AIR QUALITY REPORT

Interstate 15 Express Lanes Project Southern Extension

Cities of Lake Elsinore, Corona, and Unincorporated Riverside County, California

08-RIV-15-20.3/40.1
EA 08-0J0820 / ID: 08-18000063

Prepared by

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July 2022

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Interstate 15 Express Lanes Project Southern Extension

RIVERSIDE COUNTY, CALIFORNIA

CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8

EA 08-0J0820 / ID: 08-18000063

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List of Abbreviated Terms

Acronym	**Definition**
2020–2045 RTP/SCS	*Connect SoCal*
AADT	average annual daily traffic
ACM	asbestos-containing materials
ADT	average daily traffic
AQMP	Air Quality Management Plan
FCAA	Federal Clean Air Act
CAAQS	California ambient air quality standards
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCAA	California Clean Air Act
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
DPM	diesel particulate matter
ELPSE	Express Lanes Project Southern Extension
EMFAC	EMission FACtors
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GHG	greenhouse gas
GWP	global warming potential
I-15	Interstate 15
LOS	level of service
MMT	million metric tons

Acronym	**Definition**
MPO	Metropolitan Planning Organization
MSAT	mobile-source air toxic
MT	metric tons
NAAQS	National Ambient Air Quality Standards
NB	northbound
NEPA	National Environmental Protection Act
NO_2	nitrogen dioxide
NO_X	nitrogen oxide
O_3	ozone
Pb	lead
PM	Post Mile
PM_{10}	particulate matter 10 microns or less in diameter
$PM_{2.5}$	particulate matter 2.5 microns or less in diameter
POAQC	project of air quality concern
Project	I-15 Express Lanes Project Southern Extension
RCTC	Riverside County Transportation Commission
ROGs	organic gases
RTP	Regional Transportation Plan
SB	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 oxide
SR-74	State Route 74
TAC	a toxic air contaminant

Acronym	**Definition**
Transportation Conformity Guidance	*Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{10} and $PM_{2.5}$ Nonattainment and Maintenance Areas*
U.S. EPA	U.S. Environmental Protection Agency
VMT	vehicle miles traveled
VOC	volatile organic compounds

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Chapter 1 Proposed Project Description

1.1 Introduction

The Riverside County Transportation Commission (RCTC), in cooperation with the California Department of Transportation (Caltrans), is proposing to construct new lanes along Interstate 15 (I-15) between Post Mile (PM) 21.2 and PM 38.1 in Riverside County, California. The primary component of the I-15 Express Lanes Project Southern Extension (ELPSE) would be the addition of two tolled express lanes[1] in both the northbound (NB) and southbound (SB) directions within the median of I-15 from State Route 74 (SR-74) (Central Avenue) (PM 22.3) in the City of Lake Elsinore, through the unincorporated Riverside County community of Temescal Valley, to El Cerrito Road (PM 38.1) in the City of Corona, for a distance of approximately 15.8 miles (see Figures 1-1 and 1-2). The proposed Project would also add a SB auxiliary lane between both the Main Street (PM 21.2) Off-Ramp and SR-74 (Central Avenue) On-Ramp (approximately 0.75 mile) and the SR-74 (Central Avenue) Off-Ramp and Nichols Road On-Ramp (PM 23.9) (approximately one mile). Along with the lane additions, which would extend from PM 21.2 to 38.1, the Project would include widening of up to 15 bridges, potential construction of noise barriers, retaining walls, drainage systems, and implementation of electronic toll collection equipment and signs. In addition, due to the southbound express lanes access between the Cajalco Road and Weirick Road interchanges, the southbound I-15 Weirick Road Off-Ramp would be configured as a dual lane exit. Associated improvements for the toll lanes, including advance signage and transition striping, would extend approximately two miles from each end of the express lane limits to PM 20.3 in the south and PM 40.1 in the north. The proposed lane additions and supporting infrastructure are expected to be constructed primarily within the existing state right of way.

1.2 Location and Background

The project area is on the mainline segment of I-15 in southwestern Riverside County. Riverside County is in the South Coast Air Basin (SCAB), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The Southern California Association of Governments (SCAG) serves as the Metropolitan Planning Organization (MPO) and the Regional Transportation Planning Agency for the project area. Figure 1-1 shows the project vicinity and Figure 1-2 shows the project location.

This ELPSE is included in the 2021 Federal Transportation Improvement Program (FTIP) as Project ID RIV170901. It is also included in Amendment #1 to SCAG's *Connect SoCal* 2020–2045 Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) as Project ID 3160001. The FTIP and RTP listings state the following:

[1] *Express lanes* are traffic lanes that are separated from general purpose lanes, where users are charged a toll to use the lanes.

IN WESTERN RIVERSIDE COUNTY - ON I-15, ADD 2 EXPRESS LANES IN EACH DIRECTION, GENERALLY IN THE MEDIAN, FROM SR-74 (CENTRAL AVENUE) (PM 22.3) IN THE CITY OF LAKE ELSINORE TO EL CERRITO ROAD (PM 38.1) IN THE CITY OF CORONA. CONSTRUCT SOUTHBOUND AUXILIARY LANE FROM MAIN STREET (PM 21.2) TO SR-74 (CENTRAL AVENUE) (PM 22.3) AND FROM SR-74 (CENTRAL AVENUE) (PM 22.3) TO NICHOLS ROAD (PM 23.9). SIGNAGE AND TRANSITION STRIPING EXTENDS TO PM 20.3 TO THE SOUTH AND PM 40.1 TO THE NORTH.

1.3 Purpose and Need

1.3.1 Purpose

The purpose of the Project is to:

- Improve and manage traffic operations, congestion, and travel times along the corridor.
- Expand travel mode choice along the corridor.
- Provide an option for travel time reliability.
- Provide a cost-effective mobility solution.
- Expand and maintain compatibility with the express lane network in the region.

1.3.2 Need

Existing traffic volumes often exceed current highway capacity along several segments of I-15 between SR-74 (Central Avenue) and El Cerrito Road. Due to forecasted population growth and the continued development to support the projected growth in the region, the I-15 corridor is expected to continue to experience increased congestion and longer commute times that are projected to negatively affect traffic operations along the freeway mainline.

The adopted SCAG 2016 RTP Growth Forecast estimates a 36.7-percent increase in population in Riverside County between 2015 and 2040. SCAG's recently adopted *Connect SoCal* (2020–2045 RTP/SCS) Growth Forecast estimates a 38.3-percent increase in population in Riverside County between 2020 and 2045, with the number of households and employment increasing by approximately 30.5 percent and 34.02 percent, respectively. In the City of Corona, the 2020–2045 RTP/SCS Growth Forecast estimates an 11.6-percent increase in population from 2016 to 2045 and an 11.7-percent increase in households. According to the same source, the City of Lake Elsinore is projected to see a 76.8-percent increase in population. This projected growth is expected to place a high demand on existing transportation facilities and services.

\\PDCCITRDSGIS1\Projects_1\Caltrans\I15_ELPSE\Figures\Fig01_Regional_Vicinity.mxd Date: 6/16/2022 37937

Figure 1-1
Regional Vicinity
Interstate 15 Express Lanes Project Southern Extension (I-15 ELPSE)

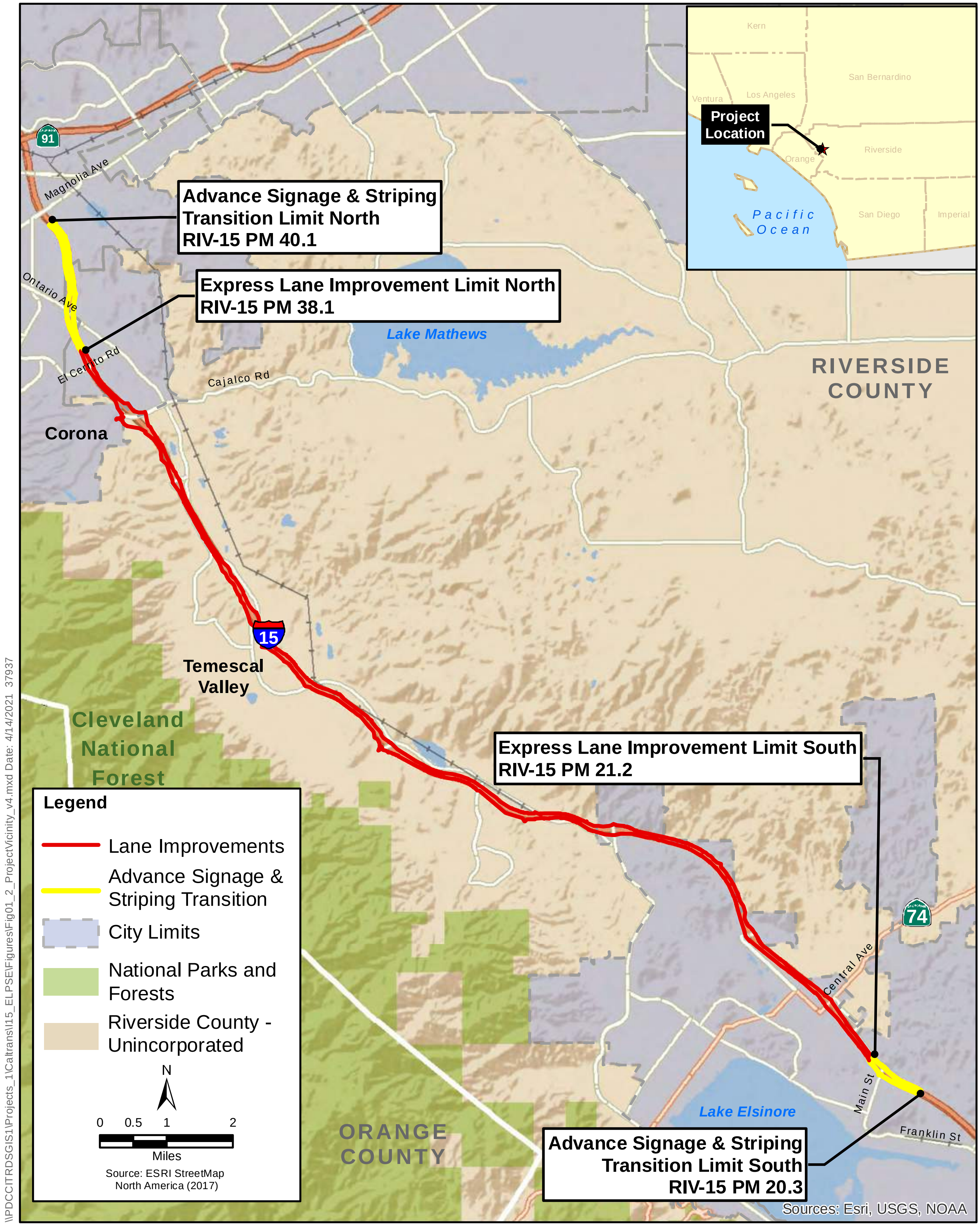

Figure 1-2
Project Location
Interstate 15 Express Lanes Project Southern Extension (I-15 ELPSE)

Currently, north–south mobility options for motorists are limited through this portion of Riverside County. Besides local streets, the only parallel route for motorists is Interstate 215, which is over 10 miles east of I-15 and generally serves a different region within Riverside County. As demonstrated in the traffic analyses performed for the Project, NB I-15 currently operates at an unacceptable level of service (LOS)[2] (i.e., LOS E or F) during the AM or PM peak hour along six out of the 15 segments evaluated between the Cajalco Road Off-Ramp and the Indian Truck Trail On-Ramp. This is projected to climb to eight of 18 segments evaluated by 2030 between the El Cerrito Road On-Ramp and the Indian Truck Trail On-Ramp, and to 19 of 20 locations evaluated within the project limits by 2050. SB I-15 currently operates at an unacceptable LOS (i.e., LOS E or F) during the AM and/or PM peak periods at three of 15 mainline segment locations evaluated between the El Cerrito Road Off-Ramp and the Weirick Road/Dos Lagos Drive Off-Ramp. This is projected to increase to five locations by 2030, and then decrease to four locations by 2050, also between the El Cerrito Road Off-Ramp and the Weirick Road/Dos Lagos Drive Off-Ramp.

The expected increase in congestion during peak periods and worsening traffic conditions, particularly during AM and PM peak periods, are expected to result in additional local and regional traffic congestion. Existing heavy peak-period congestion and traffic delays, as evidenced by the poor LOS, are expected to continue to negatively affect traffic operations along mainline I-15.

Although LOS is typically used to gauge transportation facility performance, system-wide performance metrics have become effective measurements in evaluating transportation systems. The system-wide performance measures analyzed for the corridor include number of vehicles served by the study network, total travel time/vehicle hours traveled, average delay per vehicle, and total delay/vehicle hours delay.

Based on the traffic analyses performed, NB and SB I-15 vehicle volume served is projected to continue to increase during the AM and PM peak periods from the existing year through 2050, as is the total distance traveled. In addition, the total travel time during the PM peak period in particular is anticipated to more than double by the Design Year (2050), with total travel time during the PM peak period forecasted to rise by 167 percent compared to the existing (2019) travel time condition. Furthermore, average delay per vehicle and total delay are projected to increase from Existing Year (2019) to Design Year (2050) during the AM and PM peak periods, at least tripling on both NB and SB I-15 during this timeframe.

Under Existing Conditions (2019), average speeds for NB and SB I-15 during the AM and PM peak hours are projected to decrease between the Existing Conditions (2019) and Design Year (2050) in all instances except during the PM peak hour in the SB direction. These projected reductions are most pronounced on NB I-15, ranging from a reduction of 25.5 miles per hour (mph) to 52.6 mph. The projected average delay per vehicle during this same period is expected to increase, with the NB I-15 delay projected to increase from 774 seconds and 102 seconds

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[2] The ability of a highway to accommodate traffic is typically measured in terms of LOS. Traffic flow is classified by LOS, ranging from LOS A (traffic is free flowing, with low volumes and high speeds) to LOS F (traffic volume exceeds design capacity, with forced flow and substantial delays). The LOS for signalized and unsignalized intersections is based on delay time per vehicle.

during the AM and PM peak hours, respectively, under Existing Conditions (2019), to 3,828 seconds and 6,224 seconds during the AM and PM peak hours, respectively, in the Design Year (2050).

Based on the above existing and forecasted traffic data, recurring daily congestion due to continuing population growth, development, and travel demand exceeding available highway capacity is expected to continue to result in slower travel speeds, reduced throughput, and increased travel times along mainline I-15.

1.4 Baseline and Forecast Conditions for the Build and No-Build Alternatives

RCTC is considering the Build Alternative and the No-Build Alternative. The Build Alternative would add approximately 15.8 miles of two tolled express lanes in both the NB and SB directions within the median of I-15 from SR-74 (Central Avenue) (PM 22.3) in the City of Lake Elsinore through the unincorporated Riverside County community of Temescal Valley to El Cerrito Road (PM 38.1) in the City of Corona (Figure 1-3).

Legend

- - Existing Right-of-Way (2008)

Project_Limits

Project Limits

Advance Signage/Striping Areas (PM 20.3/40.1)

Anticipated Sign Location

New Pavement Shape

Source: ESRI USA Imagery

N

0 200 400 Feet

1:4,800

Figure 1-3 - Sheet 1 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend

- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Advance Signage/Striping Areas (PM 20.3/40.1)
- Limits of Disturbance (PM 21.2/38.1)
- Anticipated Sign Location
- New Pavement Shape
- Pavement Shape
- Permanent Grading

Source: ESRI USA Imagery

N

0 200 400 Feet

1:4,800

Figure 1-3 - Sheet 2 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend

- - Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- New Pavement Shape
- Pavement Shape
- Permanent Grading

Source: ESRI USA Imagery

N

0 200 400 Feet

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Figure 1-3 - Sheet 3 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend

- - Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- BMP
- Pavement Shape
- Permanent Grading

Source: ESRI USA Imagery

N

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Figure 1-3 - Sheet 4 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend

- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- BMP
- Construction Acces_Temp Construction
- Modified BMP
- Pavement Shape
- Permanent Grading

Source: ESRI USA Imagery

N

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Figure 1-3 - Sheet 5 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Figure 1-3 - Sheet 6 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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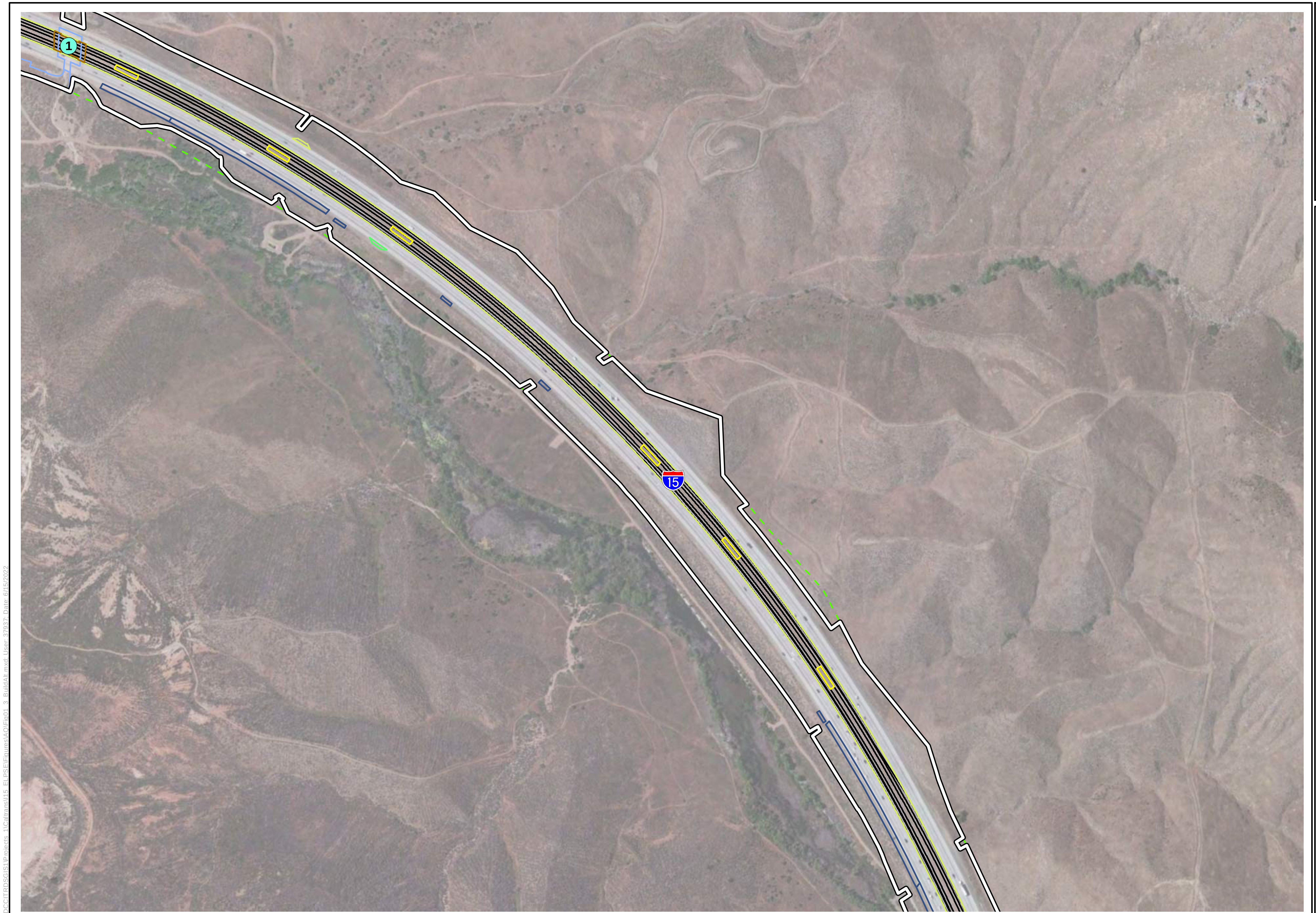

Legend

- Bridge ID
- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- BMP
- Bridge Expansion
- Construction Acces_Temp Construction
- New Pavement Shape
- Pavement Shape

Source: ESRI USA Imagery

N

0 200 400 Feet

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Figure 1-3 - Sheet 7 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend

- Bridge ID
- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- BMP
- Bridge Expansion
- Construction Acces_Temp Construction
- New Pavement Shape
- Pavement Shape

Source: ESRI USA Imagery

N

0 200 400 Feet

1:4,800

Figure 1-3 - Sheet 8 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend

- Bridge ID
- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- BMP
- Bridge Expansion
- Construction Acces_Temp Construction
- Modified BMP
- New Pavement Shape
- Pavement Shape

Source: ESRI USA Imagery

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Figure 1-3 - Sheet 9 of 26

Build Alternative Map

Interstate 15 Express Lanes Project Southern Extension

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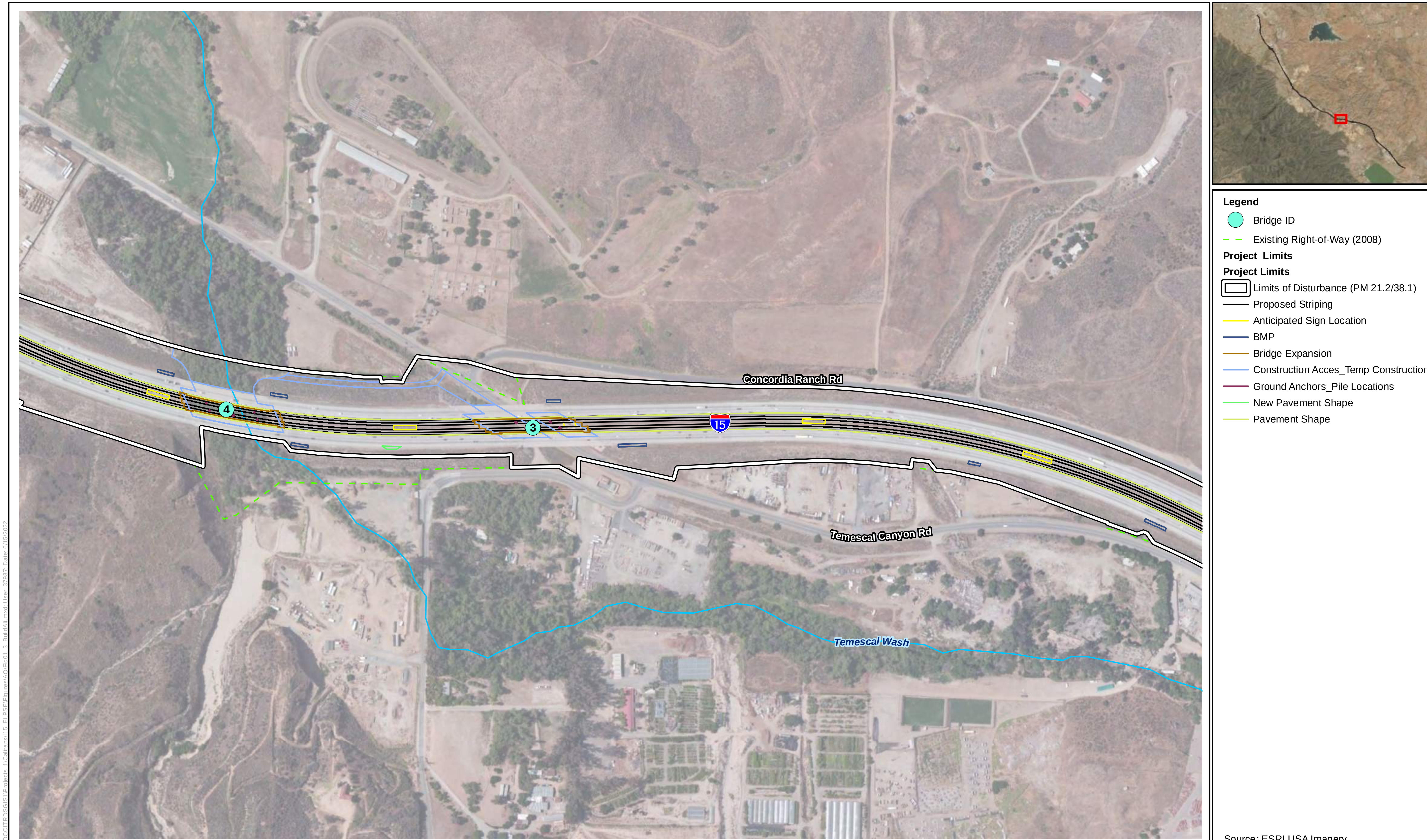

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Figure 1-3 - Sheet 10 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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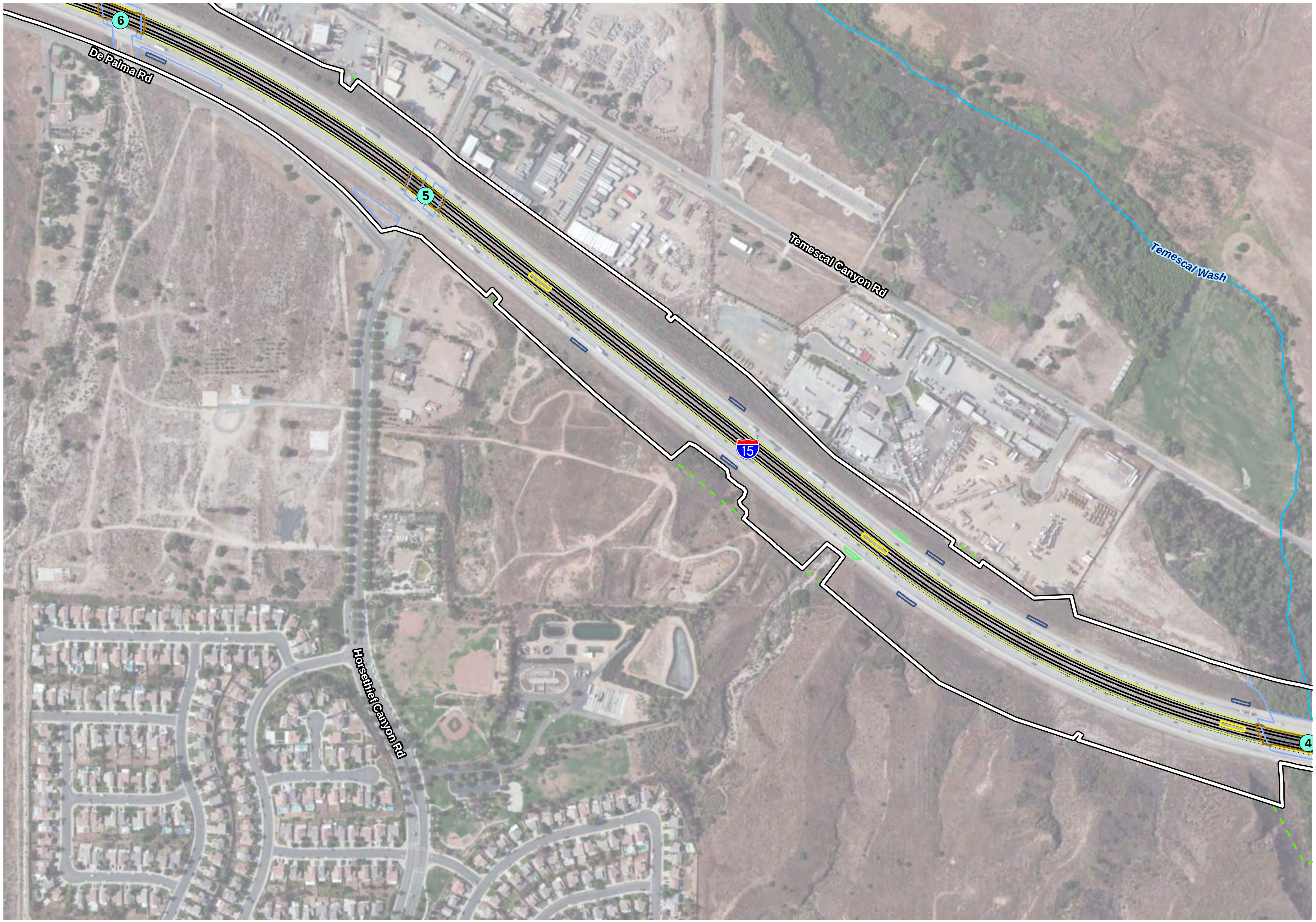

Legend

- Bridge ID
- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- BMP
- Bridge Expansion
- Construction Acces_Temp Construction
- Ground Anchors_Pile Locations
- New Pavement Shape
- Pavement Shape

Source: ESRI USA Imagery

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Figure 1-3 - Sheet 11 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Figure 1-3 - Sheet 12 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend

- Bridge ID
- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- BMP
- Bridge Expansion
- Construction Acces_Temp Construction
- Modified BMP
- New Pavement Shape
- Pavement Shape

Source: ESRI USA Imagery

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Figure 1-3 - Sheet 13 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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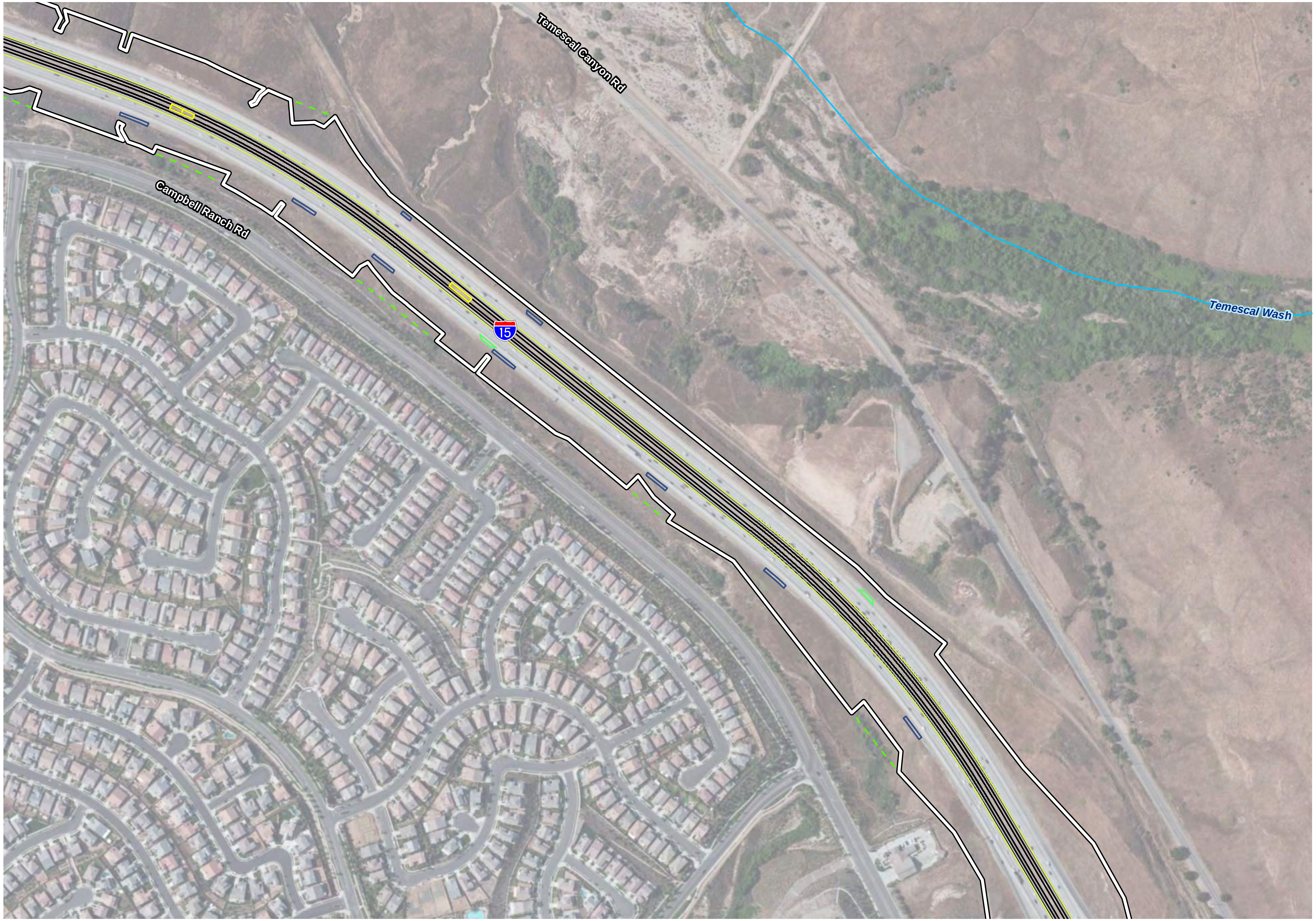

Legend

- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- BMP
- New Pavement Shape
- Pavement Shape

