Caltrans

U.S. Department of Transportation
Federal Railroad Administration

RCTC RIVERSIDE COUNTY TRANSPORTATION COMMISSION

Air Quality and Greenhouse Gas Technical Memorandum

Coachella Valley-San Gorgonio Pass Rail Corridor Service Program

May 2021

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Abbreviations/Acronyms

AB	Assembly Bill
ARB	Air Resources Board
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent
EIR	environmental impact report
EIS	environmental impact statement
EO	Executive Order
EPA	Environmental Protection Agency
FCAA	Federal Clean Air Act
FRA	Federal Railroad Administration
GHG	greenhouse gas
MMT	million metric tons
MPO	metropolitan planning organization
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
O_3	ozone
Pb	lead
PM	particulate matter
PM_{10}	particles of 10 micrometers or smaller

$PM_{2.5}$	particles of 2.5 micrometers or smaller
Program	Coachella Valley-San Gorgonio Pass Rail Corridor Service Program
Program Corridor	Coachella Valley-San Gorgonio Pass Rail Corridor
RCTC	Riverside County Transportation Commission
ROW	right-of-way
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SCAB	South Coast Air Basin
SDP	Service Development Plan
SIP	state implementation plan
SO_2	sulfur dioxide
SO_X	sulfur oxide
SSAB	Salton Sea Air Basin
TAC	toxic air contaminant
U.S.	United States
VMT	vehicle miles traveled

1 Introduction

The Federal Railroad Administration (FRA), California Department of Transportation (Caltrans) Division of Rail and Mass Transportation, and Riverside County Transportation Commission (RCTC) are proposing the Coachella Valley-San Gorgonio Pass Rail Corridor Service Program (Program) to establish daily intercity passenger rail service between Los Angeles Union Station (LAUS) in Los Angeles County, California and the City of Coachella in Riverside County, California. This air quality and greenhouse gas (GHG) technical memorandum evaluates air quality and GHG resources along the 144-mile Coachella Valley-San Gorgonio Pass Rail Corridor (Program Corridor) in support of a Tier 1/Program Environmental Impact Statement (EIS)/Environmental Impact Report (EIR). The evaluation of potential air quality and GHG effects resulting from the Program includes:

- Consistency with the state implementation plan (SIP)
- Changes to air quality compared with the No Build Alternative as a result of construction and operation of the Build Alternative Options
- Changes to GHG compared with the No Build Alternative as a result of construction and operation of the Build Alternative Options

1.1 Study Approach

This evaluation was prepared pursuant to the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) and will be incorporated into the Tier 1/Program EIS/EIR evaluation.

FRA, Caltrans, and RCTC are using a tiered NEPA/CEQA process (e.g., Tier 1/Program EIS/EIR) to complete the environmental review of the Program, under 40 Code of Federal Regulations (CFR) 1508.28 (titled “Tiering”), CEQA Guidelines Section 15168 (titled “Program EIR”), and Section 15170 (titled “Joint EIS/EIR”). “Tiering” is a staged environmental review process often applied to environmental review for complex transportation projects.

The Tier 1/Program EIS/EIR, along with the concurrent preparation of the Service Development Plan (SDP), are the first steps in the tiered environmental review process. Based on the decisions made in the Tier 1/Program EIS/EIR and SDP, future site-specific proposals of infrastructure improvements will be evaluated through one or more Tier 2/Project-level environmental clearance processes. A description of the Tier 1/Program EIS/EIR, SDP, and Tier 2/Project-level analysis processes are further discussed below:

- *Tier 1/Program EIS/EIR*: The Tier 1/Program EIS/EIR evaluates potential environmental impacts of the No Build Alternative and three Build Alternative Options broadly within the Program Corridor. The Program Corridor provides a flexible regional context for the best location of an enhanced passenger rail system while providing opportunities for the Build Alternative Options to account for engineering and environmental constraints. The Tier 1/Program EIS/EIR evaluation addresses broad questions and likely environmental effects within the Tier 1/Program Study Area for specific environmental resources. The resource-specific study areas generally represent the potential area where rail infrastructure improvements and station facilities could be implemented and constructed but does not represent the precise location or footprint of the improvement or facility.
- *SDP*: The SDP defines the Program's service mode, estimated ridership to include demand and revenue forecasts, operational strategy, station and access analysis, operating and maintenance costs, required infrastructure improvements and capital programming, and public benefits analysis necessary to implement the proposed intercity passenger rail service. As part of the SDP process, the site-specific infrastructure improvement requirements are being identified, including the number of stations and the general areas/communities in which stations might be located. The SDP infrastructure analysis is being informed by rail operations simulation modeling and would occur parallel to the Tier 1/Program EIS/EIR evaluation process.

  Tier 2 Project-Level Analysis: Based on the environmental evaluation conducted in the Tier 1/Program EIS/EIR and the site-specific infrastructure improvements identified in the SDP, a Tier 2/Project-level analysis would be required. The Tier 2/Project-level analysis would be a separate environmental review potentially led and funded by an agency other than FRA. In addition, the Tier 2/Project-level analysis process would not automatically follow the Tier 1 process, rather the potential Tier 2 Projects would need to be defined based on the Tier 1/Program EIS/EIR's broad scope and funding. The Tier 2/Project-level analysis would closely align with the future preliminary engineering process and would analyze site-specific direct and indirect Project-level effects, in addition to any required permits, consultations, or approvals needed for construction.

