CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
          JUNE 1989 VERSION
          PAGE   1


       RUN: CALINE4 RUN      (WORST CASE ANGLE)
    POLLUTANT: Carbon Monoxide


 I.  SITE VARIABLES

      U=   0.5 M/S            Z0= 100. CM           ALT=    42. (M)
     BRG= WORST CASE           VD=  0.0 CM/S
    CLAS=     7 (G)            VS=  0.0 CM/S
    MIXH= 1000. M              AMB=  0.0 PPM
   SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


 II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*-------------------------------
 A. Link_1       * -1000    -5     0    -5 *  AG   1540   4.0    1.0  17.0
 B. Link_2       *     0    -2  1000    -2 *  AG   1615   4.0    1.0  10.0
 C. Link_3       *  1000     5     0     5 *  AG   2010   4.0    1.0  17.0
 D. Link_4       *     0     4 -1000     4 *  AG   1955   4.0    1.0  13.3
 E. Link_5       *    -7  1000    -7     0 *  AG    375   4.0    1.0  20.6
 F. Link_6       *    -5     0    -5 -1000 *  AG     55   4.0    1.0  17.0
 G. Link_7       *     9 -1000     9     0 *  AG     45   4.0    1.0  24.3
 H. Link_8       *     5     0     5  1000 *  AG    345   4.0    1.0  17.0


 III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
  RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -18     10   1.8
 2. R_002    *     22     -7   1.8
 3. R_003    *     14     14   1.8
 4. R_004    *    -15    -15   1.8


1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                  JUNE 1989 VERSION
                  PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

               *       * PRED  *                  CONC/LINK
               *  BRG  * CONC  *                    (PPM)
   RECEPTOR    * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001     *   95. *   2.0 *  0.0  0.5  1.0  0.4  0.1  0.0  0.0  0.0
  2. R_002     *   84. *   1.9 *  0.0  1.1  0.8  0.0  0.0  0.0  0.0  0.0
  3. R_003     *  263. *   1.6 *  0.5  0.0  0.2  0.8  0.1  0.0  0.0  0.1
  4. R_004     *  277. *   1.4 *  0.9  0.0  0.0  0.5  0.0  0.0  0.0  0.0


 1
 EXIT
```

```
        CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
              JUNE 1989 VERSION
              PAGE   1


          RUN: CALINE4 RUN      (WORST CASE ANGLE)
       POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

        U=   0.5 M/S            Z0= 100. CM           ALT=    42. (M)
      BRG= WORST CASE           VD=  0.0 CM/S
     CLAS=     7 (G)            VS=  0.0 CM/S
     MIXH= 1000. M             AMB=  0.0 PPM
    SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *             EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000    -5     0    -5 *  AG    480   4.0    1.0  17.0
 B. Link_2       *     0    -4  1000    -4 *  AG    475   4.0    1.0  13.3
 C. Link_3       *  1000     5     0     5 *  AG    570   4.0    1.0  17.0
 D. Link_4       *     0     4 -1000     4 *  AG    660   4.0    1.0  13.3
 E. Link_5       *   -11  1000   -11     0 *  AG   1135   4.0    1.0  27.9
 F. Link_6       *    -4     0    -4 -1000 *  AG   1685   4.0    1.0  13.3
 G. Link_7       *    11 -1000    11     0 *  AG   2355   4.0    1.0  27.9
 H. Link_8       *     5     0     5  1000 *  AG   1720   4.0    1.0  17.0


 III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -26     11   1.8
 2. R_002    *     25    -11   1.8
 3. R_003    *     14     14   1.8
 4. R_004    *    -11    -15   1.8


1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

            *       * PRED  *               CONC/LINK
            *  BRG  * CONC  *                  (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *  171. *   1.2 *  0.1  0.0  0.0  0.2  0.0  0.4  0.4  0.0
  2. R_002    *  187. *   1.4 *  0.0  0.0  0.0  0.0  0.0  0.3  1.0  0.0
  3. R_003    *  184. *   1.8 *  0.0  0.1  0.1  0.0  0.0  0.4  1.0  0.2
  4. R_004    *  173. *   1.7 *  0.0  0.0  0.0  0.0  0.0  1.0  0.7  0.0


1
EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   1


            RUN: CALINE4 RUN      (WORST CASE ANGLE)
       POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