Source: ESRI USA Imagery

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Figure 1-3 - Sheet 14 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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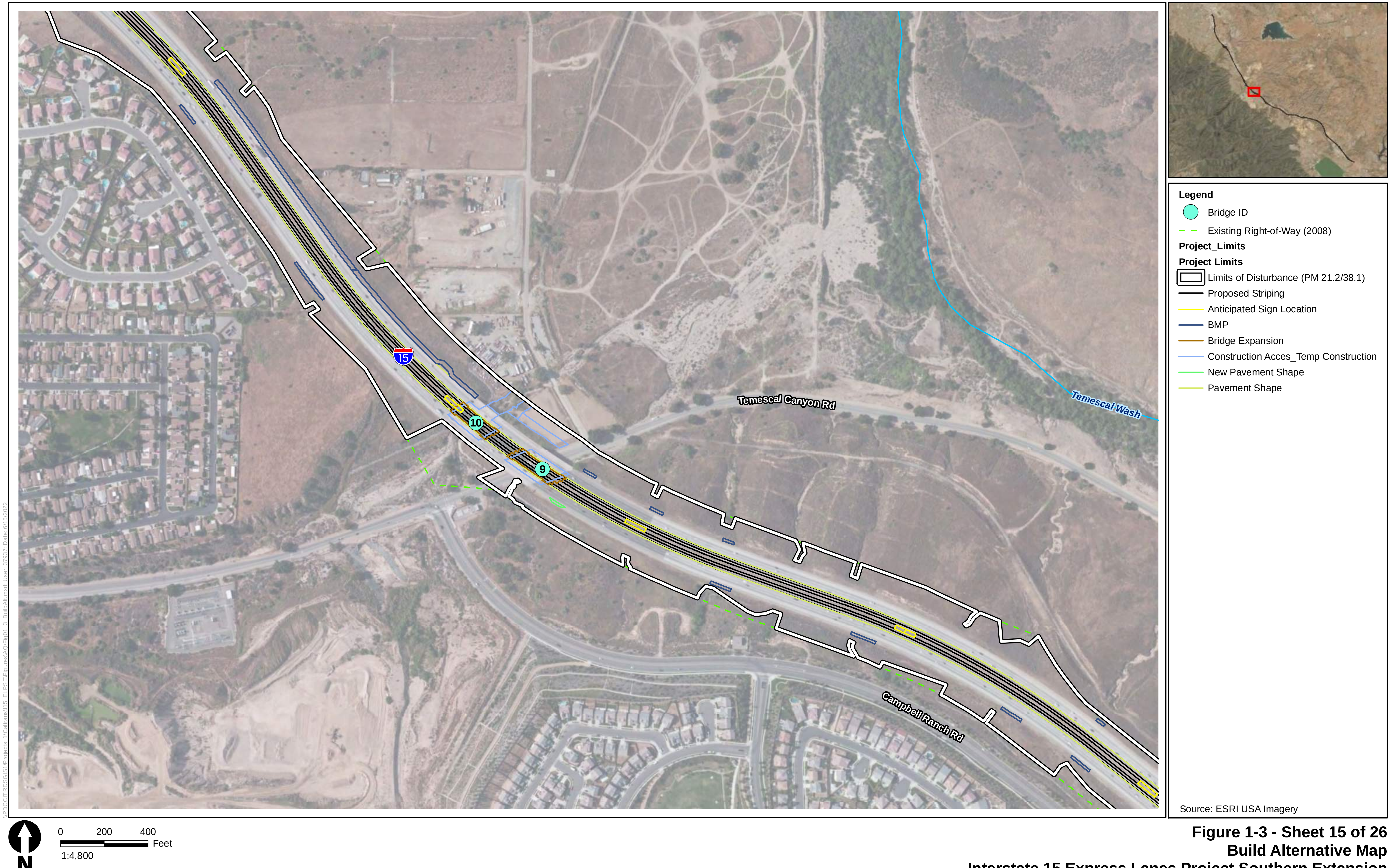

Figure 1-3 - Sheet 15 of 26
Build Alternative Map
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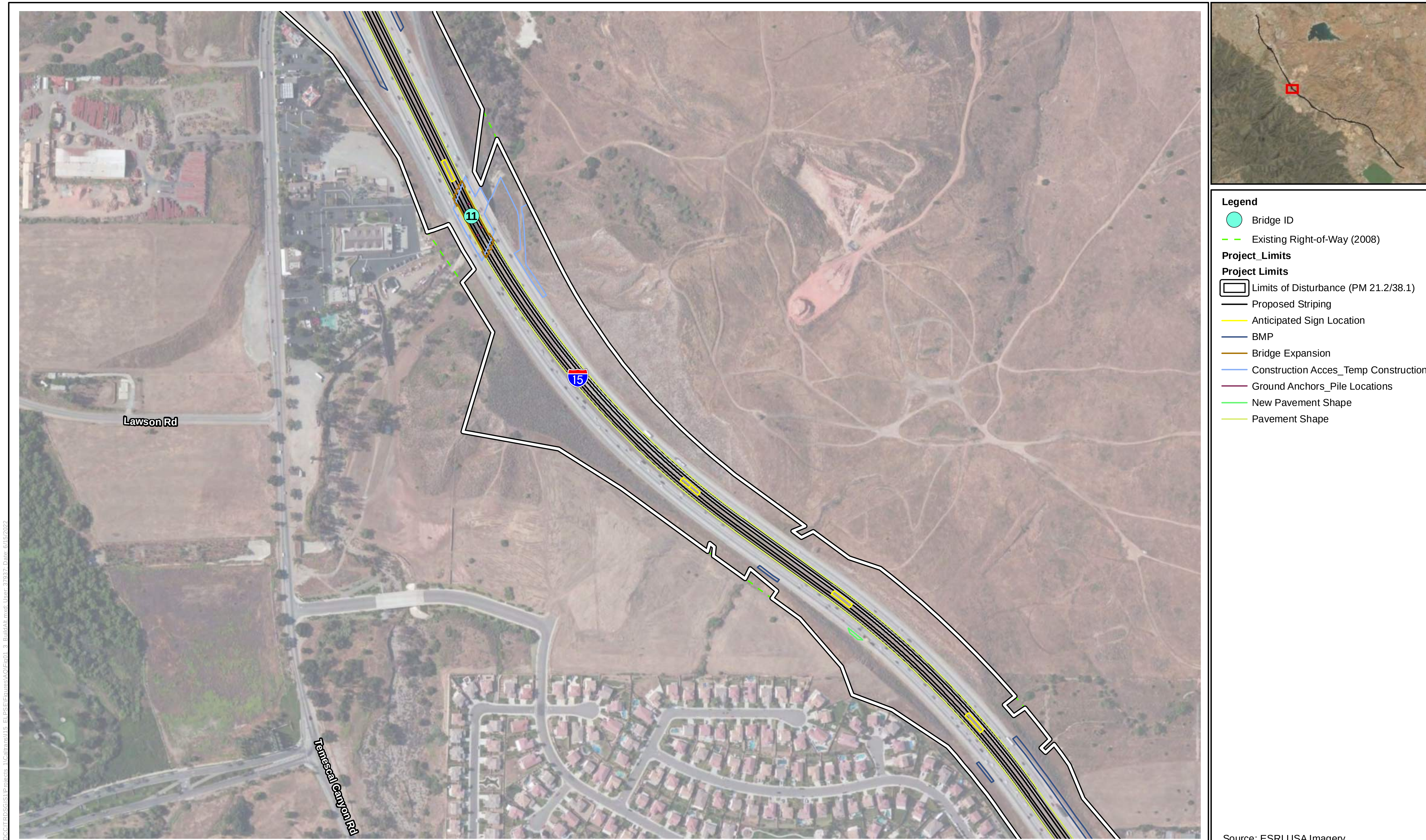

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Figure 1-3 - Sheet 16 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend

- Bridge ID
- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- BMP
- Bridge Expansion
- Construction Acces_Temp Construction
- Pavement Shape

Source: ESRI USA Imagery

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Figure 1-3 - Sheet 17 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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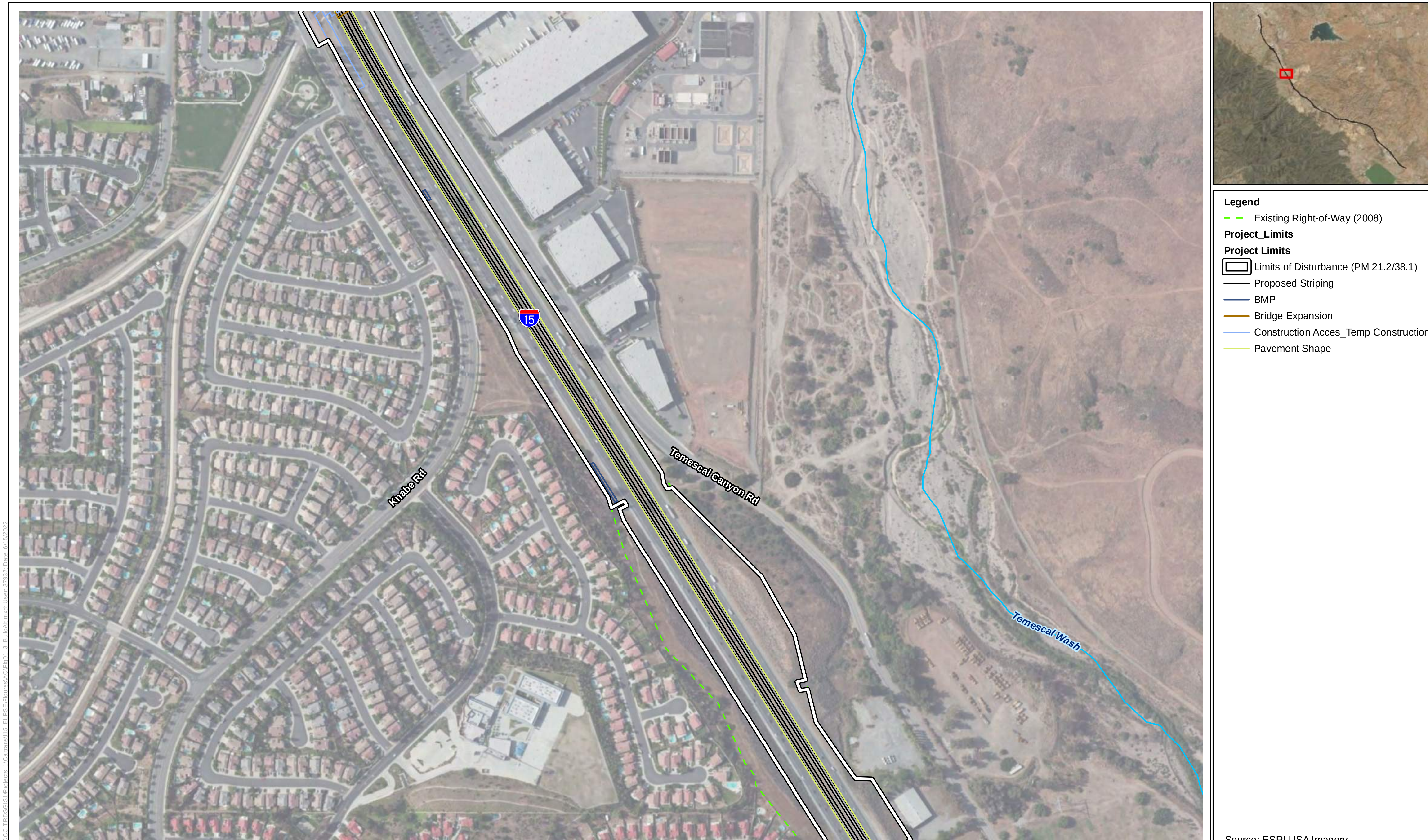

Legend

- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- BMP
- Bridge Expansion
- Construction Acces_Temp Construction
- Pavement Shape

Source: ESRI USA Imagery

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Figure 1-3 - Sheet 18 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Figure 1-3 - Sheet 19 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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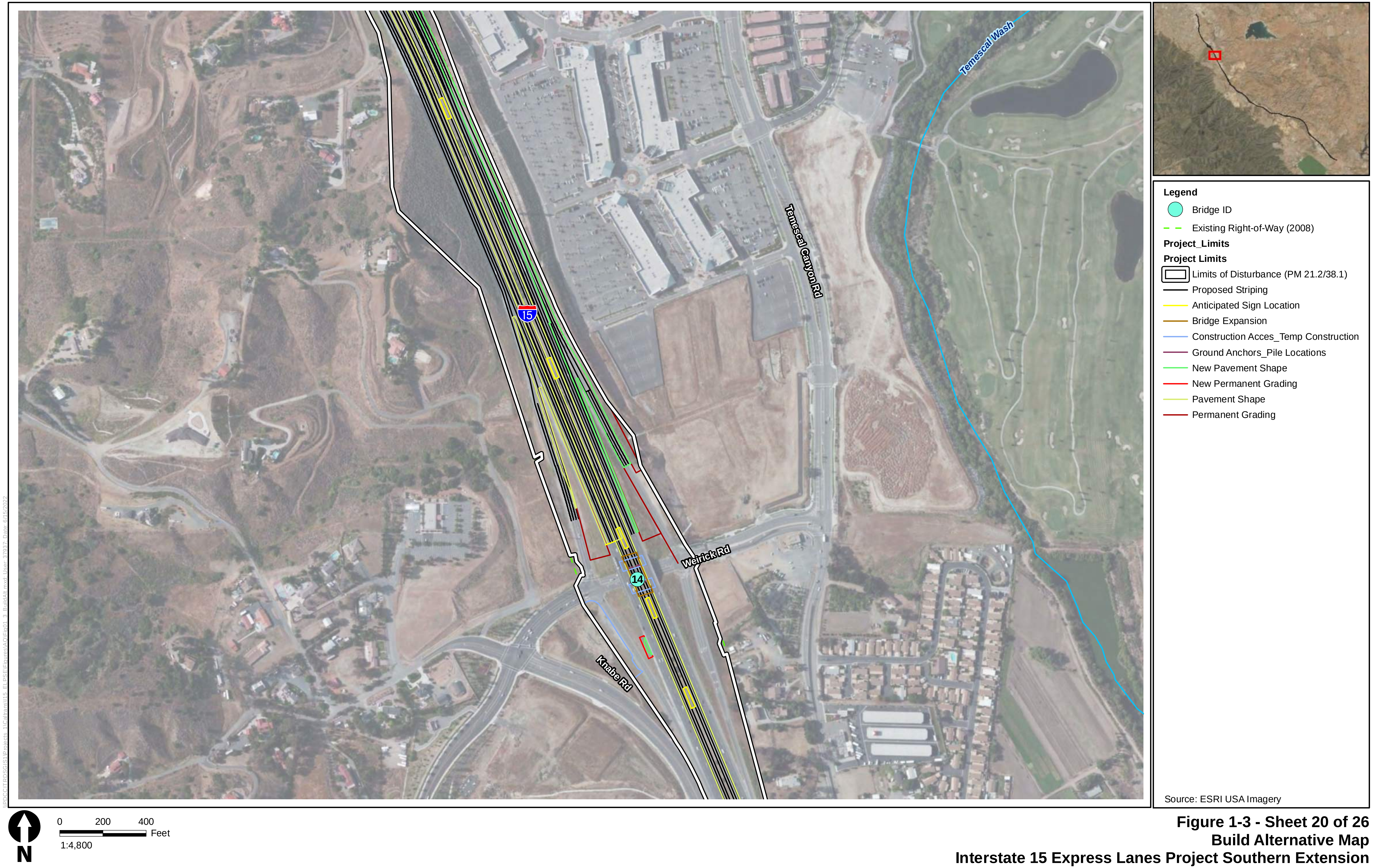

Figure 1-3 - Sheet 20 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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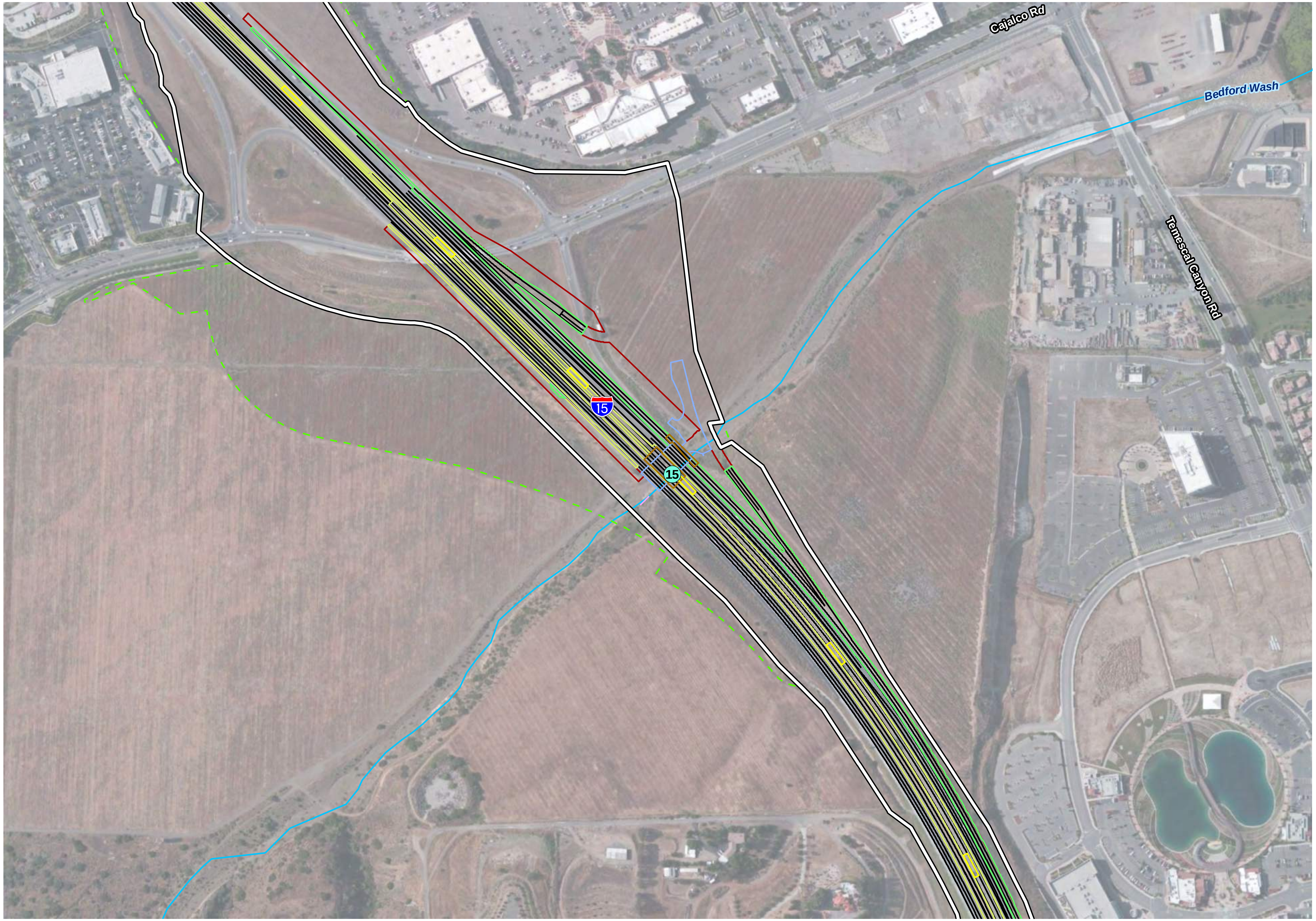

Legend

- Bridge ID
- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- Bridge Expansion
- Construction Acces_Temp Construction
- New Pavement Shape
- Pavement Shape
- Permanent Grading
- Tie Backs

Source: ESRI USA Imagery

N

0 200 400 Feet

1:4,800

Figure 1-3 - Sheet 21 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend

- Existing Right-of-Way (2008)

Project_Limits

Project Limits

- Limits of Disturbance (PM 21.2/38.1)
- Proposed Striping
- Anticipated Sign Location
- New Pavement Shape
- New Permanent Grading
- Pavement Shape
- Permanent Grading
- Revised Temporary Impact Line

Source: ESRI USA Imagery

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Figure 1-3 - Sheet 22 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend

Existing Right-of-Way (2008)

Project_Limits

Project Limits

Advance Signage/Striping Areas (PM 20.3/40.1)

Limits of Disturbance (PM 21.2/38.1)

Proposed Striping

Anticipated Sign Location

New Pavement Shape

New Permanent Grading

Pavement Shape

Source: ESRI USA Imagery

0 200 400 Feet

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Figure 1-3 - Sheet 23 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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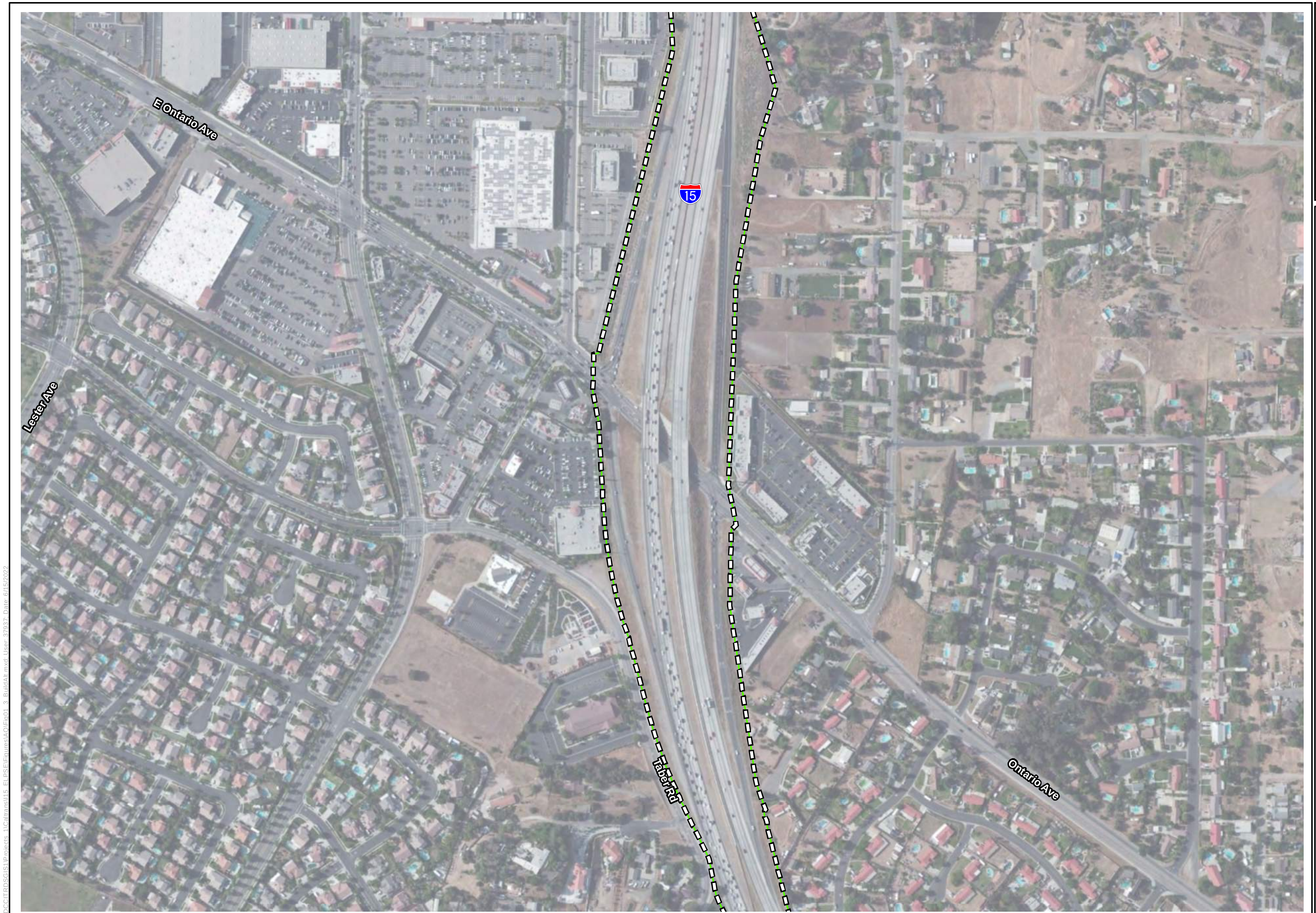

Legend

- - Existing Right-of-Way (2008)

Project_Limits

Project Limits

Advance Signage/Striping Areas (PM 20.3/40.1)

Source: ESRI USA Imagery

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0 200 400 Feet

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Figure 1-3 - Sheet 24 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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Legend
Existing Right-of-Way (2008)
Project_Limits
Project Limits
Advance Signage/Striping Areas (PM 20.3/40.1)

Source: ESRI USA Imagery

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0 200 400 Feet
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Figure 1-3 - Sheet 25 of 26
Build Alternative Map
Interstate 15 Express Lanes Project Southern Extension

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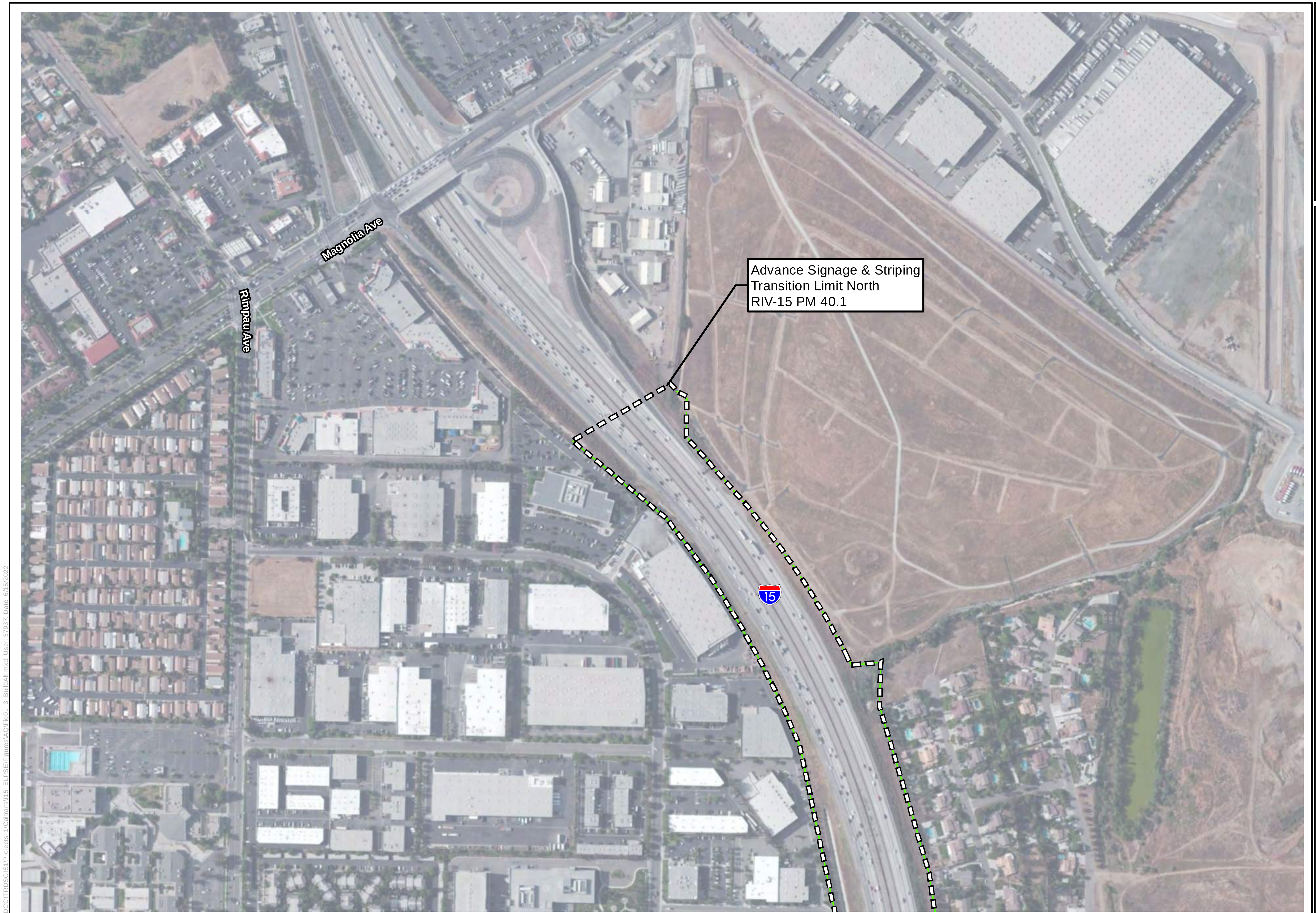

Legend

Existing Right-of-Way (2008)

Project_Limits

Project Limits

Advance Signage/Striping Areas (PM 20.3/40.1)

Source: ESRI USA Imagery

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Figure 1-3 - Sheet 26 of 26

Build Alternative Map

Interstate 15 Express Lanes Project Southern Extension

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1.4.1 Existing Roadways and Traffic Conditions

I-15 is a major north–south route that stretches from San Diego to Canada. Its southerly terminus is its intersection with I-5 in San Diego. It is also a Surface Transportation Assistance Act route for use by oversize trucks. The segment of I-15 within the project limits has three general purpose lanes in each direction and a posted speed limit of 65 miles per hour (mph). According to the Caltrans Traffic Census Program (Caltrans 2018), average annual daily traffic (AADT) through the segment ranged from 118,000 to 169,000 vehicles in 2018.

Table 1-1 shows existing (2019) traffic conditions on the mainline segment of I-15. For the purposes of this impact analysis, existing (2019) conditions serve as the baseline[3], which reflects the beginning of environmental study preparation for the proposed project.

Table 1-1. Summary of Existing (2019) Traffic Conditions

I-15 Segment	AADT		Percent Truck	Daily VMT (miles)	NB Speed during Peak Travel (mph)	SB Speed during Peak Travel (mph)	Average Speed during Off-Peak Travel
	Total	Truck			AM/PM	AM/PM	NB/SB
South of Main Street	163,241	15,248	9.3%	288,937	62/66	66/66	69/69
Main Street to SR-74	152,021	14,113	9.3%	196,107	61/65	63/55	69/68
SR-74 to Nichols Road	135,579	12,529	9.2%	212,859	64/68	63/60	69/69
Nichols Road to Lake Street	131,811	12,156	9.2%	375,661	67/68	67/65	69/69
Lake Street to Horsethief Canyon	138,414	12,808	9.3%	300,358	67/68	67/66	69/69
Horsethief Canyon to Indian Truck Trail	138,414	12,808	9.3%	211,773	67/68	67/66	69/69
Indian Truck Trail to Temescal Canyon Road	143,884	13,273	9.2%	410,069	18/68	67/62	68/69
Temescal Canyon Road to Weirick Road	146,942	13,466	9.2%	351,191	8/65	64/51	68/70
Weirick Road to Cajalco Road	166,472	15,436	9.3%	199,766	9/27	62/24	69/69
Cajalco Road to El Cerrito Road	175,671	16,490	9.4%	172,158	13/14	65/22	69/69
El Cerrito Road to Ontario Avenue	180,537	17,124	9.5%	158,873	53/61	61/18	68/69

3 The baseline is the existing condition when environmental studies were initiated for the proposed project. During the time of environmental analysis in 2019 for this project, there were on-going construction activities in the corridor at the Cajalco Road interchange and for the I-15 ELPSE. Existing Conditions (2019) do not include the I-15 ELPSE from SR-60 to Cajalco Road, because that project was not operational in 2019. However, since that time, the I-15/Cajalco Road Interchange Project and I-15 ELPSE construction projects have been completed.

I-15 Segment	AADT		Percent Truck	Daily VMT (miles)	NB Speed during Peak Travel (mph) AM/PM	SB Speed during Peak Travel (mph) AM/PM	Average Speed during Off-Peak Travel NB/SB
	Total	Truck					
Ontario Avenue to Magnolia Avenue	195,568	18,684	9.6%	320,732	18/64	68/17	69/69
Magnolia Avenue to SR-91	192,037	18,142	9.4%	220,843	17/18	67/30	68/69

Source: Fehr & Peers 2022.

AADT = annual average daily traffic; NB = Northbound; SB = Southbound; VMT = vehicle miles traveled; SR = State Route

Note: Free flow speeds not provided. Average speeds during off-peak travel estimated based off maximum speeds provided during peak hours.

