REVISED AIR QUALITY REPORT

SOUTH BOUND STATE ROUTE 133 TRAFFIC OPERATION IMPROVEMENT PROJECT

ORANGE COUNTY, CALIFORNIA

DISTRICT 12-ORA-133 PM 8.3/M9.3
EA 0N890
EFIS 1214000130

Prepared by

CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 12
1750 E 4TH St #100
Santa Ana, California 92705

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CALIFORNIA DEPARTMENT OF TRANSPORTATION DISTRICT 12

E.A. 0N8900

EFIS 1214000130

Reviewed By: _____ Date: 12/30/2019

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Acronyms and Abbreviations

µg/m^3	micrograms per cubic meter
°F	degrees Fahrenheit
AB	Assembly Bill
ACMs	asbestos-containing materials
ADT	average daily traffic
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
CAAA	Clean Air Act Amendments
CAAQS	California ambient air quality standards
CAFÉ	Corporate Average Fuel Economy (standards)
CAL-CET	Caltrans Construction Emission Tool
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAP	Climate Action Program
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CD	collector-distributor
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO Protocol	Transportation Project-Level Carbon Monoxide Protocol
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CTP	California Transportation Plan
diesel PM	diesel particulate matter
EB	eastbound
EMFAC	Emission Factor Model

EO	Executive Order
FCAA	Federal Clean Air Act
FHWA	Federal Highway Administration
ft	foot/feet
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GHG	greenhouse gas
Guidance	USEPA *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*
GWP	global warming potential
H_2S	hydrogen sulfide
I-5	Interstate 5
IPCC	International Panel on Climate Change
IRIS	Integrated Risk Information System
LOS	level of service
mi	mile(s)
ML	mainline
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
MOVES	Motor Vehicle Emission Simulator
mph	miles per hour
MPO	Metropolitan Planning Organization
MSAT	Mobile Source Air Toxics
$MTCO_2e$	metric tons of carbon dioxide equivalent
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NB	northbound
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administration
NO_2	nitrogen dioxide
NOA	naturally occurring asbestos
NO_x	nitrogen oxides
O_3	ozone

OCTA	Orange County Transportation Authority
PA/ED	Project Approval/Environmental Document
Pb	lead
PDT	Project Development Team
PM	Post Mile OR particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
POAQC	project of air quality concern
POM	polycyclic organic matter
ppb	parts per billion
ppm	parts per million
project	I-5/El Toro Road Interchange Improvements Project
RoadMod	Road Construction Model
ROGs	reactive organic gases
RTP	Regional Transportation Plan
SB	Senate Bill OR southbound
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_X	sulfur oxides
STIP	State Transportation Improvement Program
TACs	toxic air contaminants
TCWG	SCAG Transportation Conformity Working Group
TIP	Transportation Improvement Program
USC	United States Code
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled

VOCs	volatile organic compounds
vph	vehicles per hour
VRP	visibility-reducing particles
WB	westbound

1. Proposed Project Description

1.1. Introduction

The purpose of this Air Quality Report is to document the air quality and greenhouse gas (GHG) emissions analysis for the operational improvement project at South Bound (SB) Rte133 in between SB Rte 133/SB I-5 connector and SB Rte133/NB I-405 connector; and NB-I405 Connector

1.2. Location and Background

The California Department of Transportation (Caltrans) is proposing to improve the South Bound (SB) State Route (Rte) 133 in between Post Mile (PM) 8.3 and PM M9.3 in the City of Irvine. Figure 1-1, Project Location Map, and Figure 1-2, Map of the Project with Roadways, present the details of the project study area, respectively. During the AM peak hours, this segment of the route is having a long queue of vehicles. This long queue is a result of heavy congestion on the NB I-405 mainline that is not permitting the traffic to flow through the connector at its design rate. Trucks represents 4.5% of total vehicle volume. Land uses near this segment of the route are primarily urban, commercial and residential.

Caltrans, as assigned by the Federal Highway Administration (FHWA), is the Lead Agency for compliance under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The environmental review, consultation, and any other action required in accordance with applicable federal laws for this project have been or are being carried out by Caltrans under its assumption of responsibility pursuant to 23 United States Code (U.S.C.) 326. Project ID for the Federal Transportation Improvement Program (FTIP) is ORA001105.

The proposed project is listed in the 2019 Federal Transportation Improvement Program in the under RTP IDs: REG0701(see Appendix A). The 2016 RTP was approved by the Regional Council of the Southern California Association of Governments (SCAG) on April 7, 2016 (SCAG, 2016) with ongoing amendments as needed, with Amendment No. 3 adopted on September 6, 2018.

This proposed project is included in the 2019 FTIP and is proposed for funding under FTIP ID: ORA001105. The 2019 FTIP was approved by SCAG on August 9, 2019, and by the Federal Transit Administration (FTA)/FHWA on September 3, 2019. Under the FTIP, the project description for this operational improvement project is as follows:

- Operational improvement project on southbound (SB) Route 133 – addition of auxiliary lane on SB Rte 133 from Northbound (NB) I-405 connector to southbound (SB) I-5 connector.

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Vicinity Map

Figure 1-1 Project Location Map

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1.3. Purpose and Need

1.3.1. Purpose

The purpose of this project is to improve traffic flow on SB Rte 133 by reducing congestion and improving operational deficiencies between the SB I-5 connector and NB I-405 connector. In addition, this project will provide additional vehicular storage, shorten the queue length of vehicles, enhance operations, and improve safety for the drivers traveling on SB I-5 connector and SB Rte 133 mainline during peak periods.

1.3.2. Need

This segment of SB Rte 133 is operating under severe congestion during morning peak hours. The number three lane of SB Rte 133 experiences long traffic queues which back up all the way from the SB I-5 connector to the SB 133 mainline (north of the SB I-5 connector). This segment of SB Rte 133 has accident rates higher than average rates for similar facilities statewide.

1.4. Baseline and Forecasted Conditions for No Build and Project Alternatives

The proposed alternative includes a No Build Alternative and one Build Alternative for Opening Year 2024 and Design Year 2044. The proposed project alternative would reduce congestion and improve operational efficiency on the mainline SB Rte 133 between SB I-5 connector and NB I-405 connector. The Build Alternative focus primarily on adding auxiliary lane on the SB Rte 133 in between SB I-5 connector and NB I-405 connector and continuing this lane to the NB I-405 connector. This report documents the development of existing and future air quality and Greenhouse gas (GHG) impacts for this project for the following alternatives;

- Existing (2018)
- Opening Year 2024 No Build Alternative
- Opening Year 2024 Alternative: Construct auxiliary lane on the SB Rte 133 in between SB I-5 connector and NB I-405 connector and continuing this lane to the NB I-405 connector.
- Design Year 2044 No Build Alternative
- Design Year 2044 Alternative: Two alternatives, including one Build Alternative and one No Build Alternative have been considered and will be evaluated in the environmental document.

1.4.1. Existing Roadways and Traffic Conditions

This operational improvement project is on the SB Route 133 (Rte 133) from 0.2-mile North of Route 133/405 separation (PM 8.3) to Irvine Center Drive Overcrossing (PM M9.3) in the City of Irvine, in the County of Orange. The project study area of this Project is between post mile 8.3 and M9.3 along the SB Rte 133; and NB I-405 connector.

The existing SB Rte 133 has three mainlines. One of the main concerns within the project study area is the traffic congestion on the third mainline along the SB Rte 133. For the purpose of the air quality analysis, 2018 traffic data is used as a Base Year data.

Table 1.1 presents a summary of the existing traffic conditions within the project area. A brief summary of the travel forecast activities are included in Appendix B. The highest AADT in the project area is 32,750 that of the truck is 1,474 (4.5%).

Table 1.1 Summary of Existing (2018) Traffic Conditions

Scenario	Road Segment	Type	Average Annual Daily Traffic		Trucks (%)	VMT (mi)	Average speed (mph)	
			Total	Trucks			During peak Travel	During Off - peak Travel
SB Rte 133	SB Rte 133/SB I-5 connector-SB Rte 133/Barranca Parkway	ML	26,580	1,196	4.5	9,310	65	65
	SB Rte 133/Barranca Parkway to SB Rte 133/NB I-405 connector	ML	32,750	1,474		6,880	64	65
	SB Rte133/NB I-405 connector to the Ramp	Ramp	12,990	585		5,850	42	45

Source: OCTAM 4.0 (2012 base year network and 2040 MPAH network)
ADT = average daily traffic
Caltrans = California Department of Transportation
NB = eastbound
mi = mile/miles
ML = mainline
mph = miles per hour
NB = northbound
SB = southbound
VMT = vehicle miles traveled
WB = westbound

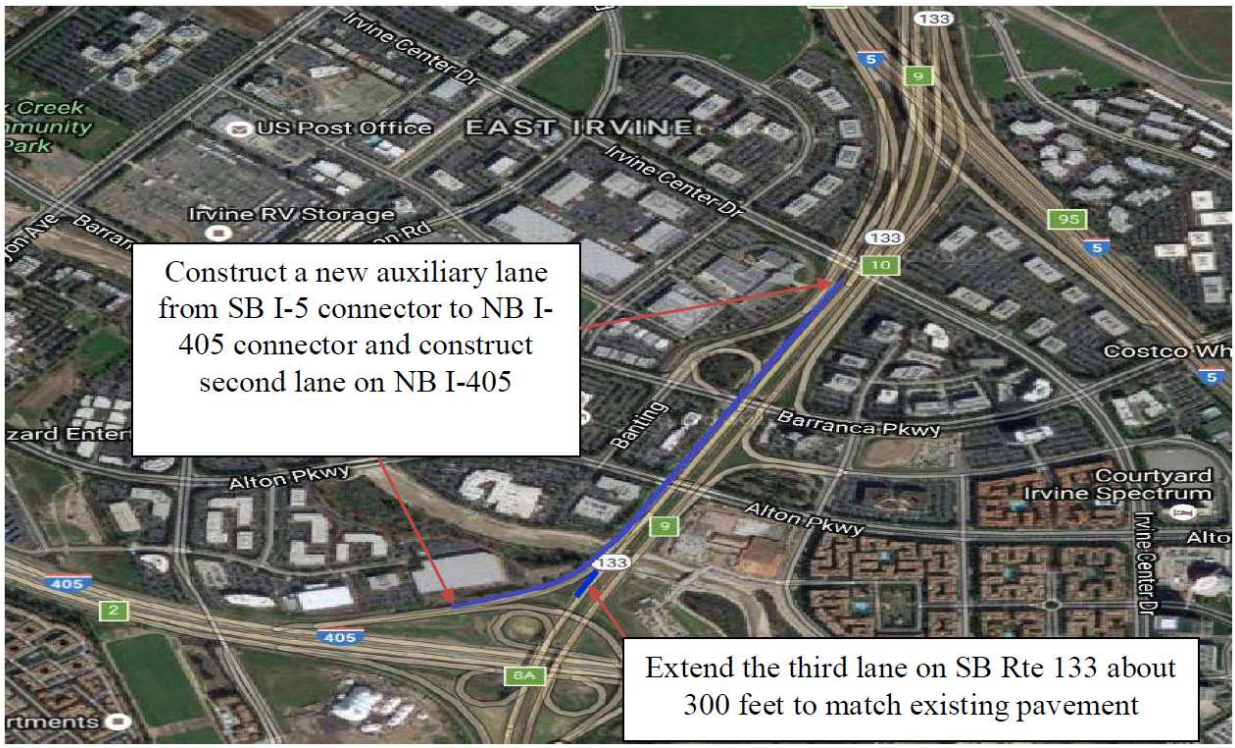

Figure 1-2 Build Alternative Map of the Project & Nearby Roadways

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1.4.2. No Build Alternative

Under the No Build Alternative, no construction or improvements would be made to the existing SB Rte 133. The No Build Alternative is not consistent with regional and local transportation plans, would not alleviate existing and projected congestion in the study area, and would not meet the project Purpose and Need. Under the No Build Alternative, the performance of the roadway would continue to deteriorate with the forecasted increase in traffic. The Future No Build Alternative serves as a baseline against which the effects of a Build Alternative can be evaluated to meet NEPA requirement. Table 1.2 presents a summary of the Opening Year 2024 No Build Alternative traffic conditions, and Table 1.3 presents a summary of the Design Year 2044 No Build Alternative traffic conditions.

Table 1.2 Summary of Opening Year (2024) No Build Traffic Conditions

Scenario	Road Segment	Type	Average Annual Daily Traffic		Trucks (%)	VMT (mi)	Average speed (mph)	
			Total	Trucks			During peak Travel	During Off - peak Travel
SB Rte 133	SB Rte 133/SB I-5 connector-SB Rte 133/Barranca Parkway	ML	29,530	1,329	4.5	10,340	64	65
	SB Rte 133/Barranca Parkway to SB Rte 133/NB I-405 connector	ML	35,700	1,607		7,500	64	65
	SB Rte133/NB I-405 connector to the Ramp	Ramp	14,710	662		6,620	38	45

Source: OCTAM 4.0 Model (2012, 2040)
ADT = average daily traffic
Caltrans = California Department of Transportation
EB = eastbound
mi = mile/miles
ML = mainline
mph = miles per hour
NB = northbound
SB = southbound
VMT = vehicle miles traveled
WB = westbound

The highest AADT is 48,470 with truck number of 2,181(4.5%) in the design year 2044. The average speed on the ramp SB Rte 133/I-405 Connector during the peak travel is 16 mph (See Table 1.3). The speed on the SB Rte 133 between SB I-5 and NB-I405 Connector is 51. These two segments on the SB 133 contains two general purpose lanes contributing to the higher average speed in these two segments.

Table 1.3 Summary of Opening Year (2044) No Build Traffic Conditions

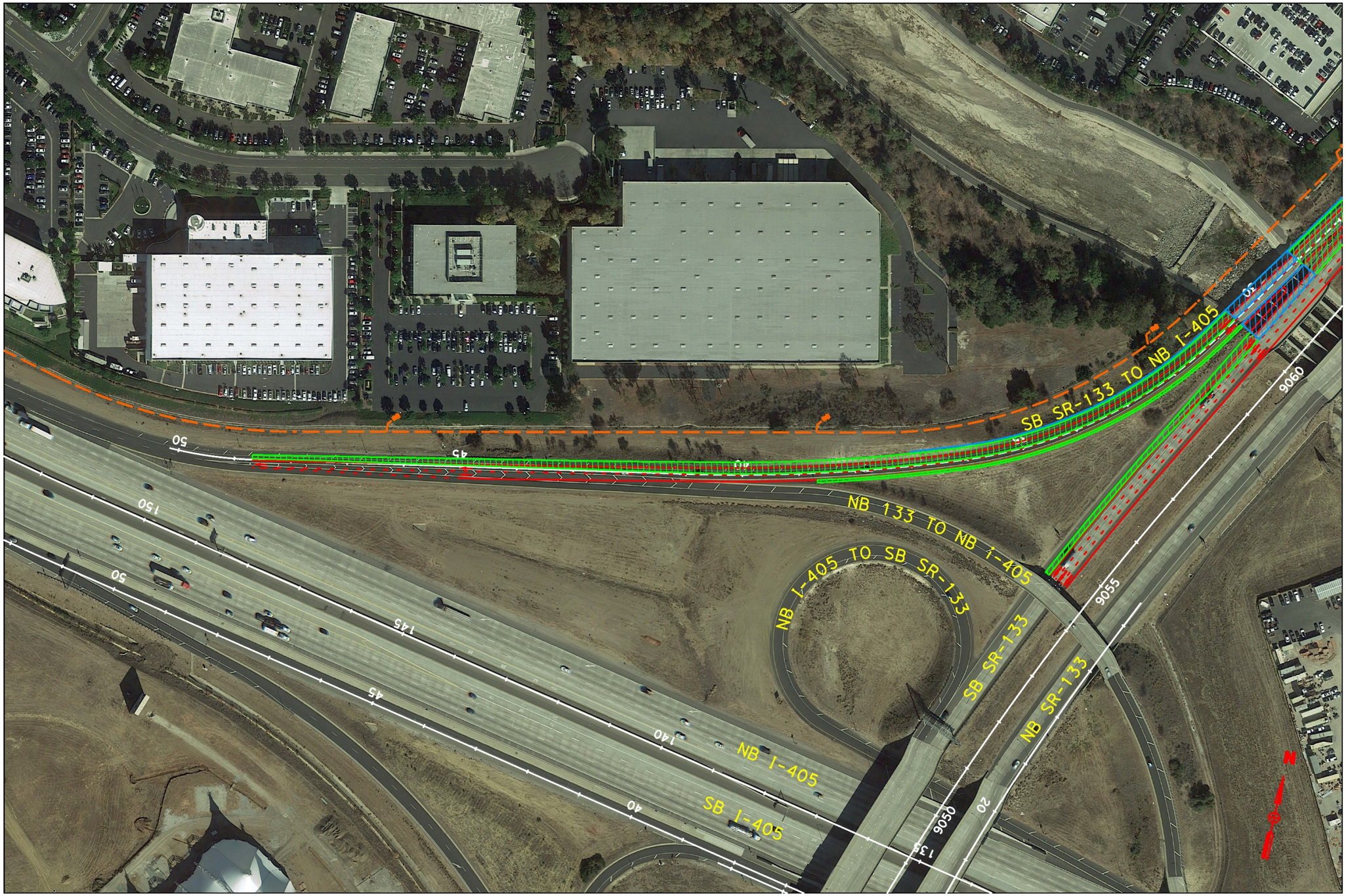
Scenario	Road Segment	Type	Average Annual Daily Traffic		Trucks (%)	VMT (mi)	Average speed (mph)	
			Total	Trucks			During peak Travel	During Off -peak Travel
SB Rte 133	SB Rte 133/SB I-5 connector-SB Rte 133/Barranca Parkway	ML	42,300	1,904	4.5	14,810	53	65
	SB Rte 133/Barranca Parkway to SB Rte 133/NB I-405 connector	ML	48,470	2,181		10,180	51	65
	SB Rte133/NB I-405 connector to the Ramp	Ramp	22,450	1,010		10,110	16	45

Source: OCTAM 4.0 Model (2012, 2040)
ADT = average daily traffic
Caltrans = California Department of Transportation
EB = eastbound
mi = mile/miles
ML = mainline
mph = miles per hour
NB = northbound
SB = southbound
VMT = vehicle miles traveled
WB = westbound

1.4.3. Project Build Alternative

Build Alternative proposes to improve operations and safety of this facility by constructing a new auxiliary lane on SB Rte 133 from the SB-I5 connector to NB I-405 connector. This proposed auxiliary lane will become the second lane on the NB I-5 connector. This alternative also proposes to extend the number three lane on SB Rte 133 approximately 300 feet South of San Diego Creek to match the existing roadway pavement. This work will also require construction of shoulder and Midwest Guardrail System (MGS), widening of ramps, realigning Barranca Pkwy loop on ramp and convert High Occupancy Vehicle (HOV) lane to General Purpose (GP) lane, retaining walls, install connector ramp meter system and replacing light poles, modification of drainage, reconstruct maintenance vehicle pullouts. Conceptual plan for the Build Alternative is as shown in the Figure 1-3.

Table 1.4 and 1.5 presents the traffic condition in the build scenarios in the Opening year (2024) and the Design Year (2044). In the Design Year 2044, the average speed in the worst scenario is at 42 mph, while it was 16 mph in the No Build condition in the year 2044 (See Table 1.4 and Table 1.5).