        U=   0.5 M/S            Z0= 100. CM           ALT=    42. (M)
      BRG= WORST CASE           VD=  0.0 CM/S
     CLAS=     7 (G)            VS=  0.0 CM/S
     MIXH= 1000. M             AMB=  0.0 PPM
    SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000    -5     0    -5 *  AG   1695   4.0    1.0  17.0
 B. Link_2       *     0    -2  1000    -2 *  AG   1920   4.0    1.0  10.0
 C. Link_3       *  1000     5     0     5 *  AG   2645   4.0    1.0  17.0
 D. Link_4       *     0     4 -1000     4 *  AG   2445   4.0    1.0  13.3
 E. Link_5       *    -7  1000    -7     0 *  AG    395   4.0    1.0  20.6
 F. Link_6       *    -5     0    -5 -1000 *  AG     50   4.0    1.0  17.0
 G. Link_7       *     9 -1000     9     0 *  AG     50   4.0    1.0  24.3
 H. Link_8       *     5     0     5  1000 *  AG    370   4.0    1.0  17.0


 III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -18     10   1.8
 2. R_002    *     22     -7   1.8
 3. R_003    *     14     14   1.8
 4. R_004    *    -15    -15   1.8


1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *       * PRED  *                CONC/LINK
              *  BRG  * CONC  *                  (PPM)
  RECEPTOR    * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   95. *   2.4 *  0.0  0.6  1.2  0.5  0.1  0.0  0.0  0.1
  2. R_002    *   83. *   2.2 *  0.0  1.2  1.0  0.0  0.0  0.0  0.0  0.0
  3. R_003    *  262. *   1.9 *  0.5  0.0  0.3  0.9  0.1  0.0  0.0  0.1
  4. R_004    *  277. *   1.6 *  1.0  0.0  0.0  0.6  0.0  0.0  0.0  0.0


1
EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   1


              RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

         U=   0.5 M/S             Z0= 100. CM           ALT=    42. (M)
       BRG= WORST CASE           VD=  0.0 CM/S
      CLAS=     7 (G)            VS=  0.0 CM/S
      MIXH= 1000. M              AMB=  0.0 PPM
     SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

      LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000    -5     0    -5 *  AG    480   4.0    1.0  17.0
 B. Link_2       *     0    -4  1000    -4 *  AG    530   4.0    1.0  13.3
 C. Link_3       *  1000     5     0     5 *  AG    635   4.0    1.0  17.0
 D. Link_4       *     0     4 -1000     4 *  AG    670   4.0    1.0  13.3
 E. Link_5       *   -11  1000   -11     0 *  AG   1153   4.0    1.0  27.9
 F. Link_6       *    -4     0    -4 -1000 *  AG   1803   4.0    1.0  13.3
 G. Link_7       *    11 -1000    11     0 *  AG   2380   4.0    1.0  27.9
 H. Link_8       *     5     0     5  1000 *  AG   1645   4.0    1.0  17.0


 III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -26     11   1.8
 2. R_002    *     25    -11   1.8
 3. R_003    *     14     14   1.8
 4. R_004    *    -11    -15   1.8


1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                 JUNE 1989 VERSION
                 PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

             *       * PRED  *                CONC/LINK
             *  BRG  * CONC  *                  (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
  -------------*-------*-------*----------------------------------------
   1. R_001    *  171. *   1.2 *  0.1  0.0  0.0  0.2  0.0  0.5  0.5  0.0
   2. R_002    *  187. *   1.4 *  0.0  0.0  0.0  0.0  0.0  0.4  1.1  0.0
   3. R_003    *  184. *   1.9 *  0.0  0.1  0.1  0.0  0.0  0.5  1.0  0.2
   4. R_004    *  173. *   1.8 *  0.0  0.0  0.0  0.0  0.0  1.1  0.7  0.0


 1
 EXIT
```

```
        CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   1


          RUN: CALINE4 RUN      (WORST CASE ANGLE)
      POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

       U=   0.5 M/S            Z0= 100. CM           ALT=    42. (M)
     BRG= WORST CASE           VD=  0.0 CM/S
    CLAS=     7 (G)            VS=  0.0 CM/S
    MIXH= 1000. M             AMB=  0.0 PPM
   SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000    -7     0    -7 *  AG   1276   8.0    1.0  20.6
 B. Link_2       *     0    -4  1000    -4 *  AG   1439   8.0    1.0  13.3
 C. Link_3       *  1000     9     0     9 *  AG   1913   8.0    1.0  24.3
 D. Link_4       *     0     7 -1000     7 *  AG   2264   8.0    1.0  20.6
 E. Link_5       *    -5  1000    -5     0 *  AG    687   8.0    1.0  17.0
 F. Link_6       *     0     0     0 -1000 *  AG    229   8.0    1.0  10.0
 G. Link_7       *     4 -1000     4     0 *  AG    942   8.0    1.0  13.3
 H. Link_8       *     4     0     4  1000 *  AG    886   8.0    1.0  13.3


 III.  RECEPTOR LOCATIONS

           *    COORDINATES (M)
  RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -15     19   1.8
 2. R_002    *     11    -11   1.8
 3. R_003    *     11     22   1.8
 4. R_004    *     -7    -19   1.8