1.4.2 No-Build Alternative

The No-Build Alternative consists of those transportation projects that are already planned for construction by or before 2030. Consequently, the No-Build Alternative represents future travel conditions in the I-15 ELPSE Project study area without the I-15 ELPSE project and is the baseline against which the I-15 ELPSE Build Alternatives will be assessed to meet National Environmental Protection Act (NEPA) requirements.

The No-Build Alternative consists of the existing lane configurations for the project study area. No other reconstruction or improvements would be made within the merge, basic, and diverge freeway segments. The No-Build Alternative includes those transportation projects that are already planned for construction by or before the Opening Year (2030) and Design Year (2050). Table 1-2 presents the projected No-Build Alternative traffic conditions for 2030, and Table 1-3 presents the No-Build traffic conditions for 2050.

Table 1-2. Summary of Opening-Year (2030) No-Build Traffic Conditions

I-15 Segment	AADT		Percent Truck	Daily VMT (miles)	NB Speed during Peak Travel (mph) AM/PM	SB Speed during Peak Travel (mph) AM/PM	Average Speed during Off-Peak Travel NB/SB
	Total	Truck					
South of Main Street	173,700	16,230	9.3%	307,449	67/68	63/59	69/67
Main Street to SR-74	166,000	15,440	9.3%	214,140	66/66	61/37	68/67
SR-74 to Nichols Road	149,100	13,740	9.2%	234,087	66/65	63/56	68/67
Nichols Road to Lake Street	147,900	13,610	9.2%	421,515	67/68	63/60	69/67
Lake Street to Horsethief Canyon	155,900	14,460	9.3%	338,303	67/36	64/58	68/66
Horsethief Canyon to Indian Truck Trail	155,900	14,460	9.3%	238,527	67/36	64/58	68/66

I-15 Segment	AADT Total	AADT Truck	Percent Truck	Daily VMT (miles)	NB Speed during Peak Travel (mph) AM/PM	SB Speed during Peak Travel (mph) AM/PM	Average Speed during Off-Peak Travel NB/SB
Indian Truck Trail to Temescal Canyon Road	158,700	14,650	9.2%	452,295	66/11	64/55	68/66
Temescal Canyon Road to Weirick Road	161,000	14,750	9.2%	384,790	54/9	63/47	68/66
Weirick Road to Cajalco Road	185,000	17,190	9.3%	222,000	23/9	62/26	66/66
Cajalco Road to El Cerrito Road	205,000	19,290	9.4%	200,900	51/6	62/11	68/66
El Cerrito Road to Ontario Avenue	214,200	20,340	9.5%	188,496	10/9	63/7	68/66
Ontario Avenue to Magnolia Avenue	230,500	22,000	9.5%	378,020	6/11	51/6	67/66
Magnolia Avenue to SR-91	251,500	24,020	9.6%	289,225	11/13	63/12	67/66

Source: Fehr & Peers 2022.
AADT = annual average daily traffic; NB = Northbound; SB = Southbound; VMT = vehicle miles traveled; SR = State Route
Note: Free flow speeds not provided. Average speeds during off-peak travel estimated based off maximum speeds provided during peak hours.

Table 1-3. Summary of Design-Year (2050) No-Build Traffic Conditions

I-15 Segment	AADT Total	AADT Truck	Percent Truck	Daily VMT (miles)	NB Speed during Peak Travel (mph) AM/PM	SB Speed during Peak Travel (mph) AM/PM	Average Speed during Off-Peak Travel NB/SB
South of Main Street	178,700	17,270	9.7%	316,299	5/7	63/64	69/67
Main Street to SR-74	175,900	16,940	9.6%	226,911	4/5	59/59	68/67
SR-74 to Nichols Road	158,400	15,060	9.5%	248,688	5/6	60/59	67/67
Nichols Road to Lake Street	159,000	15,150	9.5%	453,150	6/6	59/59	67/67
Lake Street to Horsethief Canyon	167,700	16,080	9.6%	363,909	7/7	62/55	66/67
Horsethief Canyon to Indian Truck Trail	171,500	16,310	9.5%	262,395	9/7	59/56	21/66
Indian Truck Trail to Temescal Canyon Road	176,600	16,720	9.5%	503,310	12/9	62/53	22/66
Temescal Canyon Road to Weirick Road	180,700	17,090	9.5%	431,873	14/8	62/54	26/66
Weirick Road to Cajalco Road	209,300	20,030	9.6%	251,160	17/11	60/35	50/66
Cajalco Road to El Cerrito Road	264,900	25,540	9.6%	259,602	52/6	55/39	66/65

I-15 Segment	AADT		Percent Truck	Daily VMT (miles)	NB Speed during Peak Travel (mph) AM/PM	SB Speed during Peak Travel (mph) AM/PM	Average Speed during Off-Peak Travel NB/SB
	Total	Truck					
El Cerrito Road to Ontario Avenue	280,600	27,030	9.6%	246,928	41/8	38/35	66/67
Ontario Avenue to Magnolia Avenue	296,400	28,610	9.7%	486,096	37/11	19/16	67/66
Magnolia Avenue to SR-91	314,500	30,520	9.7%	361,675	15/16	22/20	66/67

Source: Fehr & Peers 2022.
AADT = annual average daily traffic; NB = Northbound; SB = Southbound; VMT = vehicle miles traveled; SR = State Route
Note: Free flow speeds not provided. Average speeds during off-peak travel estimated based off maximum speeds provided during peak hours.

1.4.3 Build Alternative

The Build Alternative would add approximately 15.8 miles of two tolled express lanes in both the NB and SB directions within the median of I-15 from SR-74 (Central Avenue) (PM 22.3) in the City of Lake Elsinore, through the unincorporated Riverside County community of Temescal Valley, to El Cerrito Road (PM 38.1) in the City of Corona. Table 1-4 presents the projected traffic conditions under the Build Alternative for 2030, and Table 1-5 presents the traffic conditions for the Build Alternative for 2050.

Table 1-4. Summary of Opening-Year (2030) Build Alternative Traffic Conditions

I-15 Segment	AADT		Percent Truck	Daily VMT (miles)	NB Speed during Peak Travel (mph) AM/PM	SB Speed during Peak Travel (mph) AM/PM	Average Speed during Off-Peak Travel NB/SB
	Total	Truck					
South of Main Street	185,200	16,230	8.8%	327,804	61/62	63/28	67/67
Main Street to SR-74	178,900	15,440	8.6%	230,781	59/59	61/22	66/67
SR-74 to Nichols Road	163,200	13,740	8.4%	256,224	63/61	64/17	67/67
Nichols Road to Lake Street	161,700	13,610	8.4%	460,845	62/63	62/12	67/66
Lake Street to Horsethief Canyon	170,400	14,460	8.5%	369,768	6262	62/40	66/66
Horsethief Canyon to Indian Truck Trail	170,400	14,460	8.5%	260,712	62/62	62/40	66/66
Indian Truck Trail to Temescal Canyon Road	174,200	14,650	8.4%	496,470	61/9	63/58	66/66
Temescal Canyon Road to Weirick Road	176,500	14,750	8.4%	421,835	61/6	62/59	66/66
Weirick Road to Cajalco Road	199,500	17,190	8.6%	239,400	54/7	62/57	66/66

I-15 Segment	AADT Total	AADT Truck	Percent Truck	Daily VMT (miles)	NB Speed during Peak Travel (mph) AM/PM	SB Speed during Peak Travel (mph) AM/PM	Average Speed during Off-Peak Travel NB/SB
Cajalco Road to El Cerrito Road	222,900	19,290	8.7%	218,442	39/8	61/57	66/66
El Cerrito Road to Ontario Avenue	229,400	20,340	8.9%	201,872	20/9	60/31	63/66
Ontario Avenue to Magnolia Avenue	239,700	22,000	9.2%	393,108	7/12	55/58	64/66
Magnolia Avenue to SR-91	258,200	24,020	9.3%	296,930	13/18	63/64	65/66

Source: Fehr & Peers 2022.
AADT = annual average daily traffic; NB = Northbound; SB = Southbound; VMT = vehicle miles traveled; SR = State Route
Note: Free flow speeds not provided. Average speeds during off-peak travel estimated based off maximum speeds provided during peak hours.

Table 1-5. Summary of Design-Year (2050) Build Alternative Traffic Conditions

I-15 Segment	AADT Total	AADT Truck	Percent Truck	Daily VMT (miles)	NB Speed during Peak Travel (mph) AM/PM	SB Speed during Peak Travel (mph) AM/PM	Average Speed during Off-Peak Travel NB/SB
South of Main Street	225,300	17,270	7.7%	398,781	6/9	61/29	66/66
Main Street to SR-74	227,100	16,940	7.5%	292,959	8/9	59/19	65/67
SR-74 to Nichols Road	211,000	15,060	7.1%	331,270	5/5	62/20	65/66
Nichols Road to Lake Street	216,800	15,150	7.0%	617,880	6/5	59/12	64/66
Lake Street to Horsethief Canyon	230,400	16,080	7.0%	499,968	5/5	57/12	63/66
Horsethief Canyon to Indian Truck Trail	231,900	16,310	7.0%	354,807	6/6	58/11	60/66
Indian Truck Trail to Temescal Canyon Road	237,700	16,720	7.0%	677,445	11/8	59/15	57/66
Temescal Canyon Road to Weirick Road	242,800	17,090	7.0%	580,292	9/8	49/15	34/65
Weirick Road to Cajalco Road	275,900	20,030	7.3%	331,080	12/8	57/44	53/65
Cajalco Road to El Cerrito Road	330,700	25,540	7.7%	324,086	9/7	57/43	56/65
El Cerrito Road to Ontario Avenue	334,400	27,030	8.1%	294,272	10/8	28/19	55/65
Ontario Avenue to Magnolia Avenue	338,100	28,610	8.5%	554,484	9/11	21/12	62/65
Magnolia Avenue to SR-91	348,200	30,520	8.8%	400,430	17/16	39/13	59/65

Source: Fehr & Peers 2022.
AADT = annual average daily traffic; NB = Northbound; SB = Southbound; VMT = vehicle miles traveled; SR = State Route
Note: Free flow speeds not provided. Average speeds during off-peak travel estimated based off maximum speeds provided during peak hours.

1.4.4 Comparison of Existing/Baseline and Build Alternatives

1.4.4.1 Existing (2019)

Under Existing (2019) conditions, there are up to 176,000 daily trips and 16,500 truck trips (9.4 percent) on the mainline segments of I-15. Due to heavy commute traffic and existing construction activities in the corridor at the Cajalco Road interchange, the existing average speeds are 48.2 mph in the AM and 55.2 mph in the PM. Table 1-6 summarizes the traffic conditions along the project corridor under the Existing (2019) conditions, and under the No-Build and Build conditions in the Opening and Design Year.

Table 1-6. Summary of Long-Term Operational Impacts on Traffic Conditions of Existing, No-Build, and Build Alternatives

Scenario/ Analysis Year	Design Features	Peak AADT[1]		Truck Percentage	Average Speed AM/PM[2]
		Total	Truck		
Existing (2019)	Existing lane configurations for the I-15 study area (generally three lanes in the NB and SB direction)	175,671	16,490	9.4%	48.2/55.2
Opening-Year (2030) No-Build	Existing lane configurations	205,000	19,290	9.4%	62.0/30.1
Opening-Year (2030) Build	14.5 Mile Extension of I-15 Express Lanes from SR-74 (Central Avenue) to El Cerrito Road; SB auxiliary lanes from Nichols Road to SR-74 (Central Avenue) and from SR-74 (Central Avenue) to Main Street; widening of up to 15 bridges	222,900	19,290	8.7%	62.6/36.3
Design-Year (2050) No-Build	Existing lane configurations	264,900	25,540	9.6%	26.9/23.7
Design-Year (2050) Build	See 2030 Build Alternative	330,700	25,540	7.7%	27.0/23.3

Source: Fehr & Peers 2022.
[1] Peak AADT volumes were obtained from the ELPSE segments of the I-15 (SR-74 [Central Avenue] to El Cerrito Road).
[2] Existing (2019) condition average speeds include congestion from construction activities that have since been completed.
AADT = annual average daily traffic; ELPSE= Express Lanes Project – Southern Extension; NB = Northbound; SB = Southbound; SR = State Route

1.4.4.2 2030 Opening Year

In the Opening Year (2030) No-Build Alternative conditions, there would be up to 205,000 daily trips and 19,290 truck trips (9.4 percent) on the mainline segments of I-15 that are within the I-15 ELPSE project area. This condition would be an increase of approximately 29,000 daily trips and 2,800 truck trips from the Existing (2019) conditions. Because the construction activities existing in 2019 have since been completed, the 2030 No-Build condition's average speeds would be 62.0 mph in the AM and 30.1 mph in the PM.

In the Opening Year (2030) Build Alternative conditions, there would be up to 223,000 daily trips and 19,300 truck trips (8.7 percent) within the ELPSE segments of I-15. Under the Opening Year (2030) Build Alternative condition, there would be an increase of approximately 47,000 daily trips and 2,800 truck trips from the Existing (2019) conditions and an increase of 18,000 daily trips from the 2030 No-Build conditions. Compared to the No-Build Alternative in 2030, would be no additional truck trips under the Build Alternative in 2030. The 2030 Build condition average speeds would be 62.6 mph in the AM and 36.3 mph in the PM.

Table 1-6 summarizes the 2030 No-Build and Build traffic conditions along the project corridor.

1.4.4.3 2050 Design Year

In the Design Year (2050) No-Build Alternative conditions, there would be up to 265,000 daily trips and 25,500 truck trips (9.6 percent) within what would be the ELPSE segments of I-15. This condition would be an increase of approximately 89,000 daily trips and 9,000 truck trips from the Existing (2019) conditions. The 2050 No-Build condition's average speeds are 26.9 in the AM and 23.7 mph in the PM.

In the Design Year (2050) Build Alternative conditions, there would be up to 331,000 daily trips and 25,500 truck trips (7.7 percent) within what would be the ELPSE segments of I-15. This condition would be an increase of approximately 155,000 daily trips and 9,000 truck trips from the Existing (2019) conditions and an increase of 66,000 daily trips and zero truck trips from the 2050 No-Build conditions. The 2050 Build Alternative's average speeds are 27.0 in the AM and 23.3 mph in the PM.

Table 1-6 summarizes the 2050 No-Build and Build traffic conditions along the project corridor.

1.5 Construction Activities and Schedule

Under the Build Alternative, construction activities are anticipated to commence in 2025 and be completed by 2028. Although construction is planned to last approximately 36 months, no construction activities are anticipated to last more than five years at any individual site. Emissions from construction-related activities pursuant to 40 Code of Federal Regulations (CFR) 93.123(c)(5) are not required to be included in PM hot-spot analyses to meet conformity requirements. Tables 1-7, 1-8, and 1-9 summarize construction assumptions.

Table 1-7. General Construction Assumptions

Parameter	Assumption
Construction start year	2025
Construction duration	36 months
Soil type	Sand/gravel
Project length	16.9 miles

Parameter	Assumption
Project area	125 acres
Maximum area disturbed per day	4 acres

Table 1-8. General Phasing Assumption

Phase	Months	Import (Cubic Yards/day)	Export (Cubic Yards/day)	Daily Haul Trips	Daily Employees	Daily Water Trucks
Grubbing/land clearing	4	0	37	2	47	1
Grading/excavation	12	0	729	37	62	1
Drainage/utilities/sub-grade	12	195	272	23	55	1
Paving	8	1,903	0	95	52	1

Table 1-9. Expected Off-Road Equipment Inventory

Phase	Equipment	Number per Day	Daily Hours
Grubbing/land clearing	Crawler tractors	2	8
	Excavators	3	8
	Signal boards	4	8
Grading/excavation	Crawler tractors	2	8
	Excavators	4	8
	Graders	3	8
	Rollers	2	8
	Rubber-tired loaders	2	8
	Scrapers	2	8
	Signal boards	4	8
	Tractors/loaders/backhoes	4	8
Drainage/utilities/sub-grade	Air compressors	2	8
	Generator sets	4	8
	Graders	2	8
	Plate compactors	2	8
	Pumps	2	8
	Rough terrain forklifts	2	8
	Scrapers	2	8
	Signal boards	4	8
	Tractors/loaders/backhoes	4	8
Paving	Pavers	2	8
	Paving equipment	2	8
	Rollers	4	8
	Signal boards	4	8
	Tractors/loaders/backhoes	4	8

Chapter 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 that 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 (i.e., particulate matter 2.5 microns or less in diameter [$PM_{2.5}$] and particulate matter 10 microns or less in diameter [PM_{10}]), and sulfur dioxide (SO_2). The U.S. Environmental Protection Agency (U.S. EPA) has also identified nine priority mobile-source air toxics (MSATs): 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (DPM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter (FHWA 2016). 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 U.S. EPA to set NAAQS for six criteria air contaminants: O_3, particulate matter, CO, NO_2, 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, summarizes the sources and health effects of the criteria pollutants, and documents the project area attainment status with the standards.

2.1.2 Mobile-Source Air Toxics

Controlling air toxic emissions became a national priority with passage of the FCAA Amendments of 1990, whereby Congress mandated that U.S. EPA regulate 188 air toxics, also known as hazardous air pollutants. U.S. EPA assessed this expansive list in its rule on the control of hazardous air pollutants from mobile sources (*Federal Register*, Volume 72, No. 37, page 8430, February 26, 2007) and identified 93 compounds that are emitted from mobile sources and are part of the agency's Integrated Risk Information System (https://www.epa.gov/iris) (U.S. EPA 2019). In addition, U.S. EPA identified nine compounds in its National Air Toxics Assessment with significant contributions from mobile sources that are among the national and regional cancer risk drivers or contributors, as well as non-hazard contributors (https://www.epa.gov/national-air-toxics-assessment) (U.S. EPA 2018). These are 1,3-butadiene, acetaldehyde, acrolein, benzene, DPM, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. Although the

Federal Highway Administration (FHWA) considers these priority MSATs, the list is subject to change and may be adjusted in consideration of future U.S. EPA rules.

The 2007 U.S. EPA rule mentioned above requires controls to decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using U.S. EPA's MOVES2014 model, even if vehicle miles traveled (VMT) increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions rate for priority MSATs is projected for the same time period, as shown in Figure 2-1.

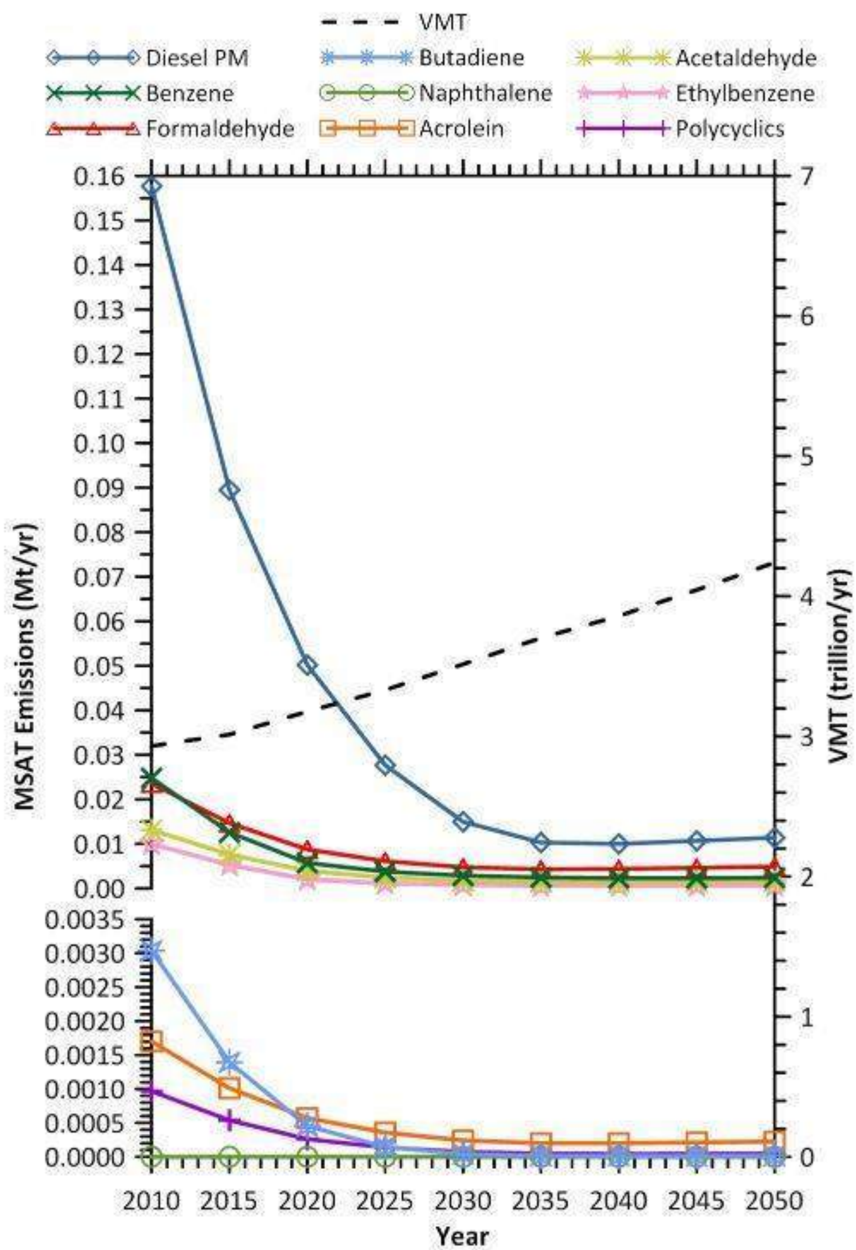

Figure 2-1. Projected National Mobile-Source Air Toxic Trends, 2010–2050
Source: FHWA 2016.

Table 2-1. Table of State and Federal Ambient Air Quality Standards, Effects, and Sources

Pollutant	Averaging Time	State[a] Standard	Federal[b] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Ozone (O_3)[c]	1 hour	0.09 ppm[d]	—	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 volatile organic compounds (VOCs) may also contribute.	Low-altitude ozone is formed almost entirely from reactive organic gases (ROGs)/VOCs as well as nitrogen oxide (NO_X) in the presence of sunlight and heat. Common precursor emitters include motor vehicle engines and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes.	Nonattainment	—
	8 hours	0.070 ppm	0.070 ppm (fourth highest in 3 years)			Nonattainment	Extreme Nonattainment
Carbon Monoxide (CO)[e]	1 hour	20 ppm	35 ppm	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO, which is colorless and odorless, also is a minor precursor for photochemical ozone.	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.	Attainment	Maintenance
	8 hours	9.0 ppm	9 ppm			Attainment	Maintenance
	8 hours (Lake Tahoe)	6 ppm	—			—	—
Respirable Particulate Matter (PM_{10})[f]	24 hours	50 μg/m^3[g]	150 μg/m^3 (expected number of days above standard less than or equal to one)	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer risk and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many toxic and aerosol and	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.	Nonattainment	Serious Maintenance
	Annual	20 μg/m^3	—[f]			Nonattainment	—

Pollutant	Averaging Time	State[a] Standard	Federal[b] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
				solid compounds are part of PM_{10}.			
Fine Particulate Matter ($PM_{2.5}$)[h]	24 hours	—	35 μg/m^3[g]	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 aerosol and solid compounds are part of $PM_{2.5}$.	Combustion, including motor vehicles, other mobile sources, and industrial activities, and residential and agricultural burning. Also formed through atmospheric chemical and photochemical reactions involving other pollutants, including NO_X, sulfur oxide (SO_X), ammonia, and ROG.	—	Serious Nonattainment
	Annual	12 μg/m^3	12.0 μg/m^3			Nonattainment	Moderate Nonattainment
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	0.100 ppm[i]	Irritating to eyes and respiratory tract. Colors atmosphere reddish brown. Contributes to acid rain and nitrate contamination of stormwater. Part of the NO_X group of ozone precursors.	Motor vehicle engines and other mobile or portable engines, especially diesel; refineries; industrial operations.	Attainment	Attainment
	Annual	0.030 ppm	0.053 ppm			Attainment	Attainment
Sulfur Dioxide (SO_2)[j]	1 hour	0.25 ppm	0.075 ppm (99th percentile over 3 years)	Irritates respiratory tract and injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, and steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing, and some natural sources, such as active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low-sulfur fuel not used.	Attainment	Attainment
	3 hours	—	0.5 ppm[k]			—	Attainment
	24 hours	0.04 ppm	0.14 ppm (for certain areas)			Attainment	Attainment
	Annual	—	0.030 ppm (for certain areas)			—	Attainment

Pollutant	Averaging Time	State[a] Standard	Federal[b] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Lead (Pb)[l]	Monthly	1.5 μg/m³	—	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a toxic air contaminant and water pollutant.	Lead-based industrial processes, such as battery production facilities and smelters; lead paint; and leaded gasoline. Aerially deposited lead from older gasoline use may exist in soil along major roads.	Attainment	—
	Calendar quarter	—	1.5 μg/m³ (for certain areas)			—	Attainment
	Rolling 3-month average	—	0.15 μg/m³[m]			—	Attainment
Sulfates	24 hours	25 μg/m³	—	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, such as volcanic areas; salt-covered dry lakes; and large sulfide rock areas.	Attainment	N/A
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm	—	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, such as volcanic areas and hot springs.	Attainment	N/A
Visibility-Reducing Particles (VRP)[n]	8 hours	Visibility of 10 miles or more (Tahoe: 30 miles) at relative humidity less than 70%	—	Reduces visibility. Produces haze. Note: Not directly related to the regional haze program under the FCCA, 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.	Attainment	N/A

Pollutant	Averaging Time	State[a] Standard	Federal[b] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Vinyl Chloride[l]	24 hours	0.01 ppm	—	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes.	Attainment	N/A

Sources: CARB 2019a, 2020; U.S. EPA 2020.

Standards adapted from the California Air Resources Board (CARB) air quality standards chart (http://www.arb.ca.gov/research/aaqs/aaqs2.pdf).

a. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe standard), sulfur dioxide (1- and 24-hour standard), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, 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.

b. Federal 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 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 micrograms per cubic meter (μg/m^3) is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

c. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 part per million. Transportation conformity applies in newly designated nonattainment areas for the 2015 national 8-hour ozone primary and secondary standards on and after August 4, 2019 (see Transportation Conformity Guidance for 2015 Ozone NAAQS Nonattainment Areas).

d. ppm = parts per million.

e. Transportation conformity requirements for carbon monoxide no longer apply after June 1, 2018, for the California carbon monoxide maintenance areas (see U.S. EPA CO Maintenance Letter).

f. On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 μg/m^3 to 12 μg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 μg/m^3, as was the annual secondary standard of 15 μg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 μg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean averaged over 3 years.

g. μg/m^3 = micrograms per cubic meter.

h. The 65 μg/m^3 $PM_{2.5}$ (24-hour) NAAQS was not revoked when the 35 μg/m^3 NAAQS was promulgated in 2006. The 15 μg/m^3 annual $PM_{2.5}$ standard was not revoked when the 12 μg/m^3 standard was promulgated in 2012. Therefore, for areas designated nonattainment or nonattainment/maintenance areas for the 1997 and/or 2006 $PM_{2.5}$ NAAQS conformity requirements still apply until the NAAQS are fully revoked.

i. Final 1-hour NO_2 NAAQS published in the *Federal Register* on February 9, 2010, effective March 9, 2010. Initial area designation for California (2012) was attainment/unclassifiable throughout. Project-level hot-spot analysis requirements do not currently exist. Near-road monitoring that started in 2013 may cause redesignation to nonattainment in some areas after 2016.

j. 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 part per billion. The 1971 SO_2 national standards (24-hour and annual standards) remain in effect until 1 year after an area is designated for the 2010 standard, except that, in areas designated nonattainment areas for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

k. Secondary standard, the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant rather than health. Conformity and environmental analysis address both primary and secondary NAAQS.

l. CARB has identified vinyl chloride and the particulate matter fraction of diesel exhaust as toxic air contaminants. Diesel exhaust particulate matter is part of PM_{10} and, in larger proportion, $PM_{2.5}$. Both CARB and U.S. EPA have identified lead and various organic compounds that are precursors to ozone and $PM_{2.5}$ as toxic air contaminants. There are no exposure criteria for adverse health effect due to toxic air contaminants, and control requirements may apply at ambient concentrations below any criteria levels specified above for these pollutants or the general categories of pollutants to which they belong.

m. Lead NAAQS are not considered in transportation conformity analysis.

n. In 1989, CARB 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.

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-nineteenth century, particularly from human activity related to fossil fuel combustion. 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. For example, the 2007 International Panel on Climate Change Fourth Assessment Report calculated the GWP of CH_4 as 25 and the GWP of N_2O as 298 over a 100-year time horizon.[4] Generally, estimates of all GHGs are summed to obtain total emissions for a project or given time period, usually expressed in metric tons (MT) or million metric tons (MMT).[5]

As evidence mounted for the relationship of climate changes to rising GHGs, federal and state governments established numerous policies and goals to improve energy efficiency and fuel economy and reduce 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, the National Environmental Protection Act (NEPA) (42 United States Code [USC] Part 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 pieces of legislation been enacted to address specifically climate change and GHG emissions reductions at the project level. However, the U.S. EPA and the National Highway Traffic Safety Administration issued the first corporate fuel economy 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 32, the California Global Warming Solutions Act of 2006. Assembly Bill 32 is California's signature

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[4] See Table 2.14 in *Intergovernmental Panel on Climate Change Fourth Assessment Report, Climate Change 2007: 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, UK, and New York, NY, USA. See http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter2.pdf.
[5] See http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/CEQA-Guidance-Tools.

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 update it every five years. In 2015, Governor Jerry Brown enhanced the overall adaptation planning effort with Executive Order 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 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 the SCS. CARB sets GHG emissions reduction targets for passenger vehicles in each region. Each regional MPO must include in its RTP an SCS that proposes actions for achieving the regional emissions reduction targets.[6]

With these and other senate and assembly bills, as well as 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 (TAC) 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 from vehicular traffic on unpaved roads, grading for development projects, and quarry operations. All of these activities may release 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, which is closely related to serpentinite, may also contain asbestos minerals. Asbestos can also be associated with other rock types in California, although much less frequently than serpentinite or ultramafic rock, which are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in the Sierra Nevada foothills, Klamath Mountains, and Coast Ranges. The California Department of Conservation, Division of Mines and Geology, has developed a map that shows the general locations of ultramafic rock in the state (www.conservation.ca.gov/cgs/minerals/hazardous_minerals/asbestos/Pages/index.aspx).

[6] CARB. 2020. *Sustainable Communities*. Available: https://www.arb.ca.gov/cc/sb375/sb375.htm.

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, whereas the California Clean Air Act (CCAA) is its companion state law. These laws and related regulations adopted by U.S. EPA and CARB set standards for the concentration of pollutants in the air. At the federal level, these standards are called 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: CO; NO_2; O_3; particulate matter, which is broken down for regulatory purposes into PM_{10} and $PM_{2.5}$; and SO_2. In addition, national and state standards exist for Pb, and state standards exist for visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The NAAQS and CAAQS are set at levels that protect public health with a margin of safety and subject to periodic review and revision. Both state and federal regulatory schemes also cover 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 FCCA Section 176(c), which prohibits the U.S. Department of Transportation and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to the State Implementation Plan (SIP) for attaining the NAAQS. The term *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 nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. The U.S. EPA 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, NO_2, O_3, particulate matter (PM_{10} and $PM_{2.5}$), and, in some areas (although not in California), SO_2. California has attainment or maintenance areas for all of these transportation-related criteria pollutants, except SO_2, and a nonattainment area for Pb; however, Pb is not currently required by the FCCA to be covered in transportation conformity analysis. Regional conformity is based on emissions analyses of RTPs and FTIPs, which include all transportation projects planned for a region over a period of at least 20 years for the RTP and four years for the FTIP. RTP and FTIP conformity uses travel demand and emission models to determine whether implementation of those projects would conform to emission budgets or other tests at various analysis years to show that the requirements of the FCCA and the SIP have been met. If a conformity analysis is successful, the MPO, FHWA, and Federal Transit Administration (FTA) make determinations, confirming that the RTP and FTIP are in conformity with the SIP for achieving the goals of the FCCA. 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 FTIP, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Project-level conformity is achieved by demonstrating that a project comes from a conforming RTP and FTIP and has a design concept and scope that have not changed significantly from the concept and scope presented in the RTP and FTIP. If the design concept and scope have changed substantially from that used in the RTP conformity analysis, RTP and FTIP amendments may be needed. Project-level conformity also needs to demonstrate that project analyses have both used the latest planning assumptions and U.S. EPA-approved emissions models and that the project complies with control measures in the SIP in particulate matter areas. Additional hot spot analyses may be required for projects located in CO and particulate matter nonattainment or maintenance areas to examine localized air quality impacts.