LEGEND

- Proposed Roadway Improvement
- Proposed Structure Improvement
- Proposed Pavement Delineation (Striping)

FIGURE 1-3
Sheet 1 of 3
Scale: 1” = 180’

BUILD ALTERNATIVE

SB State Route 133 Traffic Operation Improvement Project

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LEGEND

- Proposed Roadway Improvement
- Proposed Structure Improvement
- Proposed Pavement Delineation (Striping)

FIGURE 1-3
Sheet 2 of 3
Scale: 1” = 180’

BUILD ALTERNATIVE

SB State Route 133 Traffic Operation Improvement Project

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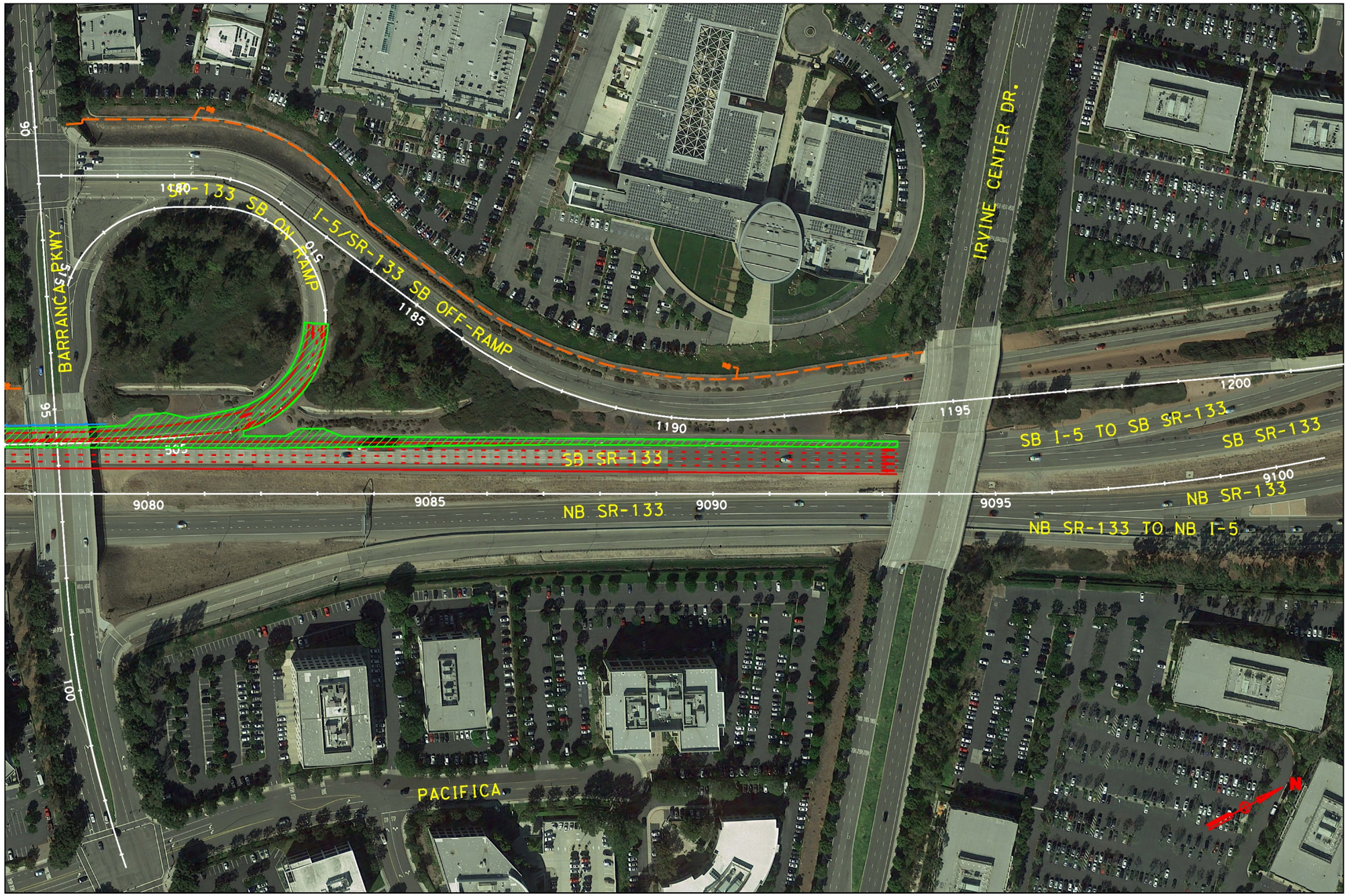

LEGEND

- Proposed Roadway Improvement
- Proposed Structure Improvement
- Proposed Pavement Delineation (Striping)

FIGURE 1-3
Sheet 3 of 3
Scale: 1” = 180’

BUILD ALTERNATIVE

SB State Route 133 Traffic Operation Improvement Project

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Table 1.4 Summary of Opening year (2024) Build Alternative Traffic Conditions

Scenario	Road Segment	Type	Average Annual Daily Traffic		Trucks (%)	VMT (mi)	Average speed (mph)	
			Total	Trucks			During peak Travel	During Off - peak Travel
SB Rte 133	SB Rte 133/SB I-5 connector-SB Rte 133/Barranca Parkway	ML	29,530	1,329	4.5	1,0340	65	65
	SB Rte 133/Barranca Parkway to SB Rte 133/NB I-405 connector	ML	35,700	1,607		7,500	65	65
	SB Rte133/NB I-405 connector to the Ramp	Ramp	14,710	662		6,620	45	45

Source: OCTAM 4.0 Model (2012, 2040)
ADT = average daily traffic
Caltrans = California Department of Transportation
EB = eastbound
mi = mile/miles
ML = mainline
mph = miles per hour
NB = northbound
SB = southbound
VMT = vehicle miles traveled
WB = westbound

Table 1.5 Summary of Design year (2044) Build Alternative Traffic Conditions

Scenario	Road Segment	Type	Average Annual Daily Traffic		Trucks (%)	VMT (mi)	Average speed (mph)	
			Total	Trucks			During peak Travel	During Off - peak Travel
SB Rte 133	SB Rte 133/SB I-5 connector-SB Rte 133/Barranca Parkway	ML	42,300	1,904	4.5	14,810	61	65
	SB Rte 133/Barranca Parkway to SB Rte 133/NB I-405 connector	ML	48,470	2,181		10,180	60	65
	SB Rte133/NB I-405 connector to the Ramp	Ramp	22,450	1,010		10,110	42	45

Source: OCTAM 4.0 Model (2012, 2040)
ADT = average daily traffic
Caltrans = California Department of Transportation
EB = eastbound
mi = mile/miles
ML = mainline
mph = miles per hour
NB = northbound
SB = southbound
VMT = vehicle miles traveled
WB = westbound

1.4.4. Comparison of Existing/Baseline and Build Alternatives

CEQA requires that the proposed Build Scenarios emissions be compared to existing/baseline conditions. As previously indicated, the project would improve operations on the SB Rte 133 and SB Rte 133/NB I-405 Connector. It would not affect regional traffic demand or distribution. Since this project is not the capacity increasing project, the traffic volumes along the route remains the same for both Opening Year (2024) and Design Year (2044). Table 1.6 presents a summary of long-term operational impacts on traffic conditions for Existing (2018), No Build Alternative, and Build Alternative conditions.

Table 1.6. Summary of Long-Term Operational Impacts on Traffic Conditions of Existing (2018), No Build Alternative, and Build Alternatives within the Project Area

Scenario/Analysis Year	Location	Annual Average Daily Traffic		Trucks (%)	Total VMT (mi)
		Total	Trucks		
Existing (2018)	SB Rte 133/Barranca Parkway-SB Rte 133/NB I-405 Connector	32,750	1,474	4.5	6,880
No Build Alternative 2024	SB Rte 133/Barranca Parkway-SB Rte 133/NB I-405 Connector	35,700	6,397	4.5	7,500
Build Alternative 2024					
No Build Alternative 2044	SB Rte 133/Barranca Parkway-SB Rte 133/NB I-405 Connector	48,470	2,181	4.5	10,180
Build Alternative 2044					

Source: OCTAM 4.0 Model (2012, 2040)
I-5 = Interstate 5
Caltrans = California Department of Transportation
mi = mile/miles
mph = miles per hour
VMT = vehicle miles traveled

1.5. Construction Activities and Schedule

Because construction is planned to last approximately 16 months, no construction activities are anticipated to last more than 5 years at any individual site. Emissions from construction-related activities are thus considered temporary as defined in 40 Code of Federal Regulations (CFR) 93.123(c)(5) and are not required to be included in particulate matter (PM) hot-spot analyses to meet conformity requirements. Table 1.7 presents the Project Milestones and Completion date.

Table 1.7 Project Milestones and Dates

Project Phase	Begin Date	Complete Date
Right-of-Way	2020	2025
Construction	2022	2025

2. Regulatory Setting

Many statutes, regulations, plans, and policies have been adopted at the federal, State, and local levels to address air quality issues related to transportation and other sources. The proposed project is subject to air quality regulations at each of these levels. This section introduces the pollutants governed by these regulations and describes the regulations and policies that are relevant to the proposed project.

2.1. Pollutant-Specific Overview

Air pollutants are governed by multiple federal and State standards to regulate and mitigate health impacts. At the federal level, there are six criteria pollutants for which national ambient air quality standards (NAAQS) have been established:

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)
- Particulate matter less than 10 microns in diameter (PM_{10})
- Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)
- Sulfur dioxide (SO_2).

The United States Environmental Protection Agency (USEPA) has also identified nine priority mobile source air toxics: 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter (POM).[1] In California, sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride are also regulated.

2.1.1. Criteria Pollutants

The Federal Clean Air Act (FCAA) requires the USEPA to set NAAQS for six criteria air contaminants: O_3, PM, CO, NO_2, lead (Pb), and SO_2. It also permits states to adopt additional or more protective air quality standards if needed. California has set standards for certain pollutants. Table 2.1 documents the current air quality standards while Table 2.2 summarizes the sources and health effects of the six criteria pollutants and pollutants regulated in the State.

[1] Federal Highway Administration (FHWA). 2016. Air Quality Transportation & Toxic Air Pollutants. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. October 18, 2016. Website: https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/.

Table 2.1. State and Federal Ambient Air Quality Standards

Ambient Air Quality Standards						
Pollutant	**Averaging Time**	**California Standards** [1]		**National Standards** [2]		
		Concentration [3]	**Method** [4]	**Primary** [3,5]	**Secondary** [3,6]	**Method** [7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	
Lead[12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	**No National Standards**		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page ...

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Source: California Air Resources Board. 2016a. Ambient Air Quality Standards. Website: https://www.arb.ca.gov/research/aaqs/aaqs2.pdf. (Assessed on October 2, 2019)

Table 2.2. State and Federal Criteria Air Pollutant Effects and Sources

Pollutant	Principal Health and Atmospheric Effects	Typical Sources
Ozone (O_3)	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include many known toxic air contaminants. Biogenic VOC may also contribute.	Low-altitude ozone is almost entirely formed from reactive organic gases/volatile organic compounds (ROG or VOC) and nitrogen oxides (NO_X) in the presence of sunlight and heat. Common precursor emitters include motor vehicles and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes.
Respirable Particulate Matter (PM_{10})	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many toxic and other aerosol and solid compounds are part of PM_{10}.	Dust- and fume-producing industrial and agricultural operations; combustion smoke and vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.
Fine Particulate Matter ($PM_{2.5}$)	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter—a toxic air contaminant—is in the $PM_{2.5}$ size range. Many toxic and other aerosol and solid compounds are part of $PM_{2.5}$.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical and photochemical reactions involving other pollutants including NO_X, SO_X, ammonia, and ROG.
Carbon Monoxide (CO)	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical ozone. Colorless, odorless.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.
Nitrogen Dioxide (NO_2)	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain & nitrate contamination of stormwater. Part of the "NO_X" group of ozone precursors.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; industrial operations.
Sulfur Dioxide (SO_2)	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.
Lead (Pb)	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a toxic air contaminant and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from older gasoline use may exist in soils along major roads.
Visibility-Reducing Particles (VRP)	Reduces visibility. Produces haze. **NOTE:** Not directly related to the Regional Haze program under the Federal Clean Air Act, which is oriented primarily toward visibility issues in National Parks and other "Class I" areas. However, some issues and measurement methods are similar.	See particulate matter above. May be related more to aerosols than to solid particles.
Sulfate	Premature mortality and respiratory effects. Contributes to acid rain. Some toxic air contaminants attach to sulfate aerosol particles.	Industrial processes, refineries and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.
Hydrogen Sulfide (H_2S)	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea. Strong odor.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment plants, and mines. Some natural sources like volcanic areas and hot springs.
Vinyl Chloride	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes.

Source: Caltrans Standard Environmental Reference. Website: http://www.dot.ca.gov/ser/forms.htm (accessed October 2018).
Caltrans = California Department of Transportation
NO_X = nitrogen oxides
ROG = reactive organic gases
SO_X = sulfur oxides
VOC = volatile organic compounds

2.1.2. Mobile Source Air Toxics

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. The USEPA has assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of the USEPA Integrated Risk Information System (IRIS).[1] In addition, the USEPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-hazard contributors from the 2014 National Air Toxics Assessment.[2] These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel PM, ethylbenzene, formaldehyde, naphthalene, and POM. While the FHWA considers these the priority Mobile Source Air Toxics (MSAT), the list is subject to change and may be adjusted in consideration of future USEPA rules.

The 2007 USEPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using the USEPA MOVES2014a model, even if vehicle activity (vehicle miles traveled [VMT]) increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emission rate for the priority MSATs is projected for the same time period, as shown on Figure 2-1, Projected National MSAT Trends, 2010–2050.

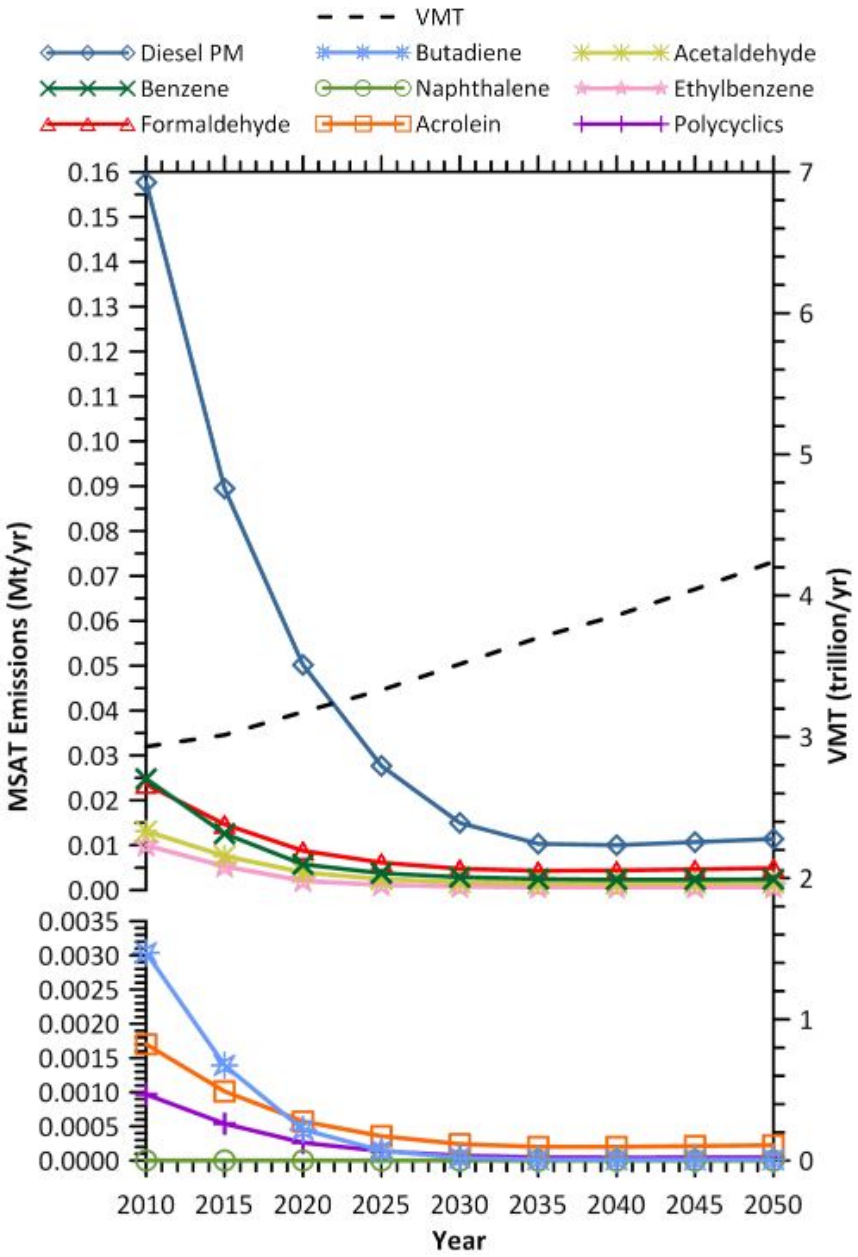
2.1.3. Greenhouse Gases

The term greenhouse gas (GHG) is used to describe atmospheric gases that absorb solar radiation and subsequently emit radiation in the thermal infrared region of the energy spectrum, trapping heat in the Earth's atmosphere. These gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and water vapor, among others. A growing body of research attributes long-term changes in temperature, precipitation, and other elements of Earth's climate to large increases in GHG emissions since the mid-19th century, particularly from human activity related to fossil fuel combustion (World Health Organization 2003). Anthropogenic GHG emissions of particular interest include CO_2, CH_4, N_2O, and fluorinated gases.

GHGs differ in how much heat each traps in the atmosphere (global warming potential, or GWP). CO_2 is the most important GHG, so amounts of other gases are expressed relative to CO_2, using a metric called "carbon dioxide equivalent" (CO_2e). The global warming potential of CO_2 is assigned a value of 1, and the warming potential of other gases is assessed as multiples of CO_2.

[1] United States Environmental Protection Agency. 2018a. Integrated Risk Information System. IRIS Toxicological Review of RDX (Final Report, August 2018). Website: https://www.epa.gov/iris.

[2] United States Environmental Protection Agency. 2018b. National Air Toxics Assessment. 2014 NATA. Website: https://www.epa.gov/national-air-toxics-assessment.



Source: Federal Highway Administration (FHWA). 2016. Air Quality Transportation & Toxic Air Pollutants. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. October 18, 2016. (Accessed October 1, 2019)

Figure 2-1. Projected National MSAT Trends, 2010–2050

For example, the 2007 International Panel on Climate Change (IPCC) *Fourth Assessment Report: Climate Change 2007 (AR4): The Physical Science Basis* calculates the GWP of CH_4 as 25 and the GWP of N_2O as 298 over a 100-year time horizon.[1] Generally, estimates of all GHGs are summed to obtain total emissions for a project or given time period, usually expressed in metric tons of CO_2e ($MTCO_2e$), or million metric tons of CO_2e ($MMTCO_2e$).[2]

As evidence has mounted for the relationship of climate change to rising GHGs, federal and state governments have established numerous policies and goals targeted to improving energy efficiency and fuel economy, and reducing GHG emissions. Nationally, electricity generation is the largest source of GHG emissions, followed by transportation. In California, however, transportation is the largest contributor to GHGs.

At the federal level, NEPA (42 USC 4332) requires federal agencies to assess the environmental effects of their proposed actions prior to making a decision on the action or project.

To date, no national standards have been established for nationwide mobile-source GHG reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and GHG emissions reduction at the project level. However, the USEPA and the National Highway Traffic Safety Administration (NHTSA) issued the first Corporate Average Fuel Economy (CAFE) standards in 2010, requiring cars and light-duty vehicles to achieve certain fuel economy targets by 2016, with the intention of gradually increasing the targets and the range of vehicles to which they would apply.

California has enacted aggressive GHG reduction targets, starting with Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. AB 32 is California's signature climate change legislation. It set the goal of reducing statewide GHG emissions to 1990 levels by 2020, and required the California Air Resources Board (CARB) to develop a Scoping Plan that describes the approach California will take to achieve that goal and to update it every 5 years (CARB, 2018). In 2015, Governor Jerry Brown enhanced the overall adaptation planning effort with Executive Order (EO) B-30-15, establishing an interim GHG reduction goal of 40 percent below 1990 levels by 2030, and requiring State agencies to factor climate change into all planning and investment decisions.

Senate Bill (SB) 375, the Sustainable Communities and Climate Protection Act of 2008, furthered State climate action goals by mandating coordinated transportation and land use planning through preparation of sustainable communities strategies (SCS). CARB sets GHG emission reduction targets for passenger vehicles for each region. Each regional metropolitan planning

[1] See Table 2.14 in the *IPCC Fourth Assessment Report: Climate Change 2007 (AR4): The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA. Website: https://www.ipcc.ch/report/ar4/wg1/.