1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

            *       * PRED  *               CONC/LINK
            *  BRG  * CONC  *                  (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
  -------------*-------*-------*----------------------------------------
   1. R_001    *   96. *   3.3 *  0.0  0.7  1.8  0.3  0.3  0.0  0.0  0.3
   2. R_002    *  276. *   3.4 *  1.3  0.2  0.0  1.3  0.0  0.1  0.5  0.0
   3. R_003    *  262. *   3.2 *  0.6  0.0  0.2  1.7  0.2  0.0  0.0  0.4
   4. R_004    *    4. *   2.8 *  0.5  0.0  0.1  0.5  0.8  0.0  0.0  0.8


 1
 EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

         U=   0.5 M/S            Z0= 100. CM           ALT=    42. (M)
       BRG= WORST CASE           VD=  0.0 CM/S
      CLAS=     7 (G)            VS=  0.0 CM/S
      MIXH= 1000. M             AMB=  0.0 PPM
     SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


   II.  LINK VARIABLES

       LINK      *  LINK COORDINATES (M)   *              EF     H     W
    DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
  ---------------*-------------------------*-----------------------------
  A. Link_1       * -1000   -11     0   -11 *  AG   1835   8.0    1.0  27.9
  B. Link_2       *     0    -5  1000    -5 *  AG   1911   8.0    1.0  17.0
  C. Link_3       *  1000    11     0    11 *  AG   2585   8.0    1.0  27.9
  D. Link_4       *     0     7 -1000     7 *  AG   2433   8.0    1.0  20.6
  E. Link_5       *    -9  1000    -9     0 *  AG    569   8.0    1.0  24.3
  F. Link_6       *    -4     0    -4 -1000 *  AG    617   8.0    1.0  13.3
  G. Link_7       *     9 -1000     9     0 *  AG    886   8.0    1.0  24.3
  H. Link_8       *     4     0     4  1000 *  AG    914   8.0    1.0  13.3


  III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
  -----------*--------------------
  1. R_001    *    -22     18   1.8
  2. R_002    *     22    -15   1.8
  3. R_003    *     11     25   1.8
  4. R_004    *    -11    -26   1.8


 1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                 JUNE 1989 VERSION
                 PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

            *       * PRED  *               CONC/LINK
            *  BRG  * CONC  *                  (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   95. *   3.9 *  0.0  0.9  2.0  0.5  0.2  0.0  0.0  0.2
  2. R_002    *  276. *   3.6 *  1.4  0.5  0.0  1.2  0.0  0.2  0.4  0.0
  3. R_003    *  261. *   3.1 *  0.8  0.0  0.2  1.5  0.2  0.0  0.0  0.5
  4. R_004    *   81. *   2.7 *  0.1  1.1  1.0  0.0  0.0  0.3  0.3  0.0


 1
 EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   1


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

        U=   0.5 M/S             Z0= 100. CM            ALT=    42. (M)
      BRG= WORST CASE           VD=  0.0 CM/S
     CLAS=     7 (G)            VS=  0.0 CM/S
     MIXH= 1000. M              AMB=  0.0 PPM
    SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

      LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *    X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000    -7     0    -7 *  AG   1915   1.8    1.0  20.6
 B. Link_2       *     0    -4  1000    -4 *  AG   2145   1.8    1.0  13.3
 C. Link_3       *  1000     9     0     9 *  AG   2915   1.8    1.0  24.3
 D. Link_4       *     0     7 -1000     7 *  AG   3330   1.8    1.0  20.6
 E. Link_5       *    -5  1000    -5     0 *  AG    825   1.8    1.0  17.0
 F. Link_6       *     0     0     0 -1000 *  AG    340   1.8    1.0  10.0
 G. Link_7       *     4 -1000     4     0 *  AG   1335   1.8    1.0  13.3
 H. Link_8       *     4     0     4  1000 *  AG   1175   1.8    1.0  13.3


 III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -15     19   1.8
 2. R_002    *     11    -11   1.8
 3. R_003    *     11     22   1.8
 4. R_004    *     -7    -19   1.8


1
```

```
           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                  JUNE 1989 VERSION
                  PAGE   2


              RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

             *       * PRED  *               CONC/LINK
             *  BRG  * CONC  *                 (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *   96. *   1.0 *  0.0  0.2  0.6  0.1  0.1  0.0  0.0  0.1
  2. R_002    *  276. *   1.1 *  0.4  0.1  0.0  0.4  0.0  0.0  0.1  0.0
  3. R_003    *  262. *   1.0 *  0.2  0.0  0.1  0.5  0.1  0.0  0.0  0.1
  4. R_004    *    4. *   0.8 *  0.2  0.0  0.0  0.2  0.2  0.0  0.0  0.2