2.2.3 National Environmental Policy Act

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

The California Environmental Quality Act (CEQA)[7] is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and avoid or mitigate those impacts, if feasible. CEQA documents must address California CAA requirements for transportation projects. Although state standards are often stricter than federal standards, the state has no conformity process.

2.2.5 Local

The U.S. EPA has delegated responsibility for establishing local rules to protect air quality to air districts. Caltrans Standard Specification Section 14-9.02 (2018) requires compliance with all applicable air quality laws and regulations, including local and air district ordinances and rules.

2.2.5.1 South Coast Air Quality Management District

Adopted by California legislature, the 1977 Lewis Air Quality Management Act created SCAQMD to coordinate air quality planning efforts throughout Southern California. This act

[7] For general information about CEQA, see http://resources.ca.gov/ceqa/more/faq.html.

merged four county air pollution control agencies into one regional district to address the issue of improving air quality in Southern California. Under the act, renamed the Lewis-Presley Air Quality Management Act in 1988, SCAQMD is the principal agency responsible for comprehensive air pollution control in the region. Specifically, SCAQMD is responsible for monitoring air quality, as well as planning, implementing, and enforcing programs to attain and maintain NAAQS and CAAQS in the district. These programs include air quality rules that regulate stationary sources, area sources, point sources, and certain mobile-source emissions. SCAQMD is also responsible for establishing stationary-source permitting requirements and ensuring that new, modified, or relocated stationary sources do not create net emission increases.

Air Quality Management Plan

The Air Quality Management Plan (AQMP) is the SCAQMD plan for improving regional air quality. The FCCA requires an area that fails to attain the NAAQS to develop and implement an emission reduction strategy that will bring the area into attainment in a timely manner. The AQMP addresses FCCA requirements and either demonstrates attainment or outlines an emission reduction strategy to bring the area into attainment with NAAQS and CAAQS. The AQMP is prepared by SCAQMD in collaboration with SCAG and CARB. The AQMP provides policies and control measures to reduce emissions and attain both NAAQS and CAAQS by their applicable deadlines. Environmental review of individual projects within the SCAB must demonstrate that daily construction and operational emissions thresholds, as established by SCAQMD, would not be exceeded. The environmental review must also demonstrate that individual projects would not increase the number or severity of existing air quality violations.

The 2016 AQMP was adopted by the SCAQMD Governing Board on March 3, 2017. It incorporates the latest scientific and technological information and planning assumptions, including the 2016 RTP/SCS and updated emission inventory methodologies for various source categories. The 2016 AQMP includes the integrated strategies and measures needed to meet the NAAQS.

To ensure air quality goals will be met while maximizing benefits and minimizing adverse impacts on the regional economy, the following policy objectives guided development of the 2016 AQMP:

- Eliminate reliance on future technology (CAA Section 182[e][5]) measures to the maximum extent feasible.
- Calculate and take credit for co-benefits from other planning efforts.
- Develop a strategy with fair-share emission reductions at the federal, state, and local levels.
- Invest in strategies and technologies that meet multiple objectives regarding air quality, climate change, air toxics exposure, energy, and transportation.
- Identify and secure significant funding for incentives to implement early deployment and commercialization of zero and near-zero technologies.
- Enhance the socioeconomic analysis and pursue the most efficient and cost-effective path to achieve multi-pollutant and multi-deadline targets.

- Prioritize enforceable regulatory measures, and develop innovative non-regulatory “win-win” approaches for emission reductions.

The 2022 AQMP is currently being developed. It will represent a comprehensive analysis of emissions, meteorology, regional air quality modeling, and regional growth projections for the SCAB. The 2022 AQMP will also assess the impact of existing and proposed control measures.

Chapter 3 Affected Environment

The topography of a region can substantially affect 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 I-15 ELPSE project site is located in southwestern Riverside County, an area within the SCAB, which includes Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. Air quality regulation in the SCAB is administered by SCAQMD. The current and forecasted population for Riverside County is approximately 2,450,758 currently and forecasted to be greater than 3.2 million in 2040 (U.S. Census Bureau 2019), and the county's economy is driven largely by retail businesses and health care and social assistance providers (California Employment Development Department 2020).

3.1 Climate, Meteorology, and Topography

The SCAB is a coastal plain with connecting broad valleys and low hills. It is bounded by the Pacific Ocean to the west and high mountains around the rest of its perimeter. During spring and early summer, pollution is typically blown out of the SCAB through mountain passes or lifted by warm, vertical currents adjacent to mountain slopes. The vertical dispersion of air pollutants in the SCAB is limited by temperature inversions in the atmosphere close to Earth's surface. The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days with no inversion or high wind speeds, ambient air pollutant concentrations are lowest. During periods with low inversions and low wind speeds, air pollutants become more concentrated in urbanized areas with pollution sources of great magnitude. 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 O_3 and O_3 precursors from one region to another, contributing to air quality problems downwind of source regions. Furthermore, mountains can act as barriers that prevent O_3 from dispersing.

The Elsinore climatological station, which is maintained by the Western Regional Climate Center, is near the project area and representative of meteorological conditions near the project site. Figure 3-1 illustrates the wind rose analysis of the predominant wind patterns near the project site. The average high temperature in July and August is 98 degrees Fahrenheit, and the average low temperature in January is 36 degrees Fahrenheit. Average annual precipitation is 12.01 inches.

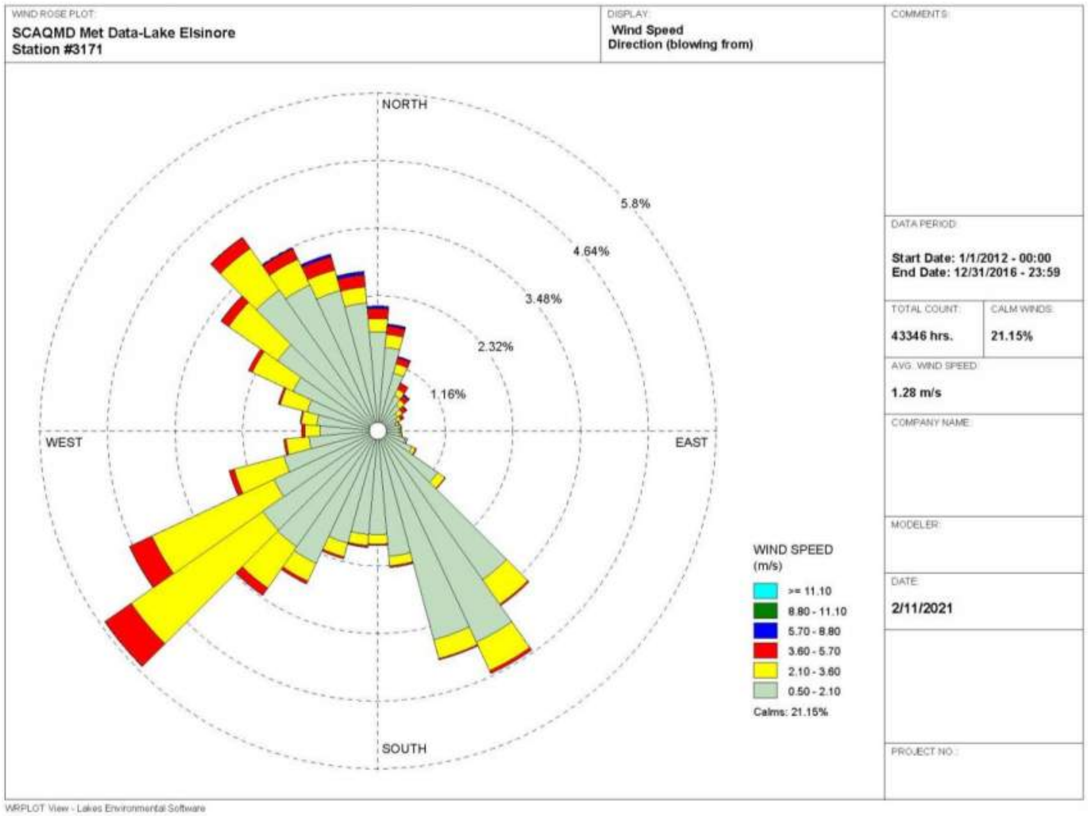

Figure 3-1. Predominant Wind Patterns near the Project Area
Source: SCAQMD 2020.

The SCAB experiences frequent temperature inversions. Atmospheric temperature typically decreases with height. However, under inversion conditions, temperature increases as altitude increases, thereby preventing air close to the ground from mixing with the air above it. As a result, air pollutants are trapped near the ground. During the summer, a moist marine layer forms and causes air quality problems in the basin by preventing air pollutants from dispersing upwards. The moist marine layer is created by the interaction between the ocean surface and the lower layer of the atmosphere. An upper layer of warm air forms over the cool marine layer, preventing air pollutants from dispersing upward (SCAQMD 1993).

3.2 Existing Air Quality

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

The closest air quality monitoring station to the project area is the Lake Elsinore Station, located at 506 West Flint Street. Figure 3-2 shows its location.

Figure 3-2. Map of Air Quality Monitoring Stations Located near the Project

3.2.1 Criteria Pollutants and Attainment Status

Table 2-1 in Section 2.1, *Pollutant-Specific Overview*, lists the state and federal attainment status of all regulated pollutants in Riverside County. Riverside County is classified as:

- an extreme nonattainment area for the federal eight-hour O_3 standard
- a serious nonattainment area for the federal $PM_{2.5}$ standard
- a maintenance area for the federal CO standard

Riverside County is also classified as a nonattainment area for the state eight-hour O_3, PM_{10}, and $PM_{2.5}$ standards.

Table 3-1 lists the air quality trends observed from the data collected at the Lake Elsinore air quality monitoring station over the past three years. This station is representative of the project area because their climate, topography, and urban setting are similar. During the 2018 to 2020 monitoring period, exceedances were recorded at the monitoring stations for the state 1-hour O_3 standard, state and federal eight-hour O_3 standards, federal $PM_{2.5}$ standard, and state PM_{10} standard.

Table 3-1. Criteria Pollutant Concentrations for the Past Three Years Measured at the Lake Elsinore Monitoring Station

Pollutant	Standard	2018	2019	2020
Ozone				
Maximum 1-hour concentration (ppm)		0.116	0.108	0.130
Number of days exceeded: state	0.09 ppm	16	4	18
Maximum 8-hour concentration		0.095	0.089	0.100
Number of days exceeded: state Number of days exceeded: federal	0.070 ppm 0.070 ppm	30 30	28 28	54 54
Carbon Monoxide				
Maximum 1-hour concentration (ppm)		1.1	1.6	0.9
Number of days exceeded: state Number of days exceeded: federal	20 ppm 35 ppm	0 0	0 0	0 0
Maximum 8-hour concentration		0.8	0.7	0.7
Number of days exceeded: state Number of days exceeded: federal	9.0 ppm 9 ppm	0 0	0 0	0 0
PM_{10}				
Maximum 24-hour concentration (µg/m^3)		105.3	93.8	84
Number of days exceeded: state Number of days exceeded: federal	50 µg/m^3 150 µg/m^3	9 0	5 0	7 0
Maximum annual concentration		23.3	19.7	23.7
Exceeded: State	20 µg/m^3	Yes	No	Yes
$PM_{2.5}$				

Pollutant	Standard	2018	2019	2020
Maximum 24-hour concentration (µg/m^3)		31.3	17.6	41.6
Number of days exceeded: federal	35 µg/m^3	0	0	3
Maximum annual concentration		11	11	7
Exceeded: state Exceeded: federal	12 µg/m^3 12.0 µg/m^3	No No	No No	No No
Nitrogen Dioxide				
Maximum 1-hour concentration (ppb)		41.3	38.0	43.8
Number of days exceeded: state Number of days exceeded: federal	180 ppb 100 ppb	0 0	0 0	0 0
Maximum annual concentration		9	7	7
Exceeded: state Exceeded: federal	30 ppb 53 ppb	No No	No No	No No

Sources: CARB 2021b; U.S. EPA 2021.

$PM_{2.5}$ = fine particulate matter; PM_{10} = suspended particulate matter; ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter

3.2.2 Mobile-Source Air Toxics

The most prominent sources of MSAT pollutants in the project area are vehicles that use local and regional roadways in the area, including I-15. Of the vehicles operating in the project area, those that are diesel powered are the largest source of MSAT emissions. No major rail yards, transit terminals, large warehouses, or distribution centers are near the project site.

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. However, it also accounted for 83 percent of California's total GHG emissions in 2019 (CARB 2021a). Transportation, primarily on-road travel, is the single largest source of CO_2 emissions in the state.

On May 7, 2020, SCAG's Regional Council adopted the 2020–2045 RTP/SCS. The plan is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The plan charts a course for closely integrating land use and transportation so that the region can grow smartly and sustainably. It outlines more than $638 billion in transportation system investments through 2045. The Project is in Riverside County and included in SCAG's 2020–2045 RTP/SCS.

The State of California has set targets for the SCAG region to reduce GHG emissions from passenger vehicles by eight percent per capita by 2020 and 13 percent by 2035 (compared with a 2005 baseline). Reductions outlined in the RTP/SCS are projected to reach 13.6 percent by 2020 and 27.9 percent by 2040.

3.3 Sensitive Receptors

Sensitive receptors include residential areas, schools, hospitals, other healthcare facilities, child/day care facilities, parks, and playgrounds. The majority of the sensitive receptors within or adjacent to the project area are residential, park, church, and school uses. Table 3-2 lists the sensitive receptors located within 500 feet of the project right of way, with the exception of the residential uses; Figure 3-3 shows the residential use sensitive receptors.

Table 3-2. Sensitive Receptors Located within 500 Feet of the Project Site.

Receptor	Description	Distance Between Receptor and Project (feet)
Temescal Valley Elementary School	K–6 Elementary school with 926 students	523
Temescal Canyon High School	9–12 High school with 2,157 students	205
El Cerrito Sports Park	Recreational park with playgrounds and sports fields	95
Just 4 Kids Pre-School	Preschool and daycare center for kids aged 6 months to 12 years	481
Tutor Time Learning Systems/La Petite Academy	Learning and daycare center for kids ages 6 weeks to 12 years	378
DaVita Corona Dialysis Center	Kidney Dialysis healthcare center for dialysis patients	380
Planned Parenthood – Corona Center	Healthcare center	305
Pacific Pain Care	Physical therapy clinic	230
The Breathe Clinic	Healthcare center for patients with pulmonary issues	303
University Pain Consultants	Pain medicine treatment clinic	215
Gymnastics Pacifica	Children’s gymnastics school	265
Church of Jesus Christ of Latter-day Saints	Church with children’s programs	185
Corona Canyon Community Church	Church with children’s and senior’s programs	493
Children's Primary Care Medical Group	Pediatrician’s healthcare clinic	436
Pediatric Partners	Pediatrician’s healthcare clinic	385
SenseAbilties Therapy Group	Speech and occupational therapy clinic and learning center for infants and kids with developmental and neurological disabilities	561
Riverside Medical Clinic & Urgent Care	Healthcare clinic and urgent care center	250
Little Munchkins Family Child Care/Pre-School	Preschool and daycare center for infants and kids aged 6 weeks to 4 years	418

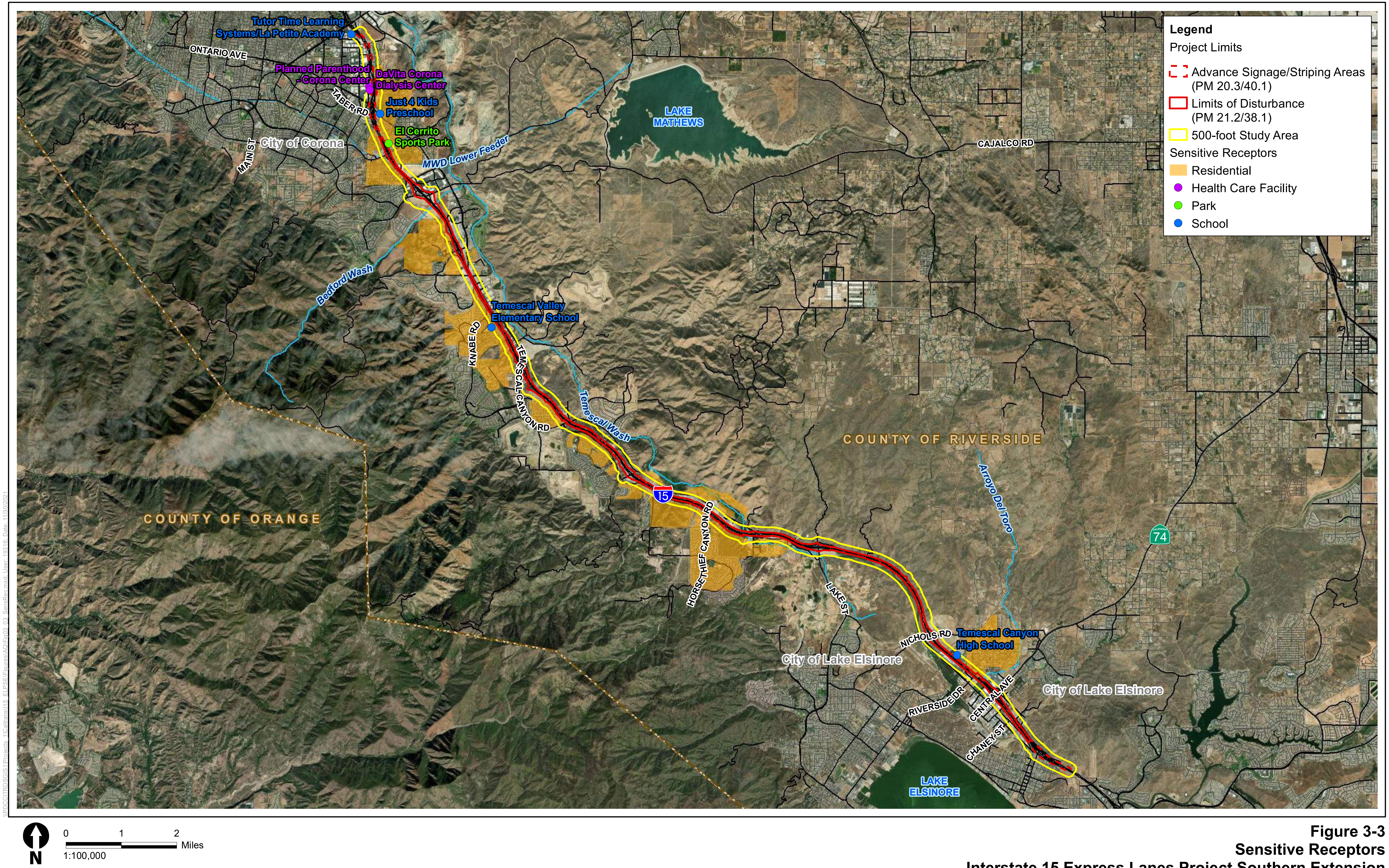

Figure 3-3
Sensitive Receptors
Interstate 15 Express Lanes Project Southern Extension

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3.4 Conformity Status

The regional and project-level conformity analysis for the Build Alternative is presented below.

3.4.1 Regional Conformity

The I-15 ELPSE is listed in Amendment #1 to the 2020–2045 RTP that was approved by the SCAG Regional Council on November 4, 2021 and was found to conform by the FHWA and FTA on January 4, 2022. It is also included in SCAG's financially constrained 2021 FTIP Amendment #21-14, adopted on October 22, 2021, and approved by FHWA and FTA on November 5, 2021. The FTIP and RTP listings state the following:

> *IN WESTERN RIVERSIDE COUNTY - ON I-15, ADD 2 EXPRESS LANES IN EACH DIRECTION, GENERALLY IN THE MEDIAN, FROM SR-74 (CENTRAL AVENUE) (PM 22.3) IN THE CITY OF LAKE ELSINORE TO EL CERRITO ROAD (PM 38.1) IN THE CITY OF CORONA. CONSTRUCT SOUTHBOUND AUXILIARY LANE FROM MAIN STREET (PM 21.2) TO SR-74 (CENTRAL AVENUE) (PM 22.3) AND FROM SR-74 (CENTRAL AVENUE) (PM 22.3) TO NICHOLS ROAD (PM 23.9). SIGNAGE AND TRANSITION STRIPING EXTENDS TO PM 20.3 TO THE SOUTH AND PM 40.1 TO THE NORTH.*

The design concept and scope of the Project are consistent with the project description in the 2020–2045 RTP/SCS and 2021 FTIP and the open-to-traffic assumptions of the most recent SCAG regional emissions analysis. Table 3-3 summarizes information about the regional conformity status. Copies of relevant pages from the RTP and FTIP are included in Appendix A. Table 3-4 provides the status of U.S. EPA-approved SIPs relevant to the project area.

Table 3-3. Status of Plans Related to Regional Conformity

MPO	Plan/Transportation Improvement Program	Date of Adoption by MPO	Date of Approval by FHWA	Last Amendment	Date of Approval by FHWA of Last Amendment
SCAG	2020–2045 RTP/SCS	September 5, 2020	June 3, 2020	Amendment #1	January 4, 2022
SCAG	2021 FTIP	March 4, 2021	April 16, 2021	21-14	November 5, 2021

Source: SCAG 2021

FHWA = Federal Highway Administration; FTIP = Federal Transportation Improvement Program; MPO = Metropolitan Planning Organization; RTP/SCS= Regional Transportation Plan/Sustainable Communities Strategy; SCAG = Southern California Association of Governments

Table 3-4. Status of State Implementation Plans Relevant to the Project Area

Name/Description	Status
2019 South Coast 8-Hour Ozone SIP Update	Approved November 2019
2018 South Coast SIP Revisions and Updates	Approved December 2018
2016 Ozone and $PM_{2.5}$ Plan for the South Coast Air Basin and Coachella Valley	Approved March 2017
2010 South Coast Air Basin PM_{10} Redesignation Request, Maintenance Plan, and Conformity Budgets	Approved February 2010
2005 South Coast Carbon Monoxide Plan	Approved February 2006

Source: CARB 2019c.

$PM_{2.5}$ = fine particulate matter; PM_{10} = suspended particulate matter; SIP = State Implementation Project

3.4.2 Project-Level Conformity

Because the I-15 ELPSE is located in a federal nonattainment area for $PM_{2.5}$ and in an attainment/maintenance area for PM_{10} and CO, a project-level hot-spot analysis is required under 40 CFR 93.109. The I-15 ELPSE does comply with all $PM_{2.5}$ and PM_{10} measures in the SIP and implements measures relied on in the RTP/TIP regional conformity analysis in a timely matter. It does not cause or contribute to any new localized CO, $PM_{2.5}$, or PM_{10} violations or delay timely attainment of any NAAQS or any required interim emission reductions or other milestones during the timeframe of the transportation plan (or regional emissions analysis).

3.4.3 Interagency Consultation

The project-level PM hot-spot analysis was presented to SCAG's Transportation Conformity Working Group for discussion and review on September 28, 2021. This hot-spot analysis is based on the project description, limits, and traffic volumes and was listed under the current RTP/FTIP Project ID. Interagency consultation on the ELPSE determined it to be not a project of air quality concern (POAQC). Table 3-5 summarizes this interagency consultation process. Appendix B provides a copy of the PM hot-spot analysis.

Table 3-5. Summary of Interagency Consultation Process

Date	Format	Participants	Discussion Summary	Outcomes
September 28, 2021	PM Form	U.S. EPA, FHWA, Caltrans	None	Not a POAQC

FHWA=Federal Highway Administration; POAQC=Project of Air Quality Concern; PM=particulate matter;

3.5 NEPA Analysis/Requirement

For NEPA, an air quality study should address federal criteria pollutants (i.e., O_3, $PM_{2.5}$, PM_{10}, CO, NO_2, SO_2, and Pb), MSATs, and asbestos. Section 4.3, *Long-Term Effects (Construction Emissions)*, provides a comparison of the Opening Year (2030) and Design Year (2050) Build scenario long-term criteria pollutant, MSAT, and GHG emissions to those from the No-Build scenarios.

3.6 CEQA Analysis/Requirement

For CEQA, an air quality study should address pollutants for which California has established air quality standards (i.e., O_3, PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, Pb, visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride), as well as GHGs, MSATs, and asbestos. Section 4.2, *Short-Term Effects (Construction Emissions)*, provides a discussion of the short-term criteria pollutant and GHG emissions from the construction of the Project. Section 4.3 provides a comparison of the Opening Year (2030) and Design Year (2050) Build scenario long-term criteria pollutant, MSAT, and GHG emissions to those from Existing Year (2019) conditions.

Chapter 4 Environmental Consequences

This section describes the methods, impact criteria, and the short and long-term results of air quality analyses for the I-15 ELPSE. Analyses in this report were conducted using methodology and assumptions consistent with the requirements of CEQA and the California CAA 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 (Transportation Conformity Guidance*) (U.S. EPA 2021), and the *Updated Interim Guidance on Mobile-Source Air Toxics Analysis in NEPA Documents* (FHWA 2016).

4.1 Impact Criteria

Project-related emissions would have an adverse environmental impact if they were to result in pollutant emissions levels that would either create or worsen an exceedance 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)

4.2.1 Construction Equipment, Traffic Congestion, and Fugitive Dust

Site preparation and roadway construction would involve: clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. During construction, short-term degradation of air quality is expected from the release of particulate emissions (i.e., airborne dust) generated by excavation, grading, hauling, and other activities related to construction. Emissions from construction equipment powered by gasoline and diesel engines are also anticipated and would include CO, NO_X, VOCs, directly emitted PM_{10} and $PM_{2.5}$, and TACs such as DPM. Construction activities are expected to increase traffic congestion in the area, resulting in increases in emissions from traffic during the delays. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Under the transportation conformity regulations (40 CFR 93.123(c)(5)), construction-related activities that cause temporary increases in emissions are not required in a hot-spot analysis. These temporary increases in emissions are those that occur only during the construction phase and last five years or less at any individual site. They typically fall into two main categories:

- ***Fugitive dust*** is a major emission from construction due to ground disturbance. All air districts and the California Health and Safety Code (Sections 41700-41701) prohibit “visible emissions” exceeding three minutes in one hour; this applies not only to dust, but also to engine exhaust. In general, this is interpreted as visible emissions crossing the right of way line. Sources of fugitive dust include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site may deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions may vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, whereas fine particles would be dispersed over greater distances from the construction site.

- ***Construction equipment emissions***: DPM is a California-identified TAC, and localized issues may exist if diesel-powered construction equipment is operated near sensitive receptors.

The I-15 ELPSE's construction emissions were estimated using the Sacramento Metropolitan Air Quality Management District's Road Construction Emissions Model, Version 9.0.0. Although the model was developed for Sacramento conditions in terms of fleet emission factors, silt loading, and other modeling assumptions, it is considered adequate for estimating road construction emissions by SCAQMD in its CEQA guidance and is used for that purpose in this analysis. Table 4-1 presents construction-related emissions for the Build Alternative, representing the peak daily construction emissions that would be generated by it. The results of the Sacramento model are included in Appendix C. The emissions presented below are based on the best information available at the time of calculations and assume that the schedule for all improvements begin in 2025 and take 36 months to complete. As project construction is expected to last less than five years, construction-related emissions were not considered in the conformity analysis.

Table 4-1. Build Alternative – Construction-Period Emissions Estimates

Project Phases	Reactive Organic Gas (ROG) (lbs/day)	Carbon Monoxide (CO) (lbs/day)	Nitrogen Oxides (NO_X) (lbs/day)	Suspended Particulate Matter (PM_{10}) (lbs/day)	Fine Particulate Matter ($PM_{2.5}$) (lbs/day)	Carbon Dioxide Equivalent (CO_2e) (lbs/day)
Grubbing/land clearing	1.72	19.03	14.04	40.76	8.92	4,882.86
Grading/excavation	5.57	55.43	57.86	42.46	10.33	17,672.36
Drainage/utilities/sub-grade	5.40	60.68	52.77	42.22	10.22	15,209.53
Paving	2.37	34.73	39.60	1.77	1.18	16,462.55
Maximum	5.57	60.68	57.86	42.46	10.33	17,672.36
Project Total (tons)	1.73	19.22	18.71	13.13	3.21	6,001.32

Emissions estimated using the Road Construction Emission Model (version 9.0) from the Sacramento Metropolitan Air Quality Management District and project-specific data provided by the design staff (see Appendix C).

The emissions presented are based on the best information available from the time when the calculations were performed. The emissions represent the peak daily construction emissions that would be generated during implementation of the Build Alternative.

Implementation of the measures listed below, some of which may also be required for other purposes, such as stormwater pollution control, would reduce air quality impacts resulting from construction activities. Although these measures are anticipated to reduce construction-related emissions, the reductions cannot be quantified at this time.

- The construction contractor will comply with Caltrans Standard Specification Section 14-9 (2019).
  - Section 14-9-02 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.
- Water or a dust palliative will be applied to the site and equipment as often as necessary to control fugitive dust emissions.
- Soil binder will be spread on any unpaved roads used for construction purposes and on all project construction parking areas.
- Trucks will be washed as they leave the right of way as necessary to control fugitive dust emissions.
- Construction equipment and vehicles will be properly tuned and maintained. All construction equipment will use low-sulfur fuel, as required by California Code of Regulations Title 17, Section 93114.
- 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 on existing communities.
- Equipment and materials 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 extended idling by diesel equipment or vehicles will be prohibited to the extent feasible.
- Track-out reduction measures, such as gravel pads at project access points to minimize dust and mud deposits on roads affected by construction traffic, will be used.
- All transported loads of soil and wet material will be covered before transport, or adequate freeboard (i.e., space from the top of the material to the top of the truck) will be provided to minimize emissions of dust during transportation.
- Dust and mud deposited on paved public roads due to construction activity and traffic will be promptly and regularly removed to reduce particulate matter 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 particulate matter in the area.

4.2.2 Asbestos

No geologic features that are normally associated with naturally occurring asbestos (i.e., serpentine rock or ultramafic rock near fault zones) are present in or near the project area (USGS and California Geological Survey 2011). Therefore, the impact from naturally occurring asbestos during project construction would be minimal to none. However, structures, including buildings and bridges, may contain asbestos-containing materials (ACMs). The use of asbestos, which was found in many building materials prior to 1978, may have continued until the early 1980s. ACMs are found in fireproofing, acoustic ceiling material, Transite pipe, roofing materials, thermal insulation, support piers, expansion joint material in bridges, asphalt, concrete, and other building materials. It is of primary concern when it is friable (i.e., easily crumbled). During demolition, if not properly identified and mitigated, asbestos fibers could become airborne.

The Project would include widening and modifying up to 15 bridges. Proposed bridge improvements are listed in Table 4-2 and have been identified in Figure 1-3, *Build Alternative Map*. ACM sampling and analysis would be conducted prior to any ground-disturbing activity and prior to completion of the Plans, Specifications, and Estimate phase. An ACM survey would be conducted in conformance with the U.S. EPA National Emission Standard for Hazardous Air Pollutants, 40 CFR Part 61; SCAQMD Rule 1403; and Caltrans Standard Special Provisions, Section 14-11.16, *Asbestos-Containing Construction Materials in Bridges*.

Table 4-2. Widened and Modified Bridges

Structure Name	Post Mile	Bridge Number	Bridge ID[1]
Gavilan Wash Bridge	25.55	56-0726 R/L	1
Lake Street UC	26.69	56-0682 R/L	2
Temescal Canyon Road OH	27.78	56-0681 R/L	3
Temescal Wash Bridge	28.04	56-0680 R/L	4
Horsethief Canyon Road UC	28.87	56-0679 R/L	5
Horsethief Canyon Wash Bridge	29.13	56-0678 R/L	6
Indian Wash Bridge	30.09	56-0677 R/L	7
Indian Truck Trail UC	30.40	56-0676 R/L	8
Temescal Canyon Road UC	31.90	56-0675 R/L	9
Mayhew Wash Bridge	31.97	56-0674 R/L	10
Coldwater Wash Bridge	32.96	56-0543 R/L	11
Temescal Canyon Road UC	33.25	56-0542 R/L	12
Brown Canyon Wash Bridge	34.72	56-0559 R/L	13
Weirick Road UC	35.64	56-0541 R/L	14
Bedford Wash Bridge	36.58	56-0540 R/L	15

Notes:
[1] The widened or modified bridges are labeled in Figure 1-3 (Build Alternative Map)
UC=Undercrossing, OH=Overhead (abandoned railway)

4.2.3 Lead (Pb)

Pb is normally not an air quality issue for transportation projects, unless the project involves disturbing soil with high levels of aerially deposited Pb or painting or modifying structures with Pb-based coatings. At the time of preparation of this report, testing for aerially deposited Pb had not been conducted. It is not known whether Pb-based paint was used in the striping on the existing bridge. If Pb is encountered, any disturbance of Pb-based paint must meet U.S. EPA and air district rules, pursuant to Caltrans Standard Specification Section 14-9.02. There are no industrial Pb sources in the immediate vicinity of the project.