[2] Sacramento Metropolitan Air Quality Management District. 2018. CEQA Guidance & Tools. Website: http://www.airquality.org/Residents/CEQA-Land-Use-Planning/CEQA-Guidance-Tools.

organization must include in its regional transportation plan an SCS proposing actions toward achieving the regional emissions reduction targets.[1]

With these and other State Senate and Assembly Bills and Executive Orders, California advances an innovative and proactive approach to dealing with GHG emissions and climate change.

2.1.4. Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by State, federal, and international agencies and was identified as a toxic air contaminant by CARB in 1986. All types of asbestos are hazardous and may cause lung disease and cancer.

Asbestos can be released from serpentine and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos-bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed.

Serpentine may contain chrysotile asbestos, especially near fault zones. Ultramafic rock, a rock closely related to serpentinite, may also contain asbestos minerals. Asbestos can also be associated with other rock types in California, though much less frequently than serpentinite and/or ultramafic rock. Serpentinite and/or ultramafic rocks are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in counties of the Sierra Nevada foothills, the Klamath Mountains, and Coast Ranges. The California Department of Conservation, Division of Mines and Geology has developed a map showing the general location of ultramafic rock in the State.[2]

[1] California Air Resources Board (CARB). 2018a. Sustainable Communities. Website: https://www.arb.ca.gov/cc/sb375/sb375.htm.

[2] California Department of Conservation, Division of Mines and Geology. Website: Website: ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/ofr_2000-019.pdf.

2.2. Regulations

2.2.1. Federal and California Clean Air Act

The FCAA, as amended, is the primary federal law that governs air quality while the California Clean Air Act (CCAA) is its companion state law. These laws and related regulations by the USEPA and CARB set standards for the concentration of pollutants in the air. At the federal level, these standards are the NAAQS. NAAQS and California ambient air quality standards (CAAQS) have been established for six transportation-related criteria pollutants that have been linked to potential health concerns: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate maters ($PM_{2.5}$ and PM_{10}), and sulfur dioxide (SO_2). In addition, national and State standards exist for Pb, and State standards exist for visibility reducing particles (VRP), sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS and CAAQS standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. Both State and federal regulatory schemes also cover toxic air contaminants (TACs). Some criteria pollutants are also air toxics or may include certain air toxics in their general definition.

2.2.2. Transportation Conformity

The conformity requirement is based on FCAA Section 176(c), which prohibits the United States Department of Transportation (USDOT) and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to a State Implementation Plan (SIP) for attaining the NAAQS. "Transportation Conformity" applies to highway and transit projects and 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 non-attainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. The USEPA regulations at 40 CFR 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for State standards regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for CO, O_3, $PM_{2.5}$, PM_{10}, and in some areas (although not in California) SO_2. California has regions designated as "attainment," "nonattainment," or "maintenance," for all of these transportation-related "criteria pollutants" except SO_2, and also has a region designated for lead; however, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of RTPs and FTIPs that include all transportation projects planned for a region over a period of at least 20 years (for the RTP), and 4 years (for the FTIP). Both RTP and FTIP conformity use travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years, showing that requirements of the FCAA and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning

Organization (MPO), FHWA, and FTA make the determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the FCAA. Otherwise, the projects in the RTP and/or 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 Transportation Improvement Program (TIP), then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Project-level conformity is achieved by demonstrating that the project comes from a conforming RTP and TIP and that the project has a design concept and scope[1] that have not changed significantly from those in the RTP and TIP. If the design concept and scope have changed substantially from that used in the RTP conformity analysis, RTP and TIP amendments may be needed. Project-level conformity also needs to demonstrate that project analyses have used the latest planning assumptions and USEPA-approved emissions models and that the project complies with any control measures in the SIP in PM areas. Furthermore, additional analyses (known as hot-spot analyses) may be required for projects located in CO and PM nonattainment or maintenance areas to examine localized air quality impacts.

2.2.3. National Environmental Policy Act (NEPA)

NEPA requires that policies and regulations administered by the federal government are consistent with its environmental protection goals. NEPA also requires that federal agencies use an interdisciplinary approach to planning and decision-making for any actions that could impact the environment. It requires environmental review of federal actions including the creation of Environmental Documents that describe the environmental effects of a proposed project and its alternatives (including a section on air quality impacts).

2.2.4. California Environmental Quality Act (CEQA)

CEQA[2] is a statute that requires State and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA documents address CCAA requirements for transportation projects. While State standards are often more strict than federal standards, the State has no conformity process.

[1] "Design concept" indicates the type of facility that is proposed (e.g., a freeway or arterial highway). "Design scope" refers to those aspects of the project that would clearly affect capacity and thus any regional emissions analysis (e.g., the number of lanes and the length of the project).

[2] For general information about CEQA, see California Natural Resources Agency. 2014. Website: http://resources.ca.gov/ceqa/more/faq.html.

2.2.5. Local

The USEPA has delegated responsibility to air districts to establish local rules to protect air quality. Caltrans' Standard Specification 14-9.02 (Caltrans, 2018b) requires compliance with all applicable air quality laws and regulations including local and air district ordinances and rules.

South Coast Air Quality Management District (SCAQMD) and Southern California Association of Governments (SCAG) are responsible for formulating and implementing the 2016 Air Quality Management Plan (AQMP) for the South Coast Air Basin (SCAB). The main purpose of an AQMP is to bring the area into compliance with federal and State air quality standards. Every 3 years, SCAQMD prepares a new AQMP, updating the previous plan and 20-year horizon (SCAQMD, 2016).

SCAQMD approved the 2016 AQMP on March 3, 2017, and submitted the plan to CARB on March 10, 2017. Key elements of the 2016 AQMP include the following:

- Calculating and taking credit for co-benefits from other planning efforts (e.g., climate, energy, and transportation)
- Developing a strategy with fair-share emission reductions at the federal, State, and local levels
- Investment in strategies and technologies meeting multiple objectives such as air quality, climate change, air toxics, energy and transportation
- Seeking new partnerships and significant funding for incentives to accelerate deployment of zero-emission and near-zero-emission technologies
- Enhanced socioeconomic assessment, including an expanded environmental justice analysis
- Attainment of the 24-hour $PM_{2.5}$ standard in 2019 with no additional measures
- Attainment of the annual $PM_{2.5}$ standard by 2025 with implementation of a portion of the O_3 strategy
- Attainment of the 1-hour O_3 standard by 2022 with no reliance on "black box" future technology (CCAA Section 182(e)(5) measures)

SCAG is responsible under the CCAA for determining the consistency of projects, plans, and programs with the SCAQMD AQMP. As indicated in the SCAQMD *CEQA Air Quality Handbook* (1993, currently being revised), there are two main indicators of consistency:

- Whether the project would result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and
- Whether the project would exceed the AQMP's assumptions for 2020 or increments based on the year of project build out and phase.

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3. Affected Environment

The topography of a region can substantially impact air flow and resulting pollutant concentrations. California is divided into 15 air basins with similar topography and meteorology to better manage air quality throughout the State. Each air basin has a local air district that is responsible for identifying and implementing air quality strategies to comply with ambient air quality standards.

The project site is located in the City of Irvine which is entirely within the SCAB, which includes the western portions of Riverside and San Bernardino Counties, as well as Los Angeles County and Orange County. Air quality regulation in the SCAB is administered by SCAQMD. The current population for Orange County is 3.19 million (U.S. Census Bureau, 2017). Orange County's economy is largely driven by international trade, automotive, medical technology, amusement parks, food industry, fashion, apparel, and tourism (Orange County Business Council 2017).

3.1. Climate, Meteorology, and Topography

Meteorology (weather) and terrain can influence air quality. Certain weather parameters are highly correlated to air quality, including temperature, the amount of sunlight, and the type of winds at the surface and above the surface. Winds can transport ozone and ozone precursors from one region to another, thereby contributing to air quality problems downwind of the source regions. Furthermore, mountains can act as barriers that prevent ozone from dispersing.

SCAQMD operates several air quality monitoring stations in the SCAB. Figure 3-1, Map of the Air Quality Monitoring Station Located Near the Project Site, shows the location of the Mission Viejo Air Quality Monitoring Station located at 26081 Via Pera, Mission Viejo, which is near the proposed project site.

The Laguna Beach climatological station is representative of meteorological conditions near the proposed project. The climate of the project area is generally Mediterranean in character, with cool winters (average 51.8 degrees Fahrenheit [°F] in January) and warm, dry summers (average 72.3°F in July).[1] Temperature inversions are common, affecting localized pollutant concentrations in the winter and enhancing ozone formation in the summer. Mountains averaging 10,000 ft in altitude tend to trap pollutants in the region by limiting air flow. Annual average rainfall is 13.55 inches (at the Laguna Beach), mainly falling during the winter months. Figure 3-2, Predominant Wind Patterns at El Toro, is located at the former El Toro Marine Corps Air Station, which shows a wind rose illustrating the predominant wind patterns near the proposed project area.

[1] U.S. Climate Data. Website: https://www.usclimatedata.com/climate/laguna-beach/california/united-states/usca%200573 (accessed November 2018).

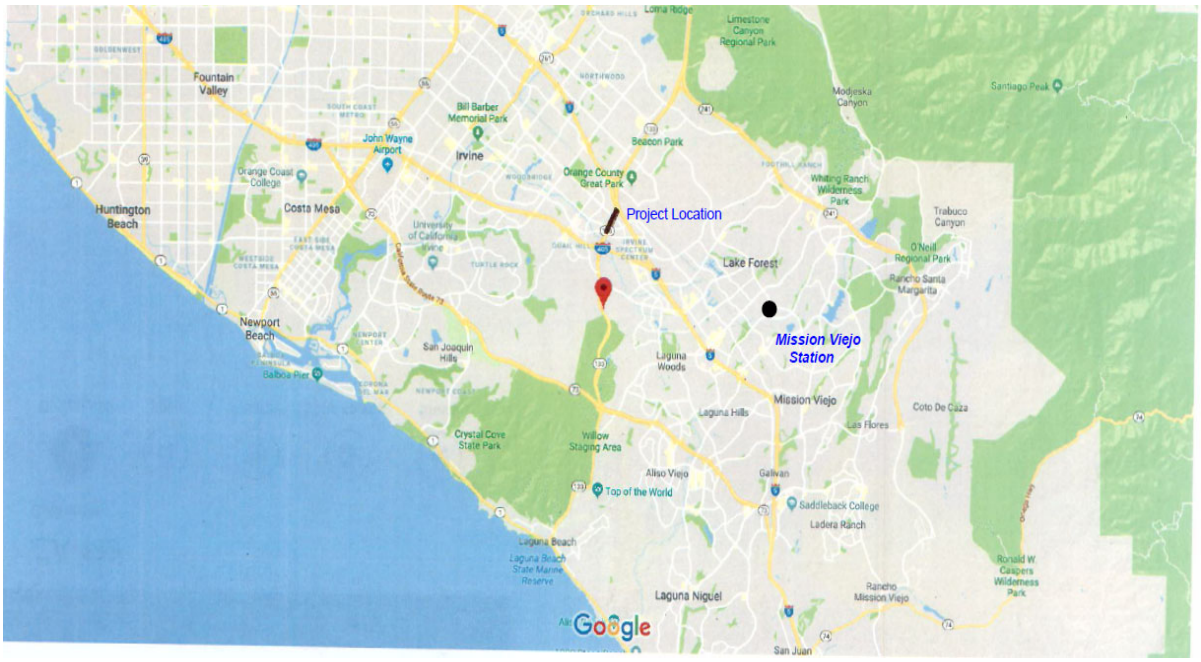

Figure 3-1. Map of the Air Quality Monitoring Station Located Near the Project Area

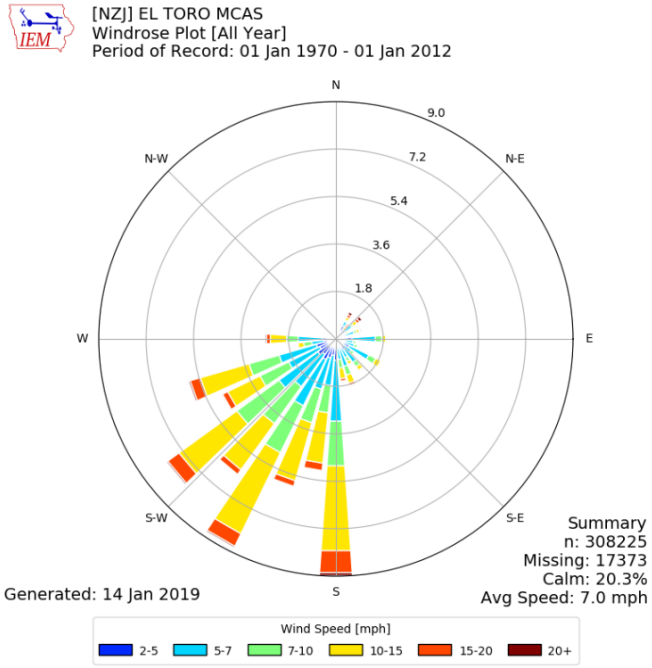

Figure 3-2. Predominant Wind Patterns at El Toro

Source: Iowa State University, 2108. Iowa Environmental Mesonet (IEM), Wind Rose Plot for El Toro MCAS. http://mesonet.agron.iastate.edu/sites/windrose.phtml?station=NZJ&network=CA_ASOS (Assessed on October 1, 2019)

3.2. Existing Air Quality

This section summarizes existing air quality conditions near the project area. It includes attainment statuses for criteria pollutants, describes local ambient concentrations of criteria pollutants for the past 5 years, and discusses MSAT and GHG emissions.

3.2.1. Criteria Pollutants and Attainment Status

Air quality monitoring stations are located throughout the nation and are maintained by local air districts and State air quality regulating agencies. Data collected at permanent monitoring stations are used by the USEPA to identify regions as "attainment," "nonattainment," or "maintenance," depending on whether the regions meet the requirements stated in the primary NAAQS.

Nonattainment areas are imposed with additional restrictions as required by the USEPA. In addition, different classifications of nonattainment (e.g., marginal, moderate, serious, severe, and extreme) are used to classify each air basin in the State on a pollutant-by-pollutant basis. The classifications are used as a foundation to create air quality management strategies to improve air quality and comply with the NAAQS. Table 3.1 lists the State and federal attainment status for all regulated pollutants.

Table 3.1. State and Federal Attainment Status

Pollutant	State Attainment Status	Federal Attainment Status
Ozone (O_3)	Nonattainment (1-hour and 8-hour)	Extreme Nonattainment (8-hour)
Respirable Particulate Matter (PM_{10})	Nonattainment	Attainment/Maintenance
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Moderate Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment/Maintenance
Nitrogen Dioxide (NO_2)	Attainment	Attainment/Maintenance
Sulfur Dioxide (SO_2)	Attainment/Unclassified	Attainment/Unclassified
Lead (Pb)	Nonattainment (Los Angeles County only)	Nonattainment (Los Angeles County only)
Visibility-Reducing Particles (VRP)	Attainment/Unclassified	N/A
Sulfates	Attainment/Unclassified	N/A
Hydrogen Sulfide (H_2S)	Attainment/Unclassified	N/A
Vinyl Chloride	Attainment/Unclassified	N/A

Source: California Air Resources Board, Air Quality Standards and Area Designations. Website: http://www.arb.ca.gov/desig/desig.htm (accessed October 2019).
N/A = not applicable

The City of Irvine located in the Central Orange County. The SCAQMD provided Central Orange County air quality historical data on their website. Table 3.2 lists air quality trends for five criteria pollutants (O_3, CO, PM_{10}, $PM_{2.5}$, and NO_2) collected between 2014 and 2018 in the Central Orange County.

Table 3.2. Air Quality Concentrations for the Past Five Years at the Central Orange County

Pollutant		Standard	2014	2015	2016	2017	2018
Ozone							
Max 1-hr concentration			0.111	0.10	0.103	0.09	0.112
No. days exceeded:	State	0.09 ppm	2	0	2	0	1
Max 8-hr concentration			0.081	0.08	0.074	0.076	0.071
No. days exceeded:	State	0.070 ppm	6	1	4	27	1
	Federal	0.070 ppm	6	1	4	25	1
Carbon Monoxide							
Max 1-hr concentration			3	3.1	2.6	2.5	2.3
No. days exceeded:	State	20 ppm	0	0	0	0	0
	Federal	35 ppm	0	0	0	0	0
Max 8-hr concentration			2.1	2.2	2.1	2.1	1.9
No. days exceeded:	State	9.0 ppm	0	0	0	0	0
	Federal	9 ppm	0	0	0	0	0
PM_{10}							
Max 24-hr concentration			122	66	74	128	129
No. days exceeded:	State	50 µg/m^3	12	11	3	17	13
	Federal	150 µg/m^3	0	11	0	0	0
Max annual concentration			26.3	24.8	24.40	26.3	27.2
No. days exceeded:	State	20 µg/m^3					
$PM_{2.5}$							
Max 24-hr concentration			56.2	45.8	44.45	53.9	54.10
No. days exceeded:	Federal	35 µg/m^3	6	3	1	6	3
Max annual concentration			10.53	9.38	9.47	11.39	11.02
No. days exceeded:	State	12 µg/m^3	0	0	0	0	0
	Federal	12.0 µg/m^3	0	0	0	0	0
Nitrogen Dioxide							
Max 1-hr concentration			0.758	0.059	0.064	0.081	0.066
No. days exceeded:	State	0.18 ppm	0	0	0	0	0
	Federal	100 ppb	0	0	0	0	0
Max annual concentration (ppm)			0.0152	0.0146	0.0147	0.011	0.0137
No. days exceeded:	State	0.030 ppm	0	0	0	0	0
	Federal	53 ppb	0	0	0	0	0

Source: United States Environmental Protection Agency, Air Data: Air Quality Data Collected at Outdoor Monitors Across the US. Website: https://www.epa.gov/outdoor-air-quality-data.

µg/m^3 = micrograms per cubic meter
avg. = average
hr = hour
max = maximum
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ppb = parts per billion
ppm = parts per million

http://www.aqmd.gov/docs/default-source/air-quality/historical-data-by-year/aq13card.pdf?sfvrsn=9 (accessed October 2019).

3.2.2. Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, the USEPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories and refineries).

Controlling air toxic emissions became a national priority with the passage of the CAAAs of 1990, whereby Congress mandated the USEPA regulate 188 air toxics, also known as hazardous air pollutants. The USEPA has assessed this expansive list in its latest rule on the Control of Hazardous

Air Pollutants from Mobile Sources (Federal Register, Volume 73, No. 201, page 61,358; October 16, 2008) and identified a group of 93 compounds emitted from mobile sources that are listed in its IRIS.

In addition, the USEPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from its 2014 National Air Toxics Assessment. These are acrolein, benzene, 1,3-butadiene, acetaldehyde, diesel PM, ethylbenzene, formaldehyde, naphthalene, and POM. While the FHWA considers these the priority MSATs, the list is subject to change and may be adjusted in consideration of future USEPA rules. Table 3.3 lists the ambient concentrations of the MSATs in the project vicinity.

Table 3.3. Mobile Source Air Toxics Measured Concentrations in the Project Vicinity

MSAT	Unit	Measured Maximums				
		2013	2014	2015	2016	2017
Acrolein	ppb	1.60	1.90	1.10	0.60	1.00
Benzene	ppb	0.82	0.72	0.83	0.72	1.00
1,3-Butadiene	ppb	0.26	0.20	0.24	0.20	0.19
Acetaldehyde	ppb	3.70	3.30	2.80	2.90	2.60
Ethylbenzene	ppb	0.80	1.20	1.90	1.10	0.40
Formaldehyde	ppb	7.50	5.60	7.30	6.80	7.30

Source: California Air Resources Board. Annual Toxics Summaries, Los Angeles-North Main Street Station. Website: https://www.arb.ca.gov/adam/toxics/toxics.html (accessed October 2019).

3.2.3. Greenhouse Gas and Climate Change

CO_2, as part of the carbon cycle, is an important compound for plant and animal life, but also accounted for 83 percent of California's total GHG emissions in 2016 (CARB, 2018b). The other gases that are widely seen as the principal contributors to climate change are methane (CH_4); nitrous oxide (N_2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulfur hexafluoride (SF_6); and nitrogen trifluoride (NF_3).