2 Program Location and Description

2.1 Program Location

The Tier 1/Program EIS/EIR analyzes the No Build Alternative and three Build Alternative Options in two geographic sections—a Western Section and an Eastern Section—occurring within existing railroad rights-of-way (ROW), as shown on Figure 2-1 through Figure 2-3. The Program Corridor runs west-to-east, extending up to 144 linear miles from a western terminus at LAUS to an eastern terminus in either the City of Indio or City of Coachella (depending on the Build Alternative Option).

From west to east, the cities traversed by the Build Alternative Options include Los Angeles, Vernon, Bell, Commerce, Montebello, Pico Rivera, Santa Fe Springs, Norwalk, La Mirada, Buena Park, Fullerton, Anaheim, Placentia, Yorba Linda, Chino Hills, Corona, Riverside, Grand Terrace, Colton, San Bernardino, Loma Linda, Redlands, Calimesa, Beaumont, Banning, Cabazon, Palm Springs, Cathedral City, Thousand Palms, Rancho Mirage, Palm Desert, Indio (under all Build Alternative Options), and/or Coachella (under Build Alternative Option 1 only). The boundary between Western and Eastern Sections is in the City of Colton, at the intersection of existing railroad lines owned by Union Pacific Railroad and BNSF.

2.2 Program Description

2.2.1 Build Alternative Option 1 (Coachella Terminus)

Build Alternative Option 1 includes a total Program Corridor distance of 144 miles and consists of a Western Section, terminating at LAUS, and an Eastern Section, terminating in the City of Coachella.

Western Section. Under Build Alternative Option 1, existing rail infrastructure would be used in the Western Section of the Program Corridor, and no additional railroad infrastructure improvements would be required. LAUS would serve as the western terminus, while existing stations in the Cities of Fullerton and Riverside would be utilized to support the proposed passenger rail service. No new stations or improvements to existing stations would be required to accommodate the proposed service within the Western Section of the Program Corridor.

Eastern Section. Under Build Alternative Option 1, potential new infrastructure improvements on the Eastern Section of the Program Corridor could include sidings, additional main line track, wayside signals, drainage, grade separation structures, and up to five new stations constructed in the following areas: 1) Loma Linda/Redlands Area (serving the Cities of Loma Linda and Redlands), 2) the Pass Area (serving the communities of Beaumont, Banning, and Cabazon), 3) the Mid Valley

(serving the communities of Cathedral City, Thousand Palms, the Agua Caliente Casino area, Rancho Mirage, and Palm Desert), 4) the City of Indio, and 5) the City of Coachella as the eastern terminus of the Program Corridor.

2.2.2 Build Alternative Option 2 (Indio Terminus)

Build Alternative Option 2 includes a total Program Corridor distance of 140.25 miles and consists of a Western Section, terminating at LAUS, and an Eastern Section, terminating at the City of Indio.

Western Section. The Western Section under Build Alternative Option 2 would be the same as that described above under Build Alternative Option 1.

Eastern Section. Under Build Alternative Option 2, potential new infrastructure improvements on the Eastern Section of the Program Corridor could include sidings, additional main line track, wayside signals, drainage, grade separation structures, and up to four new potential stations could be constructed in the following areas: 1) Loma Linda/Redlands Area (serving the Cities of Loma Linda and Redlands), 2) the Pass Area (serving the communities of Beaumont, Banning, and Cabazon), 3) the Mid Valley (serving the communities of Cathedral City, Thousand Palms, the Agua Caliente Casino area, Rancho Mirage, and Palm Desert), and 4) the City of Indio as the eastern terminus of the Program Corridor.

2.2.3 Build Alternative Option 3 (Indio Terminus with Limited Third Track)

Build Alternative Option 3 includes a total Program Corridor distance of 140.25 miles and consists of a Western Section, terminating at LAUS, and an Eastern Section, terminating at the City of Indio.

Western Section. The Western Section under Build Alternative Option 3 would be the same as that described above under Build Alternative Options 1 and 2.

Eastern Section. The Eastern Section under Build Alternative Option 3 would be the same as that described above under Build Alternative Option 2, except for the following changes:

As part of Build Alternative Option 3, additional infrastructure improvements for the Eastern Section of the Program Corridor have been considered. These potential infrastructure improvements include the addition of station tracks and a third main line track. The addition of station tracks would be the same as described under Build Alternative Options 1 and 2; however, the addition of the third main track would be limited under Build Alternative Option 3 when compared with Build Alternative Options 1 and 2. The limited third track under Build Alternative Option 3 would augment the existing two main tracks along the Eastern Section of the Program Corridor to the proposed Mid Valley Station Area.

2.3 Construction

2.3.1 Western Section

In the Western Section, existing rail infrastructure would be used to accommodate the proposed service, and no additional track improvements would be required to accommodate the proposed service under all Build Alternative Options. LAUS would serve as the western terminus, and existing stations in the Cities of Fullerton and Riverside would be used, as depicted on Figure 2-1. No new stations or additions to existing stations would be required to accommodate the proposed service under all Build Alternative Options. The Tier 1/Program EIS/EIR Study Area for potential construction-related impacts on air quality and GHG resources within the Western Section is up to 600 feet from either side of the existing railroad centerline.

2.3.2 Eastern Section

In the Eastern Section, proposed new infrastructure improvements under all Build Alternative Options could include sidings, additional main line track, wayside signals, drainage, grade-separation structures, and stations to accommodate the proposed service. The Eastern Section would use the existing station in the City of Palm Springs, which is the only existing station in the Eastern Section. Additionally, as depicted on Figure 2-2 and Figure 2-3, up to five new potential stations could be constructed in the following areas: 1) Loma Linda/Redlands Area (serving the Cities of Loma Linda and Redlands), 2) the Pass Area (serving the communities of Beaumont, Banning, and Cabazon), 3) the Mid-Valley (serving the communities of Cathedral City, Thousand Palms, the Agua Caliente Casino area, Rancho Mirage, and Palm Desert), 4) the City of Indio (under all Build Alternative Options), and/or 5) the City of Coachella (under Build Alternative Option 1 only).