 1
 EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1


              RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

         U=   0.5 M/S             Z0= 100. CM           ALT=    42. (M)
       BRG= WORST CASE           VD=  0.0 CM/S
      CLAS=     7 (G)            VS=  0.0 CM/S
      MIXH= 1000. M              AMB=  0.0 PPM
     SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


   II.  LINK VARIABLES

      LINK      *  LINK COORDINATES (M)   *             EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
  ----------------*-------------------------*------------------------------
  A. Link_1       * -1000    -5     0    -5 *  AG   1890   1.8    1.0  17.0
  B. Link_2       *     0    -2  1000    -2 *  AG   1880   1.8    1.0  10.0
  C. Link_3       *  1000     5     0     5 *  AG   2355   1.8    1.0  17.0
  D. Link_4       *     0     4 -1000     4 *  AG   2260   1.8    1.0  13.3
  E. Link_5       *    -7  1000    -7     0 *  AG    355   1.8    1.0  20.6
  F. Link_6       *    -5     0    -5 -1000 *  AG     55   1.8    1.0  17.0
  G. Link_7       *     9 -1000     9     0 *  AG     45   1.8    1.0  24.3
  H. Link_8       *     5     0     5  1000 *  AG    450   1.8    1.0  17.0


  III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
  ------------*---------------------
  1. R_001    *    -18     10   1.8
  2. R_002    *     22     -7   1.8
  3. R_003    *     14     14   1.8
  4. R_004    *    -15    -15   1.8


 1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


    IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

               *       * PRED  *               CONC/LINK
               *  BRG  * CONC  *                 (PPM)
    RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
  -------------*-------*-------*----------------------------------------
   1. R_001    *   95. *   1.0 *  0.0  0.3  0.5  0.2  0.0  0.0  0.0  0.0
   2. R_002    *   83. *   1.0 *  0.0  0.6  0.4  0.0  0.0  0.0  0.0  0.0
   3. R_003    *  262. *   0.8 *  0.2  0.0  0.1  0.4  0.0  0.0  0.0  0.0
   4. R_004    *  277. *   0.7 *  0.5  0.0  0.0  0.3  0.0  0.0  0.0  0.0


 1
 EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

         U=   0.5 M/S             Z0= 100. CM            ALT=    42. (M)
       BRG= WORST CASE            VD=  0.0 CM/S
      CLAS=     7 (G)            VS=  0.0 CM/S
      MIXH= 1000. M              AMB=  0.0 PPM
     SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

      LINK       *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *    X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000   -11     0   -11 *  AG   1880   1.8    1.0  27.9
 B. Link_2       *     0    -5  1000    -5 *  AG   2585   1.8    1.0  17.0
 C. Link_3       *  1000    11     0    11 *  AG   3325   1.8    1.0  27.9
 D. Link_4       *     0     7 -1000     7 *  AG   2350   1.8    1.0  20.6
 E. Link_5       *    -9  1000    -9     0 *  AG   1325   1.8    1.0  24.3
 F. Link_6       *    -4     0    -4 -1000 *  AG    675   1.8    1.0  13.3
 G. Link_7       *     9 -1000     9     0 *  AG    950   1.8    1.0  24.3
 H. Link_8       *     4     0     4  1000 *  AG   1870   1.8    1.0  13.3


 III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -22     18   1.8
 2. R_002    *     22    -15   1.8
 3. R_003    *     11     25   1.8
 4. R_004    *    -11    -26   1.8


1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   2


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


    IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *       * PRED  *                CONC/LINK
              *  BRG  * CONC  *                  (PPM)
    RECEPTOR   * (DEG) * (PPM) *    A    B    C    D    E    F    G    H
  -------------*-------*-------*----------------------------------------
   1. R_001    *   95. *   1.1 *  0.0  0.2  0.6  0.1  0.1  0.0  0.0  0.1
   2. R_002    *   83. *   1.0 *  0.0  0.6  0.3  0.0  0.0  0.0  0.0  0.0
   3. R_003    *  261. *   0.9 *  0.2  0.0  0.1  0.3  0.1  0.0  0.0  0.2
   4. R_004    *    5. *   0.8 *  0.2  0.0  0.0  0.1  0.2  0.1  0.0  0.3


 1
 EXIT
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1


             RUN: CALINE4 RUN      (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

        U=   0.5 M/S             Z0= 100. CM           ALT=    42. (M)
      BRG= WORST CASE           VD=  0.0 CM/S
     CLAS=     7 (G)            VS=  0.0 CM/S
     MIXH= 1000. M              AMB=  0.0 PPM
    SIGTH=   10. DEGREES       TEMP=  3.9 DEGREE (C)