Transportation, primarily on-road travel, is the single largest source of CO_2 emissions in the State. CARB estimates that transportation was the source of approximately 39 percent of the State's GHG emissions in 2016, followed by electricity generation (both in-State and out-of-State) at 16 percent and industrial sources at 21 percent. The remaining sources of GHG emissions were residential activities at 7 percent, commercial activities at 5 percent, agriculture at 8 percent, high-GWP gases at 4.6 percent, and recycling and waste at 2 percent (CARB, 2018b).

The proposed project is located in the City of Irvine and listed in the 2016 RTP/SCS as amended by Amendment No. 3 adopted on September 6, 2018 under RTP ID:REG0701. The proposed project

is listed in the 2019 FTIP under the ID #ORA001105. The 2019 FTIP was approved by SCAG on August 9, 2019, and by FHWA/FTA on September 3, 2019.

3.3. Sensitive Receptors

Sensitive populations are more susceptible to the effects of air pollution than the general population. Sensitive populations (sensitive receptors) that are in proximity to localized sources of toxics and CO are of particular concern. Land uses considered to be sensitive receptors include Hotel, medical facilities, university and Irvine Spectrum. Table 3.4 presents the list of sensitive receptors location and distance. Figure 3-3 shows the location of the sensitive receptors.

Table 3.4. List of Sensitive Receptors Location and Distance

Sensitive Receptors	Location	Nearest Distance to Project Site
Orange Coast Women Medical Group	Northwest of project study area	2,442 feet
Wester University	Northwest of project study area	1,250 feet
Sand Canyon Urgent Care	Northwest of project study area	2,280 feet
Alcon Laboratories	West of project study area	845 feet
Westview at Irvine Spectrum	East of project Study area	315 feet
Cal State Fullerton Irvine Center	West of the project study area	535 feet
Double Tree by Hilton Hotel Irvine-Spectrum	West of the project study area, nearby the Barranca Parkway	417 feet

Source: Compiled by Caltrans District 12, 2019.

3.4. Conformity Status

The Transportation Conformity Rule is based on FCAA Section 176(c), which prohibits the US Department of Transportation (USDOT) and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to the SIP for attaining the NAAQS. Conformity applies to highway and transit projects and 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. USEPA regulations at 40 CFR 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for the NAAQS and do not apply at all for State standards regardless of the status of the area.

3.4.1. Regional Conformity

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for CO, NO_2, O_3, PM_{10}, and $PM_{2.5}$, and in some areas (although not in California) SO_2. California has nonattainment or maintenance areas for all of these transportation-related "criteria pollutants" except SO_2, and also has a nonattainment area for lead; however, the Clean Air Act Amendment (CCAA) does not currently require lead to be covered in transportation conformity analysis.

As part of the Clean Air Rules of 2004, the USEPA published a final rule in the Federal Register on July 1, 2004, to amend the Transportation Conformity Rule to include criteria and procedures for the new 8-hour O_3 and $PM_{2.5}$ NAAQS. The final rule addressed a March 2, 1999, court decision by incorporating USEPA and USDOT guidance. On July 20, 2004, the USEPA published a technical correction notice to correct two minor errors in the July 1, 2004 notice. To remain consistent with the stricter federal standards, CARB approved a new 8-hour O_3 standard (0.07 parts per million [ppm], not to be exceeded) on April 28, 2005.

Table 2 of 40 CFR 93.126 lists the types of projects that are exempt. The proposed operational improvement project is not one of the exempt projects listed in this table. Therefore, the proposed project is not exempt from all emissions analyses. Projects, including intersection channelization projects, that are included in Table 3 of 40 CFR 93.127 are exempt from regional conformity. Because the proposed project would fall under the intersection channelization project, it is exempt from regional emissions analysis.

The design concept and scope of the proposed project were consistent with the Project Description in the 2016 RTP/SCS and 2019 FTIP Project List with ID # ORA001105. Conformity status information is summarized in Table 3.5. Copies of relevant pages from the 2016 RTP/SCS and 2019 FTIP for ID # ORA 001105 are included in Appendix A.

Table 3.5. Status of Plans Related to Regional Conformity

MPO	Plan/TIP	Date of Adoption by MPO	Date of Approval by FHWA	Last Amendment	Date of Approval by FHWA of Last Amendment
SCAG	Regional Transportation Plan/ Sustainable Communities Strategy	April 7, 2016	June 2016	Amendment No. 3	September 2018
SCAG	Transportation Improvement Program (FTIP approval)	August 9, 2018	September 3, 2019	Amendment 19-09	September 3, 2019

Source: Southern California Association of Governments (2019).
FHWA = Federal Highway Administration MPO = Metropolitan Planning Organization
FTIP = Federal Transportation Improvement Program TIP = Transportation Improvement Program

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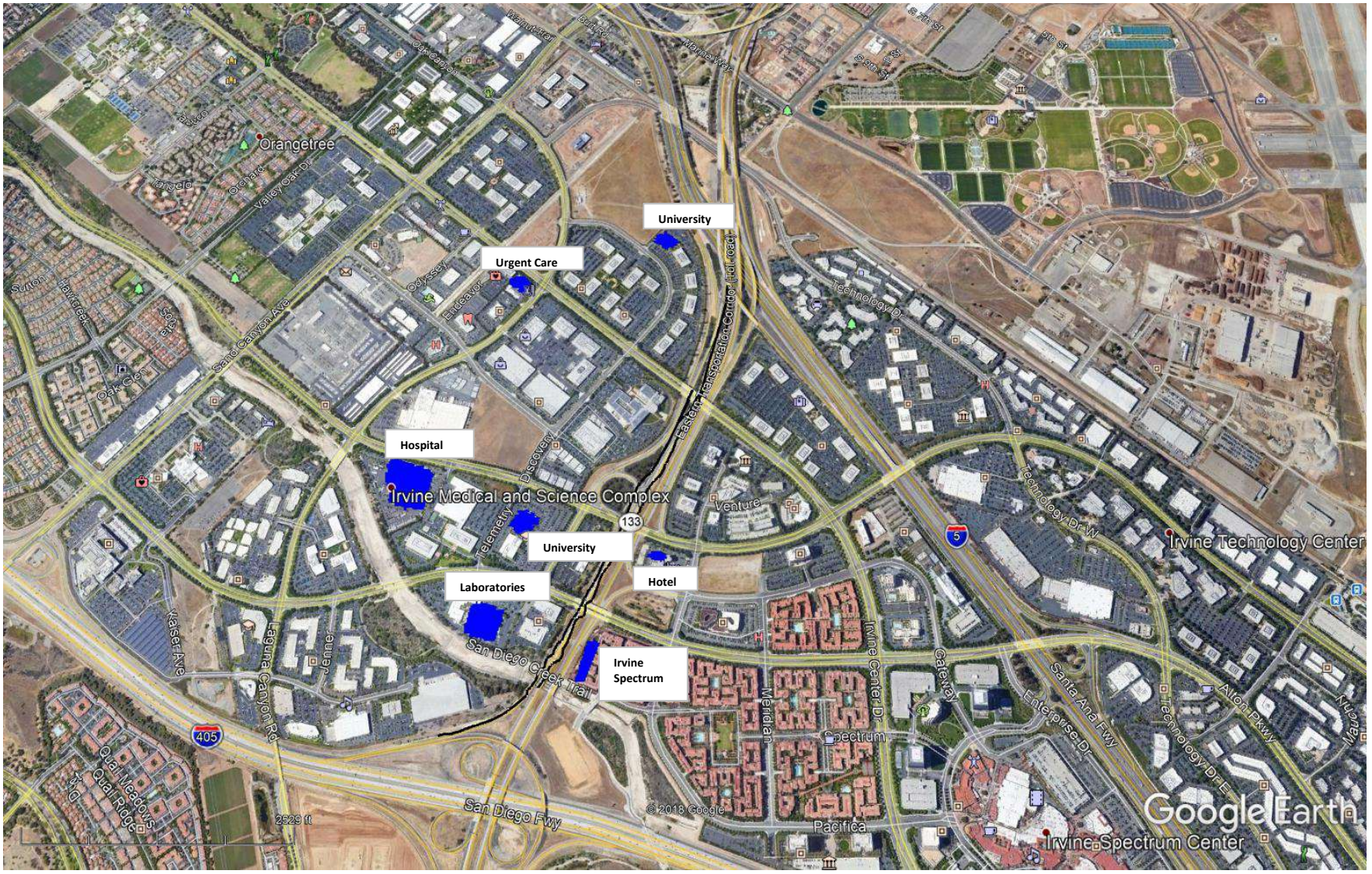

Figure 3-**3**

Sensitive areas

Project Location

Sensitive Receptor Locations

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3.4.2. Project-Level Conformity

The proposed project is located in an attainment/maintenance area for federal CO standards, a nonattainment area for federal $PM_{2.5}$ standards, and an attainment/maintenance area for federal PM_{10} standards; therefore, a project-level hot-spot analysis is required under 40 CFR 93.109 (d) for all three pollutants. The proposed project does not cause or contribute to any new localized CO, $PM_{2.5}$, and/or PM_{10} violations, or delay timely attainment of any NAAQS or any required interim emission reductions or other milestones during the time frame of the transportation plan (or regional emissions analysis). See Appendix E for the CO flow chart.

3.4.3. Interagency Consultation

On October 22, 2019, the SCAG Transportation Conformity Working Group (TCWG) determined that the project was not a project of air quality concern (POAQC). Membership of the TCWG includes federal (USEPA, FHWA, and FTA), State (CARB and Caltrans), regional (Air Quality Management Districts [AQMDs] and SCAG), and sub-regional (County Transportation Commissions) agencies and other stakeholders. Per the transportation conformity rules and regulations, all nonexempt projects must go through review by the TCWG. The proposed project was approved and concurred upon by Interagency Consultation at the TCWG meeting as a project not having adverse impacts on air quality, and the proposed project meets the requirements of the FCAA and 40 CFR 93.116. A copy of the TCWG finding is included in Appendix C.

3.5. NEPA Analysis/Requirement

NEPA applies to all projects that receive federal funding or involve a federal action. NEPA requires that all reasonable alternatives for the proposed project are rigorously explored and objectively evaluated. As described above, the proposed project is listed in a conforming RTP and FTIP. For NEPA, the air quality study should address federal criteria pollutants (Ozone, $PM_{2.5}$, PM_{10}, CO, NO_2, SO_2, and lead), MSATs, and asbestos. Analysis/documentation requirements vary by pollutant; for example, in some cases documentation that the project is listed in a conforming RTP and TIP is sufficient, while in other cases emissions modeling may be required. If construction will last more than three years and/or will substantially impact traffic due to detours, road closures, and temporary terminations, then impacts of the resulting traffic flow changes may need to be analyzed. Construction will last less than 3 years and would not substantially impact traffic due to detours, road closures, and temporary terminations. Thus, impacts of the resulting traffic flow changes do not need to be analyzed.

3.6. CEQA Analysis/Requirement

CEQA applies to most California transportation projects (certain projects are statutorily exempt). CEQA requires that a range of reasonable alternatives to the project that would feasibly attain most

of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project are explored. This air quality study addresses pollutants for which California has established air quality standards (O_3, PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, Pb, VRP, sulfates, H_2S, and vinyl chloride), as well as GHGs, MSATs, and asbestos. Similar to NEPA, the analysis/documentation requirements for CEQA vary by pollutant, ranging from a narrative describing that the pollutant is typically not a transportation issue to an emissions analysis. If construction will last more than three years and/or will substantially impact traffic due to detours, road closures, and temporary terminations, then impacts of the resulting traffic flow changes may need to be analyzed. Because construction would not last more than 3 years or substantially impact traffic due to detours, road closures, and temporary terminations, impacts of the resulting traffic flow changes do not need to be analyzed. For CEQA analyses, emissions from the Future Year Build Alternative scenarios are compared to emissions from the Base Year (existing 2018 conditions). The difference between the future No Build and Build Alternative conditions may help inform significance determinations, which will be made by the Project Development Team (PDT).

4. Environmental Consequences

This section describes the methods, impact criteria, and results of air quality analyses of the proposed project. Analyses in this report were conducted using methodology and assumptions that are consistent with the requirements of NEPA, CEQA, the CAAAs of 1990, and the CCAA of 1988. The analyses also use guidelines and procedures provided in applicable air quality analysis protocols, such as the Transportation Project-Level Carbon Monoxide Protocol (CO Protocol) (Garza et al., 1997), Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{10} and $PM_{2.5}$ Nonattainment and Maintenance Areas (USEPA, 2015a), and the FHWA Updated Interim Guidance on Air Toxics Analysis in NEPA Documents (FHWA, 2016).

4.1. Impact Criteria

Project-related emissions would have an adverse environmental impact if they result in pollutant emissions levels that either create or worsen a violation of an ambient air quality standard (identified in Table 2.1) or contribute to an existing air quality violation.

4.2. Short-Term Effects (Construction Emissions)

During construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other activities related to construction. Emissions from construction equipment also are anticipated and would include CO, NO_X, Volatile Organic Compounds (VOCs), directly-emitted PM ($PM_{2.5}$ and PM_{10}), and TACs (e.g., diesel exhaust PM).

4.2.1. Construction Equipment, Traffic Congestion, and Fugitive Dust

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, and paving roadway surfaces. Construction-related effects on air quality from most roadway projects would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate CO, NO_X, VOCs, PM_{10}, and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after drying. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would also depend on soil moisture, the silt content of soil, wind speed, and the amount of equipment operating at the time. Larger dust particles would settle

near the source, while finer particles would be dispersed over greater distances from the construction site.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, NO_X, VOCs, and some particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site. Areas within 500 ft of CARB-defined sensitive land (Cal EPA, 2005) uses would be labeled as no-idle areas where material storage/transfer and equipment maintenance activities are not to occur (Caltrans, 2018c).

SO_2 is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Off-road diesel fuel meeting federal standards can contain up to 5,000 ppm of sulfur, whereas on-road diesel is restricted to less than 15 ppm of sulfur (CARB, 2012). However, under California law and CARB regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel, so SO_2-related issues due to diesel exhaust would be minimal.

The construction emissions were estimated for the proposed project using the Caltrans Construction Emissions Tool (CAL-CET2018 version 1.2), which is consistent with the guidance provided by the SCAQMD for evaluating construction impacts from roadway projects with the EMFAC2017 motor vehicle emission factor data. The maximum amount of construction-related emissions during a peak construction day is presented in Table 4.1 (model data are provided in Appendix D). The PM_{10} and $PM_{2.5}$ emissions assume a 50 percent control of fugitive dust as a result of watering and associated dust-control measures. Additionally, SCAQMD has established rules for reducing fugitive dust emissions. The proposed project would comply with SCAQMD Rule 403 requiring the implementation of best available dust control measures during active operations capable of generating fugitive dust. Project features would include specific measures such as frequent watering (e.g., a minimum of twice per day) to reduce any air quality impacts resulting from construction activities. The emissions presented below are based on the best information available at the time of calculations and specify that the schedules for the Build Alternative that is anticipated to take approximately 12 to 16 months beginning in 2022.

For conformity purposes, construction emissions need only be analyzed at the project level if construction will last more than five years at one location (40 CFR 93.123 (c) (5). For this project, construction activities will not last for more than 5 years at one general location, so construction-related emissions do not need to be included in regional and project-level conformity analysis (40 CFR 93.123(c)(5)).

Implementation of the following standard Caltrans construction measures, some of which may also be required for other purposes such as storm water pollution control, would reduce air quality impacts resulting from construction activities. Please note that although these measures are anticipated to reduce construction-related emissions, these reductions cannot be quantified at this time.

Table 4.1. Construction Emissions for Build Alternative

Project Phases	PM10 (lbs/day)	PM2.5 (lbs/day)	CO (lbs/day)	NOx (lbs/day)	CO_2 (tons/day)
Build Alternative					
Land Clearing/Grubbing	8.0	1.33	6.67	8.0	0.93
Roadway Excavation	4.50	2.0	19.50	22.00	2.13
Structural Excavation	4.0	0.67	2.67	4.67	0.57
Base/Subbase/Imported Borrow	4.24	2.73	31.21	33.03	3.09
Structural Concrete	0.40	0.40	3.54	6.97	0.72
Paving	1.33	1.33	6.67	20.0	1.87
Drainage/Environment/Landscaping	0.91	0.91	3.64	9.55	0.86
Traffic Signalization/Signage/Striping/Painting	0	0	6.0	14.0	2.10
Other operations	0	0	0	0	0.10
Maximum (lbs/day)	8.21	2.69	31.16	32.95	6167
Total (tons/construction project)	0.43	0.22	2.02	2.78	550

Source: Compiled by Caltrans District 12 using CAL-CET2018 (2019).
CO = carbon monoxide PM_{10} = particulate matter less than 10 microns in diameter
lbs/day = pounds per day $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
NO_X = nitrogen oxides ROG = reactive organic compound

- The construction contractor must comply with the Caltrans' Standard Specifications in Section 14-9 (2018).
    - Caltrans' Standard Specification Section 14-9-02 (2018) specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.
- Construction equipment and vehicles will be properly tuned and maintained. All construction equipment will use low-sulfur fuel as required by 17 California Code of Regulations (CCR) 93114.
- Water or a dust palliative will be applied to the site and equipment as often as necessary to control fugitive dust emissions. Fugitive emissions generally must meet a "no visible dust" criterion either at the point of emissions or at the right-of-way line, depending on local regulations.
- Soil binder will be spread on any unpaved roads used for construction purposes and on all project construction parking areas (providing an estimated 50 percent reduction of fugitive emissions).
- Trucks will be washed as they leave the right-of-way as necessary to control fugitive dust emissions.
- A dust control plan will be developed documenting sprinkling, temporary paving, speed limits, and timely revegetation of disturbed slopes as needed to minimize construction impacts to existing communities.

- Equipment and material storage sites will be located as far away from residential and park uses as practicable. Construction areas will be kept clean and orderly.
- Environmentally sensitive areas will be established near sensitive air receptors. Within these areas, construction activities involving the extended idling of diesel equipment or vehicles will be prohibited to the extent feasible.
- Track-out reduction measures will be used (e.g., gravel pads at project access points to minimize dust and mud deposits on roads affected by construction traffic).
- All transported loads of soils and wet materials will be covered before transport, or adequate freeboard (space from the top of the material to the top of the truck) will be provided to minimize emission of dust during transportation.
- Dust and mud that are deposited on paved, public roads due to construction activity and traffic will be promptly and regularly removed to reduce PM emissions.
- To the extent feasible, construction traffic will be scheduled and routed to reduce congestion and related air quality impacts caused by idling vehicles along local roads during peak travel times.
- Mulch will be installed or vegetation planted as soon as practical after grading to reduce windblown PM in the area. Be aware that certain methods of mulch placement (e.g., straw blowing) may themselves cause dust and visible emission issues, and may require controls such as dampened straw.

4.2.2. Asbestos

The proposed project is in Orange County, which is not known to contain serpentine or ultramafic rock, according to the California Department of Conservation, Division of Mines and Geology (2000). Naturally occurring asbestos (NOA) in bedrock is typically associated with serpentine and peridotite deposits. Note that during demolition activities, the likelihood of encountering structural asbestos is low due to the nature of the demolished materials (i.e., the material would consist of concrete and metal piping). Therefore, the potential for NOA to be present within the project limits is considered to be low. Furthermore, prior to the commencement of construction, qualified geologists would further examine the soils and makeup of the existing structure. Should the project geologist encounter asbestos during the analysis, proper steps shall be executed to handle the materials. Therefore, the impact from NOA during project construction would be minimal to none. In the unlikely event that naturally NOA, serpentine, or ultramafic rock is discovered, SCAQMD will be notified per 17 CCR 93105.

4.2.3. Lead

Lead (Pb) is normally not an air quality issue for transportation projects unless the project involves disturbance of soils containing high levels of aerially deposited lead or painting or modification of structures with lead-based coatings. There are no known soils containing high levels of aerially deposited lead, nor does the proposed project include painting or modification of structures with lead-based coatings. Thus, there is no requirement for an analysis of Pb emissions.

4.3. Long-Term Effects (Operational Emissions)

The purpose of the proposed project is to reduce congestion, improve traffic operations, and to improve the safety.