The Tier 1/Program EIS/EIR Study Area for potential construction-related impacts on air quality and GHG resources within the Eastern Section is up to 1,000 feet from either side of the centerline, plus a 500-foot buffer for the assessment of indirect impacts, for a total Tier 1/Program EIS/EIR Study Area of 1,500 feet from either side of the centerline at each of the individual station location areas. The remaining portion of the Eastern Section Tier 1/Program EIS/EIR Study Area encompasses up to 300 feet from the railroad centerline to include non-station-related infrastructure improvements, plus a 500-foot buffer for the assessment of indirect impacts, for a total Tier 1/Program EIS/EIR Study Area of 800 feet from the railroad centerline.

2.4 Operation

Passenger train frequencies proposed as part of the Program would consist of the addition of two daily round-trip intercity diesel-powered passenger trains operating the entire length of the Program Corridor between Los Angeles and Indio and/or Coachella, with one morning departure and one afternoon departure from each end of the Program Corridor.

Figure 2-1. Western Section of the Program Corridor (Build Alternative Options 1, 2, and 3)

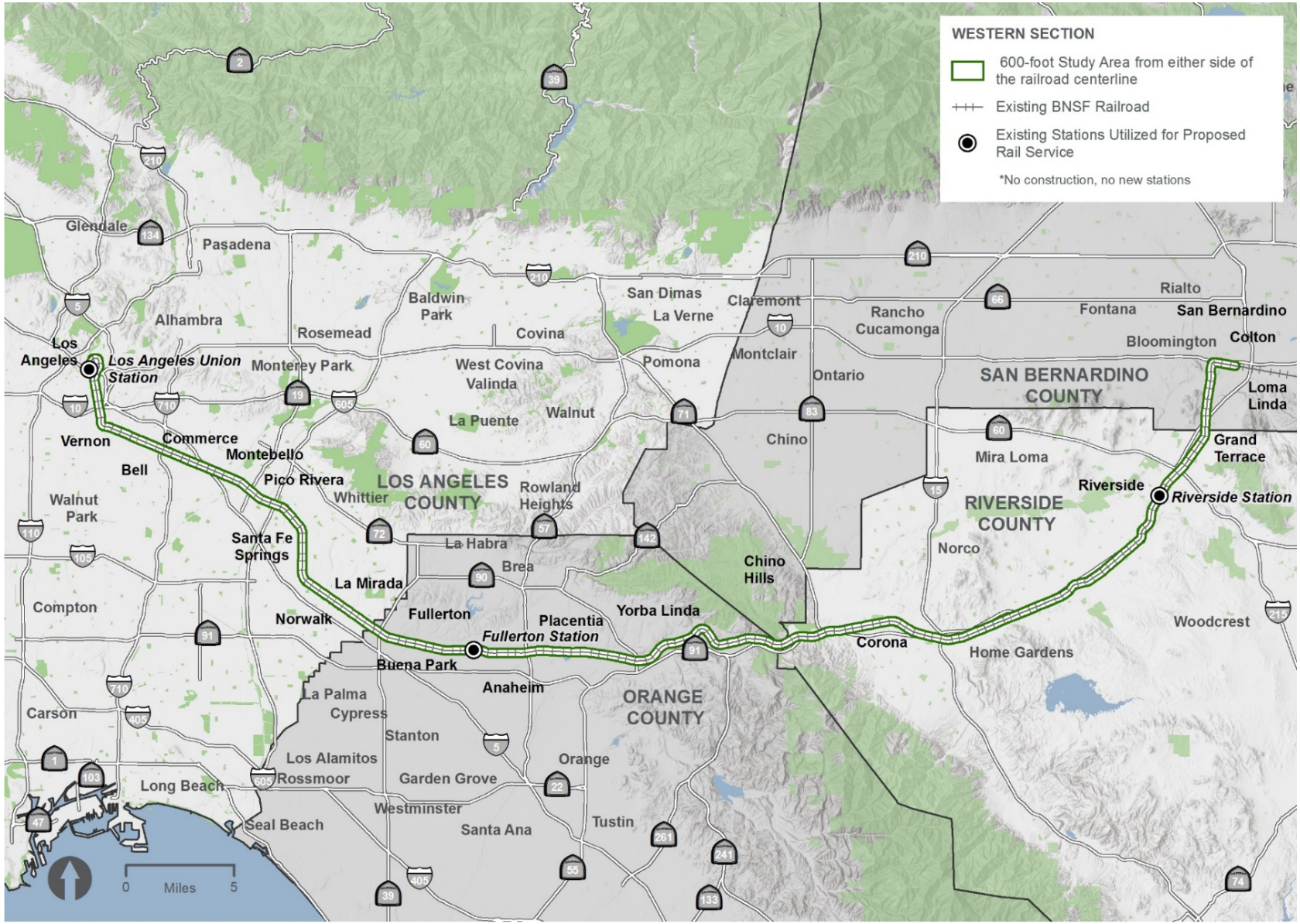

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Figure 2-2. Eastern Section of the Program Corridor (Build Alternative Option 1)