  II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *              EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. Link_1       * -1000    -5     0    -5 *  AG    470   1.8    1.0  17.0
 B. Link_2       *     0    -4  1000    -4 *  AG    610   1.8    1.0  13.3
 C. Link_3       *  1000     5     0     5 *  AG    710   1.8    1.0  17.0
 D. Link_4       *     0     4 -1000     4 *  AG    620   1.8    1.0  13.3
 E. Link_5       *   -11  1000   -11     0 *  AG   1690   1.8    1.0  27.9
 F. Link_6       *    -4     0    -4 -1000 *  AG   2095   1.8    1.0  13.3
 G. Link_7       *    11 -1000    11     0 *  AG   2425   1.8    1.0  27.9
 H. Link_8       *     5     0     5  1000 *  AG   1970   1.8    1.0  17.0


 III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
  RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. R_001    *    -26     11   1.8
 2. R_002    *     25    -11   1.8
 3. R_003    *     14     14   1.8
 4. R_004    *    -11    -15   1.8


1
```

```
           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                  JUNE 1989 VERSION
                  PAGE   2


              RUN: CALINE4 RUN      (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *       * PRED  *              CONC/LINK
              *  BRG  * CONC  *                 (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
  1. R_001    *  171. *   0.6 *  0.0  0.0  0.0  0.1  0.0  0.2  0.2  0.0
  2. R_002    *  187. *   0.7 *  0.0  0.0  0.0  0.0  0.0  0.2  0.5  0.0
  3. R_003    *  185. *   0.9 *  0.0  0.0  0.1  0.0  0.0  0.2  0.5  0.1
  4. R_004    *  173. *   0.9 *  0.0  0.0  0.0  0.0  0.0  0.6  0.3  0.0