Based on the *Traffic Analysis conducted in the year 2019,* the proposed project would improve traffic flow without increasing the traffic volumes along the SB Rte 133, as shown in Appendix B. Table 4.2 presents a summary of comparative emissions analysis. The project Build Alternatives would show reduction in long-term regional vehicle air emissions compared to the No Build Alternative. The details of the Operational Emission Model result is presented in the Appendix F.

Table 4.2. Summary of Comparative Emissions Analysis

	CO (lbs/day)	ROG (lbs/day)	NO_X (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)
Opening Year 2024					
2018 Existing	54.54	3.39	12.66	5.25	1.54
No Build Alternative	35.62	2.34	5.79	5.70	1.58
Change from Existing	*-18.92*	*-1.05*	*-6.87*	*0.45*	*0.04*
Build Alternative	**36.14**	**2.35**	**5.56**	5.70	1.57
Change from Existing	*-18.40*	*-1.04*	*-7.10*	*0.45*	*0.03*
Change from No Build	*0.52*	*0.01*	*-0.23*	*0*	*-0.01*
Design Year 2044					
2018 Existing	54.54	3.39	12.66	5.25	1.54
No Build Alternative	**36.27**	**2.19**	**5.31**	**8.19**	**2.22**
Change from Existing	*-18.27*	*-1.20*	*-7.35*	*2.94*	*0.68*
Build Alternative	33.48	1.83	4.43	8.19	2.22
Change from Existing	*-21.06*	*-1.56*	*-8.23*	*2.94*	*0.68*
Change from No Build	*-2.79*	*-0.36*	*-0.88*	*0.00*	*0.00*

(Source: Compiled by Caltrans District 12 using Data Bridge, (v3) and CT-EMFAC 2017)

In the Build Year 2044, pollutants Carbon Monoxide (CO), Reactive Organic Gas (ROG), Nitrogen Oxides (NOX), Particulate Matter (PM10) and PM2.5 were reduced compared to the No Build Scenario in the Design Year (2044). PM10 and PM2.5 were slightly increased in the Design Year (2044) compared to the Base Year (2018). Air Quality in the project area is not worsened by the implication of the project.

4.3.1. CO Analysis

Areas of vehicle congestion have the potential to create pockets of CO called hot spots. These pockets have the potential to exceed the State 1-hour standard of 20 ppm or the 8-hour standard of 9.0 ppm. At the time the SCAQMD 1993 *CEQA Air Quality Handbook* was published, the SCAB was designated nonattainment under the CAAQS and NAAQS for CO (SCAQMD,1993). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of control technology

on industrial facilities, CO concentrations in the SCAB and in the State have steadily declined. In 2007, the SCAQMD was designated in attainment for CO under both the CAAQS and NAAQS. As identified within the SCAQMD 2016 AQMP and the SCAQMD 1992 Federal Attainment Plan for Carbon Monoxide, peak CO concentrations in the SCAB were a result of unusual meteorological and topographical conditions and not a result of congestion at a particular intersection (SCAQMD, 2016 and SCAQMD, 1992). A CO hot-spot analysis that was conducted at four busy intersections in Los Angeles County at the peak morning and afternoon periods did not predict a violation of CO standards.[1] Under existing and future vehicle emission rates, a project would have to increase traffic volumes at a single intersection by more than 44,000 vehicles per hour (vph)—or 24,000 vph where vertical and/or horizontal air do not mix—in order to generate a significant CO impact (BAAQMD 2017). One of the top four worst intersections in Los Angeles County (i.e., Long Beach Boulevard/Imperial Highway)[2] is approximately 54 miles (mi) southwest of the proposed project. Since the SCAQMD modeled intersections do not exceed the CO standards, all intersections within the proposed project with less volumes of traffic and under less extreme conditions would not exceed the CO standards. The proposed Opening Year 2024 and Design Year 2044 projects would not generate traffic volumes comparable to the referenced SCAQMD intersections and therefore would not generate a hot spot. Therefore, implementation of the proposed project would not be expected to result in CO hot spots and impacts would be less than significant. No mitigation is required.

The methodology required for a CO local analysis is summarized in Section 3 (Determination of Project Requirements) and Section 4 (Local Analysis) of the CO Protocol.

Section 3 of the CO Protocol provides two conformity requirement decision flowcharts designed to assist project sponsors in evaluating the requirements that apply to specific projects. Figure 1 of the CO Protocol (provided herein as Figure 1 in Appendix E) applies to new projects and was used in this local analysis conformity decision. The following provides a step-by-step explanation of the flowchart. Each level cited is followed by a response, which in turn determines the next applicable level of the flowchart for the project (Garza et al., 1997).

The flowchart begins with Section 3.1.1:

- **3.1.1. Is this project exempt from all emissions analyses?**
  No.

  Table 1 of the CO Protocol is Table 2 of 40 CFR 93.126. Section 3.1.1 inquires whether the project is exempt. Such projects appear in Table 1 of the CO Protocol. The proposed project is

[1] The four intersections were Long Beach Boulevard/Imperial Highway, Wilshire Boulevard/Veteran Avenue, Sunset Boulevard/Highland Avenue, and La Cienega Boulevard/Century Boulevard. The busiest intersection evaluated (Wilshire Boulevard/Veteran Avenue) had a daily traffic volume of approximately 100,000 vehicles and LOS E in the morning peak hour and LOS F in the evening peak hour.

[2] The intersection of Long Beach Boulevard/Imperial Highway is within the South Coast Air Basin and is used to represent a condition where there is a high volume of traffic during the a.m. and p.m. peak hours to demonstrate that intersections below the volume of traffic at this particular intersection, under less severe atmospheric conditions (i.e., where vertical and horizontal air does not mix), would not result in a CO hot spot.

not one of the exempt projects listed in Table 1 of the CO Protocol; therefore, the proposed project is not exempt from all emission analyses.

- **3.1.2. Is the project exempt from regional emissions analyses?**
  Yes.

  Table 2 of the CO Protocol is Table 3 of 40 CFR 93.127. The question attempts to determine whether the proposed project is listed in Table 2. Projects that are included in Table 2 of the CO Protocol are exempt from regional conformity. Because the proposed project would intersection channelization projects, it is exempt from regional emission analysis.

- **3.1.9. Examine local impacts.**

  Section 3.1.9 of the flowchart directs the project evaluation to Section 4 (Local Analysis) of the CO Protocol. This concludes the evaluation procedure in Figure 1 of the CO Protocol.

- **Section 4: Local Analysis**

  Section 4 of the CO Protocol contains Figure 3, Local CO Analysis (provided herein as Figure 3 in Appendix E), which is a flowchart. This flowchart is used to determine the type of CO analysis required for the Build Alternative. Below is a step-by-step explanation of the flow chart. Each level cited is followed by a response, which in turn, determines the next applicable level of the flowchart for the Build Alternatives.

  The flowchart begins at Level 1:

  - **Level 1. Is the project in a CO nonattainment area?**
    No.

    The project site is in an area that has demonstrated attainment with the federal CO standard.

  - **Level 1 (cont.). Was the area redesignated as "attainment" after the 1990 Clean Air Act?**
    Yes.

  - **Level 1 (cont.). Has "continued attainment" been verified with the local Air District, if appropriate?**
    Yes.

    The USEPA designated the SCAB as attainment/maintenance on June 11, 2007. (Proceed to Level 7.)

  - **Level 7. Does the project worsen air quality?**
    No.

Because the proposed project would not meet any of the criteria discussed below, it would not potentially worsen air quality.

- **The project significantly increases the percentage of vehicles operating in cold start mode. Increasing the number of vehicles operating in cold start mode by as little as 2% should be considered potentially significant.**

  The percentage of vehicles operating in cold-start mode is the same or lower for the segments under study compared to those used for the interchange in the attainment plan. It is assumed that all vehicles at the segments are in a fully warmed-up mode. Therefore, this criterion is not met.

- **The project significantly increases traffic volumes. Increases in traffic volumes in excess of 5% should be considered potentially significant. Increasing the traffic volume by less than 5% may still be potentially significant if there is also a reduction in average speeds.**

  The project is congestion relief project, number of the vehicles in the project segments is almost the same. Thus, the change in traffic volumes for the Build Alternative scenario would be less than 5 percent compared to the No Build Alternative. As a result, the proposed project would not increase the daily traffic volumes at the segments. As shown in Table 1.6, the project would not increase the traffic volumes at the segments. Therefore, this criterion is not met.

- **The project worsens traffic flow. For uninterrupted roadway segments, a reduction in average speeds (within a range of 3 to 50 miles per hour [mph]) should be regarded as worsening traffic flow. For intersection segments, a reduction in average speed or an increase in average delay should be considered as worsening traffic flow.**

Table 4.3 shows the average speed and vehicle hours of the delay (VHD) for the three scenarios Existing (2018), No Build (2024 and 2044) and Build Alternative (2024 and 2044) along SB Rte 133/SB I-5 Connector and SB Rte 133/NB I-405 Connector. The table clearly shows the improvement in the speed of the vehicle in the Build Year (2044) compared to the No Build Year (2044). VHD in the Build scenario in the Design Year (2044) is reduced compared to the No Build Scenario in the Design Year (2044). Therefore, this criterion is not met.

This concludes the Caltrans CO flowchart evaluation procedure listed in Figure 3 of Appendix E of this report. Using the levels and criteria in Figure 3 of the CO Protocol, the project would be considered satisfactory, and no further analysis is needed.

Table 4.3 Average speed (mph)/VHD along SB SR 133 between SB SR 133/SB I-5 connector and SB SR133/ NB I-405 connector

	Existing		No Build				Alternative 1			
	2018		2024		2044		2024		2044	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
SB Rte 133/SB I-5 connector-SB Rte 133/Barranca Parkway	65 0.04	65 0.10	64 0.10	65 0.01	53 2.06	63 0.22	65 0.03	65 0.00	61 0.76	64 0.08
SB Rte 133/Barranca Parkway to SB Rte 133/NB I-405 connector	64 0.03	64 0.08	64 0.08	63 0.14	51 1.58	64 1.07	65 0.03	65 0.05	60 0.58	62 0.39
SB Rte133/NB I-405 connector to the Ramp	42 1.95	42 4.43	38 4.43	40 3.32	16 67.82	37 28.35	45 0.20	45 0.15	42 3.0	43 1.25

4.3.2. PM Analysis

Emissions Analysis

For non-conformity project-level PM analysis, common practice is to conduct an emissions analysis by comparing PM emissions between the Build scenario and the No-Build scenario, and/or between the Build scenario and the Baseline scenario. The basic procedure for analyzing project-level PM emissions is to calculate emission factors using EMFAC or CT-EMFAC2017. EMFAC is an emissions model developed by the ARB that calculates emissions rates for California motor vehicles. CT-EMFAC2017 is an emission model developed by Caltrans that calculates project-level emissions using EMFAC-based emission rates.

Based on the *Traffic Data Analysis conducted by using OCTAM 4.0 (2012 base year network and 2040 MPAH network)*, the proposed project would improve traffic speed and reduce the delay in the project area, as shown in Appendix B. Build Alternative (2044) would show reduction in long-term regional vehicle air emissions as compared to the No Build Alternative (2044) (See Table 4.2)

Hot-Spot Analysis

In November 2015, the USEPA released an updated version of *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (Guidance) for quantifying the local air quality impacts of transportation projects and comparing them to the PM NAAQS (75 Federal Register 79370) (USEPA, 2015 b). The USEPA originally released the quantitative Guidance in December 2010, and released a revised version in November 2013 to reflect the approval of EMFAC 2011 and the USEPA 2012 PM NAAQS final rule. The November 2015 version reflects MOVES2014 and its subsequent minor revisions such as MOVES2014a, to revise design value calculations to be more consistent with other USEPA programs and to reflect guidance implementation and experience in the field. Note that EMFAC (Emission Factor Model), not MOVES (Motor Vehicle Emission Simulator), should be used for project hot-spot analysis in

California. The Guidance requires a hot-spot analysis to be completed for a POAQC. The final rule in 40 CFR 93.123(b)(1) defines a POAQC as:

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

The USEPA Guidance for PM hot-spot analysis and interagency consultation was used to determine whether the project is a POAQC. On October 22, 2019, the TCWG determined that the proposed project is not a POAQC. Per the transportation conformity rules and regulations, all nonexempt projects must go through review by the TCWG. The proposed project was approved and concurred upon by interagency consultation at the TCWG meeting as a project not having adverse impacts on air quality, and the proposed project meets the requirements of the FCAA and 40 CFR 93.116. A copy of the TCWG finding is included in Appendix C.

Therefore, the Build Alternative meet the FCAA requirements and 40 CFR 93.116, without any explicit hot-spot analysis. The proposed project was listed in the 2016 RTP/SCS and 2019 FTIP under ID # ORA0011055. Thus, the proposed Build Alternative was included in the regional transportation plan that was used to meet regional conformity and would not delay timely attainment of the PM_{10} or $PM_{2.5}$ NAAQS for the SCAB. On September 2019, the FHWA published its determination that 2016 RTP/SCS Amendment No. 3 conforms with the SIP in accordance with 40 CFR 93. Construction and long-term operation of the proposed project would therefore be considered consistent with the purpose of the SIP, and the Build Alternative would conform to the requirements of the FCAA.

4.3.3. NO_2 Analysis

The USEPA modified the NO_2 NAAQS to include a 1-hour standard of 100 parts per billion (ppb) in 2010. Currently there is no federal project-level NO_2 analysis requirement. However, NO_2 is among the near-road pollutants of concern (Caltrans, 2012b). Within the project area, it is unlikely

that NO_2 standards would be approached or exceeded based on the relatively low ambient concentrations of NO_2 in the SCAB and on the long-term trend toward reduction of NO_X emissions. Because of these factors, a specific analysis of NO_2 was not conducted for the proposed project.

4.3.4. Mobile Source Air Toxics Analysis

The FHWA released updated guidance in October 2016 (FHWA 2016) for determining when and how to address MSAT impacts for transportation projects. FHWA identified three levels of analysis:

- No analysis for exempt projects or projects with no potential for meaningful MSAT effects
- Qualitative analysis for projects with low potential MSAT effects
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects

Projects with no impacts generally include those that (a) qualify as a categorical exclusion under 23 CFR 771.117, (b) qualify as exempt under the FCAA conformity rule under 40 CFR 93.126, and (c) are not exempt but have no meaningful impacts on traffic volumes or vehicle mix.

Projects that have low potential MSAT effects are those that serve to improve highway, transit, or freight operations or movement without adding substantial new capacity or creating a facility that is likely to substantially increase emissions. The large majority of projects fall into this category.

Projects with high potential MSAT effects include those that:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel PM in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the annual average daily traffic is projected to be in the range of 140,000 to 150,000, or greater, by the design year; or
- Are proposed to be located near populated areas or, in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, and hospitals).

MSAT emission was estimated by using CT-EMFAC2017 to calculate the acrolein, benzene, 1,3-butadiene, acetaldehyde, diesel PM, ethylbenzene, formaldehyde, naphthalene, and POM emission for Baseline, No Build and Build Alternative for the opening year (2024) and design year (2044). The modeling results are summarized in Table 4.4 and are included in Appendix G. As shown in the Table 4.4, the MSAT emissions in the Build scenario (2044) are lower than in the Existing scenario (2018) and No Build scenario (2044) emissions. Because the emission effects of the proposed project would be low, it is expected that there would be no appreciable difference in overall MSAT emissions between the Existing condition and the proposed project.

Table 4.4. Summary of Comparative MSAT Emissions Analysis

Alternative	MSAT Exhaust (lbs/day)								
	Acrolein	Benzene	1,3-butadiene	Acetaldehyde	Diesel PM	Ethylbenzene	Formaldehyde	Naphthalene	POM
OPENING YEAR (2024)									
Existing (2018)	0.00	0.07	0.01	0.03	0.15	0.05	0.07	0.00	0.00
No Build Alt (2024)	0.00	0.05	0.01	0.01	0.04	0.04	0.03	0.00	0.00
Change from Existing	0.00	-0.02	0.00	-0.002	-0.11	-0.01	-0.04	0.00	0.00
Build Alt 1 (2024)	0.00	0.05	0.01	0.01	0.04	0.04	0.03	0.00	0.00
Change from Existing	**0.00**	**-0.02**	**-0.00**	**-0.002**	**-0.11**	**-0.01**	**-0.04**	**0.00**	**0.00**
Change from No Build	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
DESIGN YEAR (2044)									
Existing (2018)	0.00	0.07	0.01	0.03	0.15	0.05	0.07	0.00	0.00
No Build Alt (2044)	0.00	0.05	0.01	0.01	0.04	0.03	0.04	0.00	0.00
Change from Existing	0.00	-0.02	0.00	-0.02	-0.11	-0.02	-0.03	0.00	0.00
Build Alt 1 (2044)	0.00	0.04	0.01	0.01	0.05	0.03	0.03	0.00	0.00
Change from Existing	**0.00**	**-0.03**	**0.00**	**0.00**	**-0.10**	**-0.02**	**-0.04**	**0.00**	**0.00**
Change from No Build	**0.00**	**-0.01**	**0.00**	**0.00**	**0.01**	**0.00**	**-0.01**	**0.00**	**0.00**

Source: Compiled by Caltrans District 12 using Data Bridge (V3) and CT-EMFAC2017 (2019).
Diesel PM = diesel particulate matter MSAT = Mobile Source Air Toxics
EMFAC = Emission Factor Model POM = polycyclic organic matter
lbs/day = pounds per day

4.3.5. Greenhouse Gas Emissions Analysis

GHG emissions associated with the project (consisting primarily of emissions from equipment exhaust) would occur over the short term from construction activities. There would also be long-term GHG emissions associated with project-related changes to vehicle miles traveled (VMT). Recognizing that the field of global climate change analysis is rapidly evolving, the approaches advocated most recently indicate that lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, construction activities, and any other significant source of emissions within the project area.

Construction Emissions

As described in the Section 4.2.1, the construction emissions were estimated for the proposed project using the Caltrans Construction Emissions Tool (CAL-CET2018 version 1.2). GHG emissions generated by construction of the proposed project are presented in Table 4.5. The total CO_2e emission was 507 MT in the construction of the project.

Table 4.5. Project Construction Greenhouse Gas Emissions

Project Phases	CO_2 (tons/phase)	CH_4 (tons/phase)	N_2O (tons/phase)	CO_2e (MT/phase)
Land Clearing/Grubbing	14	0	0.0013	13
Roadway Excavation & Removal	85	0.003	0.004	78
Structural Excavation & Removal	17	0.001	0.001	16
Base/Subbase/Imported Borrow	204	0.007	0.009	187
Structural Concrete	142	0.004	0.008	131
Paving	28	0.001	0.002	26
Drainage/Environment/Landscaping	38	0.001	0.002	35
Traffic Signalization/Signage/Striping/Painting	21	0.001	0.002	19
Other Operations	1	0.00	0.00	1
Total (MT/construction project)	**500**	**0.018**	**0.0293**	**507**

Source: Compiled by Caltrans District 12 using CAL-CET2018.

CH_4 = methane MT/phase = metric tons per phase 1 MT= 2204.6 lb, 1 t = 2000 lb

CO_2 = carbon dioxide N_2O = nitrous oxide

CO_2e = carbon dioxide equivalent tons/phase = tons per phase

Operational Emissions

The Build Alternative involves addition of auxiliary lane on SB Rte 133 and addition of a lane on SB Rte 133/NB I-405 Connector. Construction emissions will be unavoidable, but there will likely be long-term GHG benefits from improved operation and smoother traffic flow.

The regional vehicle miles traveled (VMT) for the Existing (2018), No Build Alternative, and Build Alternatives were estimated using the daily traffic volumes obtained from Traffic Analysis. CT-EMFAC2017 was used to calculate and compare the CO_2 emissions for the years 2018, 2024, and 2044. The model result is presented in Table 4.6 and Appendix D. Note that these CO_2 emission numbers are only useful for a comparison. The numbers are not necessarily an accurate reflection of what the true CO_2e emissions will be, because CO_2e emissions depend on other factors that are not part of the model (e.g., the fuel mix, rate of acceleration, and the aerodynamics and efficiency of the construction equipment units and on-road vehicles). Total CO_2 emission in the Build scenario (2044) was less than the Existing in the Base Year (2018) and the No Build scenario in the Year (2044). Operation with this project in this area would not increase the CO_2e compared to the as it is condition.