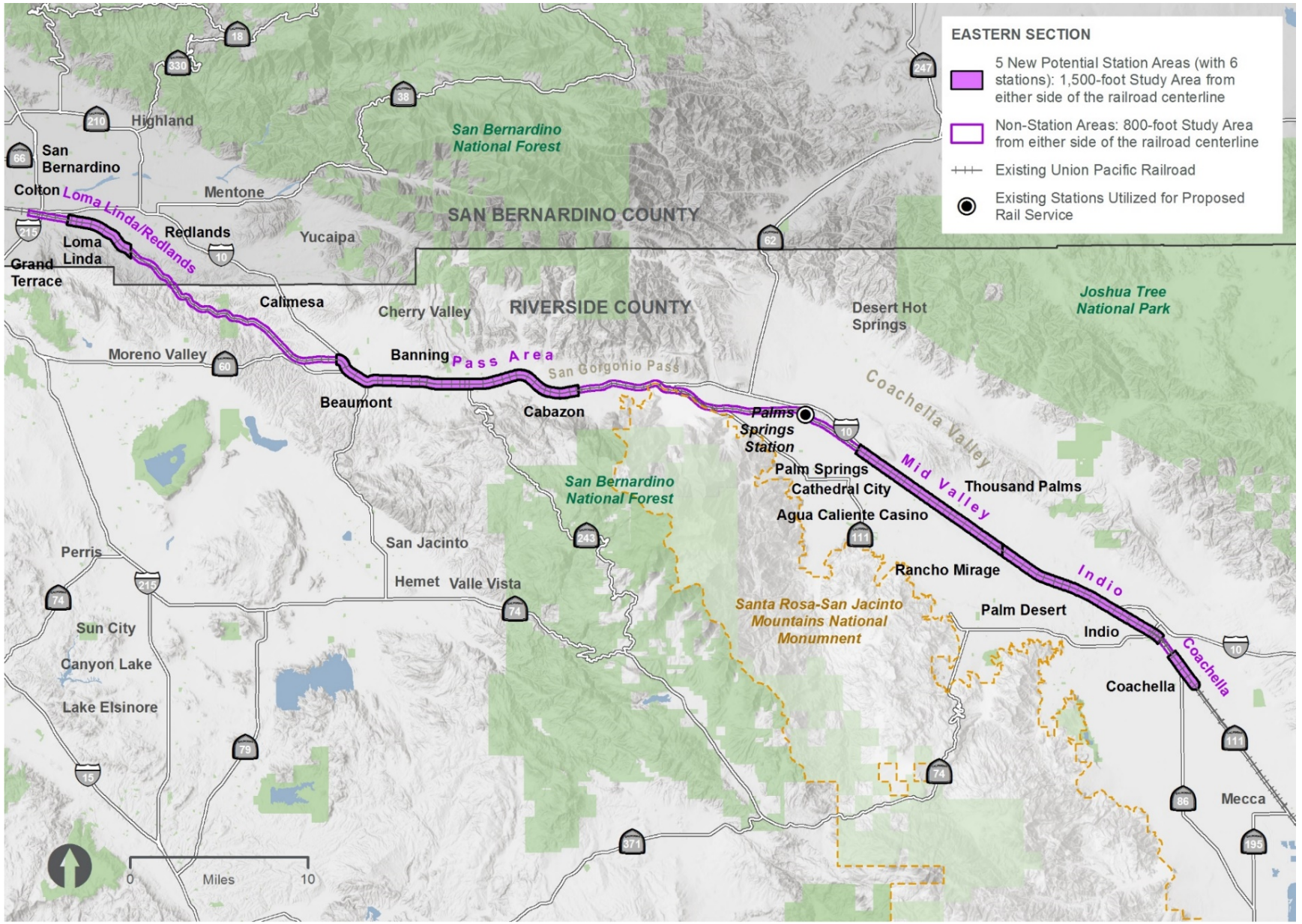

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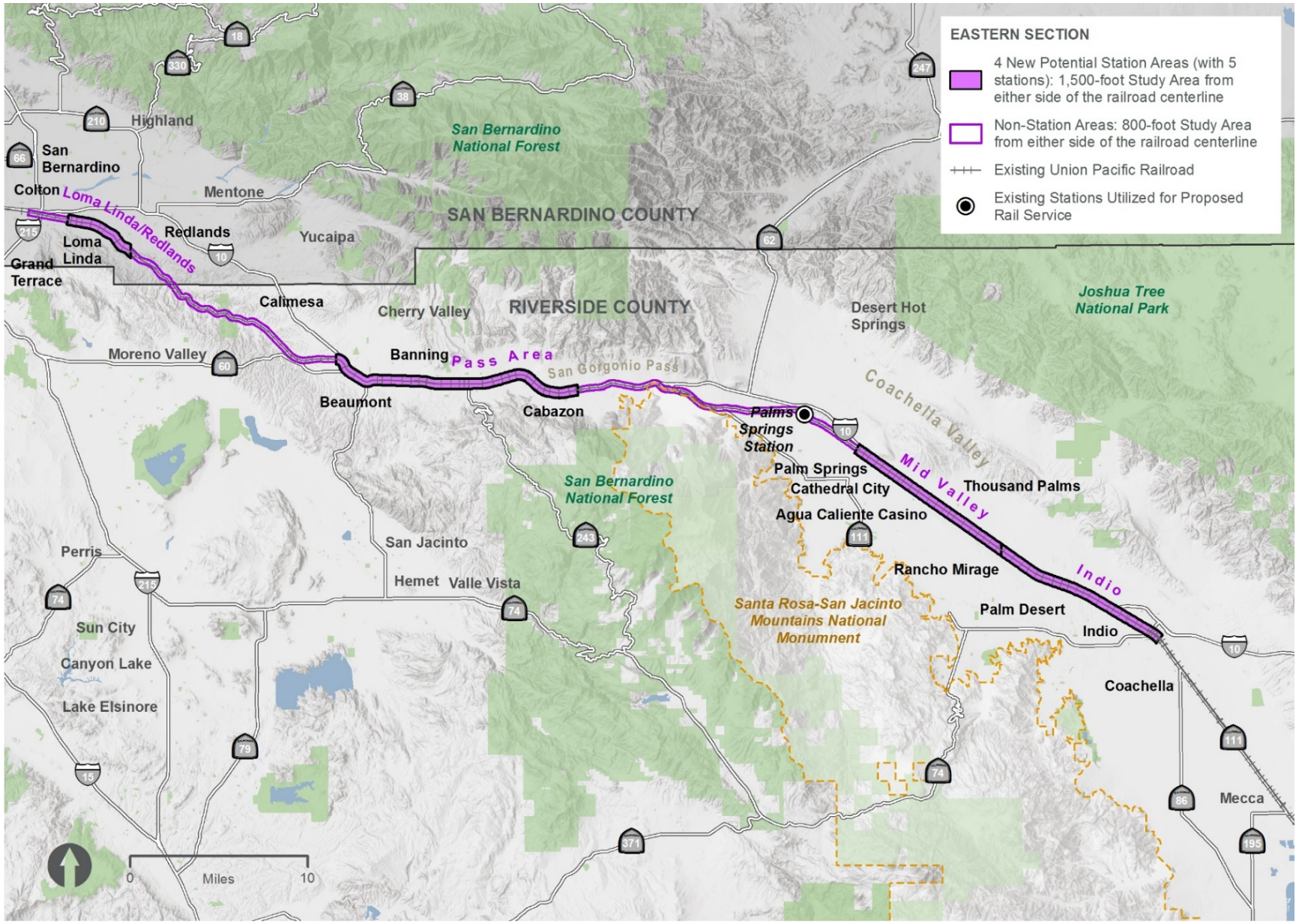
Figure 2-3. Eastern Section of the Program Corridor (Build Alternative Options 2 and 3)