1
EXIT
```

Appendix C Interagency Consultation

Regional Planning Partnership **Item #4**

May 21, 2013

Project Level Conformity Working Group Update

Issue: What actions has the Project Level Conformity Group, a subcommittee of the RPP, taken since September 2011?

Recommendation: None, this is for information only.

Discussion: Using delegated authority from the RPP, the Project Level Conformity Group (PLCG) is tasked with reviewing and taking action on $PM_{2.5}$ and PM_{10} Project of Air Quality Concern (POAQC) determinations and hot spot analyses. Since its formation in September 2011, the PLCG, a subcommittee of the RPP, has evaluated ten projects, determining whether they should be considered POAQCs.

Attachment A lists the projects determined and the actions taken; Attachment B lists the members of the PLCG; and Attachment C is the RPP item from September 2011, establishing the PLCG.

Anyone from the RPP is welcome to join the PLCG. If you would like to join, please contact José Luis Cáceres.

JLC:gg
Attachments

Key Staff: Matt Carpenter, Director of Transportation Services, (916) 340-6276
Gordon Garry, Director of Research and Analysis, (916) 340-6230
Renée DeVere-Oki, Senior Planner, (916) 340-6219
José Luis Cáceres, Associate Planner, (916) 340-6218
Victoria S. Cacciatore, Planning Analyst, (916) 340-6214

Actions Taken by the Project Level Conformity Group, September 2011 to May 2013.

#	Date Circulated	Action Date	Action	ID	Title	Sponsor
1	12/23/2011	1/4/2012	POAQC Approved	CAL20452	SR 113/SR 99 Interchange	Caltrans District 3
2	1/19/2012	1/27/2012	POAQC Approved	PLA25502	Rocklin Rd/Meyers St. Roundabout	City of Rocklin Division of Engineering
3	4/23/2012	5/10/2012	POAQC Approved	SAC24470	White Rock Rd. - Sunrise Blvd. to City Limits	City of Rancho Cordova
4	7/5/2012	7/17/2012	POAQC Approved	PLA25499	Rocklin Rd/Grove St Roundabout	City of Rocklin Division of Engineering
5	8/6/2012	8/13/2012	POAQC Approved	PLA25252	Swetzer Road / King Road Signalization	Town of Loomis Dept of Public Works
6	9/11/2012	9/18/2012	POAQC Approved	SAC16800	Fair Oaks Boulevard Improvements Phase 2	Sacramento County Dept of Transportation
7	12/5/2012	4/23/2013*	POAQC Approved*	PLA25440	I-80/SR 65 Interchange Improvements	Placer County Transportation Planning Agency
8	1/4/2013	2/4/2013	POAQC Approved	PLA20721/PLA25299	Placer Parkway Project	Placer County Dept of Public Works
9	3/21/2013	3/28/2013	POAQC Approved	PLA25520	Oak Street Improvements	City of Roseville Dept of Public Works
10	4/15/2013	4/30/2013	POAQC Approved	PLA25509	Nelson Ln/Markham Ravine Bridge Replacement	City of Lincoln Dept of Public Works

* Action taken by Regional Planning Partnership at its April 23, 2013 Meeting.

From: uke McNeel-Caird <lmcneel-caird@pctpa.net>
Sent: uesday, May 07, 2013 9:28 AM
To: eo.Heuston@CH2M.com; Bromund, Claire; Hatcher, Shannon;
Chris.Benson@CH2M.com; David Stanek
Subject: W: RE: I-80/SR 65 IC Updated POAQC Form

EPA and FHWA have concurred that the I-80/SR 65 interchange project is not a POAQC. Thanks to all of you for your help through this process. Claire, let me know if there is anything else you need for your documentation.
Luke McNeel-Caird, P.E.
Placer County Transportation Planning Agency
299 Nevada Street, Auburn, CA 95603
(530) 823-4033

From: Joseph.Vaughn@dot.gov [mailto:Joseph.Vaughn@dot.gov]
Sent: Tuesday, May 07, 2013 9:21 AM
To: JCaceres@sacog.org
Cc: Luke McNeel-Caird; RDeVere-Oki@sacog.org; vcacciatore@sacog.org; mike_brady@dot.ca.gov; oconnor.karina@epa.gov
Subject: RE: RE: I-80/SR 65 IC Updated POAQC Form

FHWA concurs that this is not a project of air quality concern.

Joseph Vaughn
Air Quality Specialist/MPO Coordinator
FHWA, CA Division
(916) 498-5346

From: Jose Luis Caceres [mailto:JCaceres@sacog.org]
Sent: Monday, May 06, 2013 4:10 PM
To: Vaughn, Joseph (FHWA)
Cc: Luke McNeel-Caird; Renee DeVere-Oki; Victoria Cacciatore
Subject: Fwd: RE: I-80/SR 65 IC Updated POAQC Form

Hi Joseph,

It would be great if I could also get FHWA concurrence so that this project can move forward. I'm leaving on paternity leave Tuesday, so if you contact me after then, please copy Renée DeVere-Oki and Luke McNeel-Caird.

Thanks,

José Luis Cáceres
Transportation Planner, SACOG
(916) 340-6218

>>> "OConnor, Karina" <OConnor.Karina@epa.gov> 5/6/2013 9:31 AM >>>
In response to your request for a quick turnaround - the revised form looks fine! EPA concurs that this is not a project of air quality concern.

thanks, Kairna

Karina OConnor
EPA, Region 9
Air Planning Office (AIR-2)
(775) 434-8176
oconnor.karina@epa.gov

From: Jose Luis Caceres [JCaceres@sacog.org]
Sent: Thursday, May 02, 2013 3:46 PM
To: Joseph Vaughn; OConnor, Karina
Cc: Luke McNeel-Caird; Victoria Cacciatore
Subject: Fwd: I-80/SR 65 IC Updated POAQC Form
Karina and Joseph,

The RPP approved this project as not a POAQC on the condition that the sponsor revise the POAQC form. Attached is that form. If this is sufficient, then would you please email me your concurrence on the determination that this is not a POAQC?

Thanks,

José Luis Cáceres
Transportation Planner, SACOG
(916) 340-6218

>>> Luke McNeel-Caird <lmcneel-caird@pctpa.net> 5/2/2013 3:36 PM >>>
Hi Jose Luis,