4.2.4 Valley Fever

Valley Fever is not an air pollutant, but a disease caused by inhaling *Coccidioides immitis* (*C. immitis*) spores. The spores are found in certain types of soil and become airborne when the soil is disturbed. Riverside County authorities reported 137 cases in 2018, which is an incidence rate of 5.6 per 100,000 (California Department of Public Health 2019).

The presence of *C. immitis* in Riverside County does not guarantee that construction activities would result in an increased incidence of Valley Fever. Propagation of *C. immitis* is dependent on climatic conditions, with the potential for growth and surface exposure highest following early seasonal rains and long dry spells. Although *C. immitis* spores can be released when areas are disturbed by earthmoving activities, receptors must be exposed to and must inhale the spores to have an increased risk of contracting Valley Fever. Moreover, exposure to *C. immitis* does not guarantee that an individual will become ill—approximately 60 percent of people exposed to the fungal spores are asymptomatic and show no signs of an infection (USGS 2000).

Although several factors influence receptor exposure and development of Valley Fever, earthmoving activities during construction could release *C. immitis* spores if filaments are present and other soil chemistry and climatic conditions are conducive to spore development. Receptors within several miles of the construction area, particularly adjacent residential receptors, may be exposed to an increased risk from inhaling *C. immitis* spores and subsequently developing Valley Fever. Dust control measures are the primary defense against infection (USGS 2000). Implementation of a fugitive dust control plan, as a minimization measure, would limit dust, and routine watering would reduce the risks associated with contracting Valley Fever.

4.3 Long-Term Effects (Operational Emissions)

Operational emissions take into account long-term changes in emissions due to the Project (excluding the construction phase). The operational emissions analysis compares forecast emissions for the Existing (2019), Opening Year (2030), and Design Year (2050) conditions.

For roadway improvement projects, regional emissions are a function of regional VMT and travel speeds. As such, the operational emissions analysis compares the long-term changes in VMT and travel speeds between the Build Alternative and the No-Build Alternative (excluding the construction phase).

The regional VMT data for the Existing conditions, and Opening Year and Design Year No-Build, and Build Alternatives, along with the CT- EMission FACtors (EMFAC) 2017 emission rates, were used to calculate the CO, NO_X, PM_{10}, $PM_{2.5}$, and CO_2e emissions for the Existing (2019), 2030, and 2050 conditions. The results of the modeling are summarized in Table 4-3 and included in Appendix D.

The emissions analysis presented in Table 4-3 indicates that operation of the Build Alternative under Opening Year (2030) and Design Year (2050) conditions is expected to increase PM_{10} and $PM_{2.5}$ emissions compared with existing conditions and decrease ROG, NO_X, and CO emissions. These results are due to factors both internal and external to the improvements.

- The increase in particulate matter is due partly to background growth and projected increase in VMT from 2019 to 2050. As VMT increases, particulate matter emissions from fugitive dust increase as well. While particulate matter emissions from exhaust emission factors, which are also tied to VMT, decrease over time due to improvements in vehicle engine technology and fuel efficiency, fugitive dust particulate matter emission factors remain constant regardless of these improvements. Consequently, total particulate matter emissions increase over time as particulate matter fugitive dust emissions increase from increases in VMT from 2019 to 2050.
- The decreases in other pollutants are due to expected improvements in vehicle engine technology, fuel efficiency, and turnover in vehicles that are older and more heavily polluting, all of which reduce exhaust emissions.

Table 4-3. Operational Criteria Pollutant Emissions (pounds per day)

Scenario/Analysis Year	PM_{10}	$PM_{2.5}$	CO	NO_X	ROG
Existing Year (2019)	1,594.2	8,015.4	9,049.5	22,446.9	1,848.1
Opening Year (2030) No-Build Alternative	2,326.0	12,381.4	5,765.7	17,172.7	1,417.2
Opening Year (2030) Build Alternative	2,396.3	12,752.0	5,830.8	17,467.2	1,429.4
Design Year (2050) No-Build Alternative	2,449.6	13,179.0	5,464.7	14,394.8	950.0
Design Year (2050) Build Alternative	2,507.2	13,485.3	5,441.7	14,536.9	947.7
Net Emissions Comparison to Existing Conditions					
Opening Year (2030) Build Alternative	802.1	4,736.7	-3,218.8	-4,979.6	-418.8
Design Year (2050) Build Alternative	913.1	5,469.9	-3,607.8	-7,910.0	-900.5
Net Emissions Comparison to No-Build Conditions					
Opening Year (2030) Build Alternative	70.3	370.7	65.1	294.5	12.2
Design Year (2050) Build Alternative	57.6	306.2	-23.0	142.1	-2.3

Source: Modeled using CT-EMFAC2017.

CO = carbon monoxide; NO_X = nitrogen oxide; $PM_{2.5}$ = fine particulate matter; PM_{10} = suspended particulate matter; ROG = reactive organic gas

4.3.1 CO Analysis

The CO Protocol was developed for project-level conformity (i.e., hot-spot) analysis and approved for use by U.S. EPA in 1997. It provides qualitative and quantitative screening procedures, as well as quantitative (i.e., modeling) analysis methods for assessing project-level CO impacts. The qualitative screening step is designed to avoid the use of detailed modeling for projects that clearly cannot cause an exceedance of the CO standards or worsen an existing exceedance. Although the protocol was designed to address federal standards, it has been recommended for use by several air pollution control districts in their CEQA analysis guidance documents and should also be valid for California standards because the key criterion (i.e., eight-hour concentration) is similar (i.e., nine parts per million for both the federal and state standard).

Sections 3 and 4 of the CO Protocol describe the methodology for determining whether a CO hot-spot analysis is required. The CO Protocol provides two conformity-requirement decision flowcharts to assist project sponsors in evaluating the requirements that apply to their projects. The flowchart of the CO Protocol applies to new projects and was used with the analysis of the ELPSE. The flowchart is shown in Appendix E of this report. Below is 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.

3.1.1: Is the project exempt from all emissions analyses?

3.1.1 Response: No. It is not exempt because it does not fit any of the exemption categories identified in 40 CFR 93.126.

3.1.2: Is the project exempt from regional emissions analyses?

3.1.2 Response: No. It does not align with any of the project types exempted from regional emissions analyses under 40 CFR 93.127 (proceed to 3.1.3).

3.1.3: Is the project locally defined as regionally significant?

3.1.3 Response: Yes. It is considered a regionally significant transportation project, according to 40 CFR 93.101, because it is included in the modeling of the area's transportation network (proceed to 3.1.4).

3.1.4: Is the project in a federal attainment area?

3.1.4 Response: No. It is in the SCAB, which is a federal extreme nonattainment area for O_3 and a serious nonattainment area for $PM_{2.5}$ (see Table 2-1) (proceed to 3.1.5).

3.1.5: Is there a currently conforming RTP and TIP?

3.1.5 Response: Yes. The 2020–2045 RTP/SCS and 2021 FTIP are conforming programs (proceed to 3.1.6).

3.1.6: Is the project included in the regional emissions analysis supporting the currently conforming RTP and TIP?

3.1.6 Response: Yes. It is identified in the 2020–2045 RTP/SCS under project number 3160001-RIV170901 and the 2021 FTIP under project number RIV170901 (see Appendix A). So, it has been included in the regional emissions analysis (proceed to 3.1.7).

3.1.7: Has the project design concept and/or scope changed significantly from that in the regional analysis?

3.1.7 Response: No. Its design concept has not changed significantly from that in the regional analysis (proceed to 3.1.9).

3.1.9: The conclusion from this series of questions and answers is that the project needs to be examined for its local air impacts (proceed to Section 4, Figure 3, of the CO Protocol).

Based on the answers to the first flowchart, a second flowchart, Figure 3 of the CO Protocol, is used to determine the level of local CO effect analysis required for the improvement. The questions that are applicable to the ELPSE are in the second flowchart (provided in Appendix E), and the answers to those questions are as follows:

Level 1: Is the project in a CO nonattainment area?

Response: No. It and its respective air basin are in an attainment/ maintenance area for the federal CO standards (Table 2-1).

Level 1: Was the area redesignated as an attainment area after the 1990 Clean Air Act?

Response: Yes. Riverside County was redesignated as an attainment area on June 11, 2007, and the associated maintenance plan will expire in 2027.

Level 1: Has "continued attainment" been verified with the local air district, if appropriate?

Response: Yes. Based on ambient air monitoring data collected by SCAQMD, SCAB has continually met the NAAQS for CO since 2002 (proceed to Level 7).

Level 7: Does the project worsen air quality?

Response: Yes. Because two of the following conditions (listed in Section 4.7.1 of the CO Protocol) are met, it would potentially worsen air quality:

- *The project substantially increases the percentage of vehicles operating in the cold-start mode. Increasing the number of vehicles in cold-start mode by as little as two percent should be considered potentially substantial.*

Because the ELPSE would not generate new vehicular traffic trips because it would not construct new homes or businesses, it is assumed that the number of vehicles operating in cold-start mode would remain the same or decrease slightly.

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

  As shown in Table 4-4 and Table 4-5, the ELPSE would increase the peak hour traffic volumes along I-15 by more than five percent, which meets this criterion.

- *The project worsens traffic flow. For uninterrupted roadway segments, a reduction in average speeds (within a range of three to 50 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 a worsening of traffic flow.*

  Under the Design Year (2050) conditions, the Build Alternative would degrade traffic operation service levels at 11 percent of the freeway mainline and ramp locations during the AM and PM peak hour compared to the No-Build Alternative, which meets this criterion.

Level 7 (cont.): Is the project suspected of resulting in higher CO concentrations than those existing within the region at the time of attainment demonstration?

Response: No. CO concentrations at the intersections under study are projected to be lower than those reported for the maximum of the intersections analyzed in the CO attainment plan because all of the following conditions listed in Section 4.7.2 of the CO Protocol are satisfied:

- The receptor locations at the intersections under study are at the same distance or farther from the traveled roadway than the receptor locations used in the intersections in the attainment plan. The attainment plan evaluates the CO concentrations at a distance of 10 feet from the edge of the roadways. The CO Protocol does not permit the modeling of receptor locations closer than this distance.
- Its intersection traffic volumes and geometries are not substantially different from those included in the attainment plan. Also, the intersections under study have less total traffic and the same number of lanes or fewer than the intersections in the attainment plan.
- The assumed meteorology for the intersections under study is the same as the assumed meteorology for the intersections in the attainment plan. Both use the worst-case scenario meteorology settings in the CALINE4 and/or CAL3QHC models.
- As shown in Tables 4-6 and 4-7, its interchange ramp volumes are similar to or lower than those assumed for the intersection in the attainment plan. Because the volumes in 2030 are lower than those in 2050, the traffic lane volumes listed in Table 4-7 represent the worst-case scenario for the Project.
- It would not generate new vehicular traffic trips because it would not construct new homes or businesses. So, it is assumed that the Project would not change the number of vehicles operating in cold-start mode.

- The percentages of heavy-duty gas trucks in the intersections under study are the same or lower than the percentages used for the intersections in the attainment plan analysis. It is assumed that traffic distribution at the intersections under study does not vary from the EMFAC standards.
- Average delay and queue length for each approach are the same or less for the intersections under study compared to those found in the intersections in the attainment plan. The predicted LOS for the intersections under study range from A to F. The LOS for the intersections in the attainment plan are not listed; however, the traffic counts and intersection geometries correspond to LOS F for three of the four intersections in the attainment plan.
- As shown in Table 3-1, the background CO concentrations in the area of the intersections under study are up to 1.6 ppm for one hour and 0.8 ppm for eight hours, which is lower than the background concentrations for the intersections in the attainment plan. These varied from 5.3 to 13.2 ppm for one hour and 3.7 to 9.9 ppm for eight hours.

Table 4-4. 2030 Traffic Volumes

I-15 Freeway Segment	No Build			Build			Project Increase		
	ADT	Truck ADT	Truck %	ADT	Truck ADT	Truck %	ADT	Truck ADT	% Increase in Trucks
South of Main Street	173,700	16,230	9.3%	185,200	16,230	8.8%	11,500	0	0%
Main Street to SR-74	166,000	15,440	9.3%	178,900	15,440	8.6%	12,900	0	0%
SR-74 to Nichols Road	149,100	13,740	9.2%	163,200	13,740	8.4%	14,100	0	0%
Nichols Road to Lake Street	147,900	13,610	9.2%	161,700	13,610	8.4%	13,800	0	0%
Lake Street to Horsethief Canyon	155,900	14,460	9.3%	170,400	14,460	8.5%	14,500	0	0%
Horsethief Canyon to Indian Truck Trail	155,900	14,460	9.3%	170,400	14,460	8.5%	14,500	0	0%
Indian Truck Trail to Temescal Canyon Road	158,700	14,650	9.2%	174,200	14,650	8.4%	15,500	0	0%
Temescal Canyon Road to Weirick Road	161,000	14,750	9.2%	176,500	14,750	8.4%	15,500	0	0%
Weirick Road to Cajalco Road	185,000	17,190	9.3%	199,500	17,190	8.6%	14,500	0	0%
Cajalco Road to El Cerrito Road	205,000	19,290	9.4%	222,900	19,290	8.7%	17,900	0	0%
El Cerrito Road to Ontario Avenue	214,200	20,340	9.5%	229,400	20,340	8.9%	15,200	0	0%
Ontario Avenue to Magnolia Avenue	230,500	22,000	9.5%	239,700	22,000	9.2%	9,200	0	0%
Magnolia Avenue to SR-91	251,500	24,020	9.6%	258,200	24,020	9.3%	6,700	0	0%

Source: Fehr & Peers 2022.
ADT = average daily traffic; SR = State Road

Table 4-5. 2050 Traffic Volumes

I-15 Freeway Segment	No Build			Build			Project Increase		
	ADT	Truck ADT	Truck %	ADT	Truck ADT	Truck %	ADT	Truck ADT	% Increase in Trucks
South of Main Street	178,700	17,270	9.7%	225,300	20,728	7.7%	46,600	0	0%
Main Street to SR-74	175,900	16,940	9.6%	227,100	16,942	7.5%	51,200	0	0%
SR-74 to Nichols Road	158,400	15,060	9.5%	211,000	22,155	7.1%	52,600	0	0%
Nichols Road to Lake Street	159,000	15,150	9.5%	216,800	22,234	7.0%	57,800	0	0%
Lake Street to Horsethief Canyon	167,700	16,080	9.6%	230,400	21,976	7.0%	62,700	0	0%
Horsethief Canyon to Indian Truck Trail	171,500	16,310	9.5%	231,900	22,119	7.0%	60,400	0	0%
Indian Truck Trail to Temescal Canyon Road	176,600	16,720	9.5%	237,700	21,307	7.0%	61,100	0	0%
Temescal Canyon Road to Weirick Road	180,700	17,090	9.5%	242,800	19,636	7.0%	62,100	0	0%
Weirick Road to Cajalco Road	209,300	20,030	9.6%	275,900	19,886	7.3%	66,600	0	0%
Cajalco Road to El Cerrito Road	264,900	25,540	9.6%	330,700	22,061	7.7%	65,800	0	0%
El Cerrito Road to Ontario Avenue	280,600	27,030	9.6%	334,400	21,309	8.1%	53,800	0	0%
Ontario Avenue to Magnolia Avenue	296,400	28,610	9.7%	339,950	21,930	8.5%	44,050	0	0%
Magnolia Avenue to SR-91	314,500	30,520	9.7%	348,200	19,534	8.8%	33,700	0	0%

Source: Fehr & Peers 2022.
ADT = average daily traffic; SR = State Road

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Table 4-6. Peak Hour Approach Lane Volumes Used in the 2003 Air Quality Management Plan Attainment Demonstration

Location	Northbound (AM/PM)	Southbound (AM/PM)	Eastbound (AM/PM)	Westbound (AM/PM)
Wilshire and Veteran (4 lanes all directions)	140/233	180/350	1,238/517	458/829

Source: SCAQMD 2003 Air Quality Management Plan.

Table 4-7. 2050 Build Alternative Lane Volumes

Location	Southbound Off-Ramp (AM/PM)	Southbound On-Ramp AM/PM)	Northbound Off-Ramp (AM/PM)	Northbound On-Ramp (AM/PM)
Magnolia Avenue	695/405	375/580	620/565	485/430
Ontario Avenue	1,120/1,020	370/780	585/515	755/650
El Cerrito Road	420/1,200	745/1,000	1,165/1,420	1,060/780
Cajalco Road	745/1,000	290/790	940/710	1,165/1,420
Weirick Road	700/1,060	65/195	80/400	600/1,010
Temescal Canyon Road	610/650	95/265	650/240	280/670
Indian Truck Trail	300/640	200/190	480/340	260/225
Horsethief Canyon	350/370	280/710	660/430	840/700
Lake Street	240/750	165/145	270/210	620/255
Nichols Road	570/510	620/340	470/450	530/220
Central (SR-74)	430/705	665/715	405/375	760/910
Main Street	250/700	520/420	590/580	425/270

Source: Fehr & Peers 2022.

Because the I-15 ELPSE is not expected to result in any concentrations exceeding the one-hour or eight-hour CO standards, a quantitative Caline4 CO hot spot analysis is not required. The Build Alternative would not be expected to result in a new or more severe exceedance of either the NAAQS or CAAQS.

4.3.2 Particulate Matter Analysis

4.3.2.1 Hot-Spot Analysis

In November 2015, U.S. EPA released an updated version of the 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 FR 79370). The U.S. EPA originally released the quantitative guidance in December 2010; it released a revised version in November 2013 to reflect approval of EMFAC 2011 and U.S. EPA's 2012 particulate matter NAAQS final rule. The November 2015 version reflects MOVES2014 and its subsequent minor revisions, such as MOVES2014a, with revised design value calculations to be more consistent with other U.S. EPA programs and reflect guidance implementation and experience in the field. Note that EMFAC, not MOVES, should be used for project hot-spot analysis in California. The Transportation Conformity 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 with a significant number of diesel vehicles or increase in the number of diesel vehicles;

(ii) Projects affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles or those that will 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 identified in the applicable $PM_{2.5}$ and PM_{10} implementation plan or implementation plan submission, as appropriate, as sites with violations or possible violations.

Because the I-15 ELPSE is within a nonattainment area for the federal $PM_{2.5}$ standards and within an attainment/maintenance area for the federal PM_{10} standards, analyses are required for conformity purposes per 40 CFR, Part 93. However, U.S. 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. The ELPSE does not qualify as a POAQC because of the following reasons:

(i) The proposed Build Alternative would expand I-15 through the addition of express lanes and auxiliary lanes. Tables 4-4 and 4-5 list the average daily traffic (ADT) and truck ADT volumes along the highway segments within the project area for the Opening Year (2030) and Design Year (2050) conditions. These tables also compare the ADT and Truck ADT volumes associated with the Build Alternative to the No-Build conditions. As shown in Tables 4-4 and 4-5, the ELPSE would increase the total ADT by up to 17,900 in 2030 and by up to 66,600 in 2050. However, because the new lanes cannot accommodate heavy-duty vehicles, it is not anticipated that the extension of the existing express lanes in the median of I-15 would result in a substantial increase of truck trips. Tables 4-4 and 4-5 provide the data showing that the expanded highway would not substantially increase in the number of diesel vehicles.

(ii) As discussed above, the I-15 ELPSE would not substantially increase the number of diesel vehicles operating within the project study area and consequently not affect intersections that are operating at LOS D, E, or F with a substantial number of diesel vehicles.

(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 affecting locations, areas, or categories of sites that 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. As such, the ELPSE meets the CAA requirements and 40 CFR 93.116 without any explicit hot-spot analysis and would not create a new, or worsen an existing, $PM_{2.5}$ and PM_{10} violation.

Therefore, the proposed project meets the CAA requirements and 40 CFR 93.116 without any explicit hot-spot analysis and would not create a new, or worsen an existing, $PM_{2.5}$ and PM_{10} violation. As discussed in Section 3.4.3, on September 28, 2021, SGAG's Transportation Conformity Working Group determined that the ELPSE is not a POAQC.

4.3.3 NO_2 Analysis

As a surrogate for NO_2 emissions resulting from the proposed project, NO_X emissions were estimated for the Existing (2019), the No-Build Alternative, and the Build Alternative in the Opening Year (2030) and Design Year (2050), using project-specific traffic data and the CT-EMFAC2017 model. Table 4-3 shows that the Build Alternative would not increase NO_X emissions in the project vicinity relative to Existing (2019) emissions; however, at 2030 Opening Year and the 2050 Design Year, it would increase regional NO_X emissions by a maximum of 298.2 pounds per day, an increase of 1.7 percent. NO_X emissions for the Build Alternative and No-Build Alternative would be less than under Existing (2019) conditions at 2030 Opening Year and 2050 Design Year, due to the improvement in engine emissions technologies, as well as the retirement of older vehicles and their replacement with less-polluting vehicles.

4.3.4 Mobile-Source Air Toxics Analysis

FHWA released updated guidance in October 2016 for determining when and how to address MSAT impacts in the NEPA process for transportation projects (FHWA 2016). 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 for MSAT effects
- Quantitative analysis to differentiate alternatives for projects with higher potential for 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 FCCA conformity rule at 40 CFR 93.126; and (c) are not exempt, but have no meaningful impacts on traffic volumes or vehicle mix.

Projects with low potential for MSAT effects are those that improve highway, transit, or freight operations or movements without adding substantial new capacity or creating a facility that is likely to increase emissions substantially.

Projects with high potential for MSAT effects include those that:

- Create or significantly alter a major intermodal freight facility with the potential to concentrate high levels of DPM at 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 AADT is projected to be in the range of 140,000 to 150,000 or greater by the Design Year; and
- Are to be located in proximity to populated areas or, in rural regions, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

With respect to the I-15 ELPSE, the projected maximum AADT volumes at the Opening Year (2030) and Design Year (2050) would be above the 140,000 to 150,000 AADT criterion established by FHWA for projects considered to have higher potential for MSAT effects. According to FHWA guidance, “projects with higher potential MSAT effects” have the potential for meaningful differences in VMT and related MSAT emissions among project alternatives.

The latest federally approved version of CT-EMFAC, CT-EMFAC2017, released in January 2019 and based on EMFAC and factors provided by CARB and U.S. EPA, was used to estimate emissions of MSATs, including benzene, 1,3-butadiene, formaldehyde, acrolein, naphthalene, DPM, and polycyclic organic matter.

MSAT emissions were estimated for Existing (2019) conditions, No-Build 2030, and No-Build 2050 conditions, as well as the Build Alternative under 2030 Opening Year and 2050 Design Year conditions. Table 4-8 presents the modeling results for the Existing (2019, 2030 Opening Year, and 2050 Design Year conditions; Appendix D includes traffic activity data. Emissions were estimated for all MSATs using CT-EMFAC, based on EMFAC and speciation factors provided by CARB and U.S. EPA.

Table 4-8. Summary of Comparative MSAT Emissions Analysis (pounds per day)

Analysis Scenario	1,3-butadiene	Acetaldehyde	Acrolein	Benzene	Diesel Particulate Matter	Ethyl-benzene	Formaldehyde	Naphthalene	Polycyclic Organic Matter
2019 Existing	5.4	27.0	1.1	36.9	125.9	25.5	62.1	2.2	1.5
2030 Opening Year									
No-Build Alternative	3.3	8.0	0.7	24.5	37.7	21.6	21.1	1.8	0.6
Build Alternative	3.3	8.1	0.7	24.8	40.0	21.8	21.4	1.8	0.6
2030 Opening-Year Net Emissions vs. Existing									
Build Alternative	-2.1	-18.9	-0.4	-12.1	-85.8	-3.8	-40.7	-0.3	-0.9
2030 Opening-Year Net Emissions vs. No-Build Alternative									
Build Alternative	0.1	0.1	0.0	0.3	2.4	0.2	0.3	0.0	0.0

Analysis Scenario	1,3-butadiene	Acetaldehyde	Acrolein	Benzene	Diesel Particulate Matter	Ethyl-benzene	Formaldehyde	Naphthalene	Polycyclic Organic Matter
2050 Design Year									
No-Build Alternative	2.5	6.9	0.5	17.5	35.1	14.3	17.5	1.3	0.4
Build Alternative	2.5	6.9	0.6	17.5	37.1	14.3	17.5	1.3	0.4
2050 Design-Year Net Emissions vs. Existing									
Build Alternative	-2.9	-20.2	-0.5	-19.4	-88.8	-11.2	-44.6	-0.9	-1.1
2050 Design-Year Net Emissions vs. No-Build Alternative									
Build Alternative	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0

Source: Emissions modeled using CT-EMFAC20217. See modeling outputs provided in Appendix D.

As shown in Table 4-8, MSAT emissions for the Build Alternative and No-Build Alternative at both the Opening Year (2030) and Design Year (2050) are projected to be less than under Existing (2019) conditions due to improvements in engine emissions technologies, as well as the retirement of older vehicles. In addition, minor increases in MSAT emissions are predicted to occur under the Build Alternative relative to the No-Build Alternative in the Opening Year (2030) and Design Year (2050).

To comply with Council on Environmental Quality regulations (40 CFR 1502.22[b]) regarding incomplete or unavailable information, Appendix F discusses how air toxics analysis is an emerging field, and how current scientific techniques, tools, and data are not sufficient to accurately estimate the human health effects that would result from a transportation project in a way that would be useful to decision-makers. This appendix also contains a summary of current studies regarding the health effects of MSATs so that it is in compliance with 40 CFR 1502.22(b).

Regardless of the alternative chosen, emissions in future years would be lower than present levels as a result of U.S. EPA’s national control programs, which are projected to reduce annual MSAT emissions by more than 90 percent from 2010 to 2050. Local conditions may differ from these national projections in terms of three factors: fleet mix and turnover, VMT growth rates, and local control measures. However, even after accounting for VMT growth, the magnitude of the U.S. EPA projected reductions is so great that MSAT emissions in the project study area are likely to be lower in the future in virtually all locations.

Under the Build Alternative conditions, there would be localized areas where VMT would increase. It is likely that localized increases in some MSAT emissions would occur under the Build Alternative as compared to the No-Build Alternative. The localized increases in some MSAT emissions would be most pronounced along freeway mainline sections under the Build

Alternative. However, they, too, would be substantially reduced in the future due to implementation of U.S. EPA's vehicle and fuel regulations.

4.3.5 Greenhouse Gas Emissions Analysis

An individual project does not generate enough GHG emissions to influence global climate change significantly. Rather, global climate change is a cumulative impact. This means that a project may contribute to a potential impact through its incremental change in emissions when combined with the contributions of all other sources of GHGs.[8] In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable." To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. Gathering the needed information on a global scale would be a difficult, if not impossible, task.

GHG emissions for transportation projects can be divided into those produced during construction and those during operation, as discussed below.

4.3.5.1 Construction Emissions

Construction GHG emissions would result from material processing, onsite construction equipment, and traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase. Project construction would involve crawler tractors, excavators, graders, rollers, rubber-tired loaders, scrapers, rough terrain forklifts, and paving equipment, among other types of construction equipment.

Construction GHG emissions were calculated using the Sacramento Metropolitan Air Quality Management District Roadway Construction Emissions Model and estimated to total approximately 5,444 metric tons over the course of the approximately three-year construction period. Appendix C details construction GHG emissions modeling assumptions.

4.3.5.2 Operational Emissions

Four primary strategies can reduce GHG emissions from transportation sources: (1) improving the transportation system and operational efficiencies; (2) reducing travel activity; (3) transitioning to fuels that emit lower levels of GHGs; and (4) improving vehicle technologies and efficiency. To be most effective, all four strategies should be pursued concurrently. FHWA supports these strategies to lessen climate change impacts. These strategies correlate with efforts that California is undertaking to reduce GHG emissions from the transportation sector.

Figure 4-1 shows that the highest levels of CO_2 from mobile sources such as automobiles occur at stop-and-go speeds (0 to 25 mph, which are the most severe) and speeds of more than 55 mph. To

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

the extent that a project relieves congestion by enhancing operations and improving travel times in high-congestion travel corridors, GHG emissions, particularly CO_2, may be reduced.

The ELPSE is identified in SCAG's 2020–2045 RTP/SCS under project number 3160001-RIV170901. The Build Alternative directly supports the 2020–2045 RTP/SCS mobility and accessibility performance outcome by reducing vehicle delay and congestion. This strategy contributes to overall GHG reduction efforts regarding mobile sources within the SCAG region.

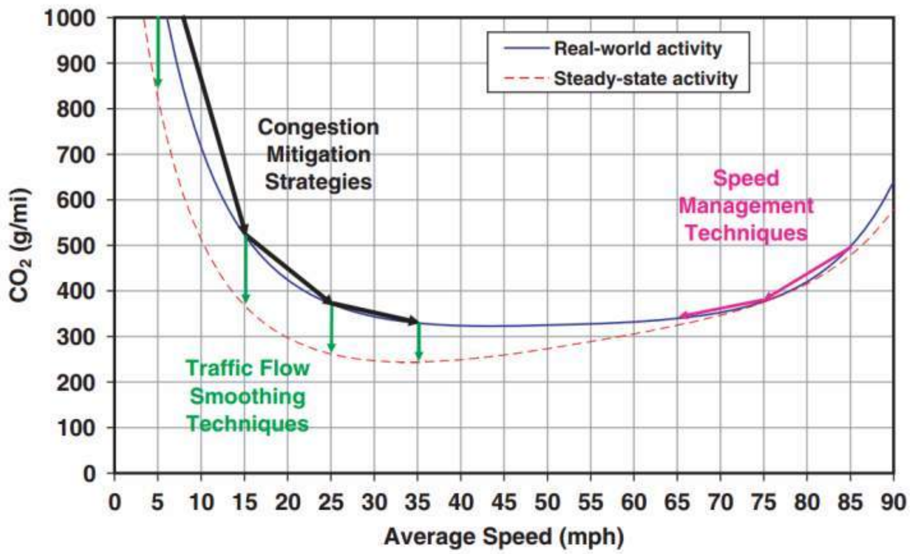

Figure 4-1. Possible Use of Traffic Operation Strategies in Reducing On-Road CO_2 Emissions

Source: Barth and Boriboonsomsin 2010.

The regional VMT data, along with the CT-EMFAC2017 emission rates, were used to calculate the CO_2 emissions for the Existing (2019), Opening Year (2030) No-Build, Opening Year (2030) Build, Design Year (2050) No-Build, and Design Year (2050) Build conditions. Table 4-9 summarizes the results of the modeling, showing that all the future No-Build and Build condition emissions are higher than under the existing condition. Appendix D provides the analysis. When compared to the No-Build conditions, the Build Alternative would result in a minimal increase in emissions.

Table 4-9. Summary of Operational GHG Emissions (metric tons per year)

Scenario/Analysis Year	CO_2e	Annual Vehicle Miles Traveled[a]
Existing Year (2019)	1,332,631.8	3,319,554,680
Opening Year (2030)		
No-Build Alternative	1,539,138.5	5,221,621,300
Build Alternative	1,581,455.8	5,377,597,800
Design Year (2050)		
No-Build Alternative	1,399,081.3	5,430,206,470
Build Alternative	1,425,225.1	5,556,004,380

Source: Modeled using CT-EMFA2017.

[a.] Annual VMT values derived from daily VMT values multiplied by 347, per CARB methodology (CARB 2008).

CO_2e = carbon dioxide equivalent

4.3.5.3 Limitations of EMFAC

Although EMFAC has a rigorous scientific foundation and has been vetted through multiple stakeholder reviews, its emission rates are based on tailpipe emission test data. The numbers are estimates of CO_2 emissions and do not necessarily reflect actual CO_2 emissions. The model does not account for factors such as the rate of acceleration and vehicle aerodynamics, both of which influence CO_2 emissions. To account for CO_2 emissions, CARB's GHG inventory follows the Intergovernmental Panel on Climate Change guideline (IPCC 2007) by assuming complete fuel combustion while still using EMFAC data to calculate CH_4 and N_2O emissions. Although EMFAC is currently the best available tool for use in calculating GHG emissions, the CO_2 numbers provided are useful only for a comparison of alternatives.