Construction GHG emissions would be unavoidable. While construction GHG emissions would be unavoidable, SCAQMD staff is recommending that construction emissions be amortized over a 30-year project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies. The proposed project Build Alternative would show slight decrease in long-term regional vehicle GHG emissions compared to the No Build Alternative**.**

SCAG's 2016 RTP/SCS complies with the emission reduction targets established by the California Air Resources Board (ARB) and meets the requirements of SB 375 as codified in Government Code §65080(b) et seq. by achieving per capita GHG emission reductions relative to 2005 of 8 percent by 2020 and 18 percent by 2035, which meets or exceeds targets set by ARB. As required by SB 375, the SCS outlines growth strategies that better integrate land use and transportation planning and help reduce the State's GHG emissions from cars and light trucks. The proposed project is listed in the 2016 RTP/SCS (project ID: REG0701), which can be found in Appendix A of this report. The project will assist the region with its overall goals to reduce vehicle-related GHGs by relieving congestion and improving traffic flow, thereby reducing emissions. This is consistent with the RTP/SCS's identified strategies to manage congestion by maximizing the current system and ensuring it operates with maximum efficiency and effectiveness.

The 2016 RTP/SCS commits $6.9 billion toward transportation demand management (TDM) strategies and $9.2 billion for transportation systems management (TSM) improvements in the region. As described in Section 1.5.4.2, both TSM and TDM elements may be incorporated into the Build Alternative for the proposed project. Together, congestion management, TDM, and TSM strategies will all help the region achieve its goals of VMT and VHT reduction. Specifically, TSM and TDM measures may provide the following benefits: lessen the number of trips, lessen peak-hour travel, conserve energy, and provide more travel alternatives. As a result, these strategies may reduce GHG emissions.

Table 4.6 Modeled Annual CO_2 Emissions and Vehicle Miles Traveled by Alternative

Alternative	Annual VMT[1]	CO_2 emissions (MT/yr)	CH_4 emissions (MT/yr)	N_2O emissions (MT/yr)	CO_2e emissions (MT/yr)
Base Year (2018)	7,647,880	2,864.46	0.1433	0.1243	2,905
Opening Year (2024)					
No Build	8,487,620	2,669.97	0.1273	0.0993	2,703
Build Alternative	8,487,620	2612.14	0.1289	0.0969	2,644
Design Year/Horizon Year (2044)					
No Build	12,179,700	2,961.79	0.1632	0.1087	2,998
Build Alternative	12,179,700	2,856.47	0.1432	0.1043	2,891

Source: Compiled by Caltrans District 12 using Data Bridge (v3) and CT-EMFAC2017 (2019)

1. Annual VMT values derived from Daily VMT values multiplied by 347, per CARB methodology (CARB, 2008)
2. CO2e of the CO_2, CH_4 and N2O was obtained by multiplying them by their respective global warming potential (GWP) of 1, 25 and 298, respectively.

CARB =California Air Resources Board
CO2 = carbon dioxide
MT/yr =metric tons per year
VMT =Vehicle miles traveled

The Build Alternative would not result in a cumulatively considerable net increase of any criteria pollutant for which the region is in nonattainment under an applicable Federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors). Co_2e in the Build Year 2044 (2,891 MT/Year) is less than in the Existing Year 2018 (2,905 MT/Year) and in No Build Year 2044 (2,998 MT/Year) (See Table 4.6). Thus, impacts for the Build Alternative would be less than significant (Caltrans, 2019; Interim Guidance: Determining CEQA

Significance for Greenhouse Gas Emissions for Projects on the State Highway system). No mitigation is required.

4.4. Cumulative/Regional/Indirect Effects

Ozone, secondary PM_{10}, and secondary $PM_{2.5}$ are normally regional issues because they are formed by photochemical and chemical reactions over time in the atmosphere. For these pollutants, localized impact analysis is not meaningful. However, emissions analyses may be required in order to make some comparison with Existing (2018) and No Build conditions. Formation of O_3 and secondary PM is a function of VOC and NO_X emissions. CT-EMFAC2017 was used to determine the emission. As described above, based on the *Traffic Analysis*, the proposed project would improve traffic flow on SB Rte 133 between the SB Rte 133/ SB I-5 and SB Rte 133/NB I-405 Connector. Thus, the proposed project would not result in increases in the emissions of O_3, secondary PM_{10}, or secondary $PM_{2.5}$.

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5. Minimization Measures

CEQA requires that feasible measures that can eliminate or substantially reduce project impacts be addressed. The FHWA requires a project to incorporate measures to mitigate adverse impacts caused by the action and requires the project applicant to be responsible for the implementation of the measures (23 CFR 771). No avoidance, minimization, and/or mitigation measures are required. However, State and local air quality regulations require the implementation of air quality control measures. Several project features are listed below.

5.1. Short-Term (Construction)

The following project features will be implemented during construction activities.

PF-AQ-1 All air quality minimization measures are included in Caltrans Standard Specification (2018) for Construction, Sections 14.9-02.

5.2. Long-Term (Operational)

No avoidance, minimization, and/or mitigation measures are required because the proposed project Build Alternative would show slight decrease in long-term regional vehicle air quality and GHG emissions compared to the No Build Alternative. Because the project emissions were accounted for in the conforming RTP/SCS and conformity budget that is used for attainment of the standards, the project would have no adverse impact. However, Caltrans is firmly committed to implementing statewide strategies to help reduce the potential effects of GHG emissions statewide. These GHG strategies are discussed below.

One of the main strategies in the Caltrans 2006 Climate Action Program (CAP) (Caltrans, 2006) is to reduce GHG emissions to make California's transportation system more efficient. In an effort to further the vision of California's GHG reduction targets outlined in AB 32 and SB 32, California Governor Jerry Brown identified key climate change strategy pillars (concepts), as shown on Figure 5-1, The Governor's Climate Change Pillars: 2030 Greenhouse Gas Reduction Goals. These pillars highlight the concept that several major areas of the California economy will need to reduce emissions to meet the 2030 GHG emissions target. These pillars are: (1) reducing today's petroleum use in cars and trucks by up to 50 percent; (2) increasing from one-third to one-half California's electricity derived from renewable sources; (3) doubling the energy efficiency savings achieved at existing buildings and making heating fuels cleaner; (4) reducing the release of methane, black carbon, and other short-lived climate pollutants; (5) managing farm and rangelands, forests, and wetlands so they can store carbon; and (6) periodically updating the State's climate adaptation strategy, Safeguarding California.

The transportation sector is integral to the people and economy of California. To achieve GHG emission reduction goals, it is vital that the State builds on its past successes in reducing criteria and toxic air pollutants from transportation and goods movement activities. GHG emission reductions will come from cleaner vehicle technologies, lower-carbon fuels, and reduction of VMT. One of Governor Brown's key pillars sets the ambitious goal of reducing today's petroleum use in cars and trucks by up to 50 percent by 2030.

Governor Brown called for support to manage natural and working lands, including forests, rangelands, farms, wetlands, and soils, so they can store carbon. These lands have the ability to remove CO_2 from the atmosphere through biological processes, and to then sequester carbon in above-and below-ground matter.

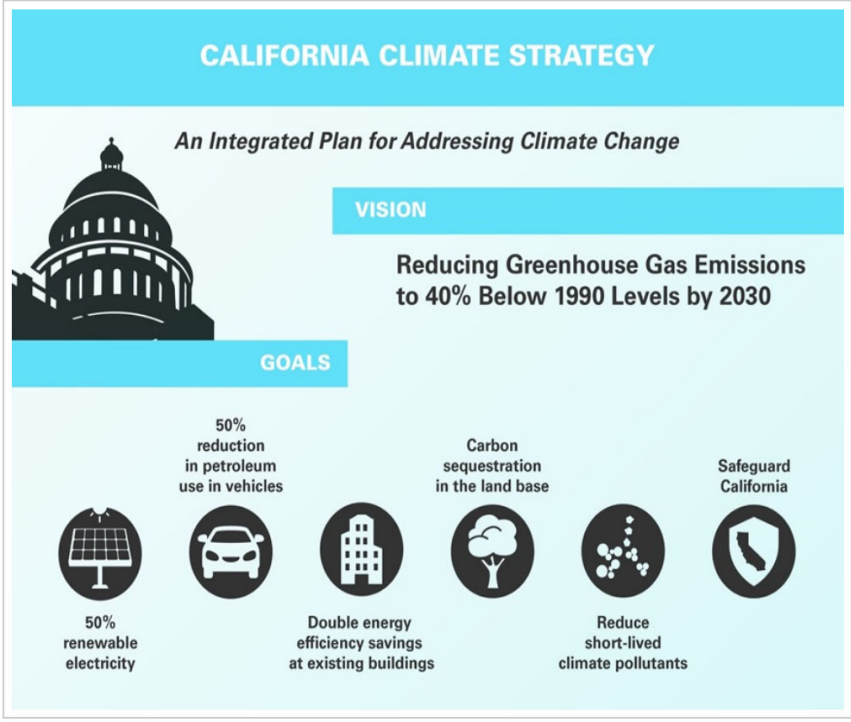

Figure 5-1. The Governor's Climate Change Pillars: 2030 Greenhouse Gas Reduction Goals

5.2.1. Caltrans Activities

Caltrans continues to be involved in the Governor's Climate Action Team as CARB works to implement EO S-3-05 and EO S-01-07 and helps to achieve the targets set forth in AB 32. EO B-30-15, issued in April 2015, and SB 32 (2016), set a new interim target to cut GHG emissions to 40 percent below 1990 levels by 2030. The following major initiatives are underway at Caltrans to help meet these targets.

California Transportation Plan

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce GHG emissions. The CTP defines performance-based goals, policies, and strategies to achieve the collective vision for California's future statewide, integrated, multimodal transportation system. It serves as an umbrella document for all of the other statewide transportation planning documents.

SB 391 (Liu, 2009) requires the CTP to meet California's climate change goals under AB 32. Accordingly, the CTP identifies the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the State's transportation needs. While MPOs have primary responsibility for identifying land use patterns to help reduce GHG emissions, the CTP identifies additional strategies in pricing, transportation alternatives, mode shift, and operational efficiency.

Caltrans Strategic Management Plan

The Caltrans Strategic Management Plan, released in 2015, creates a performance-based framework to preserve the environment and reduce GHG emissions, among other goals. Specific performance targets in the Plan that would help to reduce GHG emissions include the following (Caltrans, 2015):

- Increasing percentage of non-automobile mode share
- Reducing VMT per capita
- Reducing Caltrans' internal operational (i.e., buildings, facilities, and fuel) GHG emissions

Funding and Technical Assistance Programs

In addition to developing plans and performance targets to reduce GHG emissions, Caltrans also administers several funding and technical assistance programs that have GHG reduction benefits. These include the Bicycle Transportation Program, Safe Routes to School, Transportation Enhancement Funds, and Transit Planning Grants. A more extensive description of these programs can be found in *Caltrans Activities to Address Climate Change* (2013).

Director's Policy 30 (DP-30) Climate Change (Caltrans 2012a) is intended to establish a department policy that will ensure coordinated efforts to incorporate climate change into departmental decisions and activities.

Caltrans Activities to Address Climate Change (2013) provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce GHG emissions resulting from agency operations.

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6. Conclusions

As described above, the purpose of the proposed project is to reduce congestion and improve traffic operations on SB Rte 133. As shown in Chapter 4, Environmental Consequences, neither the short-term construction impacts nor the long-term operational impacts would result in any adverse impact with the implementation of the project features for construction and with the proposed operational improvement project included in a conforming RTP/SCS plan.

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8. Appendices

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Appendix A. RTP and TIP Listings for the Project and FHWA Conformity Determination

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TABLE 1 FTIP Projects - Continued

County	System	FTIP ID	Route #	Description	Project Cost ($1,000's)
ORANGE	STATE HIGHWAY	ORA150110	91	SR-91 (SR-57 TO SR-55) - PROJECT PROPOSES TO ADD 1 GP LANE EASTBOUND FROM SR-57 TO SR-55, AND 1 GP LANE WESTBOUND FROM GLASSELL STREET TO STATE COLLEGE BLVD. ADDITIONAL FEATURES OF THE PROJECT INCLUDE IMPROVEMENTS TO NEARBY LOCAL INTERCHANGES AND FREEWAY TO FREEWAY CONNECTORS. AUXILIARY LANES WILL BE ADDED IN CERTAIN SEGMENTS (PA&ED PHASE).	$425,000
ORANGE	STATE HIGHWAY	ORA000821	91	SR-91 WB (SR-55 THROUGH TUSTIN INTERCHANGE) EXTEND LANE AND RECONSTRUCT AUX. LANE. PPNO 4587A EA 0C560)	$46,270
ORANGE	STATE HIGHWAY	ORA020807	91	IN ORANGE COUNTY, AT THE COAL CANYON ROAD INTERCHANGE. THE PROJECT IS TO INSTALL VEGETATION ENHANCEMENTS. EA12-0K3300	$802
ORANGE	STATE HIGHWAY	ORA051	241	FOOTHILL TRANSPORTATION CORRIDOR-NORTH (FTC-N - SR 241). 12.7 MI TOLL ROAD BETWEEN OSO PKWY AND ETC, CONSISTENT WITH SCAG/TCA MOU 4/05/01. EXISTING 2 M/F IN EA DIR. 2 ADDITIONAL M/F, PLS CLIMBING & AUX LANES BY 2020.	$269,045
ORANGE	STATE HIGHWAY	ORA052	241	FOOTHILL TRANSPORTATION CORRIDOR-SOUTH (FTC-S - SR 241). 10.3 MI TOLL ROAD BETWEEN SAN DIEGO COUNTY LINE AND OSO PKWY, CONSISTENT WITH SCAG/TCA MOU 4/05/01. 2 M/F EA DIR FROM OSO PKWY TO COW CAMP RD BY 2017. 2 M/F EA DIR FROM COW CAMP RD TO SAN DIEGO CO LINE BY 2021. 1 ADDITIONAL M/F EA DIR PLS CLIMBING & AUX LANES BY 2030.	$1,331,269
ORANGE	STATE HIGHWAY	ORA111207	241	241/91 EXPRESS LANES (HOT) CONNECTOR: NB SR-241 TO EB SR-91, WB SR-91 TO SB SR-241, PER SCAG/TCA MOU 4/05/01.	$183,557
ORANGE	STATE HIGHWAY	ORA111207	241	241/91 EXPRESS LANES (HOT) CONNECTOR: NB SR-241 TO EB SR-91, WB SR-91 TO SB SR-241, PER SCAG/TCA MOU 4/05/01. PARENT PROJECT ORA050	$183,557
ORANGE	STATE HIGHWAY	ORA050	241	EASTERN TRANSPORTATION CORRIDOR (ETC- SR 241/261/133) 26.4 MI TOLL ROAD CONNECTS SR 91 TO I-5 VIA SR 261 AND SR 133, CONSISTENT WITH SCAG/TCA MOU 4/05/01. EXISTING 2 M/F EA DIR. 2 ADDITIONAL M/F IN EA DIR, PLUS CLIMBING AND AUX LANES BY 2020.	$631,902
ORANGE	STATE HIGHWAY	ORA131304	405	I-405(I-5 TO SR-55)-ADD 1 MF LANE EACH DIRECTION FROM I-5 TO SR-55 AND IMPROVE MERGING.(UTILIZE TOLL CREDIT MATCH FOR RSTP) ENG ONLY.	$190,000
ORANGE	STATE HIGHWAY	ORA130064	405	I-405 – ADD ONE SOUTHBOUND AUXILIARY LANE FROM UNIVERSITY DRIVE TO SAND CANYON (SEGMENT 2) AND SAND CANYON AVENUE TO SR-133 (SEGMENT 1)	$16,379
ORANGE	STATE HIGHWAY	ORA113030	405	WIDEN RAMP FOR DECELERATION LANE - NB I-405 FROM 1 MILE NORTH OF JEFFERY RD TO CULVER DR. 0.6 MILES SPLIT FROM ORA001105	$3,230
ORANGE	STATE HIGHWAY	ORA000194	405	HOV CONNECTORS FROM I-405 TO I-605, BETWEEN KATELLA AVE. (I-605 PM R001.104) AND SEAL BEACH BLVD. (I-405 PM 022.643), WITH A SECOND HOV LANE IN EACH DIRECTION ON I-405 BETWEEN THE TWO DIRECT CONNECTORS. TOLL CREDITS FOR CMAQ.	$162,830
ORANGE	STATE HIGHWAY	ORA030605	405	I-405 FROM SR-73 TO I-605. ADD 1 MF LANE IN EACH DIRECTION, AND ADDITIONAL CAPITAL IMPROVEMENTS. COMBINED WITH ORA045, ORA151, ORA100507 AND ORA120310. PHASE 2 LISTED UNDER ORA030605A	$1,300,000
ORANGE	STATE HIGHWAY	ORA030605A	405	I-405 FROM SR-73 TO I-605. CONVERT EXISTING HOV TO HOT. ADD 1 ADDITIONAL HOT LANE EACH DIRECTION AND ADD A HOT DIRECT CONNECTOR TO SR-73 (BY 2035). PHASE 1 PROJECT LISTED UNDER ORA030605	$400,000
ORANGE	STATE HIGHWAY	ORA001108	999	GROUPED PROJECTS FOR SAFETY IMPROVEMENTS - SHOPP MANDATES PROGRAM. SCOPE: PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126 EXEMPT TABLES 2 AND TABLE 3 CATEGORIES - RAILROAD/HIGHWAY CROSSING, SAFER NON-FEDERAL-AID SYSTEM ROADS, SHOULDER IMP, TRAFFIC CONTROL DEVICES AND OPS ASSISTANCE OTHER THAN SIGNALIZATION PROJECTS, LIGHTING IMP	$23,623
ORANGE	STATE HIGHWAY	ORA040607	999	ORANGE COUNTY - COUNTYWIDE ACTIVITIES: PLANNING, PROGRAMMING AND MONITORING (PPM)	$16,459
ORANGE	STATE HIGHWAY	ORA001104	999	GROUPED PROJECTS FOR SHOULDER IMPROVEMENTS - SHOPP ROADSIDE PRESERVATION PROGRAM. SCOPE: PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126 EXEMPT TABLES 2 CATEGORIES - FENCING, SAFETY ROADSIDE REST AREAS	$1,264
ORANGE	STATE HIGHWAY	ORA084402	999	GROUPED PROJECTS FOR PURCHASE OF OFFICE, SHOP, AND OPERATING EQUIPMENT FOR EXISTING FACILITIES. SCOPE - PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126 EXEMPT TABLES 2 AND TABLE 3 CATEGORIES - PURCHASE OF OFFICE, SHOP, AND OPERATING EQUIPMENT FOR EXISTING FACILITIES	$580
ORANGE	STATE HIGHWAY	ORA001103	999	GROUPED PROJECTS FOR PAVEMENT RESURFACING AND/OR REHABILITATION - SHOPP ROADWAY PRESERVATION PROGRAM. SCOPE: PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126 EXEMPT TABLES 2 CATEGORIES - PAVEMENT RESURFACING AND/OR REHABILITATION, EMERGENCY RELIEF (23 U.S.C. 125), WIDENING NARROW PAVEMENTS OR RECONSTRUCTING BRIDGES (NO ADDITIONAL TRAVEL LANES)	$52,962
ORANGE	STATE HIGHWAY	ORA001105	999	GROUPED PROJECTS FOR SAFETY IMPROVEMENTS - SHOPP MOBILITY PROGRAM. SCOPE: PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126 EXEMPT TABLES 2 AND TABLE 3 CATEGORIES - RAILROAD/HIGHWAY CROSSING, SAFER NON-FEDERAL-AID SYSTEM ROADS, SHOULDER IMP, TRAFFIC CONTROL DEVICES OPS ASSISTANCE.INTERSECTION SIGNALIZATION PROJECTS, PAVEMENT MARKING DEMO,LIGHTING	$47,730
ORANGE	STATE HIGHWAY	ORA001109	999	GROUPED PROJECTS FOR BRIDGE REHABILITATION AND RECONSTRUCTION - SHOPP PROGRAM. SCOPE: PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126 EXEMPT TABLES 2 CATEGORIES - WIDENING NARROW PAVEMENTS OR RECONSTRUCTING BRIDGES (NO ADDITIONAL TRAVEL LANES).	$5,200