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3 Regulatory Framework

3.1 Definitions

Air Quality: General term used to describe pollutant levels in the atmosphere. Individual air pollutants and GHG emissions can harm human or animal health, reduce the productivity or vigor of crops or natural vegetation, damage property, contribute to climate change, and degrade the atmosphere by reducing visibility.

Air Toxics*:* Air pollutants known or suspected to cause cancer or other serious health effects.

Attainment area: An area considered to have air quality as good as or better than the National Ambient Air Quality Standards (NAAQS) as defined in the Federal Clean Air Act (FCAA). An area may be an attainment area for one pollutant and a non-attainment area for others.

Federal Clean Air Act: A federal law passed in 1963 and amended in 1967, 1970, 1974, 1977, and 1990 that forms the basis for the national air pollution control effort. Basic elements of the FCAA include NAAQS for major air pollutants, mobile and stationary control measures, toxic air contaminant (TAC) standards, acid rain control measures, and enforcement provisions.

Climate Change*:* As described by the United States (U.S.) Environmental Protection Agency (EPA), climate change is any significant change in the measures of climate lasting for an extended period of time. It includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over a period of several decades or longer.

Conformity: Conformity is required by the FCAA to ensure that federal funding and approval are given to projects that are consistent with ("conform to") the air quality goals established by a SIP. The Final Conformity Rule implementing the FCAA Amendments of 1990 defines conformity as follows:

“Conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards; and that such activities will not cause or contribute to any new violation of any NAAQS in any area, increase the frequency or severity of any existing violation of any NAAQS in any area, or delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in any area.” EPA promulgated two sets of regulations. Transportation conformity applies to highways and mass transit projects, while general conformity applies to all other federal actions such as the FRA.

Criteria Air Pollutant: An air pollutant for which acceptable levels of exposure, based on human health and/or environmentally based criteria, have been determined by EPA and for which a NAAQS has been set.

Greenhouse Gases: Atmospheric gases, such as carbon dioxide (CO_2), methane, chlorofluorocarbons, nitrous oxide, ozone (O_3), and water vapor, which slow the passage of re-radiated heat through the Earth's atmosphere.

Global Warming*:* The EPA describes global warming as the measured increases in average temperatures worldwide in recent decades and the continued increases projected to occur throughout this century. The climate change effects associated with this gradual warming trend include rises in sea levels (because of the melting of glaciers and ice caps and the thermal expansion of ocean water); projected changes in the location, level, and frequency of precipitation; and the frequency and/or severity of storm events and changes in temperature ranges (e.g., frequency and intensity of maximum and minimum temperature extremes).

Mobile Sources: Moving sources of pollution, such as automobiles, motorcycles, trucks, off-road vehicles, boats, and airplanes.

National Ambient Air Quality Standards: The FCAA requires EPA to set NAAQS (set in 40 CFR Part 50) for pollutants considered harmful to public health and the environment. The FCAA identifies two types of NAAQS. Primary standards provide public health protection, including protecting the health of "sensitive" populations, such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. The EPA periodically reviews new scientific data and may propose revisions to the standards as a result.

Non-attainment Area: A geographic area identified by the EPA as not meeting the NAAQS for a given pollutant. An area may be a non-attainment area for one pollutant and an attainment area for others.

State Implementation Plan: A plan for each state that identifies how that state will attain and/or maintain the primary and secondary NAAQS and that includes federally enforceable requirements. Each state is required to have a SIP that contains control measures and strategies that demonstrate how each area will attain and maintain the NAAQS.

Stationary Sources: Non-mobile sources of pollution, such as power plants, refineries, and manufacturing facilities that emit air pollutants.

Vehicle Miles Traveled: The total number of miles traveled by all vehicles for a specified period of time.