As requested at the SACOG Regional Planning Partnership meeting on April 24th, attached is an updated POAQC form for the I-80/SR 65 interchange project for transmittal to EPA and FHWA for concurrence. Please let me know if you have any questions.
Luke McNeel-Caird, P.E.
Placer County Transportation Planning Agency
299 Nevada Street, Auburn, CA 95603
(530) 823-4033

Appendix D Modeling Limitations

Limitations and Uncertainties with Modeling

EMFAC

Although EMFAC can calculate CO_2 emissions from mobile sources, the model does have limitations when it comes to accurately reflecting changes in CO_2 emissions due to impacts on traffic. According to the National Cooperative Highway Research Program report, *Development of a Comprehensive Modal Emission Model* (April 2008) and a 2009 University of California study (Barth and Boriboonsomsin 2009), brief but rapid accelerations, such as those occurring during congestion, can contribute significantly to a vehicle's CO_2 emissions during a typical urban trip. Current emission-factor models are insensitive to the distribution of such modal events (i.e., cruise, acceleration, deceleration, and idling) in the operation of a vehicle and instead estimate emissions by average trip speed. This limitation creates an uncertainty in the model's results when compared to the estimated emissions of the various alternatives with baseline in an attempt to determine impacts. Although work by EPA and the ARB is underway on modal-emission models, neither agency has yet approved a modal emissions model that can be used to conduct this more accurate modeling.

The ARB is currently not using EMFAC to create its inventory of greenhouse gas emissions. It is unclear why the ARB has made this decision. Their website only states:

> REVISION: Both the EMFAC and OFFROAD Models develop CO2 and CH4 [methane] emission estimates; however, they are not currently used as the basis for [ARB's] official [greenhouse gas] inventory which is based on fuel usage information. . . However, ARB is working towards reconciling the emission estimates from the fuel usage approach and the models. (California Air Resources Board 2010)

Other Variables

With the current science, project-level analysis of greenhouse gas emissions has limitations. Although a greenhouse gas analysis is included for this project, there are numerous key greenhouse gas variables that are likely to change dramatically during the design life of the proposed project and would thus dramatically change the projected CO_2 emissions.

First, vehicle fuel economy is increasing. The EPA's annual report, "Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2012 ," which provides data on the fuel economy and technology characteristics of new light-duty vehicles including cars, minivans, sport utility vehicles, and pickup trucks, confirms that average fuel economy has improved each year beginning in 2005, and is now at a record high (U.S. Environmental Protection Agency 2013). Corporate Average Fuel Economy (CAFE) standards remained the same between model years 1995 and 2003 and subsequently began setting increasingly higher fuel economy standards for future vehicle model years. The EPA estimates that light duty fuel economy rose by 16% from 2007 to 2012. Table E-1 shows the increases in required fuel economy standards for cars and trucks between Model Years 2012 and 2025 as available from the National Highway Traffic Safety Administration for the 2012-2016 and 2017-2025 CAFE Standards.

Table E-1. Average Required Fuel Economy (mpg)

	2012	2013	2014	2015	2016	2018	2020	2025
Passenger Cars	33.3	34.2	34.9	36.2	37.8	41.1 to 41.6	44.2 to 44.8	55.3 to 56.2
Light Trucks	25.4	26	26.6	27.5	28.8	29.6 to 30.0	30.6 to 31.2	39.3 to 40.3
Combined	29.7	30.5	31.3	32.6	34.1	36.1 to 36.5	38.3 to 38.9	48.7 to 49.7

Source: U.S. Environmental Protection Agency 2013

Second, near zero carbon vehicles will come into the market during the design life of this project. According to the 2013 Annual Energy Outlook:

> "LDVs that use diesel, other alternative fuels, hybrid-electric, or all-electric systems play a significant role in meeting more stringent GHG emissions and CAFE standards over the projection period. Sales of such vehicles increase from 20 percent of all new LDV sales in 2011 to 49 percent in 2040 in the AEO2013 Reference case." (U.S. Energy Information Administration 2013)

The greater percentage of alternative fuel vehicles on the road in the future will reduce overall GHG emissions as compared to scenarios in which vehicle technologies and fuel efficiencies do not change.

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

Lastly, driver behavior has been changing as the U.S. economy and oil prices have changed. In its January 2008 report, "Effects of Gasoline Prices on Driving Behavior and Vehicle Market," the Congressional Budget Office found the following results based on data collected from California (U.S. Congressional Budget Office 2008):

1. freeway motorists adjust to higher gas prices by making fewer trips and driving more slowly;
2. the market share of sports utility vehicles is declining; and