4.4 Cumulative/Regional/Indirect Effects

The I-15 ELPSE would involve emissions of VOC/ROG and NO_X. These emission types contribute to the formation of O_3, secondary PM_{10}, and secondary $PM_{2.5}$ as a result of photochemical reactions during project construction. Table 4-1 shows that construction of the Build Alternative is projected to result in temporary increases in daily emissions of ROG, CO, NO_X, $PM_{2.5}$, and PM_{10}.

Because the project area is in the SCAB, the SCAB is the appropriate study area for the evaluation of cumulative impacts on air quality. SCAQMD has responsibility for managing the SCAB's air resources and is responsible for bringing the basin into attainment with respect to NAAQS and CAAQS. To achieve this goal, SCAQMD prepares and updates the AQMPs for the SCAB regarding the various pollutants with emissions inventories based on data from SCAG, including regional transportation planning documents prepared by SCAG.

The I-15 ELPSE is included in the SCAG 2020–2045 RTP/SCS under project number 3160001-RIV170901 and has been incorporated into the SCAG 2021 FTIP. FHWA approved the 2020–2045 RTP/SCS and the 2021 FTIP on June 5, 2020; the FTA approved it on April 16, 2021 (Appendix A). In its Program Environmental Impact Report (PEIR) prepared for the 2020–2045 RTP/SCS, SCAG concluded that RTP mitigation measures would encourage a reduction in GHG emissions; however, they would not guarantee GHG emission reductions. Under SCAG's limited authority, measures proposed in the PEIR are not directly enforceable; therefore, cumulative impacts would remain significant and unavoidable under CEQA (SCAG 2019).

Chapter 5 Minimization Measures

5.1 Short-Term (Construction) Measures

The following standard measures will be implemented during construction activities to mitigate impacts from construction. The following measures are either an avoidance, minimization, or mitigation measure that go beyond standard measures included on most Caltrans projects.

AQ-1 During clearing, grading, earthmoving, or excavation operations, fugitive dust emissions will be controlled by regular watering or other dust-preventive measures using the following procedures, as specified in SCAQMD Rule 403. All material excavated or graded will be sufficiently watered to prevent excessive amounts of dust. Watering will occur at least twice daily with complete coverage, preferably in the late morning and after work is finished for the day. All material transported on site or off site will be either sufficiently watered or securely covered to prevent excessive amounts of dust. The areas disturbed by clearing, grading, earthmoving, or excavation operations will be minimized so as to prevent excessive amounts of dust. These control techniques will be indicated in project specifications. Visible dust beyond the property line emanating from the Project will be prevented to the maximum extent feasible.

AQ-2 Project grading plans will show the duration of construction. Ozone precursor emissions from construction equipment vehicles will be controlled by maintaining equipment engines in good condition and in proper tune per manufacturers' specifications.

AQ-3 All trucks that are to haul excavated or graded material on site will comply with State Vehicle Code Section 23114, with special attention to Sections 23114(b)(F), (e)(2), and (e)(4), as amended, regarding the prevention of such material spilling onto public streets and roads.

AQ-4 The contractor will adhere to Caltrans Standard Specifications for Construction (Section 14.9 02).

5.2 Long-Term (Operational) Measures

No long-term (operational) minimization measures are required.

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Chapter 6 Conclusions

Summarized below are the short- and long-term air quality impacts from emissions from construction and operational activities. Impacts from operational emissions under different build scenarios have been compared and summarized. Lastly, MSAT conformity analysis results have been summarized.

- Construction Emissions: Compliance with Caltrans Standard Specifications Sections 14.9-02 and the SCAQMD Rules and Regulations during construction will be implemented to reduce construction-related air quality impacts from fugitive dust emissions and construction equipment emissions.
- Comparison of Operational Emissions between Alternatives: The emissions of the Build Alternative under Opening Year (2030) and Design Year (2050) conditions are projected to increase PM_{10} and $PM_{2.5}$ emissions compared with existing conditions and decrease ROG, NO_X, and CO emissions.
  - The increase in particulate matter is partly due to background growth in VMT from 2019 to 2050 because particulate matter fugitive dust emissions are a function of VMT.
  - The decreases in other pollutants are due to expected improvements in vehicle engine technology, fuel efficiency, and turnover in older, more-heavily polluting vehicles, which reduces exhaust emissions.
  - When compared to the No-Build Alternative, except for CO and ROG in 2050, the Build Alternative is projected to: a) result in a marginal increase in daily regional emissions due to capacity expansion and subsequent increases in VMT along the project corridor, and b) result in a minimal increase in GHG emissions in the project area.
- MSAT: The ELPSE is required to include an analysis of MSAT as part of the NEPA process for highways. The Build Alternative is projected to result in a minimal increase in MSAT emissions in the project limits when compared to the No-Build Alternative. Existing (2019) MSAT emissions, including DPM, are projected to be substantially greater than 2030 and 2050 emissions, despite projected increases in vehicle volumes. This is due to improvements in engine efficiencies and associated emission rates.

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Appendices

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Appendix A: RTP and FTIP Listings for the Project

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FTIP ID	LEAD AGENCY	COUNTY	CONFORM CATEGORY	AIR BASIN	PROJECT COST	RTP ID	SYSTEM
RIV160101	RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	Riverside	TCM Committed	SCAB	$270,000	RIV071250B	State

PRIMARY PROGRAM CODE	PROJECT LIMITS	MODELING	FTIP AMENDMENT
CANT9 - NEW HOT LANE(S) REGIONALLY SIGNIFICANT	From SB-15 to WB-91 Post Miles: Begin 41.50 End 43.40	YES	21-03

DESCRIPTION

IN WESTERN RIVERSIDE COUNTY ON SR-91/I-15: On I-15 - ADD TOLL EXPRESS LANE MEDIAN DIRECT CONNECT FROM SB15 TO WB91 & EB91 TO NB15, 1 TOLL EXPRESS LANE EACH DIRECTION FROM HIDDEN VALLEY TO SR91 DIRECT CONNECTOR. CONSTRUCT OPERATIONAL IMPROVEMENT BY EXTENDING THE EB91 EXPRESS LANE AND AND AUXILARY LANE ALONG SR91. CONSTRUCT ADDITIONAL SIGNAGE ALONG SR91 AT PM R18.0 IN OR COUNTY.

PHASE	FUND SOURCE	PRIOR	20/21	21/22	22/23	23/24	24/25	25/26	FUTURE	TOTAL
PE	SENATE BILL 132	$18,873	$0	$0	$0	$0	$0	$0	$0	$18,873
ROW	SENATE BILL 132	$10,000	$0	$0	$0	$0	$0	$0	$0	$10,000
CON	AGENCY	$0	$90,000	$0	$0	$0	$0	$0	$0	$90,000
CON	SENATE BILL 132	$100,000	$51,127	$0	$0	$0	$0	$0	$0	$151,127
TOTAL	TOTAL	$128,873	$141,127	$0	$0	$0	$0	$0	$0	$270,000

FTIP ID	LEAD AGENCY	COUNTY	CONFORM CATEGORY	AIR BASIN	PROJECT COST	RTP ID	SYSTEM
RIV160101A	RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	Riverside	EXEMPT - 93.126	SCAB	$1,000	RIV071250B	State

PRIMARY PROGRAM CODE	PROJECT LIMITS	MODELING	FTIP AMENDMENT
CANT9 - NEW HOT LANE(S) REGIONALLY SIGNIFICANT	From East of Main Street to East of Promenade Ave Post Miles: Begin 6.20 End 8.60	NO	21-17

DESCRIPTION

IN WESTERN RIVERSIDE COUNTY IN THE CITY OF CORONA ON EASTBOUND SR-91: ADD A SECOND TOLL EXPRESS LANE FROM THE EXIT TO THE EXPRESS LANES CONNECTORS (JUST EAST OF THE MAIN STREET UNDERCROSSING) TO THE BEGINNING OF THE SR-91 HOV LANE JUST EAST OF THE PROMENADE AVENUE OVERCROSSING. PAED ONLY.

PHASE	FUND SOURCE	PRIOR	20/21	21/22	22/23	23/24	24/25	25/26	FUTURE	TOTAL
PE	AGENCY	$0	$0	$500	$500	$0	$0	$0	$0	$1,000
TOTAL	TOTAL	$0	$0	$500	$500	$0	$0	$0	$0	$1,000

FTIP ID	LEAD AGENCY	COUNTY	CONFORM CATEGORY	AIR BASIN	PROJECT COST	RTP ID	SYSTEM
RIV170901	RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	Riverside	TCM Committed	SCAB	$523,828	3160001	State

PRIMARY PROGRAM CODE	PROJECT LIMITS	MODELING	FTIP AMENDMENT
CANT9 - NEW HOT LANE(S) REGIONALLY SIGNIFICANT	From Main St to Central Ave Post Miles: Begin 21.20 End 38.10	YES	21-05

DESCRIPTION

IN WESTERN RIVERSIDE COUNTY - ON I-15, ADD 2 EXPRESS LANES IN EACH DIRECTION, GENERALLY IN THE MEDIAN, FROM SR-74 (CENTRAL AVENUE) (PM 22.3) IN THE CITY OF LAKE ELSINORE TO EL CERRITO ROAD (PM 38.1) IN THE CITY OF CORONA. CONSTRUCT SOUTHBOUND AUXILIARY LANE FROM MAIN STREET (PM 21.2) TO SR-74 (CENTRAL AVENUE) (PM 22.3) AND FROM SR-74 (CENTRAL AVENUE) (PM 22.3) TO NICHOLS ROAD (PM 23.9). SIGNAGE AND TRANSITION STRIPING EXTENDS TO PM 20.3 TO THE SOUTH AND PM 40.1 TO THE NORTH.

PHASE	FUND SOURCE	PRIOR	20/21	21/22	22/23	23/24	24/25	25/26	FUTURE	TOTAL
PE	AGENCY	$0	$0	$15,147	$0	$0	$0	$0	$0	$15,147
PE	CMAQ	$29,828	$0	$0	$0	$0	$0	$0	$0	$29,828
ROW	AGENCY	$0	$0	$8,435	$0	$0	$0	$0	$0	$8,435
CON	AGENCY	$0	$0	$0	$0	$470,418	$0	$0	$0	$470,418
TOTAL	TOTAL	$29,828	$0	$23,582	$0	$470,418	$0	$0	$0	$523,828

FTIP ID	LEAD AGENCY	COUNTY	CONFORM CATEGORY	AIR BASIN	PROJECT COST	RTP ID	SYSTEM
RIV180104	RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	Riverside	NON-EXEMPT	SCAB	$37,300	2016A319	State

PRIMARY PROGRAM CODE	PROJECT LIMITS	MODELING	FTIP AMENDMENT
NCR88 - RAMPS-MODIFY	From W/B off/on ramps to E/B off/on ramps Post Miles: Begin 8.20 End 11.30	YES	21-18

DESCRIPTION

IN WESTERN RIVERSIDE COUNTY IN THE CITIES OF BANNING AND BEAUMONT: I-10/HIGHLAND SPRINGS IC IMPROVEMENTS - IMPROVE EXISTING W/B OFF RAMP AND W/B ON RAMP

PHASE	FUND SOURCE	PRIOR	20/21	21/22	22/23	23/24	24/25	25/26	FUTURE	TOTAL
PE	AGENCY	$300	$0	$2,000	$0	$3,000	$0	$0	$0	$5,300
ROW	AGENCY	$0	$0	$0	$0	$2,000	$0	$0	$0	$2,000
CON	AGENCY	$0	$0	$0	$0	$0	$0	$30,000	$0	$30,000
TOTAL	TOTAL	$300	$0	$2,000	$0	$5,000	$0	$30,000	$0	$37,300

TABLE 1 Continued

#	COUNTY	LEAD AGENCY	RTP ID	FTIP ID	SYSTEM	ROUTE #	DESCRIPTION	COMPLETION YEAR	PROJECT COST ($1,000'S)	FISCAL IMPACT	REASON FOR AMENDMENT
106	RIVERSIDE	RIVERSIDE COUNTY TRANSPOR-TATION COMMISSION (RCTC)	3160001	RIV170901	STATE HIGHWAY	15	EXISTING: IN WESTERN RIVERSIDE COUNTY – ON I-15, ADD 2 EXPRESS LANES IN EACH DIRECTION, GENERALLY IN THE MEDIAN, FROM CAJALCO ROAD IN THE CITY OF CORONA TO SR-74 (CENTRAL AVENUE) IN THE CITY OF LAKE ELSINORE. CONSTRUCT ONE AUXILIARY LANE IN THE SOUTHBOUND DIRECTION FROM CAJALCO ROAD TO WEIRICK ROAD. REVISED: IN WESTERN RIVERSIDE COUNTY - ON I-15, ADD 2 EXPRESS LANES IN EACH DIRECTION, GENERALLY IN THE MEDIAN, FROM SR-74 (CENTRAL AVENUE) (PM 22.3) IN THE CITY OF LAKE ELSINORE TO EL CERRITO ROAD (PM 38.1) IN THE CITY OF CORONA. CONSTRUCT SOUTHBOUND AUXILIARY LANE FROM MAIN STREET (PM 21.2) TO SR-74 (CENTRAL AVENUE) (PM 22.3) AND FROM SR-74 (CENTRAL AVENUE) (PM 22.3) TO NICHOLS ROAD (PM 23.9). SIGNAGE AND TRANSITION STRIPING EXTENDS TO PM 20.3 TO THE SOUTH AND PM 40.1 TO THE NORTH.	2027	EXISTING: $544,000 REVISED: $523,828	RTP PROJECT COST DECREASE	REVISED PROJECT DESCRIPTION
107	RIVERSIDE	RIVERSIDE COUNTY TRANSPOR-TATION COMMISSION (RCTC)	3200S010	RIV181113	STATE HIGHWAY	15	EXISTING: IN WESTERN RIVERSIDE COUNTY - CONSTRUCT 1 AUX LN SB FROM CAJALCO ROAD TO WEIRICK ROAD. EXTEND 1 EXPRESS LN NB FROM ABOUT 2,000' S/O BEDFORD CANYON WASH TO CAJALCO ROAD. REVISED: IN WESTERN RIVERSIDE COUNTY – ON I-15: CONSTRUCT 1 AUX LN SB FROM WEIRICK RD TO CAJALCO RD AND WIDEN BEDFORD WASH BRIDGE. PM FOR ADVANCED SIGNAGE AND ANCILLARY IMPROVEMENTS: 35.6 TO 37.2	EXISTING: 2026 REVISED: 2025	EXISTING: $28,000 REVISED: $38,246	RTP PROJECT COST INCREASE	REVISED SCHEDULE AND PROJECT DESCRIPTION

Appendix B: PM Hot-spot Analysis

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PROJECT LEVEL CONFORMITY

- Project-Level Conformity Contact List
- PM Hot-Spot Interagency Review Form Template
- Caltrans Conformity Streamlining Exemption Form

Lists of PM hot spot interagency review forms, qualitative analyses and quantitative analyses

PM Hot Spot Forms

DECEMBER 2021

December 2021	Determination
RIV151218	To be determined at the December 7, 2021 TCWG meeting.
LA99ITC101	To be determined at the December 7, 2021 TCWG meeting.
RIV190901	To be determined at the December 7, 2021 TCWG meeting.

SEPTEMBER 2021

September 2021	Determination
RIV170901	Not a POAQC – Hot Spot Analysis Not Required
RCTC I-15 Auxiliary Lane (0.84 mile) Exemption Request Memo	TCWG concurred that this is an Exempt Project.

RTIP ID# *(required)* RIV170901

TCWG Consideration Date September 28, 2021

Project Description *(clearly describe project)*
The Riverside County Transportation Commission (RCTC), in cooperation with the California Department of Transportation (Caltrans), is proposing to construct new lanes along Interstate 15 (I-15) between Post Mile (PM) 21.2 and PM 38.1 in Riverside County, California. The primary component of the I-15 Express Lanes Project Southern Extension Project (Project) would be the addition of two tolled express lanes in both the northbound and southbound directions within the median of I-15 from State Route 74 (SR-74) (Central Avenue) (PM 22.3) in the City of Lake Elsinore, through the unincorporated Riverside County community of Temescal Valley, to El Cerrito Road (PM 38.1) in the City of Corona, for a distance of approximately 15.8 miles. The proposed Project would also add a southbound auxiliary lane between both the Main Street (PM 21.2) Off-Ramp and SR-74 (Central Avenue) On-Ramp (approximately 0.75 mile), and the SR-74 (Central Avenue) Off-Ramp and Nichols Road On-Ramp (PM 23.9) (approximately one mile). Along with the lane additions, which would extend from PM 21.2 to 38.1, the proposed Project would include widening of up to 15 bridges; potential construction of noise barriers, retaining walls, and drainage systems; and implementation of electronic toll collection equipment and signs. Associated improvements for the toll lanes, including advance signage and transition striping, would extend approximately two miles from each end of the express lane limits to PM 20.3 in the south and PM 40.1 in the north. The proposed lane additions and supporting infrastructure are expected to be constructed primarily within the existing state right of way.

Type of Project *(use Table 1 on instruction sheet)*
Change to existing state highway

County Riverside	**Narrative Location/Route & Postmiles** I-15 (PM 21.2 to 38.1) **Caltrans Projects – EA#** 08-0J0820

Lead Agency: RCTC

Contact Person	**Phone#**	**Fax#**	**Email**
Stephanie Blanco	951-809-1617		SBlanco@RCTC.org

Hot Spot Pollutant of Concern *(check one or both)* **$PM_{2.5}$** X **PM_{10}** X

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

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

Scheduled Date of Federal Action: 6/2024

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

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

Current Programming Dates *(as appropriate)*

	PE/Environmental	**ENG**	**ROW**	**CON**
Start	5/2019	6/2024	6/2024	1/2025
End	6/2024	12/2026	12/2024	12/2027

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

Purpose

The purpose of the proposed Project is to:

- Improve and manage traffic operations, congestion, and travel times along the corridor
- Expand travel mode choice along the corridor
- Provide an option for travel time reliability
- Provide a cost-effective mobility solution
- Expand and maintain compatibility with the express lane network in the region

Need

Existing traffic volumes often exceed current highway capacity along several segments of I-15 between SR-74 (Central Avenue) and El Cerrito Road. Due to forecasted population growth and the continued development to support the projected growth in the region, the I-15 corridor is expected to continue to experience increased congestion and longer commute times that are projected to negatively affect traffic operations along the freeway mainline.

Surrounding Land Use/Traffic Generators *(especially effect on diesel traffic)*
The land uses located along the Project corridor include residences, commercial developments, industrial uses, and open space. The majority of the sensitive receptors within or adjacent to the Project area are residential, park, church, and school uses.

Opening Year: Build and No Build LOS, AADT, % and # Trucks, Truck AADT of Proposed Facility
I-15

2030 No Build: ADT= 251,500, Truck ADT= 24,020 (9.6%), Level of Service (LOS) F

2030 Build: ADT= 258,200, Truck ADT= 24,020 (9.3%), LOS F

RTP Horizon Year / Design Year: Build and No Build LOS, AADT, % and # Trucks, Truck AADT of Proposed Facility
I-15

2050 No Build: ADT= 314,500, Truck ADT= 30,520 (9.7%), LOS F

2050 Build: ADT= 348,200, Truck ADT= 30,520 (8.8%), LOS F

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

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
N/A

Describe potential traffic redistribution effects of congestion relief *(impact on other facilities)*
See attached analysis.

Comments/Explanation/Details *(attach additional sheets as necessary)*
See attached analysis.

$PM_{2.5}$/PM_{10} Hot-Spot Analysis

The proposed Project is within a nonattainment area for federal standards for particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) and within an attainment/maintenance area for the federal standards for particulate matter less than 10 microns in diameter (PM_{10}). Therefore, per 40 Code of Federal Regulations (CFR) Part 93, hot-spot analyses are required for conformity purposes. However, the U.S. Environmental Protection Agency 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 (POAQC):

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

The Project does not qualify as a POAQC because of the following reasons:

i) The build alternative proposed as part of the Project would expand I-15 through the addition of express lanes and auxiliary lanes. Tables 1 and 2 list the average daily traffic (ADT) and truck ADT volumes along the highway segments within the Project area for the opening year (2030) and horizon year (2050) conditions, respectively. These tables also compare the ADT and Truck ADT volumes associated with the build alternative to the No-Build conditions. As shown in Tables 1 and 2, the Project would increase the total ADT by up to 17,900 vehicles in 2030 and by up to 66,600 vehicles in 2050. The increase in ADT is anticipated to be a result of passenger car demand for this corridor. It is anticipated that the extension of the existing express lanes in the median of the I-15 corridor would not result in a significant increase in truck trips because heavy trucks are limited to the two outer lanes and would be restricted from utilizing the proposed express lanes. Peak period operational improvements of the GP lanes are also not anticipated to draw additional truck traffic as truck travel times are generally less sensitive to peak period travel timeframes. Additionally, generally trucks are already utilizing the I-15 corridor as a primary regional route due to a lack of viable alternative haul routes parallel to the I-15 corridor. Therefore, as illustrated in Tables 1 and 2, the expanded highway would not significantly increase in the number of diesel vehicles.
ii) As discussed above, the proposed Project would not significantly increase the number of diesel vehicles operating within the Project study area. In addition, the mainline project will not affect local street intersections. Therefore, the proposed Project would not affect intersections that are at LOS D, E, or F with a significant number of diesel vehicles.
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 affecting locations, areas, or categories of sites that 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.

Therefore, the proposed Project meets the Clean Air Act requirements and 40 CFR 93.116 without any explicit hot-spot analysis and would not create a new, or worsen an existing, $PM_{2.5}$ and PM_{10} violation.

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Table 1. 2030 Traffic Volumes

I-15 Freeway Segment	No-Build			Build			Project Increase		
	ADT	Truck ADT	Truck %	ADT	Truck ADT	Truck %	ADT	Truck ADT	% Increase in Trucks
South of Main Street	173,700	16,230	9.3%	185,200	16,230	8.8%	11,500	0	0%
Main Street to SR-74 (Central Avenue)	166,000	15,440	9.3%	178,900	15,440	8.6%	12,900	0	0%
SR-74 (Central Avenue) to Nichols Road	149,100	13,740	9.2%	163,200	13,740	8.4%	14,100	0	0%
Nichols Road to Lake Street	147,900	13,610	9.2%	161,700	13,610	8.4%	13,800	0	0%
Lake Street to Horsethief Canyon	155,900	14,460	9.3%	170,400	14,460	8.5%	14,500	0	0%
Horsethief Canyon to Indian Truck Trail	155,900	14,460	9.3%	170,400	14,460	8.5%	14,500	0	0%
Indian Truck Trail to Temescal Canyon Road	158,700	14,650	9.2%	174,200	14,650	8.4%	15,500	0	0%
Temescal Canyon Road to Weirick Road	161,000	14,750	9.2%	176,500	14,750	8.4%	15,500	0	0%
Weirick Road to Cajalco Road	185,000	17,190	9.3%	199,500	17,190	8.6%	14,500	0	0%
Cajalco Road to El Cerrito Road	205,000	19,290	9.4%	222,900	19,290	8.7%	17,900	0	0%
El Cerrito Road to Ontario Avenue	214,200	20,340	9.5%	229,400	20,340	8.9%	15,200	0	0%
Ontario Avenue to Magnolia Avenue	230,500	22,000	9.5%	239,700	22,000	9.2%	9,200	0	0%
Magnolia Avenue to SR-91	251,500	24,020	9.6%	258,200	24,020	9.3%	6,700	0	0%

Table 2. 2050 Traffic Volumes

I-15 Freeway Segment	No-Build			Build			Project Increase		
	ADT	Truck ADT	Truck %	ADT	Truck ADT	Truck %	ADT	Truck ADT	% Increase in Trucks
South of Main Street	178,700	17,270	9.7%	225,300	17,270	7.7%	46,600	0	0%
Main Street to SR-74 (Central Avenue)	175,900	16,940	9.6%	227,100	16,940	7.5%	51,200	0	0%
SR-74 (Central Avenue) to Nichols Road	158,400	15,060	9.5%	211,000	15,060	7.1%	52,600	0	0%
Nichols Road to Lake Street	159,000	15,150	9.5%	216,800	15,150	7.0%	57,800	0	0%
Lake Street to Horsethief Canyon	167,700	16,080	9.6%	230,400	16,080	7.0%	62,700	0	0%
Horsethief Canyon to Indian Truck Trail	171,500	16,310	9.5%	231,900	16,310	7.0%	60,400	0	0%
Indian Truck Trail to Temescal Canyon Road	176,600	16,720	9.5%	237,700	16,720	7.0%	61,100	0	0%
Temescal Canyon Road to Weirick Road	180,700	17,090	9.5%	242,800	17,090	7.0%	62,100	0	0%
Weirick Road to Cajalco Road	209,300	20,030	9.6%	275,900	20,030	7.3%	66,600	0	0%
Cajalco Road to El Cerrito Road	264,900	25,540	9.6%	330,700	25,540	7.7%	65,800	0	0%
El Cerrito Road to Ontario Avenue	280,600	27,030	9.6%	334,400	27,030	8.1%	53,800	0	0%
Ontario Avenue to Magnolia Avenue	296,400	28,610	9.7%	338,100	28,610	8.5%	41,700	0	0%
Magnolia Avenue to SR-91	314,500	30,520	9.7%	348,200	30,520	8.8%	33,700	0	0%

Appendix C: Construction Emissions Inventory Documentation

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Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> I-15 ELPSE

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	1.72	19.03	14.04	40.76	0.76	40.00	8.92	0.60	8.32	0.05	4,822.97	1.02	0.12	4,882.86
Grading/Excavation	5.57	55.43	57.86	42.46	2.46	40.00	10.33	2.01	8.32	0.18	17,339.92	3.71	0.80	17,672.36
Drainage/Utilities/Sub-Grade	5.40	60.68	52.77	42.22	2.22	40.00	10.22	1.90	8.32	0.15	14,989.12	2.21	0.55	15,209.53
Paving	2.37	34.73	39.60	1.77	1.77	0.00	1.18	1.18	0.00	0.16	15,889.12	1.32	1.71	16,432.55
Maximum (pounds/day)	5.57	60.68	57.86	42.46	2.46	40.00	10.33	2.01	8.32	0.18	17,339.92	3.71	1.71	17,672.36
Total (tons/construction project)	1.73	19.22	18.71	13.13	0.81	12.32	3.21	0.65	2.56	0.06	5,877.89	0.94	0.34	6,001.32

Notes:
Project Start Year -> 2025
Project Length (months) -> 36
Total Project Area (acres) -> 125
Maximum Area Disturbed/Day (acres) -> 4
Water Truck Used? -> Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	37	0	60	0	1,880	40
Grading/Excavation	729	0	1,110	0	2,480	40
Drainage/Utilities/Sub-Grade	272	195	420	300	2,200	40
Paving	664	1239	1,020	1,860	2,080	40

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.
CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> I-15 ELPSE

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.08	0.84	0.62	1.79	0.03	1.76	0.39	0.03	0.37	0.00	212.21	0.04	0.01	194.91
Grading/Excavation	0.73	7.32	7.64	5.61	0.33	5.28	1.36	0.26	1.10	0.02	2,288.87	0.49	0.11	2,116.26
Drainage/Utilities/Sub-Grade	0.71	8.01	6.97	5.57	0.29	5.28	1.35	0.25	1.10	0.02	1,978.56	0.29	0.07	1,821.34
Paving	0.21	3.06	3.48	0.16	0.16	0.00	0.10	0.10	0.00	0.01	1,398.24	0.12	0.15	1,311.86
Maximum (tons/phase)	0.73	8.01	7.64	5.61	0.33	5.28	1.36	0.26	1.10	0.02	2288.87	0.49	0.15	2,116.26
Total (tons/construction project)	1.73	19.22	18.71	13.13	0.81	12.32	3.21	0.65	2.56	0.06	5877.89	0.94	0.34	5,444.36

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.
CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.
The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model — Version 9.0.0

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	I-15 ELPSE	
Construction Start Year	2025	Enter a Year between 2014 and 2040 (inclusive)
Project Type	2	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	36.00	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	1	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	16.90	miles
Total Project Area	125.00	acres
Maximum Area Disturbed/Day	4.00	acres
Water Trucks Used?	1	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	20.00		37.00
	Grading/Excavation	20.00		729.00
	Drainage/Utilities/Sub-Grade	20.00		272.00
	Paving	20.00	664.00	
Asphalt	Grubbing/Land Clearing	20.00		
	Grading/Excavation	20.00		
	Drainage/Utilities/Sub-Grade	20.00	195.00	
	Paving	20.00	1239.00	

Mitigation Options

On-road Fleet Emissions Mitigation

Off-road Equipment Emissions Mitigation

Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation).
Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standarc

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing	4.00	3.60		1/1/2025
Grading/Excavation	12.00	14.40		5/3/2025
Drainage/Utilities/Sub-Grade	12.00	12.60		5/3/2026
Paving	8.00	5.40		5/3/2027
Totals (Months)		36		

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions **User Input**	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing		30.00		2	60.00
Miles/round trip: Grading/Excavation		30.00		37	1110.00
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		14	420.00
Miles/round trip: Paving		30.00		34	1020.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28
Grading/Excavation (grams/mile)	0.03	0.41	3.08	0.11	0.05	0.02	1,666.01	0.00	0.26	1,744.08
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.42	3.11	0.11	0.05	0.02	1,644.61	0.00	0.26	1,721.68
Paving (grams/mile)	0.03	0.42	3.12	0.11	0.05	0.02	1,629.00	0.00	0.26	1,705.34
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.05	0.42	0.01	0.01	0.00	221.28	0.00	0.03	231.65
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.02	0.00	0.00	0.00	9.74	0.00	0.00	10.19
Pounds per day - Grading/Excavation	0.07	1.01	7.89	0.27	0.12	0.04	4,076.95	0.00	0.64	4,268.00
Tons per const. Period - Grading/Excavation	0.01	0.13	1.04	0.04	0.02	0.01	538.16	0.00	0.08	563.38
Pounds per day - Drainage/Utilities/Sub-Grade	0.03	0.38	3.01	0.10	0.05	0.01	1,522.81	0.00	0.24	1,594.18
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.05	0.40	0.01	0.01	0.00	201.01	0.00	0.03	210.43
Pounds per day - Paving	0.07	0.94	7.36	0.25	0.11	0.03	3,663.16	0.00	0.58	3,834.82
Tons per const. Period - Paving	0.01	0.08	0.65	0.02	0.01	0.00	322.36	0.00	0.05	337.46
Total tons per construction project	0.02	0.27	2.11	0.07	0.03	0.01	1,071.26	0.00	0.17	1,121.46

Note: Asphalt Hauling emission default values can be overridden in cells D91 through D94, and F91 through F94.

Asphalt Hauling Emissions **User Input**	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing		30.00		0	0.00
Miles/round trip: Grading/Excavation		30.00		0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		10	300.00
Miles/round trip: Paving		30.00		62	1860.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28
Grading/Excavation (grams/mile)	0.03	0.41	3.08	0.11	0.05	0.02	1,666.01	0.00	0.26	1,744.08
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.42	3.11	0.11	0.05	0.02	1,644.61	0.00	0.26	1,721.68
Paving (grams/mile)	0.03	0.42	3.12	0.11	0.05	0.02	1,629.00	0.00	0.26	1,705.34
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.02	0.27	2.15	0.07	0.03	0.01	1,087.72	0.00	0.17	1,138.70
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.04	0.28	0.01	0.00	0.00	143.58	0.00	0.02	150.31
Pounds per day - Paving	0.12	1.71	13.42	0.46	0.20	0.06	6,679.87	0.01	1.05	6,992.91
Tons per const. Period - Paving	0.01	0.15	1.18	0.04	0.02	0.01	587.83	0.00	0.09	615.38
Total tons per construction project	0.01	0.19	1.47	0.05	0.02	0.01	731.41	0.00	0.11	765.68

Note: Worker commute default values can be overridden in cells D121 through D126.