***Vulnerability**:* For purposes of the Tier 1/Program EIS/EIR, vulnerability is defined as the extent to which elements of existing or proposed rail service and infrastructure would be susceptible to the effects of climate change, such as sea level rise, riverine or coastal flood hazards, or other threats to the transportation network, such as extreme heat and cold effects on tracks.

3.2 Air Quality

The Tier 1/Program EIS/EIR complies with FRA's *Procedures for Considering Environmental Impacts*, Section 14(n)(1) (64 *Federal Register* 28545, May 26, 1999) (FRA 1999). According to FRA's *Procedures for Considering Environmental Impacts*, impacts on air quality must assess consistency of alternatives with federal and state plans for the attainment and maintenance of air quality standards.

FCAA, as amended, is the primary federal law that governs air quality, while the California Clean Air Act (CCAA) is its companion state law. These laws and related regulations by the EPA and California Air Resources Board (ARB) set standards for the concentration of air pollutants.

3.2.1 Federal

Federal Clean Air Act

At the federal level, these standards are called NAAQS. NAAQS and state ambient air quality standards, depicted on Figure 3-1, have been established for six transportation-related criteria pollutants that have been linked to potential health concerns: carbon monoxide (CO); nitrogen dioxide (NO_2); O_3; particulate matter (PM), which is broken down for regulatory purposes into particles of 10 micrometers or smaller (PM_{10}) and particles of 2.5 micrometers or smaller ($PM_{2.5}$); and sulfur dioxide (SO_2). In addition, national and state standards exist for lead (Pb), and state standards exist for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The NAAQS and state standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. Both state and federal regulatory schemes also cover TAC standards; some criteria pollutants are also TACs or may include certain TACs in their general definition. FCAA requires the EPA to designate areas as attainment, non-attainment, or maintenance (previously non-attainment and currently attainment) for each criteria pollutant based on whether the NAAQS have been achieved.

United States Environmental Protection Agency General Conformity Rule

The U.S. EPA General Conformity Rule (40 CFR 93 Subpart B) applies to federal actions, other than those related to highway and transit planning, that result in emissions of non-attainment or maintenance pollutants, or their precursors, in federally designated non-attainment or maintenance areas. The U.S. EPA General Conformity Rule establishes a process to demonstrate that federal actions would be consistent with applicable SIPs and would not cause or contribute to new violations of the NAAQS, increase the frequency or severity of existing violations of the NAAQS, or delay the timely attainment of the NAAQS.

3.2.2 State

California Clean Air Act

In California, the CCAA is administered by the ARB at the state level and by the air quality management districts and air pollution control districts at the regional and local levels. The ARB, which became part of the California EPA in 1991, is responsible for meeting the state requirements of the FCAA, administering the CCAA, and establishing the California Ambient Air Quality Standards (CAAQS). The CCAA, as amended in 1992, requires all air districts in the state to achieve and maintain the CAAQS. CAAQS are generally more stringent than the corresponding federal standards. The CCAA requires ARB to designate areas within California as either attainment or non-attainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as non-attainment for a pollutant if air quality data shows that a state standard for the pollutant was violated at least once during the previous 3 calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard and are not used as a basis for designating areas as non-attainment. State and national ambient air quality standards are provided on Figure 3-1.

Figure 3-1. Ambient Air Quality Standards

Ambient Air Quality Standards

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

See footnotes on next page …

For more information please call ARB-PIO at (916) 322-2990

California Air Resources Board (5/4/16)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

For more information please call ARB-PIO at (916) 322-2990 **California Air Resources Board (5/4/16)**

3.2.3 Regional

Southern California Association of Governments

Through the FCAA amendments, California's 18 metropolitan planning organizations (MPO) are responsible for the planning, programming, and coordination of federal highway and transit investments in urbanized areas. As part of this work, MPOs help to ensure that the transportation and air quality plans of the region are consistent with goals established in the SIP. The MPO responsible for air quality within the Tier 1/Program EIS/EIR Study Area is the Southern California Association of Governments. The Southern California Association of Governments region encompasses six counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) and 191 cities in an area, covering more than 38,000 square miles. The affected air basins include the South Coast Air Basin (SCAB) for the Western Section and the Eastern Section west of Cabazon, and the Salton Sea Air Basin (SSAB) for the Eastern Section east of Cabazon (Figure 4-1).

South Coast Air Quality Management District Regulations

The South Coast Air Quality Management District (SCAQMD) has jurisdiction over the SCAB and the portion of the SSAB that coincides with the Program. To ensure continued progress toward clean air and to comply with state and federal requirements, the SCAQMD, in conjunction with the ARB, Southern California Association of Governments, and the EPA, updates its air quality management plans every 3 years. The 2016 Air Quality Management Plan was adopted by the SCAQMD Governing Board March 3, 2017 (SCAQMD 2016). SCAQMD implements the following rules:

- SCAQMD Rule 402 – Nuisance: This rule prohibits discharge or air contaminants or other materials that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public; endanger the comfort, repose, health, or safety of any such persons or the public; or cause, or have a natural tendency to cause injury or damage to businesses or property.
- SCAQMD Rule 403 – Fugitive Dust: This rule prohibits emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area that remains visible beyond the emission source property line. Additional requirements apply to construction projects on property with 50 or more acres of disturbed surface area or for any earth-moving operation with a daily earth-moving or throughput volume of 5,000 cubic yards or more three times during the most recent 365-day period. These requirements include submittal of a dust control plan, maintaining dust control records, and designating a SCAQMD-certified dust control supervisor.