3. the average prices for larger, less-fuel-efficient models declined from 2003 to 2008 as average prices for the most-fuel-efficient automobiles have risen, showing an increase in demand for the more fuel efficient vehicles.

More recent reports from the Energy Information Agency and Bureau of Economic Analysis also show slowing re-growth of vehicle sales in the years since its dramatic drop in 2009 due to the Great Recession as gasoline prices continue to climb to $4 per gallon and beyond (U.S. Energy Information Administration 2013: Table 53, U.S. Bureau of Economic Analysis 2014).

Limitations and Uncertainties with Impact Assessment

Taken from p. 5-22 of the National Highway Traffic Safety Administration Final EIS for MY2017-2025 CAFE Standards (July 2012), Figure E-1 illustrates how the range of uncertainties in assessing greenhouse gas impacts grows with each step of the analysis:

> “Moss and Schneider (2000) characterize the “cascade of uncertainty” in climate change simulations Figure 5). As indicated in Figure 5, the emission estimates used in this EIS have narrower bands of uncertainty than the global climate effects, which are less uncertain than regional climate change effects. The effects on climate are, in turn, less uncertain than the impacts of climate change on affected resources (such as terrestrial and coastal ecosystems, human health, and other resources […] Although the uncertainty bands broaden with each successive step in the analytic chain, all values within the bands are not equally likely; the mid-range values have the highest likelihood.”(National Highway Traffic Safety Administration 2012:5-21).

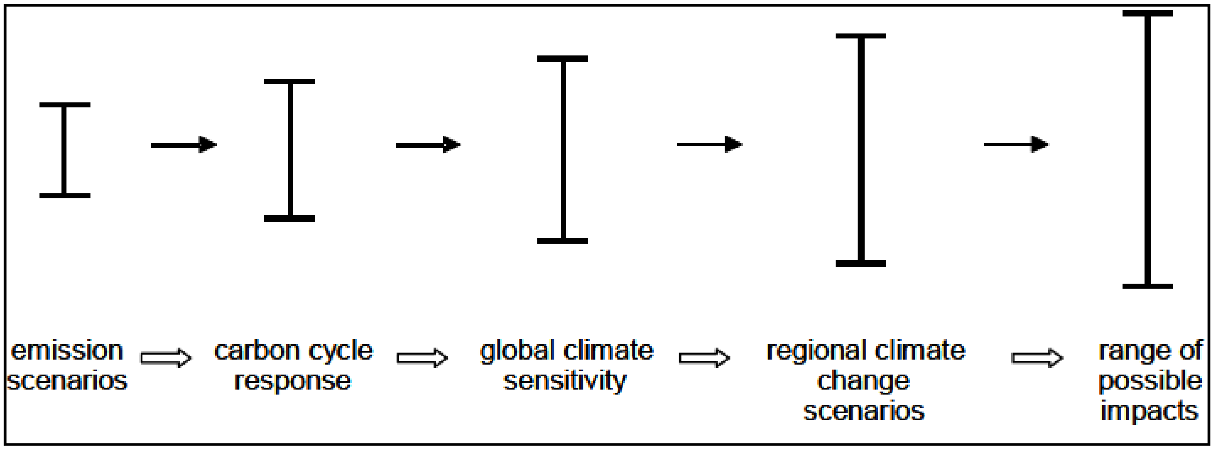


Figure E-1. Cascade of Uncertainties

Much of the uncertainty in assessing an individual project’s impact on climate change surrounds the global nature of the climate change. Even assuming that the target of meeting the 1990 levels of emissions is met, there is no regulatory or other framework in place that would allow for a ready assessment of what any modeled increase in CO_2 emissions would mean for climate change given the overall California greenhouse gas emissions inventory of approximately 430 million tons of CO_2 equivalent. This uncertainty only increases when viewed globally. The IPCC has created multiple scenarios to project potential future global greenhouse gas emissions as well as to evaluate potential changes in global temperature, other climate changes, and their effect on human and natural systems. These scenarios vary in terms of the type of economic development, the amount of overall growth, and the steps taken to reduce greenhouse gas emissions. Non-mitigation IPCC scenarios project an increase in global greenhouse gas emissions by 9.7 up to 36.7 billion metric tons CO_2 from 2000 to 2030, which represents an increase of between 25 and 90%. (Intergovernmental Panel on Climate Change 2007)

The assessment is further complicated by the fact that changes in greenhouse gas emissions can be difficult to attribute to a particular project because the projects often cause shifts in the locale for some type of greenhouse gas emissions, rather than causing “new” greenhouse gas emissions. It is difficult to assess the extent to which any project level increase in CO_2 emissions represents a net global increase, reduction, or no change; there are no models approved by regulatory agencies that operate at the global or even statewide scale.

References

Barth, M., and Boriboonsomsin, K. 2009. Energy and emissions impacts of a freeway-based dynamic eco-driving system. Transportation Research Part D, 14, 6, 400-410.

California Air Resources Board. 2010. Off-Road Emissions Inventory Program. Available:<http://www.arb.ca.gov/msei/offroad.htm>. Accessed: February 12, 2014.

Intergovernmental Panel on Climate Change. 2007. Mitigation of Climate Change In: Climate Change 2007: Working Group III: The Physical Science Basis: Fourth Assessment Report. Available: http://www.ipcc.ch/publications_and_data/ar4/wg3/en/spmsspm-b.html. Accessed: February 12, 2014.

National Highway Traffic Safety Administration. 2012. Corporate Average Fuel Economy Standards: Passenger Cars and Light Trucks Model Years 2017-2025. Final Environmental Impact Statement. July 2012. Docket No. NHTSA-2011-0056. Available:< http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/FINAL_EIS.pdf>. Accessed: February 12, 2014.

U.S. Bureau of Economic Analysis. 2014. National Economic Accounts: Supplemental Estimates. Excel Spreadsheet. Available:< http://bea.gov/national/>. Accessed: February 12, 2014.

U.S. Congressional Budget Office. 2008. Effects of Gasoline Prices on Driving Behavior and Vehicle Market. January 2008. Available: < http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/88xx/doc8893/01-14-gasolineprices.pdf>. Accessed: February 12, 2014.

U.S. Energy Information Administration. 2013. Annual Energy Outlook 2013. Available:< http://www.eia.gov/forecasts/aeo/pdf/0383(2013).pdf>. Accessed: February 12, 2014.

U.S. Environmental Protection Agency. 2013. Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2012. Available:< http://www.epa.gov/fueleconomy/fetrends/1975-2012/420r13001.pdf>. Accessed: February 12, 2014.