Final 2019 Federal Transportation Improvement Program

Orange County Project Listing
State Highway
(in $000`s)

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	Signage Begin	Signage End	System	Conformity Category	Amendment
ORA001103	Orange	SCAB		REG0701	SHP03	999					S	EXEMPT - 93.126	0
Description:							PTC	71,342			Agency	CALTRANS	

Grouped Projects for Pavement resurfacing and/or rehabilitation - SHOPP Roadway Preservation Program. Scope: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 categories - Pavement resurfacing and/or rehabilitation, Emergency relief (23 U.S.C. 125), Widening narrow pavements or reconstructing bridges (no additional travel lanes)

Fund	ENG	R/W	CON	Total	Prior	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
SHOPP - ADVANCE CONSTRUCTION			71,342	71,342		11,385	59,957					71,342
ORA001103 Total			71,342	71,342		11,385	59,957					71,342

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	Signage Begin	Signage End	System	Conformity Category	Amendment
ORA001104	Orange	SCAB		REG0701	SHP02	999					S	EXEMPT - 93.126	0
Description:							PTC	1,260			Agency	CALTRANS	

Grouped Projects for Shoulder Improvements - SHOPP Roadside Preservation Program. Scope: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 categories - Fencing, Safety roadside rest areas

Fund	ENG	R/W	CON	Total	Prior	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
SHOPP - ADVANCE CONSTRUCTION			1,260	1,260		1,260						1,260
ORA001104 Total			1,260	1,260		1,260						1,260

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	Signage Begin	Signage End	System	Conformity Category	Amendment
ORA001105	Orange	SCAB		REG0701	SHP01	999					S	EXEMPT - 93.126	0
Description:							PTC	129,561			Agency	CALTRANS	

Grouped Projects for Safety Improvements - SHOPP Mobility Program. Scope: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 and Table 3 categories - Railroad/highway crossing, Safer non-Federal-aid system roads, Shoulder imp, traffic control devices ops assistance.Intersection signalization projects, Pavement marking demo,Lighting

Fund	ENG	R/W	CON	Total	Prior	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
SHOPP - ADVANCE CONSTRUCTION			129,561	129,561		10,204	119,357					129,561
ORA001105 Total			129,561	129,561		10,204	119,357					129,561

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	Signage Begin	Signage End	System	Conformity Category	Amendment
ORA001108	Orange	SCAB		REG0701	SHP04	999					S	EXEMPT - 93.126	0
Description:							PTC	27,796			Agency	CALTRANS	

Grouped Projects for Safety Improvements - SHOPP Mandates Program. Scope: Projects are consistent with 40 CFR Part 93.126 Exempt Tables 2 and Table 3 categories - Railroad/highway crossing, Safer non-Federal-aid system roads, Shoulder imp, traffic control devices and ops assistance other than signalization projects, Lighting imp

Fund	ENG	R/W	CON	Total	Prior	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
SHOPP - ADVANCE CONSTRUCTION			27,796	27,796		7,165	20,631					27,796
ORA001108 Total			27,796	27,796		7,165	20,631					27,796

Appendix B. Summary of Forecast Travel Activities

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South Bound State Route 133 Traffic Activity Summary - 2018 Base Year

Link ID	Lane type	Description	Post Mile	Truck Vol Night	Truck Vol Night	Speed Night	Total AM Peak	Truck Vol AM Peak	Speed AM Peak	Total Vol Midday	Truck Vol Midday	Speed Midday	Total Vol PM Peak	Truck Vol PM Peak	Speed PM Peak	Road Length	Road Type
Link1	MF	Junction SB 133 & SB I5 connector to Junction SB133 & Barranca Pkway	M9.23	4490	202	65	6390	288	65	8950	403	65	6750	304	65	0.35	Freeway
Link2	MF	Junction SB133 & Barranca Pkway to Junction SB133 & NB I405 connector	8.88	5310	239	65	6710	302	64	10890	490	65	9840	443	64	0.21	Freeway
Link3	MF	Junction SB133 & NB I405 connector tounction at SB 133 off ramp and 133 off ramp at the connector	8.67	2000	90	45	2840	128	42	4450	200	44	3700	167	42	0.45	Freeway

South Bound State Route 133 Traffic Activity Summary - 2024 No Build

Link ID	Lane type	Description	Post Mile	Total Vol Night	Truck Vol Night	Speed Night	Total AM Peak	Truck Vol AM Peak	Speed AM Peak	Total Vol Midday	Truck Vol Midday	Speed Midday	Total Vol PM Peak	Truck Vol PM Peak	Speed PM Peak	Length mi	Road Type
Link1	MF	Junction SB 133 & SB I5 connector to Junction SB133 & Barranca Pkway	M9.23	4860	219	65	7300	329	64	9780	440	65	7610	342	65	0.35	Freeway
Link2	MF	Junction SB133 & Barranca Pkway to Junction SB133 & NB I405 connector	8.88	5680	256	65	7620	343	64	11720	527	65	10700	482	63	0.21	Freeway
Link3	MF	Junction SB133 & NB I405 connector tounction at SB 133 off ramp and 133 off ramp at the connector	8.67	2210	99	45	3330	150	38	5010	225	43	4180	188	40	0.45	Freeway

South Bound State Route 133 Traffic Activity Summary - 2024 Build Alternative 1

Link ID	Lane type	Description	Post Mile	Total Vol Night	Truck Vol Night	Speed Night	Total AM Peak	Truck Vol AM Peak	Speed AM Peak	Total Vol Midday	Truck Vol Midday	Speed Midday	Total Vol PM Peak	Truck Vol PM Peak	Speed PM Peak	Length mi	Road Type
Link1	MF	Junction SB 133 & SB I5 connector to Junction SB133 & Barranca Pkway	M9.23	4860	219	65	7300	329	65	9780	440.00	65	7610	342.00	65	0.35	Freeway
Link2	MF	Junction SB133 & Barranca Pkway to Junction SB133 & NB I405 connector	8.88	5680	256	65	7620	343	45	11720	527.00	65	10700	482.00	45	0.21	Freeway
Link3	MF	Junction SB133 & NB I405 connector tounction at SB 133 off ramp and 133 off ramp at the connector	8.67	2210	99	45	3330	150	45	5010	225.00	45	4180	188.00	45	0.45	Freeway

South Bound State Route 133 Traffic Activity Summary - 2044 No Build

Link ID	Lane type	Description	Post Mile	Total Vol Night	Truck Vol Night	Speed Night	Total AM Peak	Truck Vol AM Peak	Speed AM Peak	Total Vol Midday	Truck Vol Midday	Speed Midday	Total Vol PM Peak	Truck Vol PM Peak	Speed PM Peak	Length mi	Road Type
Link1	MF	Junction SB 133 & SB I5 connector to Junction SB133 & Barranca Pkway	M9.23	6440	290	65	11240	506	53	13340	600	65	11320	509	63	0.35	Freeway
Link2	MF	Junction SB133 & Barranca Pkway to Junction SB133 & NB I405 connector	8.88	7260	327	65	11560	520	51	15280	688	64	14410	648	56	0.21	Freeway
Link3	MF	Junction SB133 & NB I405 connector tounction at SB 133 off ramp and 133 off ramp at the connector	8.67	3120	140	45	5610	252	16	7520	338	37	6320	284	25	0.45	Freeway

South Bound State Route 133 Traffic Activity Summary - 2044 Build Alternative 1

Link ID	Lane type	From	Post Mile	Total Vol Night	Truck Vol Night	Speed Night	Total AM Peak	Truck Vol AM Peak	Speed AM Peak	Total Vol Midday	Truck Vol Midday	Speed Midday	Total Vol PM Peak	Truck Vol PM Peak	Speed PM Peak	Length mi	Road Type
Link1	MF	Junction SB 133 & SB I5 connector to Junction SB133 & Barranca Pkway	M9.23	6440	290	65	11240	506	61	13340	600	65	11320	509	64	0.35	Freeway
Link2	MF	Junction SB133 & Barranca Pkway to Junction SB133 & NB I405 connector	8.88	7260	327	65	11560	520	60	15280	688	65	14410	648	62	0.21	Freeway
Link3	MF	Junction SB133 & NB I405 connector tounction at SB 133 off ramp and 133 off ramp at the connector	8.67	3120	140	45	5610	252	42	7520	338	45	6320	284	43	0.45	Freeway

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Appendix C. Interagency Consultation Documentation

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PM Hot Spot Analysis Project Lists

Review of PM Hot Spot Interagency Review Forms

October, 2019	Determination
LA0G1457 October 2019	Not a POAQC - Hot Spot Analysis Not Required
ORA001105 October 2019	Not a POAQC - Hot Spot Analysis Not Required
LA0G1301 October 2019	Not a POAQC - Hot Spot Analysis Not Required

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RTIP ID# *(required)* REG0701/ ORA001105

TCWG Consideration Date October 22, 2019

Project Description *(clearly describe project)*
This operational improvement project is on the South Bound (SB) State Route (Rte) 133 from SB Interstate 5 (I-5)/SB Rte 133 connector (SB I-5 Connector) to the SB Rte 133/Northbound (NB) Interstate 405 (I-405) connector (NB-I405 Connector) in the City of Irvine in South Orange County. The project extends from NB I-405 Connector (PM 8.3) to SB I-5 Connector (PM M9.3). Following are the two alternatives considered and analyzed for this project.

Alternative #1: This is the No Build Alternative.

Alternative #2 This is Build Alternative. Alternative 2 proposes to construct a new auxiliary lane (0.56 mile) on the SB Rte 133 from the SB I-5 Connector to the NB I-405 connector. This auxiliary lane will become the second lane on the NB I-405 connector. This alternative also proposes to extend the number three lane on SB Rte 133 approximately 300 feet south of the San Diego Creek to match the existing roadway pavement. This work will also construct shoulder, retaining walls and Midwest Guardrail System (MGS), widen ramps, realign Barranca Pkwy loop on ramp, and replaces light poles, drainage, disturbance and removal of vegetation and trees. Project Location is shown in the attached Figure 1.

Type of Project *(use Table 1 on instruction sheet)*
Change to existing State Highway

County	**Narrative Location/Route & Postmiles:** 12-ORA-133-PM8.3/PM9.3 **Caltrans Projects – EA#** 12-0N890
Orange12-ORA-133	

Lead Agency: Caltrans District 12

Contact Person	**Phone#**	**Fax#**	**Email**
Rabindra Bade	(657) 328 6573		Rabindra.Bade@dot.ca.g

Hot Spot Pollutant of Concern *(check one or both)* **PM2.5** × **PM10** ×

Federal Action for which Project-Level PM Conformity is Needed *(check appropriate box)*

× **Categorical Exclusion (NEPA)**	**EA or Draft EIS**	**FONSI or Final EIS**	**PS&E or Construction**	**Other**

Scheduled Date of Federal Action: 2020

NEPA Assignment – Project Type *(check appropriate box)*

Exempt	× **Section 326 –Categorical Exemption**	**Section 327 – Non-Categorical Exemption**

Current Programming Dates *(as appropriate)*

	PE/Environmental	**ENG**	**ROW**	**CON**
Start	August 2018	February 2020	April 2020	April 2022
End	April 2020	March 2022	March 2025	March 2025

Project Purpose and Need (Summary): *(attach additional sheets as necessary)*
Purpose:

The purpose of this project is to improve traffic flow on the SB Rte 133 by reducing congestion and improving operational deficiencies between the SB I-5 connector and the NB I-405 connector. In addition, this project will provide additional vehicular storage, shorten the queue length of vehicles, enhance operations, and improve safety for the drivers traveling on the SB I-5 connector and SB Rte 133 mainline during peak periods.

Need:

The segment of SB Rte 133 is operating under severe congestion during morning peak hours. The number three lane of SB Rte 133 mainline experiences long traffic queues which back up all the way to the SB I-5 connector and the SB Rte 133 mainline (north of the SB I-5 connector).

Surrounding Land Use/Traffic Generators *(especially effect on diesel traffic)*
Rte 133 is a north-south route located in the City of Irvine, in Central Orange County. This route serves as a commuter route between Riverside County and central/southern areas of Orange County. The area is urbanized in nature. Development within the project site includes Irvine Spectrum, Costco, Walmart Business Center, on the west includes other business units and Cal State Fullerton, Irvine Center. The SB Rte 133 mainline between the SB I-5 connector and NB I-405 connector is having congestion problem creating long queue on the lane number 3 of the SB Rte 133 mainline well into the SB I-5 connector. Truck represents about 4.5% of the vehicle volume.

Opening Year: Build and No Build LOS, AADT, % and # trucks, truck AADT of proposed facility
The project does not include the construction of a new highway or the expansion of an existing highway. There would be no change to vehicle volume or daily diesel vehicle volumes on the SB Rte 133.

RTP Horizon Year / Design Year: Build and No Build LOS, AADT, % and # trucks, truck AADT of proposed facility
The project does not include the construction of a new highway or the expansion of an existing highway. There would be no change to vehicle volume or daily diesel vehicle volumes on the SB Rte 133.

Opening Year: If facility is an interchange(s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT

Table#1 AADT and Truck volume in Base year (2018, Opening year (2024) and Design year (2044)

Scenario	Road Segment	Type	Base year 2018		Opening year 2024		Design year 2044	
			Total	Truck #	Total	Truck #	Total	Truck #
SB Rte 133	SB Rte 133/SB I-5 connector-SB Rte 133/Barranca Parkway	ML	26,580	1,196	29,530	1,329	42,300	1,904
SB Rte 133	SB Rte 133/Barranca Parkway to SB Rte 133/NB I-405 connector	ML	32,750	1,474	35,700	1607	48,470	2,181
SB Rte 133	SB Rte133/NB I-405 connector to the Ramp	Ramp	12,990	585	14,710	662	22,450	1,010

Table 1 shows AADT and truck volumes for the base year (2018), Opening year (2024) and the design year (2044). Implementation of the project would not change percentage of trucks travelling on roadways throughout the project area and would not have effect on SB Rte 133. The project would not increase vehicle or truck traffic along the road segments. Truck percent in this project is 4.5%.

RTP Horizon Year / Design Year: If facility is an interchange (s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT

Table#2 LOS in Base year (2018, Opening year (2024) and Design year (2044)

Scenario	Road Segment	Type	Base Year 2018		No Build Opening Year 2024		Build Opening Year 2024		No Build Design Year 2044		Build Design Year 2044	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
SB Rte 133	SB Rte 133/SB I-5 connector-SB Rte 133/Barranca Parkway	ML	B	A	B	B	B	A	C	B	C	B
SB Rte 133	SB Rte 133/Barranca Parkway to SB Rte 133/NB I-405 connector	ML	B	B	B	B	B	B	C	C	C	C
SB Rte 133	SB Rte133/NB I-405 connector to the Ramp	Fwy Ramp	D	C	D	D	B	B	F	E	C	C

Table 2 shows LOS for the base year (2018), Opening year (2024) and the design year (2044). LOS in the Build condition is better than the no Build condition in the AM and PM peak hours in the design year 2044.

Describe potential traffic redistribution effects of congestion relief *(impact on other facilities)*
Adding an auxiliary lane on the SB Rte 133 and an additional lane on the NB I-405 connector improve flow of vehicle on the SB 133 and I405 connector, as a result congestion on the SB Rte 133 mainline will be reduced. It eventually improves vehicle safety by improving mobility of the vehicles.

Comments/Explanation/Details *(attach additional sheets as necessary)*
Located in the nonattainment area for federal PM2.5 standards and within an attainment/maintenance area for the federal PM10 standards. Therefore, per 40 CFR Part 93 hot-spot analysis are required for conformity purposes. However, the EPA does not require hot-spot analyses, qualitative or quantitative, for projects that are not listed in section 93.123 (b)(1) as an air quality concern.

According to 40 CFR Part 93.123 (b) (1), the following are Projects of Air Quality Concern:

i. New highway projects that have a significant number of diesel vehicles, and expanded highway project that have a significant increase in the number for diesel vehicles;

ii. Projects affecting intersections that are at a level of Service D, E, or F with a significant number of diesel vehicles or those that will change to Level of Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;

iii. New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;

iv. Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and

v. Project in or affecting locations, areas or categories of sites which are identified in the PM2.5 and PM10 applicable implementation plan or implementation plan submission, as appropriate as sites of violation or possible violation.

The project does not quality as a Project of Air Quality Concern (POAQC) because of the following reasons:

i. The proposed Project is not a new or expanded highway project. The proposed Project would reduce traffic congestion at the SB Rte 133 mainline and NB I-405 connector and reduce queuing without increasing capacity. Truck volume would not exceed 10,000 average daily truck trip criteria for a POAQC.

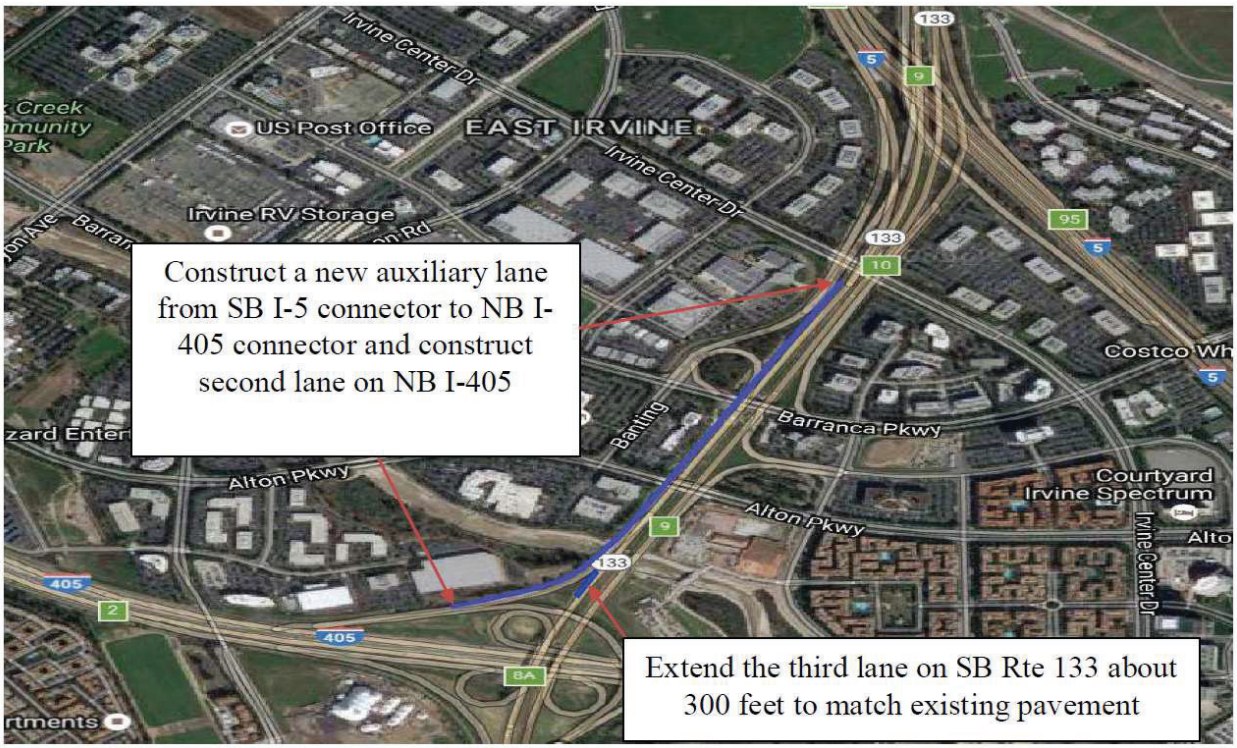
ii. The LOS conditions in the project with and without the project are shown in Table 2. LOS is improved in the project area (LOS of C or better in the Design Year Build Scenario) and the project would not result in a significant increase in the number of diesel vehicles in the project limits.

iii. The proposed build alternative does not include the construction of a new bus or rail terminal.

iv. The proposed build alternative does not expand an existing bus or rail terminal.

v. The proposed build alternative is not in or affection locations, areas, or categories of sites that are identified in the PM2.5 and PM10 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Therefore, the proposed Project meets the CAA requirements and 40 CFR 93.116 without any explicit hot-spot analysis. The proposed Project would not create a new, or worsen an existing, PM10 or PM2.5 violation. Therefore, the project would not be considered a Project of Air Quality Concern under this criterion.