- SCAQMD Rule 1108 – Cutback Asphalt: This rule prohibits the sale or use of any cutback asphalt containing more than 0.5 percent by volume organic compounds, which evaporate at 260°C (500°F) or lower within the district.
- SCAQMD Rule 1113 – Architectural Coatings: This rule is intended to limit the volatile organic compounds content of architectural coatings used in within the district.

3.2.4 Local and Tribal Governments

Regulations from cities, local agencies, and tribal governments would be identified in the Tier 2/Project-level analysis once site-specific rail infrastructure improvements and station facilities are known.

3.3 Greenhouse Gases

GHG emissions are regulated at the federal and state level. Laws and regulations, as well as plans and policies, have been adopted to address global climate change issues.

3.3.1 Federal

Greenhouse Gas Reporting Program

On September 22, 2009, the EPA published the final rule that requires mandatory reporting of GHG emissions from large sources in the U.S. The gases covered by the Final Rule are CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases, including nitrogen trifluoride and hydrofluorinated ethers. Currently, this is not a transportation-related regulation and, therefore, would not apply to this Program. However, the methodology developed as part of this regulation is helpful in identifying potential GHG emissions.

On December 7, 2009, the *Final Endangerment and Cause or Contribute Findings for Greenhouse Gases,* under Section 202(a) of the FCAA, was signed by the EPA administrator. The endangerment finding states that current and projected concentrations of the six key well-mixed GHGs in the atmosphere—CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—threaten the public health and welfare of current and future generations. Furthermore, it states that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

3.3.2 State

California has taken proactive steps, briefly described below, to address the issues associated with GHG emissions and climate change.

Assembly Bill 1493

In 2002, with the passage of Assembly Bill (AB) 1493 (Pavley), California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the state level. California AB 1493 requires ARB to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the model year 2009. Although litigation challenged these regulations and EPA initially denied California's related request for a waiver, the waiver request was later granted.

Assembly Bill 32

In 2006, the goal of Executive Order (EO) S-03-05 was further reinforced by AB 32 (Chapter 488, Statutes of 2006), the Global Warming Solutions Act of 2006, which requires the state to reduce GHG emissions to 1990 levels by 2020. AB 32 mandates that the ARB create a plan that includes market mechanisms and implement rules to achieve "real, quantifiable, cost-effective reductions of GHGs." Separately, EO S-20-06 directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

The following are specific requirements of AB 32:

- ARB will prepare and approve a scoping plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions from sources or categories of sources of GHGs by 2020 (California Health and Safety Code Section 38561). The scoping plan, approved by the ARB on December 12, 2008, and updated on May 22, 2014, provides the outline for future actions to reduce GHG emissions in California via regulations, market mechanisms, and other measures.
- The scoping plan includes the implementation of the high-speed rail system as a GHG reduction measure, estimating a 2020 reduction of 1 million metric tons (MMT) of CO_2 equivalent (CO_2e).
- Identify the statewide level of GHG emissions in 1990 to serve as the emissions limit to be achieved by 2020 (California Health and Safety Code Section 38550). In December 2007, ARB approved the 2020 emission limit of 427 MMT CO_2e of GHG.

- Adopt a regulation requiring the mandatory reporting of GHG emissions (California Health and Safety Code Section 38530). In December 2007, the ARB adopted a regulation requiring the largest industrial sources to report and verify its GHG emissions. The reporting regulation serves as a solid foundation to determine GHG emissions and track future changes in emission levels.

Executive Order S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed California EO S-3-05. EO S-3-05 establishes targets to reduce California's GHG emissions to year 2000 levels by 2010, 1990 levels by 2020, and 80 percent below the 1990 levels by 2050. EO S-3-05 also calls for the California EPA to prepare biennial science reports on the potential effect of continued global warming on certain sectors of the California economy. As a result of the scientific analysis presented in these biennial reports, a comprehensive *2009 Climate Adaptation Strategy* was released following extensive interagency coordination and stakeholder input. The latest of these reports, *Climate Action Team Biennial Report*, was published in December 2010.

Governor's Executive Order S-01-07

With EO S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

Governor's Executive Order S-13-08

On November 14, 2008, the Governor signed an EO to address the risk of sea level rise resulting from global climate change. It requires all state agencies that are planning construction projects in the areas vulnerable to sea level rise to consider a range of sea level rise scenarios to assess project vulnerability and, to the extent feasible, reduce expected risks, and increase resiliency to sea level rise.

Governor's Executive Order B-30-15

On April 29, 2015, the Governor issued an EO to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. The new emission reduction target of 40 percent below 1990 levels by 2030 is intended to make it possible to reach the state's ultimate goal of reducing emissions 80 percent under 1990 levels by 2050.

Senate Bill 375

Senate Bill (SB) 375, the *Sustainable Communities and Climate Protection Act of 2008* (Chapter 728, Statutes of 2008), signed into law by the Governor on September 30, 2008, became effective January 1, 2009. This law requires ARB to develop regional reduction targets for GHG emissions and prompts the creation of regional land use and transportation plans to reduce emissions from passenger vehicle use throughout the state. The targets apply to the regions in the state covered by California's 18 MPOs. The 18 MPOs have been tasked with creating the regional land use and transportation plans called sustainable community strategies. The MPOs are required to develop the sustainable community strategies through integrated land use and transportation planning and demonstrate an ability to attain the proposed reduction targets by 2020 and 2035. This would be accomplished through either the financially constrained sustainable community strategies as part of its regional transportation plan or through an unconstrained alternative planning strategy. If regions develop integrated land use, housing, and transportation plans that meet the SB 375 targets, new projects in these regions can be relieved of certain review requirements of CEQA.