Worker Commute Emissions User Input	User Override of Worker Commute Default Values	Default Values	Calculated Daily Trips	Calculated Daily VMT
Miles/ one-way trip		20		
One-way trips/day		2		
No. of employees: Grubbing/Land Clearing		47	94	1,880.00
No. of employees: Grading/Excavation		62	124	2,480.00
No. of employees: Drainage/Utilities/Sub-Grade		55	110	2,200.00
No. of employees: Paving		52	104	2,080.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.01	0.78	0.06	0.05	0.02	0.00	295.84	0.00	0.01	297.52
Grading/Excavation (grams/mile)	0.01	0.76	0.05	0.05	0.02	0.00	292.47	0.00	0.01	294.11
Draining/Utilities/Sub-Grade (grams/mile)	0.01	0.71	0.05	0.05	0.02	0.00	282.75	0.00	0.00	284.27
Paving (grams/mile)	0.01	0.68	0.04	0.05	0.02	0.00	276.61	0.00	0.00	278.06
Grubbing/Land Clearing (grams/trip)	0.93	2.56	0.25	0.00	0.00	0.00	63.73	0.06	0.03	73.77
Grading/Excavation (grams/trip)	0.91	2.53	0.24	0.00	0.00	0.00	63.01	0.06	0.03	72.87
Draining/Utilities/Sub-Grade (grams/trip)	0.86	2.44	0.22	0.00	0.00	0.00	60.92	0.06	0.03	70.27
Paving (grams/trip)	0.82	2.39	0.21	0.00	0.00	0.00	59.59	0.05	0.03	68.63
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.24	3.75	0.28	0.19	0.08	0.01	1,239.36	0.02	0.03	1,248.43
Tons per const. Period - Grubbing/Land Clearing	0.01	0.16	0.01	0.01	0.00	0.00	54.53	0.00	0.00	54.93
Pounds per day - Grading/Excavation	0.31	4.83	0.36	0.25	0.10	0.02	1,616.30	0.03	0.04	1,627.97
Tons per const. Period - Grading/Excavation	0.04	0.64	0.05	0.03	0.01	0.00	213.35	0.00	0.00	214.89
Pounds per day - Drainage/Utilities/Sub-Grade	0.26	4.02	0.28	0.22	0.09	0.01	1,386.16	0.03	0.03	1,395.81
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.03	0.53	0.04	0.03	0.01	0.00	182.97	0.00	0.00	184.25
Pounds per day - Paving	0.23	3.65	0.25	0.21	0.09	0.01	1,282.09	0.02	0.03	1,290.81
Tons per const. Period - Paving	0.02	0.32	0.02	0.02	0.01	0.00	112.82	0.00	0.00	113.59
Total tons per construction project	0.11	1.66	0.12	0.09	0.04	0.01	563.68	0.01	0.01	567.66

Note: Water Truck default values can be overridden in cells D153 through D156, I153 through I156, and F153 through F156.

Water Truck Emissions User Input	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Round Trips/Vehicle/Day	Default Values Round Trips/Vehicle/Day	Calculated Trips/day	User Override of Miles/Round Trip	Default Values Miles/Round Trip	Calculated Daily VMT
Grubbing/Land Clearing - Exhaust		1		5	5		8.00	40.00
Grading/Excavation - Exhaust		1		5	5		8.00	40.00
Drainage/Utilities/Subgrade		1		5	5		8.00	40.00
Paving		1		5	5		8.00	40.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28
Grading/Excavation (grams/mile)	0.03	0.41	3.08	0.11	0.05	0.02	1,666.01	0.00	0.26	1,744.08
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.42	3.11	0.11	0.05	0.02	1,644.61	0.00	0.26	1,721.68
Paving (grams/mile)	0.03	0.42	3.12	0.11	0.05	0.02	1,629.00	0.00	0.26	1,705.34
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.04	0.32	0.01	0.00	0.00	147.52	0.00	0.02	154.44
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.01	0.00	0.00	0.00	6.49	0.00	0.00	6.80
Pounds per day - Grading/Excavation	0.00	0.04	0.32	0.01	0.00	0.00	146.92	0.00	0.02	153.80
Tons per const. Period - Grading/Excavation	0.00	0.00	0.04	0.00	0.00	0.00	19.39	0.00	0.00	20.30
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.04	0.32	0.01	0.00	0.00	145.03	0.00	0.02	151.83
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.04	0.00	0.00	0.00	19.14	0.00	0.00	20.04
Pounds per day - Paving	0.00	0.04	0.32	0.01	0.00	0.00	143.65	0.00	0.02	150.39
Tons per const. Period - Paving	0.00	0.00	0.03	0.00	0.00	0.00	12.64	0.00	0.00	13.23
Total tons per construction project	0.00	0.01	0.13	0.00	0.00	0.00	57.67	0.00	0.01	60.37

Note: Fugitive dust default values can be overridden in cells D183 through D185.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		4.00	40.00	1.76	8.32	0.37
Fugitive Dust - Grading/Excavation		4.00	40.00	5.28	8.32	1.10
Fugitive Dust - Drainage/Utilities/Subgrade		4.00	40.00	5.28	8.32	1.10

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Crawler Tractors	0.75	4.21	7.92	0.31	0.28	0.02	1,516.54	0.49	0.01	1,532.89
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00	2		Model Default Tier	Excavators	0.50	9.78	3.66	0.18	0.17	0.02	1,501.02	0.49	0.01	1,517.20
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	34		Model Default Tier	Signal Boards	0.23	1.20	1.44	0.06	0.06	0.00	197.25	0.02	0.00	198.26
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing	pounds per day	1.48	15.19	13.02	0.54	0.51	0.03	3,214.81	1.00	0.03	3,248.35
Grubbing/Land Clearing	tons per phase	0.07	0.67	0.57	0.02	0.02	0.00	141.45	0.04	0.00	142.93

Grading/Excavation Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0		Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Crawler Tractors	0.75	4.21	7.92	0.31	0.28	0.02	1,516.54	0.49	0.01	1,532.89
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	3		Model Default Tier	Excavators	0.67	13.04	4.89	0.24	0.22	0.02	2,001.35	0.65	0.02	2,022.93
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00	2		Model Default Tier	Graders	0.93	4.78	10.37	0.33	0.31	0.02	1,920.72	0.62	0.02	1,941.41
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Rollers	0.27	3.69	2.89	0.15	0.13	0.01	508.12	0.16	0.00	513.60
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Rubber Tired Loaders	0.46	2.94	3.72	0.12	0.11	0.01	1,211.24	0.39	0.01	1,224.32
	2		Model Default Tier	Scrapers	1.34	10.76	12.74	0.50	0.46	0.03	2,936.30	0.95	0.03	2,967.95
4.00	34		Model Default Tier	Signal Boards	0.23	1.20	1.44	0.06	0.06	0.00	197.25	0.02	0.00	198.26
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		Model Default Tier	Tractors/Loaders/Backhoes	0.53	8.92	5.34	0.22	0.20	0.01	1,208.22	0.39	0.01	1,221.22
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment

If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase	Units	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grading/Excavation	pounds per day	5.18	49.55	49.30	1.93	1.78	0.12	11,499.76	3.68	0.10	11,622.58
Grading/Excavation	tons per phase	0.68	6.54	6.51	0.25	0.23	0.02	1,517.97	0.49	0.01	1,534.18

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Air Compressors	0.46	4.82	3.05	0.14	0.14	0.01	750.53	0.04	0.01	753.23
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	1		Model Default Tier	Generator Sets	1.07	14.64	9.58	0.38	0.38	0.03	2,492.14	0.09	0.02	2,500.03
2.00	1		Model Default Tier	Graders	0.62	3.19	6.91	0.22	0.20	0.01	1,280.48	0.41	0.01	1,294.28
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Plate Compactors	0.08	0.42	0.50	0.02	0.02	0.00	68.96	0.01	0.00	69.31
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Pumps	0.57	7.43	4.85	0.20	0.20	0.01	1,246.07	0.05	0.01	1,250.12
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Rough Terrain Forklifts	0.19	4.57	2.57	0.07	0.07	0.01	667.44	0.22	0.01	674.63
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Scrapers	1.34	10.76	12.74	0.50	0.46	0.03	2,936.30	0.95	0.03	2,967.95
4.00	34		Model Default Tier	Signal Boards	0.23	1.20	1.44	0.06	0.06	0.00	197.25	0.02	0.00	198.26
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	3		Model Default Tier	Tractors/Loaders/Backhoes	0.53	8.92	5.34	0.22	0.20	0.01	1,208.22	0.39	0.01	1,221.22
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Drainage/Utilities/Sub-Grade	pounds per day	5.09	55.96	46.99	1.81	1.73	0.11	10,847.39	2.18	0.09	10,929.02
Drainage/Utilities/Sub-Grade	tons per phase	0.67	7.39	6.20	0.24	0.23	0.02	1,431.86	0.29	0.01	1,442.63

Paving	Default Number of Vehicles	Mitigation Option Override of	Default		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles	*Program-estimate*	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1		Model Default Tier	Pavers	0.35	5.79	3.17	0.15	0.14	0.01	909.99	0.29	0.01	919.80
2.00	1		Model Default Tier	Paving Equipment	0.29	5.09	2.53	0.13	0.12	0.01	788.64	0.26	0.01	797.15
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	2		Model Default Tier	Rollers	0.55	7.39	5.77	0.29	0.27	0.01	1,016.25	0.33	0.01	1,027.20
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	34		Model Default Tier	Signal Boards	0.23	1.20	1.44	0.06	0.06	0.00	197.25	0.02	0.00	198.26
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	3		Model Default Tier	Tractors/Loaders/Backhoes	0.53	8.92	5.34	0.22	0.20	0.01	1,208.22	0.39	0.01	1,221.22
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
				pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Paving	pounds per day	1.95	28.39	18.25	0.84	0.77	0.04	4,120.35	1.29	0.04	4,163.62
	Paving	tons per phase	0.17	2.50	1.61	0.07	0.07	0.00	362.59	0.11	0.00	366.40
Total Emissions all Phases (tons per construction period) =>			1.59	17.09	14.89	0.59	0.55	0.04	3,453.87	0.93	0.03	3,486.14

Equipment default values for horsepower and hours/day can be overridden in cells D403 through D436 and F403 through F436.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		221		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		231		8
Crawler Tractors		212		8
Crushing/Proc. Equipment		85		8
Excavators		158		8
Forklifts		89		8
Generator Sets		84		8
Graders		187		8
Off-Highway Tractors		124		8
Off-Highway Trucks		402		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		168		8
Pavers		130		8
Paving Equipment		132		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		80		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		247		8
Rubber Tired Loaders		203		8
Scrapers		367		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		263		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		97		8
Trenchers		78		8
Welders		46		8

END OF DATA ENTRY SHEET

Appendix D: Operational Emissions Inventory Documentation

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Criteria Pollutant Emissions

Daily Regional Emissions (g/day)

Alternative	PM2.5	PM10	NOx	CO	ROG
Existing	723,113.40	3,635,775.10	4,104,867.20	10,181,892.40	838,319.50
2030 No Build	1,055,084.00	5,616,182.00	2,615,316.10	7,789,531.30	642,836.10
2030 ELPSE	1,086,968.20	5,784,319.80	2,644,831.60	7,923,124.30	648,364.60
2050 No Build	1,111,138.50	5,978,012.10	2,478,777.40	6,529,460.30	430,913.60
2050 ELPSE	1,137,283.70	6,116,919.50	2,468,355.00	6,593,915.70	429,864.70

Daily Regional Emissions (pounds/day)

Alternative	PM2.5	PM10	NOx	CO	ROG
Existing	1,594.2	8,015.4	9,049.5	22,446.9	1,848.1
2030 No Build	2,326.0	12,381.4	5,765.7	17,172.7	1,417.2
Increase from Existing	*731.9*	*4,366.0*	*-3,283.8*	*-5,274.2*	*-431.0*
2030 ELPSE	2,396.3	12,752.0	5,830.8	17,467.2	1,429.4
Increase from Existing	*802.1*	*4,736.7*	*-3,218.8*	*-4,979.6*	*-418.8*
Increase from No Build	*70.3*	*370.7*	*65.1*	*294.5*	*12.2*
2050 No Build	2,449.6	13,179.0	5,464.7	14,394.8	950.0
Increase from Existing	*855.4*	*5,163.7*	*-3,584.9*	*-8,052.1*	*-898.2*
2050 ELPSE	2,507.2	13,485.3	5,441.7	14,536.9	947.7
Increase from Existing	*913.1*	*5,469.9*	*-3,607.8*	*-7,910.0*	*-900.5*
Increase from No Build	*57.6*	*306.2*	*-23.0*	*142.1*	*-2.3*

Climate Change Emissions

Daily Regional Emissions (g/day)

Alternative	**CO_2**	**N_2O**	**CH_4**	**CO_2e**
Existing	3,771,685,481.30	217,330.00	159,502.20	3,840,437,376.30
2030 No Build	4,360,325,382.20	239,294.40	156,898.10	4,435,557,565.90
2030 ELPSE	4,480,417,050.30	245,406.50	158,451.60	4,557,509,477.30
2050 No Build	3,961,880,965.70	224,237.20	129,234.10	4,031,934,503.80
2050 ELPSE	4,036,066,917.30	228,124.20	129,155.40	4,107,276,813.90

Daily Regional Emissions (Metric Tons/day)

Alternative	**CO_2**	**N_2O**	**CH_4**	**CO_2e**
Existing	3,771.7	0.2	0.2	3,840.4
2030 No Build	4,360.3	0.2	0.2	4,435.6
Increase from Existing	*588.6*	*0.0*	*0.0*	*595.1*
2030 ELPSE	4,480.4	0.2	0.2	4,557.5
Increase from Existing	*708.7*	*0.0*	*0.0*	*717.1*
Increase from No Build	*120.1*	*0.0*	*0.0*	*122.0*
2050 No Build	3,961.9	0.2	0.1	4,031.9
Increase from Existing	*190.2*	*0.0*	*0.0*	*191.5*
2050 ELPSE	4,036.1	0.2	0.1	4,107.3
Increase from Existing	*264.4*	*0.0*	*0.0*	*266.8*
Increase from No Build	*74.2*	*0.0*	*0.0*	*75.3*

Annual Emissions (Metric Tons)

Alternative	CO2	N2O	CH4	CO2e
Existing	1,308,774.9	75.4	55.3	1,332,631.8
2030 No Build	1,513,032.9	83.0	54.4	1,539,138.5
Increase from Existing	*204,258.0*	*7.6*	*-0.9*	*206,506.7*
2030 ELPSE	1,554,704.7	85.2	55.0	1,581,455.8
Increase from Existing	*245,929.9*	*9.7*	*-0.4*	*248,824.0*
Increase from No Build	*41,671.8*	*2.1*	*0.5*	*42,317.3*
2050 No Build	1,374,772.7	77.8	44.8	1,399,081.3
Increase from Existing	*65,997.8*	*2.4*	*-10.5*	*66,449.5*
2050 ELPSE	1,400,515.2	79.2	44.8	1,425,225.1
Increase from Existing	*91,740.4*	*3.7*	*-10.5*	*92,593.3*
Increase from No Build	*25,742.5*	*1.3*	*0.0*	*26,143.8*

MSAT Emissions

Daily Regional Emissions (g/day)

Alternative	1,3-butadiene	Acetaldehyde	Acrolein	Benzene	Diesel PM	Ethylbenzene	Formaldehyde	Naphthalene	POM	DEOG
Existing	2,469.50	12,262.20	499.6	16,734.00	57,086.30	11,576.10	28,171.60	986.4	690.7	144,995.80
2030 No Build	1,488.80	3,632.70	327.1	11,118.70	17,094.90	9,793.70	9,557.50	831.6	274.8	33,903.50
2030 ELPSE	1,514.30	3,678.70	332.8	11,252.40	18,165.70	9,874.90	9,688.50	837.8	279.7	34,253.60
2050 No Build	1,147.50	3,123.60	248.8	7,923.40	15,913.40	6,490.10	7,937.00	572.3	192.1	29,668.80
2050 ELPSE	1,154.80	3,111.10	250.9	7,932.60	16,814.80	6,474.30	7,923.20	570.9	193.5	29,400.80

Daily Regional Emissions (pounds/day)

Alternative	1,3-butadiene	Acetaldehyde	Acrolein	Benzene	Diesel PM	Ethylbenzene	Formaldehyde	Naphthalene	POM	DEOG
Existing	5.4	27.0	1.1	36.9	125.9	25.5	62.1	2.2	1.5	319.7
2030 No Build	3.3	8.0	0.7	24.5	37.7	21.6	21.1	1.8	0.6	74.7
Increase from Existing	*-2.2*	*-19.0*	*-0.4*	*-12.4*	*-88.2*	*-3.9*	*-41.0*	*-0.3*	*-0.9*	*-244.9*
2030 ELPSE	3.3	8.1	0.7	24.8	40.0	21.8	21.4	1.8	0.6	75.5
Increase from Existing	*-2.1*	*-18.9*	*-0.4*	*-12.1*	*-85.8*	*-3.8*	*-40.7*	*-0.3*	*-0.9*	*-244.1*
Increase from No Build	*0.1*	*0.1*	*0.0*	*0.3*	*2.4*	*0.2*	*0.3*	*0.0*	*0.0*	*0.8*
2050 No Build	2.5	6.9	0.5	17.5	35.1	14.3	17.5	1.3	0.4	65.4
Increase from Existing	*-2.9*	*-20.1*	*-0.6*	*-19.4*	*-90.8*	*-11.2*	*-44.6*	*-0.9*	*-1.1*	*-254.2*
2050 ELPSE	2.5	6.9	0.6	17.5	37.1	14.3	17.5	1.3	0.4	64.8
Increase from Existing	*-2.9*	*-20.2*	*-0.5*	*-19.4*	*-88.8*	*-11.2*	*-44.6*	*-0.9*	*-1.1*	*-254.8*
Increase from No Build	*0.0*	*0.0*	*0.0*	*0.0*	*2.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-0.6*

File Name:	I-15 ELPSE Existing.EM		
CT-EMFAC2017 Version:	1.0.2.27401		
Run Date:	10/4/2021 16:40		
Area:	Riverside (SC)		
Analysis Year:	2019		
Season:	Annual		

==

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category	Gas VMT Fraction Within Category
Truck 1	0.033	0.556	0.444
Truck 2	0.061	0.97	0.02
Non-Truck	0.906	0.01	0.984

==

Road Type:	Major/Collector		
Silt Loading Factor:	CARB	0.08 g/m2	
Precipitation Correction:	CARB	P = 34 days	N = 365 days

==

Road Length:	1	miles	
Volume:	9,566,440	vehicles per hour	3,319,554,680
Number of Hours:	1	hours	

VMT Distribution by Speed Bin (mph):

<= 5 mph	0.10%
10 mph	0.51%
15 mph	0.63%
20 mph	2.79%
25 mph	7.56%
30 mph	13.57%
35 mph	15.53%
40 mph	10.12%
45 mph	6.28%
50 mph	5.11%

55 mph	8.96%
60 mph	11.13%
65 mph	9.05%
70 mph	2.80%
75 mph	5.86%

==

Summary of Emissions and Consumption

Pollutant Name	Running Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Road Dust (grams)	Total (grams)	Total (US tons)
PM2.5	68,319.40	-	22,366.30	171,191.40	461,236.30	723,113.50	0.797
PM10	71,979.60	-	89,446.20	399,446.70	3,074,902.60	3,635,775.10	4.008
NOx	4,104,867.20	-	-	-	-	4,104,867.20	4.525
CO	10,181,892.40	-	-	-	-	10,181,892.40	11.224
HC	490,120.40	397,319.00	-	-	-	887,439.30	0.978
TOG	563,266.30	424,785.30	-	-	-	988,051.60	1.089
ROG	413,534.20	424,785.30	-	-	-	838,319.50	0.924
1,3-Butadiene	2,469.50	0	-	-	-	2,469.50	0.003
Acetaldehyde	12,262.20	-	-	-	-	12,262.20	0.014
Acrolein	499.6	-	-	-	-	499.6	< 0.001
Benzene	12,486.10	4,247.90	-	-	-	16,734.00	0.018
Diesel PM	57,086.30	-	-	-	-	57,086.30	0.063
Ethylbenzene	4,609.70	6,966.40	-	-	-	11,576.10	0.013
Formaldehyde	28,171.60	-	-	-	-	28,171.60	0.031
Naphthalene	391.7	594.8	-	-	-	986.4	0.001
POM	690.7	-	-	-	-	690.7	< 0.001
DEOG	144,995.80	-	-	-	-	144,995.80	0.16
CO2	3,771,685,481.30	-	-	-	-	3,771,685,481.30	4,157.57
N2O	217,330.00	-	-	-	-	217,330.00	0.24
CH4	98,478.90	61,023.30	-	-	-	159,502.20	0.176
BC	14,020.30	-	-	-	-	14,020.30	0.015
HFC	-	8,087.30	-	-	-	8,087.30	0.009
Adjusted CO2	3,771,685,481.30	-	-	-	-	3,771,685,481.30	4,157.57
Adjusted NOx	4,104,867.20	-	-	-	-	4,104,867.20	4.525
Adjusted ROG	413,534.20	424,785.30	-	-	-	838,319.50	0.924
Adjusted PM2.5	68,319.40	-	22,366.30	171,191.40	461,236.30	723,113.40	0.797
Adjusted PM10	71,979.60	-	89,446.20	399,446.70	3,074,902.60	3,635,775.10	4.008

Adjusted CO	10,181,892.40	-	-	-	-	10,181,892.40	11.224

Fuel Type	Fuel Consumption (gallons)	
Gasoline	347,270.13	0.796345695
Diesel	88,809.49	0.203654305

===END===

File Name:	I-15 ELPSE 2030 NP.EM		
CT-EMFAC2017 Version:	1.0.2.27401		
Run Date:	10/4/2021 16:42		
Area:	Riverside (SC)		
Analysis Year:	2030		
Season:	Annual		

===

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category	Gas VMT Fraction Within Category
Truck 1	0.025	0.564	0.436
Truck 2	0.064	0.953	0.021
Non-Truck	0.911	0.014	0.951

===

Road Type:	Major/Collector		
Silt Loading Factor:	CARB	0.08 g/m2	
Precipitation Correction:	CARB	P = 34 days	N = 365 days

===

Road Length:	1	miles	
Volume:	15,047,900	vehicles per hour	5,221,621,300
Number of Hours:	1	hours	

VMT Distribution by Speed Bin (mph):

<= 5 mph	0.13%
10 mph	1.02%
15 mph	0.90%
20 mph	2.62%
25 mph	7.65%
30 mph	13.36%
35 mph	11.11%
40 mph	9.64%
45 mph	10.06%
50 mph	11.18%

55 mph	7.94%
60 mph	9.61%
65 mph	8.23%
70 mph	3.64%
75 mph	2.91%

==

Summary of Emissions and Consumption

Pollutant Name	Running Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Road Dust (grams)	Total (grams)	Total (US tons)
PM2.5	29,449.20	-	35,483.00	267,250.70	722,901.10	1,055,084.00	1.163
PM10	31,304.20	-	141,931.80	623,570.00	4,819,376.00	5,616,182.00	6.191
NOx	2,615,316.10	-	-	-	-	2,615,316.10	2.883
CO	7,789,531.30	-	-	-	-	7,789,531.30	8.586
HC	302,057.80	398,319.30	-	-	-	700,377.10	0.772
TOG	330,793.90	425,854.60	-	-	-	756,648.50	0.834
ROG	216,981.40	425,854.60	-	-	-	642,836.10	0.709
1,3-Butadiene	1,488.80	0	-	-	-	1,488.80	0.002
Acetaldehyde	3,632.70	-	-	-	-	3,632.70	0.004
Acrolein	327.1	-	-	-	-	327.1	< 0.001
Benzene	6,860.00	4,258.70	-	-	-	11,118.70	0.012
Diesel PM	17,094.90	-	-	-	-	17,094.90	0.019
Ethylbenzene	2,809.80	6,983.90	-	-	-	9,793.70	0.011
Formaldehyde	9,557.50	-	-	-	-	9,557.50	0.011
Naphthalene	235.4	596.3	-	-	-	831.6	< 0.001
POM	274.8	-	-	-	-	274.8	< 0.001
DEOG	33,903.50	-	-	-	-	33,903.50	0.037
CO2	4,360,325,382.20	-	-	-	-	4,360,325,382.20	4,806.44
N2O	239,294.40	-	-	-	-	239,294.40	0.264
CH4	90,821.90	66,076.20	-	-	-	156,898.10	0.173
BC	6,021.10	-	-	-	-	6,021.10	0.007
HFC	-	4,233.80	-	-	-	4,233.80	0.005
Adjusted CO2	4598386476	-	-	-	-	4598386476	5068.85197
Adjusted NOx	2624876.024	-	-	-	-	2624876.024	2.893
Adjusted ROG	217605.791	426384.5242	-	-	-	643990.3152	0.710
Adjusted PM2.5	29774.43274	-	35,483.00	267,250.70	722,901.10	1,055,409.23	1.163
Adjusted PM10	31649.91909	-	141,931.80	623,570.00	4,819,376.00	5,616,527.72	6.191

Adjusted CO	7884039.249	-	-	-	-	7884039.249	8.691

Fuel Type	Fuel Consumption (gallons)	
Gasoline	387,742.21	0.777736378
Diesel	110,810.03	0.222263622

==END==

File Name:	I-15 ELPSE 2030 P.EM
CT-EMFAC2017 Version:	1.0.2.27401
Run Date:	10/4/2021 16:43
Area:	Riverside (SC)
Analysis Year:	2030
Season:	Annual

==

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category	Gas VMT Fraction Within Category
Truck 1	0.025	0.564	0.436
Truck 2	0.064	0.953	0.021
Non-Truck	0.911	0.014	0.951

==

Road Type:	Major/Collector		
Silt Loading Factor:	CARB	0.08 g/m2	
Precipitation Correction:	CARB	P = 34 days	N = 365 days

==

Road Length:	1	miles	
Volume:	15,497,400	vehicles per hour	5,377,597,800
Number of Hours:	1	hours	

VMT Distribution by Speed Bin (mph):

<= 5 mph	0.16%
10 mph	0.76%
15 mph	1.01%
20 mph	2.33%
25 mph	7.08%
30 mph	12.49%
35 mph	9.91%
40 mph	10.20%
45 mph	11.66%
50 mph	7.35%

55 mph	9.06%
60 mph	11.86%
65 mph	10.19%
70 mph	3.21%
75 mph	2.73%

==

Summary of Emissions and Consumption

Pollutant Name	Running Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Road Dust (grams)	Total (grams)	Total (US tons)
PM2.5	30,696.60	-	36,542.90	275,233.80	744,494.90	1,086,968.20	1.198
PM10	32,616.10	-	146,171.50	642,196.60	4,963,335.70	5,784,319.80	6.376
NOx	2,644,831.60	-	-	-	-	2,644,831.60	2.915
CO	7,923,124.30	-	-	-	-	7,923,124.30	8.734
HC	306,636.80	400,228.90	-	-	-	706,865.70	0.779
TOG	335,783.20	427,896.30	-	-	-	763,679.40	0.842
ROG	220,468.30	427,896.30	-	-	-	648,364.60	0.715
1,3-Butadiene	1,514.30	0	-	-	-	1,514.30	0.002
Acetaldehyde	3,678.70	-	-	-	-	3,678.70	0.004
Acrolein	332.8	-	-	-	-	332.8	< 0.001
Benzene	6,973.20	4,279.10	-	-	-	11,252.40	0.012
Diesel PM	18,165.70	-	-	-	-	18,165.70	0.02
Ethylbenzene	2,857.60	7,017.40	-	-	-	9,874.90	0.011
Formaldehyde	9,688.50	-	-	-	-	9,688.50	0.011
Naphthalene	238.7	599.1	-	-	-	837.8	< 0.001
POM	279.7	-	-	-	-	279.7	< 0.001
DEOG	34,253.60	-	-	-	-	34,253.60	0.038
CO2	4,480,417,050.30	-	-	-	-	4,480,417,050.30	4,938.81
N2O	245,406.50	-	-	-	-	245,406.50	0.271
CH4	92,058.60	66,393.00	-	-	-	158,451.60	0.175
BC	6,230.90	-	-	-	-	6,230.90	0.007
HFC	-	4,254.10	-	-	-	4,254.10	0.005
Adjusted CO2	4725189171	-	-	-	-	4725189171	5208.62798
Adjusted NOx	2654505.515	-	-	-	-	2654505.515	2.926
Adjusted ROG	221103.1254	428429.1009	-	-	-	649532.2262	0.716
Adjusted PM2.5	31035.82279	-	36,542.90	275,233.80	744,494.90	1,087,307.42	1.199
Adjusted PM10	32976.53485	-	146,171.50	642,196.60	4,963,335.70	5,784,680.33	6.377

Adjusted CO	8019313.755	-	-	-	-	8019313.755	8.840

Fuel Type	Fuel Consumption (gallons)	
Gasoline	398,688.27	0.778227185
Diesel	113,614.92	0.221772815

===END===

File Name:	I-15 ELPSE 2050 NP.EM		
CT-EMFAC2017 Version:	1.0.2.27401		
Run Date:	10/4/2021 16:45		
Area:	Riverside (SC)		
Analysis Year:	2050		
Season:	Annual		

===

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category	Gas VMT Fraction Within Category
Truck 1	0.023	0.555	0.445
Truck 2	0.069	0.947	0.02
Non-Truck	0.908	0.014	0.938

===

Road Type:	Major/Collector		
Silt Loading Factor:	CARB	0.08 g/m2	
Precipitation Correction:	CARB	P = 34 days	N = 365 days

===

Road Length:	1	miles	
Volume:	15,649,010	vehicles per hour	5,430,206,470
Number of Hours:	1	hours	

VMT Distribution by Speed Bin (mph):

<= 5 mph	0.19%
10 mph	0.86%
15 mph	1.50%
20 mph	2.74%
25 mph	8.54%
30 mph	14.30%
35 mph	11.21%
40 mph	9.89%
45 mph	10.10%
50 mph	7.38%

55 mph	10.59%
60 mph	9.03%
65 mph	8.22%
70 mph	2.61%
75 mph	2.84%

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Summary of Emissions and Consumption

Pollutant Name	Running Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Road Dust (grams)	Total (grams)	Total (US tons)
PM2.5	22,515.50	-	37,432.40	277,707.20	773,483.40	1,111,138.50	1.225
PM10	23,816.00	-	149,698.40	647,994.00	5,156,503.70	5,978,012.10	6.59
NOx	2,478,777.40	-	-	-	-	2,478,777.40	2.732
CO	6,529,460.30	-	-	-	-	6,529,460.30	7.197
HC	242,365.80	247,129.10	-	-	-	489,494.90	0.54
TOG	264,666.20	264,213.10	-	-	-	528,879.40	0.583
ROG	166,700.50	264,213.10	-	-	-	430,913.60	0.475
1,3-Butadiene	1,147.50	0	-	-	-	1,147.50	0.001
Acetaldehyde	3,123.60	-	-	-	-	3,123.60	0.003
Acrolein	248.8	-	-	-	-	248.8	< 0.001
Benzene	5,281.50	2,641.90	-	-	-	7,923.40	0.009
Diesel PM	15,913.40	-	-	-	-	15,913.40	0.018
Ethylbenzene	2,157.00	4,333.10	-	-	-	6,490.10	0.007
Formaldehyde	7,937.00	-	-	-	-	7,937.00	0.009
Naphthalene	202.4	369.9	-	-	-	572.3	< 0.001
POM	192.1	-	-	-	-	192.1	< 0.001
DEOG	29,668.80	-	-	-	-	29,668.80	0.033
CO2	3,961,880,965.70	-	-	-	-	3,961,880,965.70	4,367.23
N2O	224,237.20	-	-	-	-	224,237.20	0.247
CH4	83,131.50	46,102.60	-	-	-	129,234.10	0.142
BC	4,201.10	-	-	-	-	4,201.10	0.005
HFC	-	153.9	-	-	-	153.9	< 0.001
Adjusted CO2	4349684206	-	-	-	-	4349684206	4794.70472
Adjusted NOx	2503383.917	-	-	-	-	2503383.917	2.760
Adjusted ROG	168201.3789	268787.7699	-	-	-	436989.1489	0.482
Adjusted PM2.5	23066.47465	-	37,432.40	277,707.20	773,483.40	1,111,689.47	1.225
Adjusted PM10	24398.79906	-	149,698.40	647,994.00	5,156,503.70	5,978,594.90	6.590

Adjusted CO	6688237.181	-	-	-	-	6688237.181	7.373

Fuel Type	Fuel Consumption (gallons)	
Gasoline	346,661.52	0.769525293
Diesel	103,825.97	0.230474707

===END===

File Name:	I-15 ELPSE 2050 P.EM
CT-EMFAC2017 Version:	1.0.2.27401
Run Date:	10/4/2021 16:46
Area:	Riverside (SC)
Analysis Year:	2050
Season:	Annual

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Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category	Gas VMT Fraction Within Category
Truck 1	0.023	0.555	0.445
Truck 2	0.069	0.947	0.02
Non-Truck	0.908	0.014	0.938

==

Road Type:	Major/Collector		
Silt Loading Factor:	CARB	0.08 g/m2	
Precipitation Correction:	CARB	P = 34 days	N = 365 days