Build Alternative New Auxiliary lane from SB Rte 133/SB I-5 connector to SB Rte 133/ NB I-405 connector and construct second lane on SB Rte 133/ NB I-405 Connector

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Appendix D. Construction Emissions Calculation

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PROJECT: SB Rte 133 Traffic Operation Improvement Project

PROJECT INFORMATION

Project Start Date (mm/dd/yy)	06/01/22	
Road Type	Freeway	
Project Length	1.0	(miles)

Project Type	Mainline Improvements
Construction Cost	$14,926,000
Estimated Working Days	428

Operation	Start Dates (mm/dd/yy)	Length of Operations (working days)	Daily Disturbed Areas (acres)	
			Optional Input	Default
Land Clearing/Grubbing	06/01/22	15		0.77
Roadway Excavation & Removal	06/22/22	40		0.29
Structural Excavation & Removal	08/17/22	30		0.38
Base/Subbase/Imported Borrow	09/28/22	66		0.17
Structural Concrete	12/29/22	198		
Paving	10/03/23	15		
Drainage/Environment/Landscaping	10/24/23	44		
Traffic Signalization/Signage/Striping/Painting	12/25/23	10		
Other Operations	01/08/24	10		

Total Working Days (calculated)	428	working days

Painting and Asphalt Application

Painting	Water-Based Coating		(gallons)
	Solvent-Based Coating		(gallons)
Cutback Asphalt	Total Weight		(tons)
	Diluent Content	35	(%)

FLEET INFORMATION

Off-Road Engine Emission Standards	Default	
Are signal boards battery or solar-powered?	Yes	
Distance per round-trip (heavy-duty trucks)	20	(miles)
Distance per round-trip (light-duty trucks)	1.9	(miles)
Diesel Sulfur Content	15	(ppmw)

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Appendix E. CO Flow Chart (Based on the CO Protocol)

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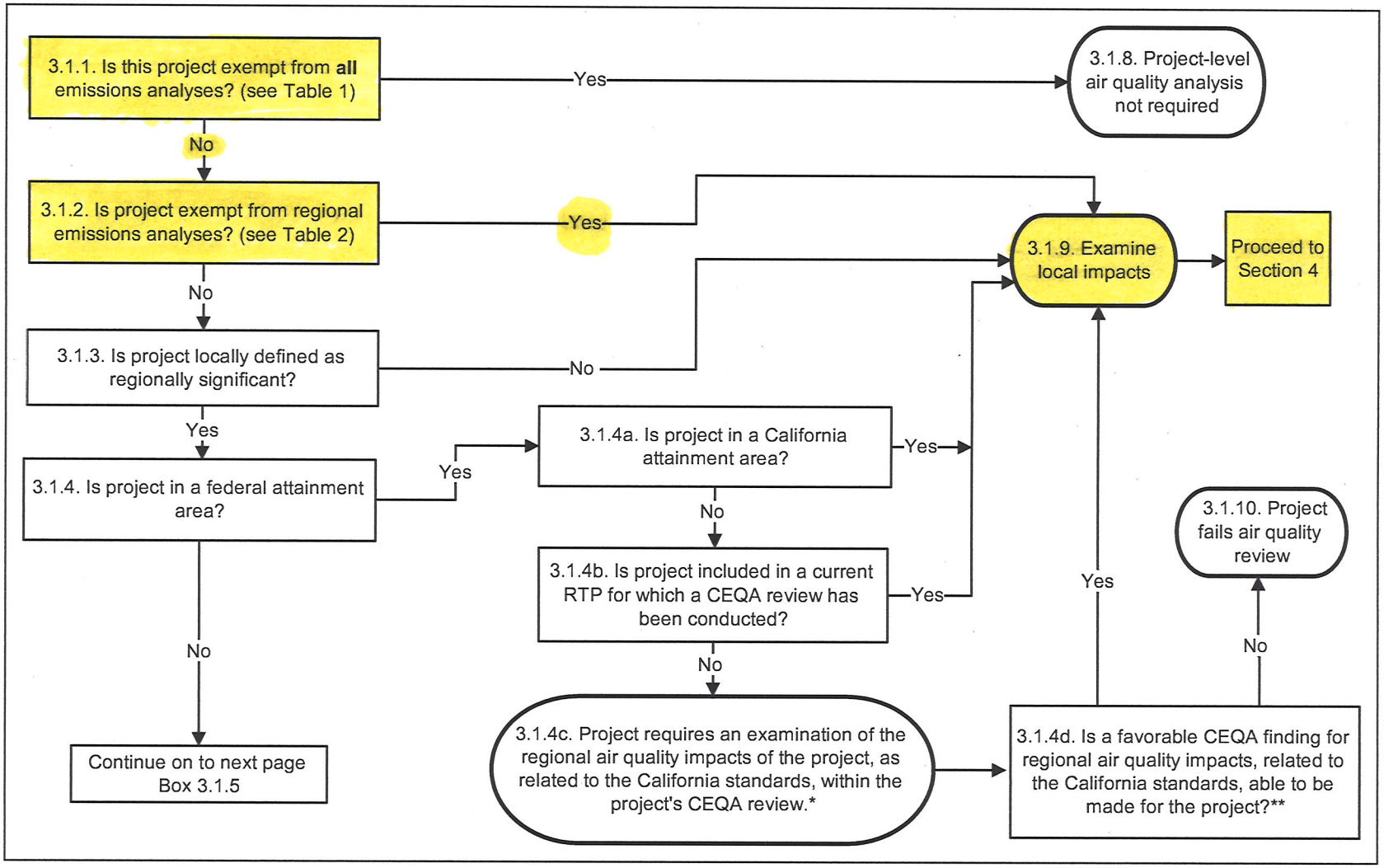

Figure 1. Requirements for New Projects

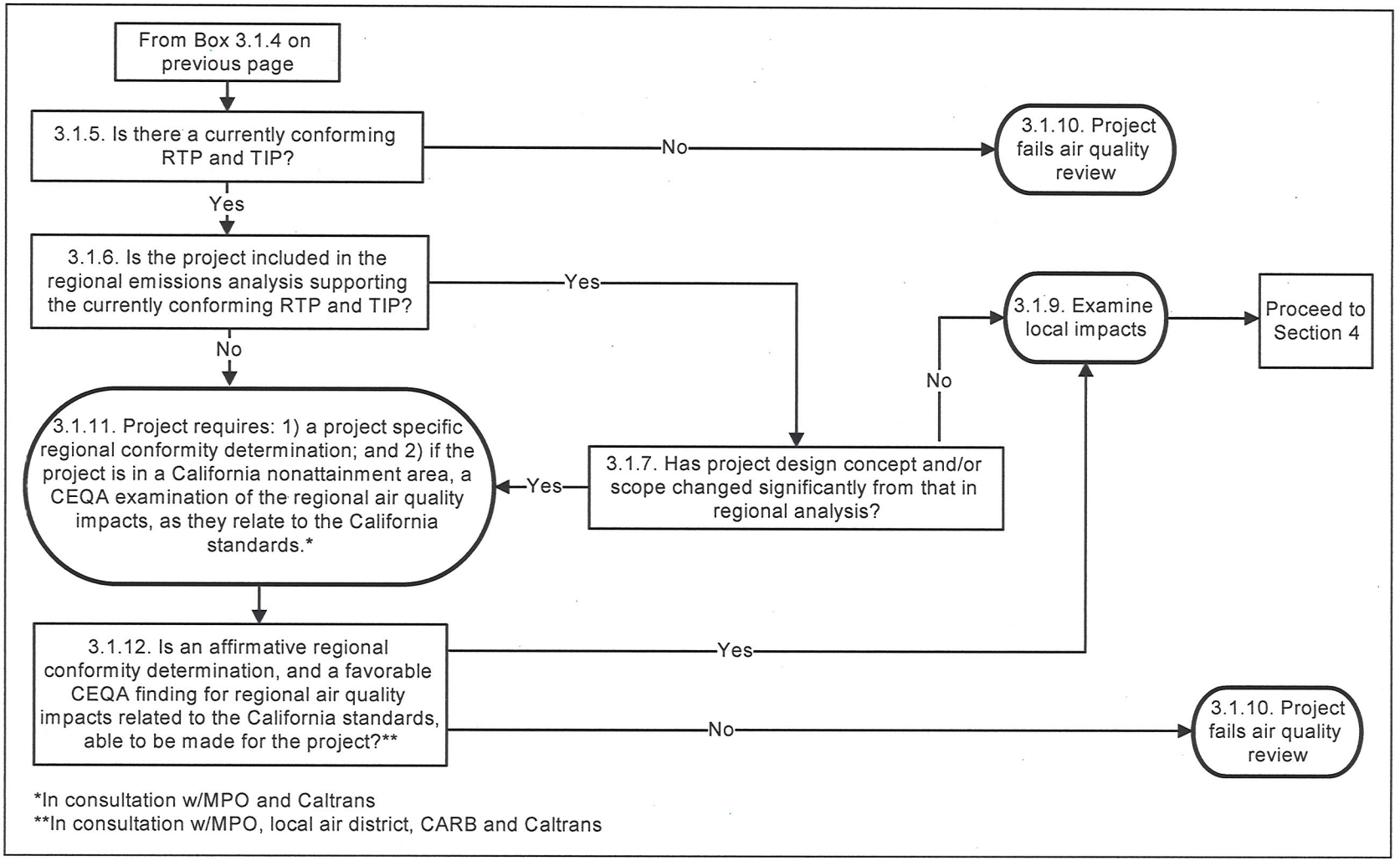

Figure 1 (cont.). Requirements for New Projects

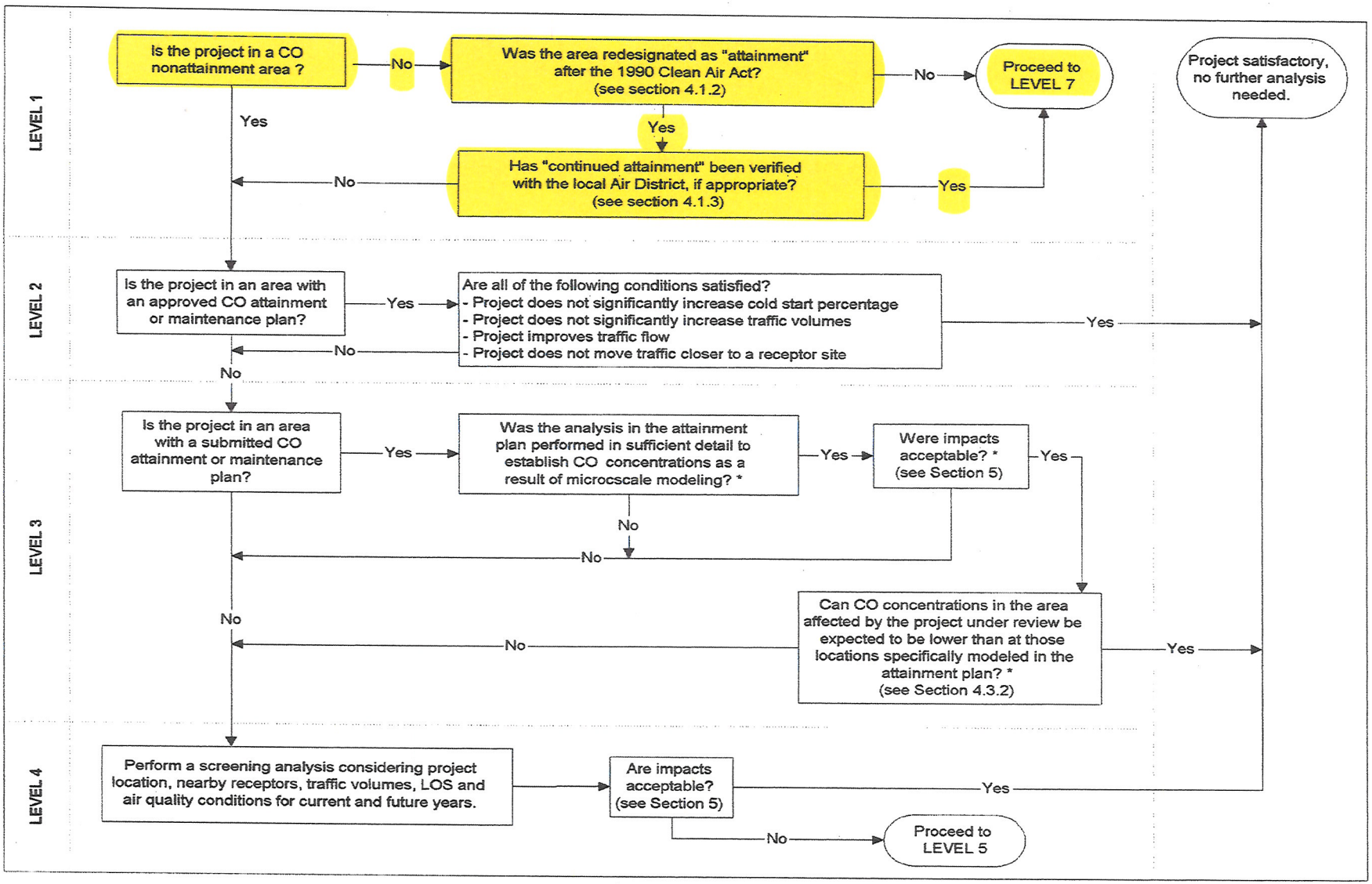

Figure 3. Local CO Analysis

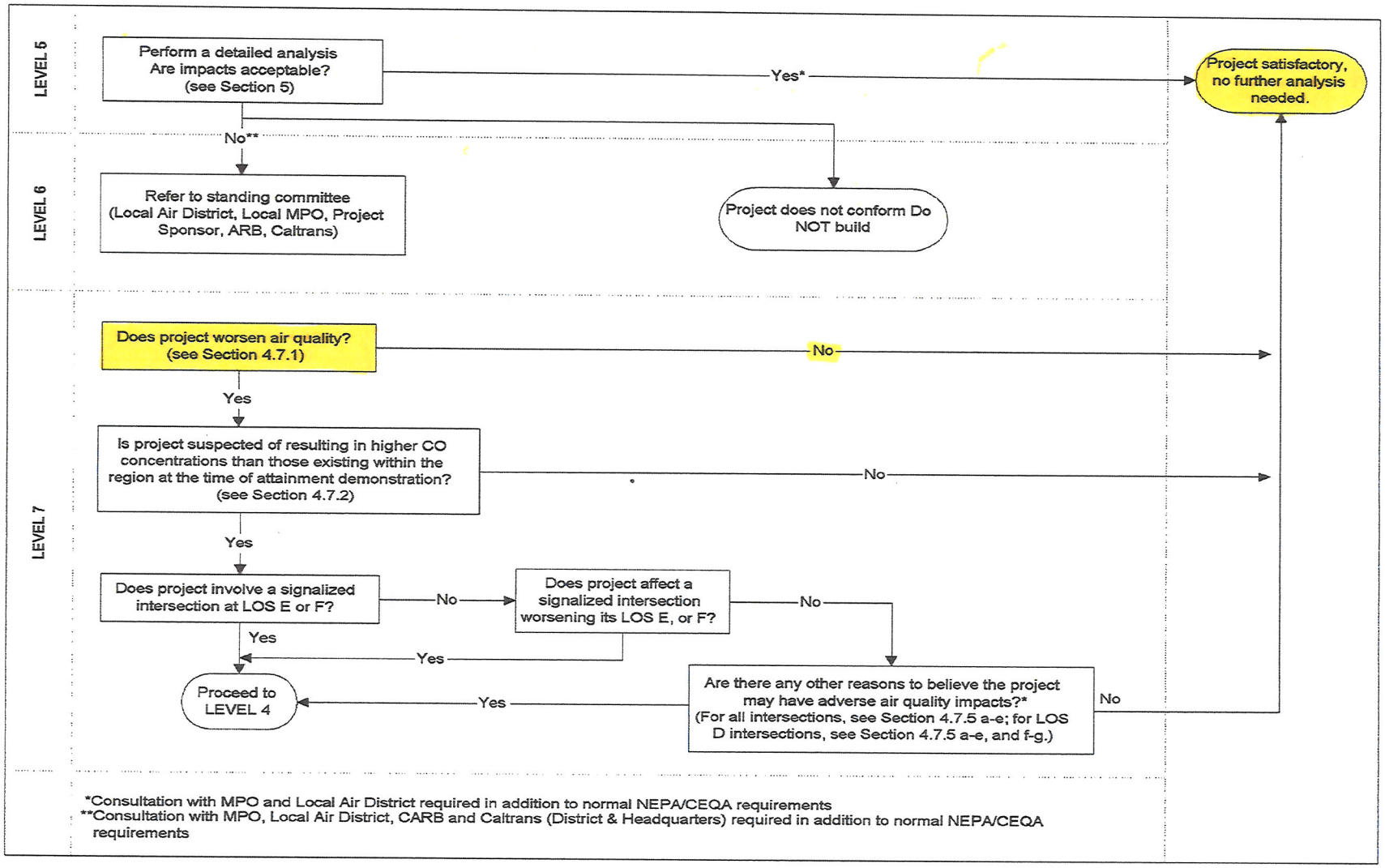

Figure 3 (cont.). Local CO Analysis

Appendix F. Summary of Operational Emissions

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Total Emissions

General

	2016 Base	2024 No Build	2024 Build	2044 No Build	2044 Build	Unit
$PM_{2.5}$	9.832E-04	9.303E-04	9.303E-04	1.151E-03	1.151E-03	tons/day
PM_{10}	3.174E-03	3.368E-03	3.368E-03	4.255E-03	4.255E-03	tons/day
NO_x	1.128E-02	3.884E-03	3.884E-03	2.782E-03	2.782E-03	tons/day
CO	3.865E-02	1.895E-02	1.895E-02	1.576E-02	1.576E-02	tons/day
HC	2.792E-03	1.530E-03	1.530E-03	1.188E-03	1.188E-03	tons/day
TOG	3.063E-03	1.641E-03	1.641E-03	1.268E-03	1.268E-03	tons/day
ROG	2.446E-03	1.251E-03	1.251E-03	8.866E-04	8.866E-04	tons/day

MSATs

1,3-Butadiene	1.029E-05	4.475E-06	4.475E-06	3.775E-06	3.775E-06	tons/day
Acetaldehyde	2.709E-05	6.292E-06	6.292E-06	5.952E-06	5.952E-06	tons/day
Acrolein	2.337E-06	1.015E-06	1.015E-06	8.407E-07	8.407E-07	tons/day
Benzene	5.755E-05	2.627E-05	2.627E-05	2.041E-05	2.041E-05	tons/day
Diesel PM	1.771E-04	3.336E-05	3.336E-05	3.753E-05	3.753E-05	tons/day
Ethylbenzene	3.448E-05	1.881E-05	1.881E-05	1.335E-05	1.335E-05	tons/day
Formaldehyde	7.053E-05	1.977E-05	1.977E-05	1.758E-05	1.758E-05	tons/day
Naphthalene	2.679E-06	1.555E-06	1.555E-06	1.216E-06	1.216E-06	tons/day
POM	2.186E-06	7.493E-07	7.493E-07	5.440E-07	5.440E-07	tons/day
DEOG	2.704E-04	3.911E-05	3.911E-05	3.631E-05	3.631E-05	tons/day

GHGs

CO_2	1.087E+01	9.754E+00	9.754E+00	9.232E+00	9.232E+00	tons/day
N_2O	5.576E-04	3.971E-04	3.971E-04	3.766E-04	3.766E-04	tons/day
CH_4	5.505E-04	4.058E-04	4.058E-04	3.998E-04	3.998E-04	tons/day
BC	5.608E-05	1.385E-05	1.385E-05	9.995E-06	9.995E-06	tons/day
HFC	1.252E-05	9.062E-06	9.062E-06	5.399E-07	5.399E-07	tons/day

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