==

Road Length:	1	miles	
Volume:	16,011,540	vehicles per hour	5,556,004,380
Number of Hours:	1	hours	

VMT Distribution by Speed Bin (mph):

<= 5 mph	0.19%
10 mph	0.65%
15 mph	1.06%
20 mph	2.85%
25 mph	8.37%
30 mph	13.40%
35 mph	9.40%
40 mph	10.28%
45 mph	11.93%
50 mph	7.60%

55 mph	6.62%
60 mph	12.97%
65 mph	9.22%
70 mph	2.68%
75 mph	2.78%

Summary of Emissions and Consumption

Pollutant Name	Running Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Road Dust (grams)	Total (grams)	Total (US tons)
PM2.5	23,440.90	-	38,299.60	284,140.80	791,402.40	1,137,283.70	1.254
PM10	24,784.30	-	153,166.40	663,005.90	5,275,962.90	6,116,919.50	6.743
NOx	2,468,355.00	-	-	-	-	2,468,355.00	2.721
CO	6,593,915.70	-	-	-	-	6,593,915.70	7.269
HC	243,284.90	245,476.20	-	-	-	488,761.10	0.539
TOG	265,590.40	262,446.00	-	-	-	528,036.40	0.582
ROG	167,418.60	262,446.00	-	-	-	429,864.70	0.474
1,3-Butadiene	1,154.80	0	-	-	-	1,154.80	0.001
Acetaldehyde	3,111.10	-	-	-	-	3,111.10	0.003
Acrolein	250.9	-	-	-	-	250.9	< 0.001
Benzene	5,308.30	2,624.30	-	-	-	7,932.60	0.009
Diesel PM	16,814.80	-	-	-	-	16,814.80	0.019
Ethylbenzene	2,170.20	4,304.10	-	-	-	6,474.30	0.007
Formaldehyde	7,923.20	-	-	-	-	7,923.20	0.009
Naphthalene	203.5	367.5	-	-	-	570.9	< 0.001
POM	193.5	-	-	-	-	193.5	< 0.001
DEOG	29,400.80	-	-	-	-	29,400.80	0.032
CO2	4,036,066,917.30	-	-	-	-	4,036,066,917.30	4,449.00
N2O	228,124.20	-	-	-	-	228,124.20	0.251
CH4	83,361.20	45,794.20	-	-	-	129,155.40	0.142
BC	4,340.30	-	-	-	-	4,340.30	0.005
HFC	-	152.9	-	-	-	152.9	< 0.001
Adjusted CO2	4431340042	-	-	-	-	4431340042	4884.71485
Adjusted NOx	2492870.974	-	-	-	-	2492870.974	2.748
Adjusted ROG	168926.739	266992.4696	-	-	-	435919.2087	0.481
Adjusted PM2.5	24014.82246	-	38,299.60	284,140.80	791,402.40	1,137,857.62	1.254
Adjusted PM10	25391.114	-	153,166.40	663,005.90	5,275,962.90	6,117,526.31	6.743

Adjusted CO		6754344.483	-	-	-	-	6754344.483	7.445

Fuel Type	Fuel Consumption (gallons)	
Gasoline	353,351.89	0.769931019
Diesel	105,587.78	0.230068981

===END==

Appendix E: Carbon Monoxide Flow Chart (Based on the Carbon Monoxide Protocol)

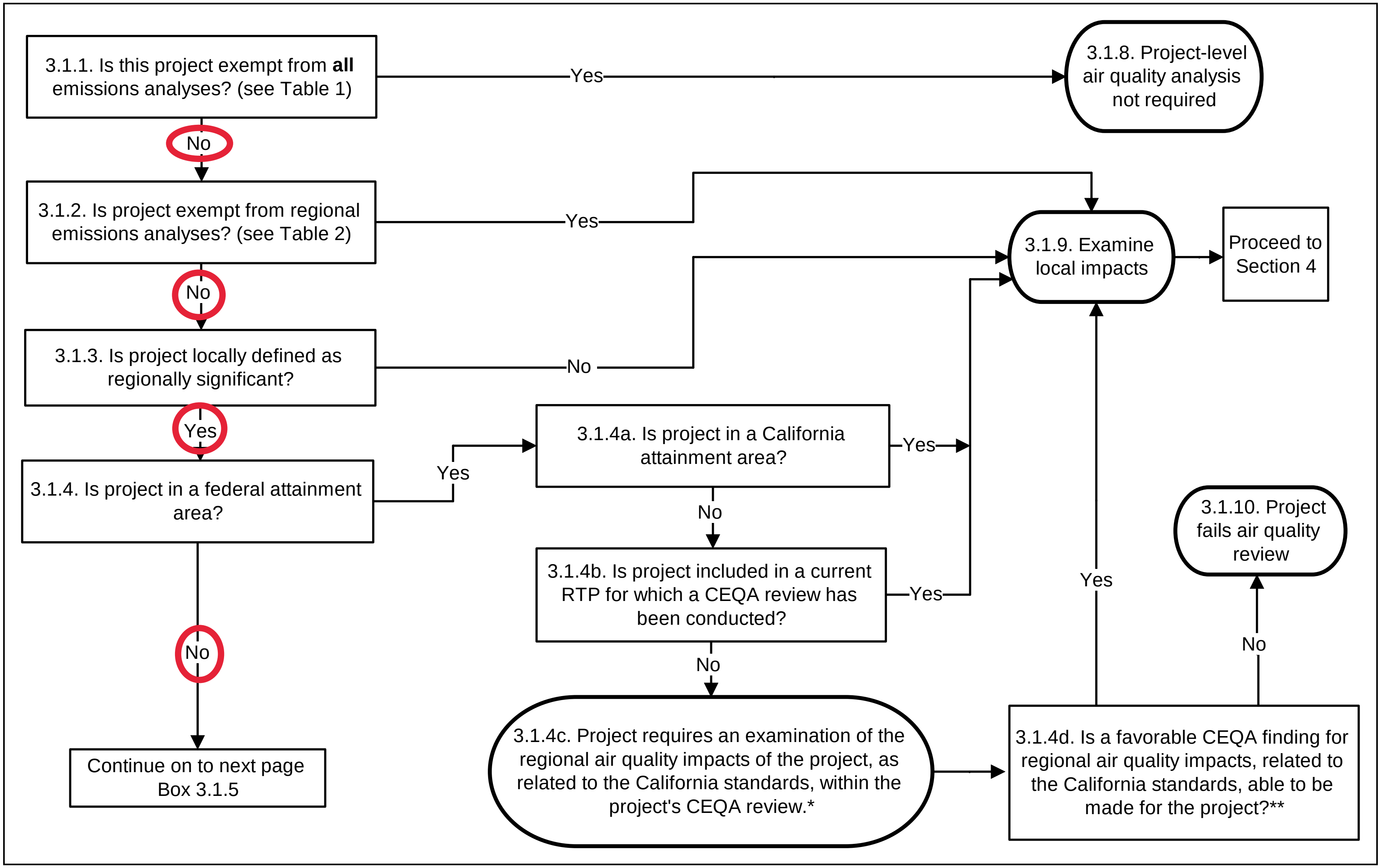

Figure 1. Requirements for New Projects

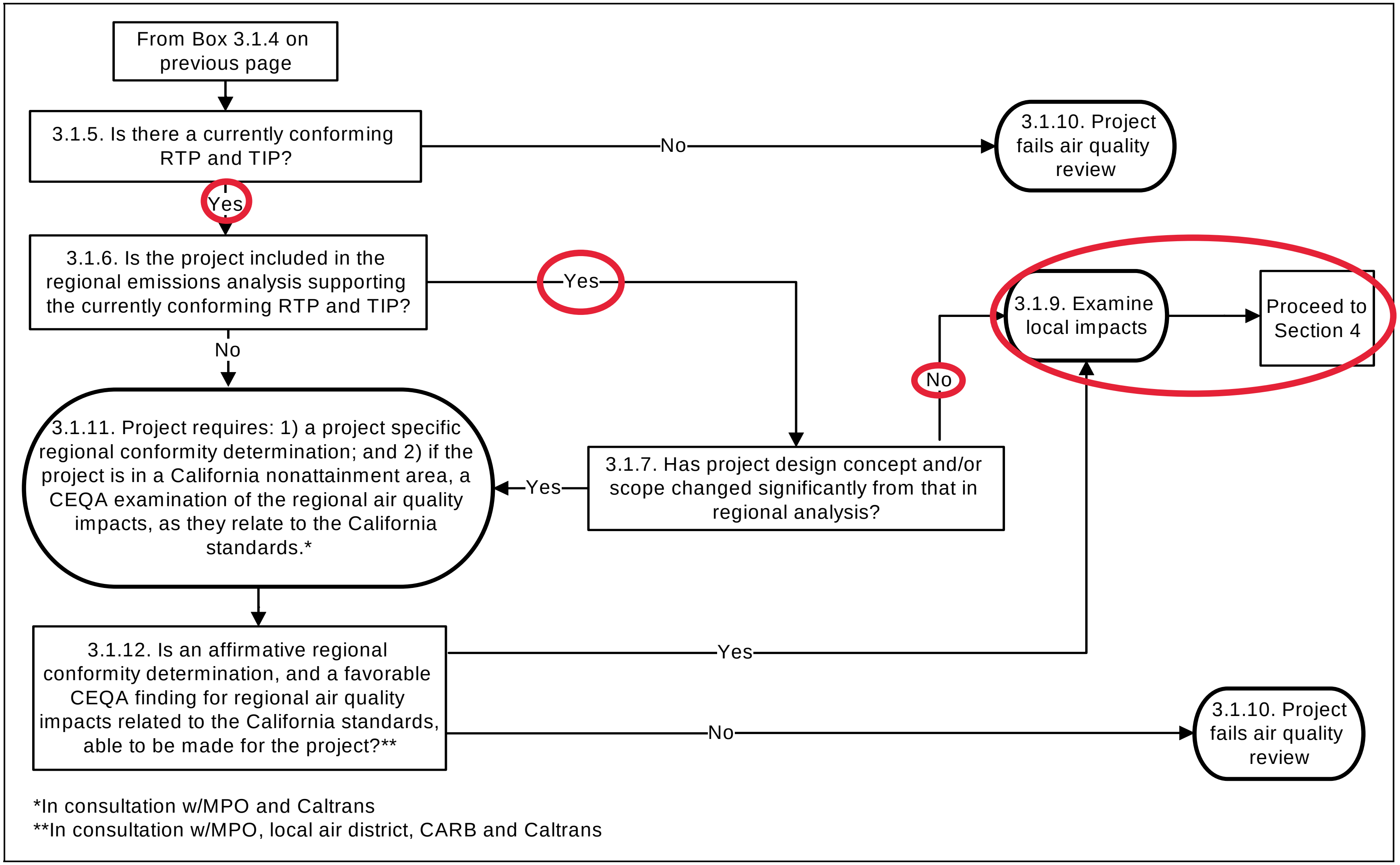

Figure 1 (cont.). Requirements for New Projects

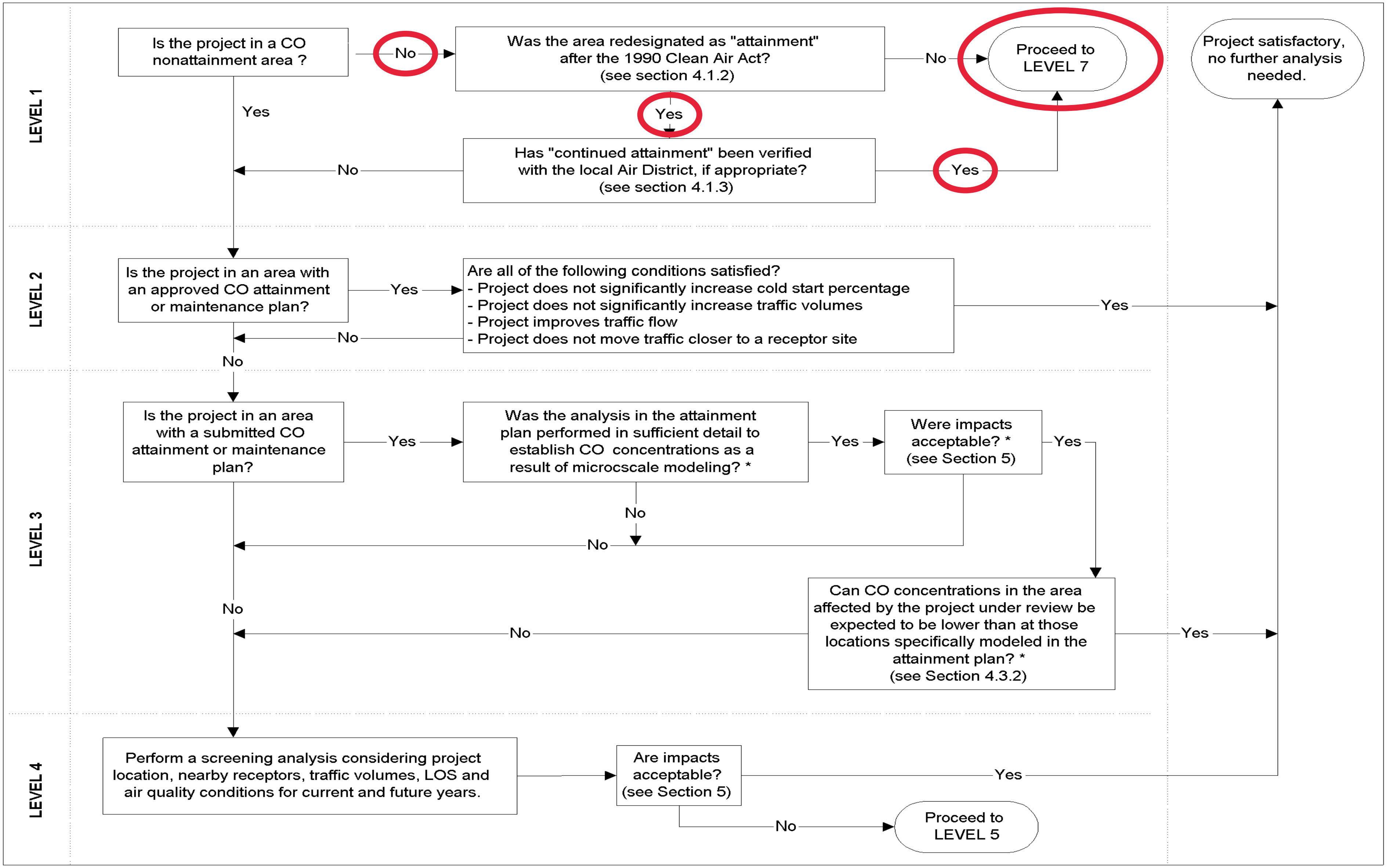

Figure 3. Local CO Analysis

4-10

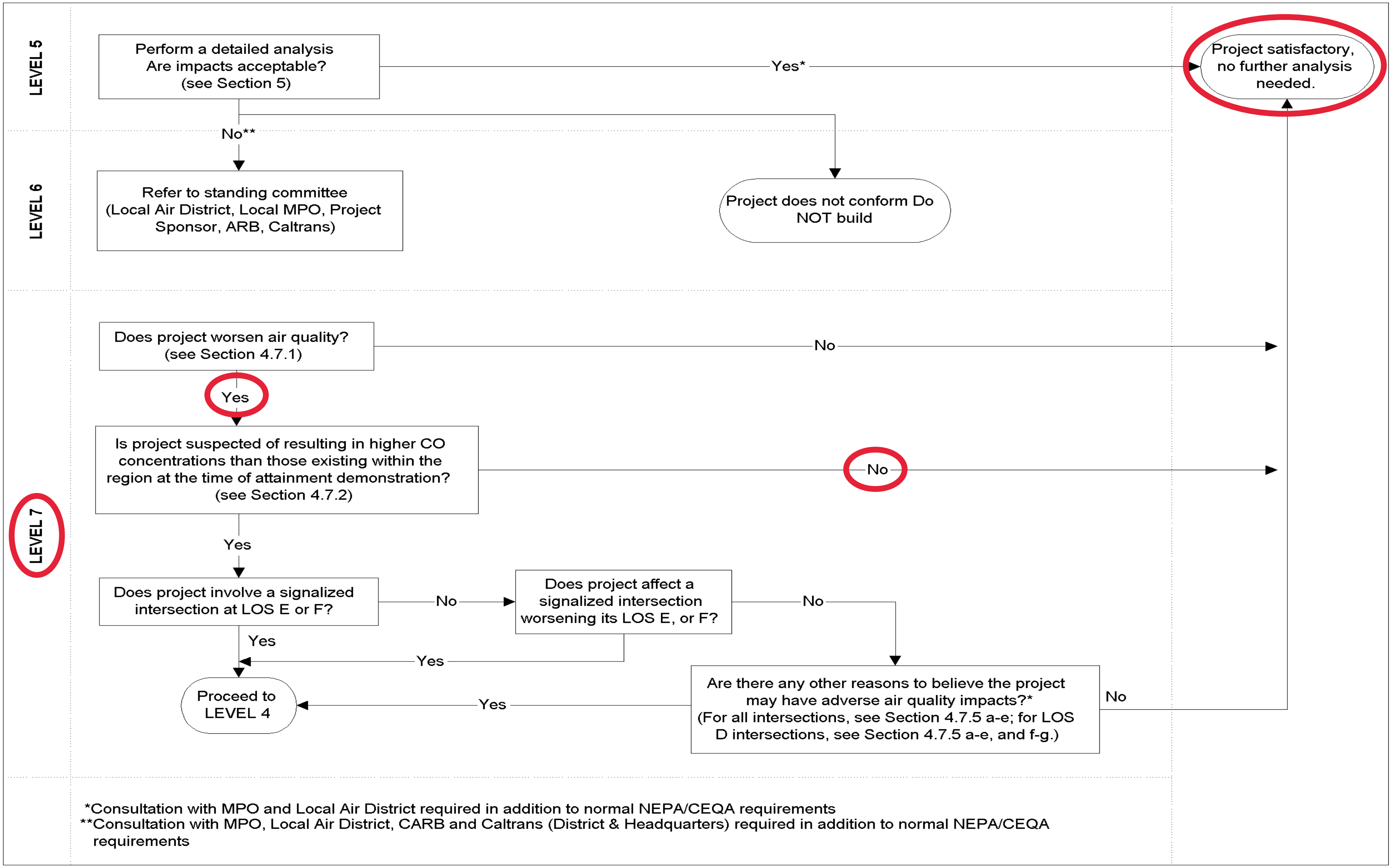

Figure 3 (cont.). Local CO Analysis

4-11

Appendix F: Council on Environmental Quality Regulations (40 CFR 1502.22[b]) Regarding Incomplete or Unavailable Information

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Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents

Council on Environmental Quality (CEQ) Provisions Covering Incomplete or Unavailable Information (40 CFR 1502.22)

Sec. 1502.22 Incompete Or Unavailable Information

When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.

- If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.
- If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement:
  - a statement that such information is incomplete or unavailable;
  - a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
  - a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and
  - the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts that have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.
- The amended regulation will be applicable to all environmental impact statements for which a Notice to Intent (40 CFR 1508.22) is published in the Federal Register on or after May 27, 1986. For environmental impact statements in progress, agencies may choose to comply with the requirements of either the original or amended regulation.

Incomplete Or Unavailable Information For Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in mobile source air toxic (MSAT) emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, https://www.epa.gov/iris). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). A number of HEI studies are summarized in Appendix D of FHWA's Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are: cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects) or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA states that with respect to diesel engine exhaust, "[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk (EPA IRIS database, Diesel Engine Exhaust, Section II.C. https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0642.htm#quainhal)."

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable (https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD59852578000050C9DA/$file/07-1053-1120274.pdf).

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Due to the limitations cited, a discussion such as the example provided in this Appendix (reflecting any local and project-specific circumstances), should be included regarding incomplete or unavailable information in accordance with Council on Environmental Quality (CEQ) regulations [40 CFR 1502.22(b)]. The FHWA Headquarters and Resource Center staff, Victoria Martinez (787) 771-2524, James Gavin (202) 366-1473, and Michael Claggett (505) 820-2047, are available to provide guidance and technical assistance and support.

FHWA Sponsored Mobile Source Air Toxics Research Efforts

Human epidemiology and animal toxicology experiments indicate that many chemicals or mixtures termed air toxics have the potential to impact human health. As toxicology, epidemiology and air contaminant measurement techniques have improved over the decades, scientists and regulators have increased their focus on the levels of each chemical or material in the air in an effort to link potential exposures with potential health effects.

Air toxics emissions from mobile sources have the potential to impact human health and often represent a regulatory agency concern. The FHWA has responded to this concern by developing an integrated research program to answer the most important transportation community questions related to air toxics, human health, and the NEPA process. To this end, FHWA has performed, or funded several research efforts.

There are hundreds, if not thousands of published analyses of air pollution, air pollution from mobile sources, near road air pollution, and health. It would not be practical to list them all, as they vary in terms of quality, methodology, spatial, temporal and geographic applicability and other possible factors. However, several of the studies either initiated or supported by FHWA are described below.

The National Near Roadway MSAT Study

The FHWA, in conjunction with the EPA and a consortium of State departments of transportation, studied the concentration and physical behavior of MSAT and mobile source PM 2.5 in Las Vegas, Nevada and Detroit, Michigan. The study criteria dictated that the study site be open to traffic and have 150,000 Annual Average Daily Traffic or more. These studies were intended to provide knowledge about the dispersion of MSAT emissions with the ultimate goal of enabling more informed transportation and environmental decisions at the project-level. The Las Vegas study was unique in that the monitored data was collected for the entire year. Both the Las Vegas, NV and Detroit, MI reports revealed there are a large number of influences in these urban settings and researchers must look beyond the roadway to find all the pollution sources in the near road environment. Additionally, meteorology played a large role in the concentrations measured in the near road study area. More information is available at http://www.fhwa.dot.gov/environment/air_quality/air_toxics/index.cfm.

Diesel Emissions

Advanced Collaborative Emissions Study

In 2015 the Health Effects Institute (HEI) released the last in a three part series of reports in a multiyear research effort to study the health effects of diesel emissions: *Advanced Collaborative Emissions Study* (ACES) https://www.healtheffects.org/publication/advanced-collaborative-emissions-study-aces-lifetime-cancer-and-non-cancer-assessment. This included reports on Subchronic Exposure Results: Biologic Responses in Rats and Mice and Assessment of Genotoxicity and Lifetime Cancer and Non-Cancer Assessment in Rats Exposed to New-Technology Diesel Exhaust. The Executive Summary "summarizes the main findings of emissions and health testing of new technology heavy-duty diesel engines capable of meeting US 2007/2010 and EURO VI/6 diesel emissions standards. The results demonstrated the dramatic improvements in emissions and the absence of any significant health effects. The Executive Summary presents the main findings of all three phases of the project and places the results in the context of health risk assessment, noting that 'the overall toxicity of exhaust from modern diesel engines is significantly decreased compared with the toxicity of emissions from traditional-technology diesel engines.'" https://www.healtheffects.org/publication/executive-summary-advanced-collaborative-emissions-study-aces

Diesel Emissions and Lung Cancer: An Evaluation of Recent Epidemiological Evidence for Quantitative Risk Assessment (Special Report 19)

In 2015 the Health Effects Institute (HEI) released Special Report 19 https://www.healtheffects.org/publication/diesel-emissions-and-lung-cancer-evaluation-recent-epidemiological-evidence-quantitative that contains "the intensive review and analysis of the studies of mine and truck workers exposed to older diesel engine exhaust." The purpose was to review two epidemiological studies of diesel exhaust and lung cancer "to consider whether data or results from these studies might also be used to quantify lung cancer risk in populations exposed to diesel exhaust at lower concentrations and with different temporal patterns, such as those experienced by the general population in urban areas worldwide." To date, the Environmental Protection Agency (EPA) has not established a cancer risk screening level for diesel exhaust*. In its report, HEI's Diesel Epidemiology Panel concluded that "the studies are well prepared and are useful for applying the data to calculate the cancer risk due to exposure to diesel exhaust. The Panel noted, however, that efforts to apply these studies to estimate human risk at today's ambient levels will need to consider the much lower levels of emission pollutants from newer diesel technology as well as the limitations . . . identified in each study." In the Report (page 6), it is stated that "detailed evaluations of these studies . . . lay the groundwork for a systematic characterization of the exposure–response relationship and associated uncertainties in a quantitative risk assessment, should one be undertaken" by the EPA.

*HEI 1999 Diesel Exhaust review identified numerous limitations of epidemiological studies available at that time and did not recommend a cancer risk due to exposure to diesel exhaust be established. See the HEI Diesel Epidemiology Expert Panel. 1999. Diesel Emissions and Lung Cancer: Epidemiology and Quantitative Risk Assessment. Special Report. Cambridge, MA: Health Effects Institute. https://www.healtheffects.org/publication/diesel-emissions-and-lung-cancer-epidemiology-and-quantitative-risk-assessment

Traffic-Related Air Pollution

Mobile Source Air Toxic Hot Spot

Given concerns about the possibility of MSAT exposure in the near road environment, The Health Effects Institute (HEI) dedicated a number of research efforts at trying to find a MSAT "hotspot." In 2011 three studies were published that tested this hypothesis. In general the authors confirm that while highways are a source of air toxics, they were unable to find that highways were the only source of these pollutants and determined that near road exposures were often no different or no higher than background or ambient levels of exposure, and hence no true hot spots were identified. These studies provide additional information:

- Lioy, P.J., et al (2011). Personal and Ambient Exposures to Air Toxics in Camden, New Jersey, Health Effects Institute No. 160, https://www.healtheffects.org/publication/personal-and-ambient-exposures-air-toxics-camden-new-jersey, page 137
- Spengler, J., et al (2011). Air Toxics Exposure from Vehicle Emissions at a U.S. Border Crossing: Buffalo Peace Bridge Study, Health Effects Institute No. 158, https://www.healtheffects.org/publication/air-toxics-exposure-vehicle-emissions-us-border-crossing-buffalo-peace-bridge-study, page 143
- Fujita, E.M., et al (2011). Concentrations of Air Toxics in Motor Vehicle–Dominated Environments, Health Effects Institute No. 156, https://www.healtheffects.org/publication/concentrations-air-toxics-motor-vehicle-dominated-environments, page 87 - where monitored on-road emissions were higher than emission levels monitored near road residences, but the issue of hot spot was not ultimately discussed.

Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects

In 2010, HEI released Special Report #17, investigating the health effects of traffic related air pollution. The goal of the research was to synthesize available information on the effects of traffic on health. Researchers looked at linkages between: (1) traffic emissions (at the tailpipe) with ambient air pollution in general, (2) concentrations of ambient pollutants with human exposure to pollutants from traffic, (3) exposure to pollutants from traffic with human-health effects and toxicologic data, and (4) toxicologic data with epidemiological associations. Challenges in making exposure assessments, such as quality and quantity of emissions data and models, were investigated, as was the appropriateness of the use of proximity as an exposure-assessment model. Overall, researchers felt that there was "sufficient" evidence for causality for the exacerbation of asthma. Evidence was "suggestive but not sufficient" for other health outcomes such as cardiovascular mortality and others. Study authors also note that past epidemiologic studies may not provide an appropriate assessment of future health associations as vehicle emissions are decreasing overtime. The report is available from HEI's website at https://www.healtheffects.org/publication/traffic-related-air-pollution-critical-review-literature-emissions-exposure-and-health.

HEI Special Report #16

In 2007, the HEI published Special Report #16: Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects. The purpose of this Report was to accomplish the following tasks:

- Use information from the peer-reviewed literature to summarize the health effects of exposure to the 21 MSATs defined by the EPA in 2001;
- Critically analyze the literature for a subset of priority MSAT; and
- Identify and summarize key gaps in existing research and unresolved questions about the priority MSAT.

The HEI chose to review literature for acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde, naphthalene, and polycyclic organic matter (POM). Diesel exhaust was included, but not reviewed in this study since it had been reviewed by HEI and EPA recently. In general, the Report concluded that the cancer health effects due to mobile sources are difficult to discern since the majority of quantitative assessments are derived from occupational cohorts with high concentration exposures and some cancer potency estimates are derived from animal models. The Report suggested that substantial improvements in analytical sensitively and specificity of biomarkers would provide better linkages between exposure and health effects. Noncancer endpoints were not a central focus of most research, and therefore require further investigation. Subpopulation susceptibility also requires additional evaluation. The study is available from HEI's website at https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects.

Going One Step Beyond: A Neighborhood Scale Air Toxics Assessment in North Denver (The Good Neighbor Project)

In 2007, the Denver Department of Environmental Health (DDEH) issued a technical report entitled *Going One Step Beyond: A Neighborhood Scale Air Toxics Assessment in North Denver (The Good Neighbor Project)*.This research project was funded by FHWA. In this study, DDEH conducted a neighborhood-scale air toxics assessment in North Denver, which includes a portion of the proposed I-70 East project area. Residents in this area have been very concerned about both existing health effects in their neighborhoods (from industrial activities, hazardous waste sites, and traffic) and potential health impacts from changes to I-70.

The study was designed to compare modeled levels of the six priority MSATs identified in FHWA's 2006 guidance with measurements at existing MSAT monitoring sites in the study area. MOBILE6.2 emissions factors and the ISC3ST dispersion model were used (some limited testing of the CALPUFF model was also performed). Key findings include: 1) modeled mean annual concentrations from highways were well below estimated Integrated Risk Information System (IRIS) cancer and non-cancer risk values for all six MSAT; 2) modeled concentrations dropped off sharply within 50 meters of roadways; 3) modeled MSAT concentrations tended to be higher along highways near the Denver Central Business District (CBD) than along the I-70 East corridor (in some cases, they were higher within the CBD itself, as were the monitored values); and 4) dispersion model results were generally lower than monitored concentrations but within a factor of two at all locations.

Kansas City PM Characterization Study (kansas City Study)

This study was initiated by EPA to conduct exhaust emissions testing on 480 light-duty, gasoline vehicles in the Kansas City Metropolitan Area (KCMA). Major goals of the study included characterizing PM emissions distributions of a sample of gasoline vehicles in Kansas City; characterizing gaseous and PM toxics exhaust emissions; and characterizing the fraction of high emitters in the fleet. In the process, sampling methodologies were evaluated. Overall, results from the study were used to populate databases for the MOVES emissions model. The FHWA was one of the research sponsors. This study is available on EPA's website at: https://www3.epa.gov/otaq/emission-factors-research/documents/420r08009.pdf

Estimating The Transportation Contribution To Particulate Matter Pollution (air Toxics Supersite Study)

The purpose of this study was to improve understanding of the role of highway transportation sources in particulate matter (PM) pollution. In particular, it was important to examine uncertainties, such as the effects of the spatial and temporal distribution of travel patterns, consequences of vehicle fleet mix and fuel type, the contribution of vehicle speed and operating characteristics, and influences of geography and weather. The fundamental methodology of the study was to combine EPA research-grade air quality monitoring data in a representative sample of metropolitan areas with traffic data collected by State departments of transportation (DOTs) and local governments.

Phase I of the study, the planning and data evaluation stage, assessed the characteristics of EPA's ambient PM monitoring initiatives and recruited State DOTs and local government to participate in the research. After evaluating and selecting potential metropolitan areas based on the quality of PM and traffic monitoring data, nine cities were selected to participate in Phase II. The goal of Phase II was to determine whether correlations could be observed between traffic on highway facilities and ambient PM concentrations. The Phase I report was published in September 2002. Phase II included the collection of traffic and air quality data and data analysis. Ultimately, six cities participated: New York City (Queens), Baltimore, Pittsburgh, Atlanta, Detroit and Los Angeles.

In Phase II, air quality and traffic data were collected. The air quality data was obtained from the EPA Air Quality System, Supersite personnel, and NARSTO data archive site. Traffic data included intelligent transportation system (ITS) roadway surveillance, coverage counts (routine traffic monitoring) and supplemental counts (specifically for research project). Analyses resulted in the conclusion that only a weak correlation existed between PM2.5 concentrations and traffic activity for several of the sites. The existence of general trends indicates a relationship, which however is primarily unquantifiable. Limitations of the study include the assumption that traffic sources are close enough to ambient monitors to provide sufficiently strong source strength, that vehicle activity is an appropriate surrogate for mobile emissions, and lack of knowledge of other factors such as non-traffic sources of PM and its precursors. A paper documenting the work of Phase II was presented at EPA's 13th International Emissions Inventory Conference and is available at http://www.epa.gov/ttn/chief/conference/ei13/mobile/black.pdf.

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