Pursuant to SB 375, ARB appointed a Regional Targets Advisory Committee on January 23, 2009, to provide recommendations on factors to be considered and methodologies to be used in ARB's target-setting process. The Regional Targets Advisory Committee was required to provide its recommendations in a report to ARB by September 30, 2009. The report included relevant issues, such as data needs, modeling techniques, growth forecasts, jobs-housing balance, interregional travel, various land use/transportation issues affecting GHG emissions, and overall issues relating to setting these targets. ARB adopted the final targets on September 23, 2010. ARB must update the regional targets every 8 years (or 4 years if it so chooses), consistent with each MPO update of its regional transportation plan.

Senate Bill 32

SB 32 expands upon AB 32 to reduce GHG emissions. SB 32 was signed into law on September 8, 2016, by Governor Jerry Brown, and it sets into law the mandated reduction target in GHG emissions as written into EO B-30-15.

3.4 Regulatory Compliance

No formal agency approvals would be requested with the Tier 1/Program EIS/EIR. The air quality and GHG compliance requirements for Tier 2/Project-level analysis are described in the Tier 1/Program EIS/EIR. Although requirements to make a conformity determination would not apply at the Tier 1/Program EIS/EIR level, such requirements would need to be addressed for Tier 2Project-level analysis. The applicability of transportation and/or general conformity for Tier 2/Project-level analysis would be determined by the FRA, Caltrans, and RCTC.

4 Methodology

This methodology for this Tier 1/Program service-level evaluation identifies the approach and assumptions for describing existing conditions for air quality and GHGs and analyzing the environmental consequences of the Build Alternative Options when compared with the No Build Alternative. The methodology describes how the affected environment was defined, presents the approach that was taken for evaluating Program-related effects, and identifies data sources.

4.1 Approach

Given that the details of the needed rail infrastructure and station locations are unknown at this time, direct and indirect effects on air quality and GHG emissions were evaluated qualitatively. The evaluation of potential effects on air quality includes 1) a qualitative evaluation of construction-related emissions; 2) identification and qualitative evaluation of operations-related emissions sources; 3) qualitative evaluation of GHG emissions; and 4) discussions of likely Tier 2 Program-level analyses.

4.1.1 Air Quality

Potential regional air quality effects from the Program were evaluated based on a comparison of their effects on overall air quality emission burdens. In addition, the effect of these changes on maintenance and non-attainment areas, as classified by U.S. EPA at the time of evaluation, is discussed.

To examine the Program's potential effects on local air quality, a quantitative analysis was conducted based on potential changes in vehicle miles traveled (VMT) as a result of estimated changes in local traffic at stations, changes in rail service, and location of parking facilities. Regional VMT estimates and EMFAC2017 emissions factors were used to estimate criteria pollutant emissions for the Build Alternative Options and No Build Alternative. Locomotive emissions were estimated using rail miles traveled estimates and EPA locomotive emissions factors. Potential local health risks associated with construction and locomotive diesel particulate matter emissions were evaluated qualitatively.

General Conformity

While a conformity determination would not apply to the Tier 1/Program EIS/EIR, the analysis approach of conformity would be used by comparing the net increase in criteria pollutant emissions estimated to occur under the Build Alternative Options when compared with the No Build Alternative to the General Conformity *de minimis* levels shown in Table 4-1. Since the Program would be located partially in the SCAB and partially in the SSAB, net criteria pollutant emissions occurring in each air basin would be compared with applicable *de minimis* levels (i.e., emissions occurring within the SCAB would be compared with SCAB *de minimis* levels, and vice-versa).

Under the FCAA's General Conformity requirements (Section 176[c][4]), determinations are made based on *de minimis* levels. These *de minimis* levels can be found in 40 CFR 93.153(b) and vary according to the type of pollutant and severity of the non-attainment area. Table 4-1 summarizes pollutant *de minimis* levels. These levels were established to focus on those federal actions likely to have a significant effect on air quality. If the Build Alternative Options emissions are projected to be below the *de minimis* levels, then the FCCA assumes the Program would not result in any significant air quality effects and no further analysis would be required.

Conversely, if the Build Alternative Options emissions exceed *de minimis* levels, then the Program would require a conformity determination requiring a "hot-spot" analysis of criteria pollutants relative to the NAAQS. The federal lead agency would be able to make changes to the design of the Program to reduce emissions below *de minimis* levels to achieve a General Conformity determination required by FRA. Hot-spot analyses would be conducted as part of the Tier 2/Project-level analysis once site-specific effects are known.

Table 4-1. General Conformity *De Minimis* Levels

Criteria Pollutant	Tons per Year[a] (SCAB)	Tons per Year[a] (SSAB)
O_3	10	25
CO	100	100
PM_{10}	100	100
$PM_{2.5}$	100	100
Pb	25	25

Source: EPA 2018b

Notes:

a The Build Alternative Options Alignment would be located partially in the SCAB and partially in the SSAB; therefore, net criteria pollutant emissions occurring in each air basin would be compared with applicable *de minimis* levels.

CO=carbon monoxide; O^3=ozone, volatile organic compounds or nitrogen oxides; Pb=lead; $PM^{2.5}$=particulate matter 2.5 microns or less; PM^{10}=particulate matter 10 microns or less; SCAB=South Coast Air Basin; SSAB=Salton Sea Air Basin

4.1.2 Greenhouse Gas Emissions

GHG emissions were evaluated on a statewide level, as emissions released as a result of implementing the Build Alternative Options would not be localized or regional; this is because of their rapid dispersion into the global atmosphere. For the GHG emissions evaluation, passenger VMT and locomotive operations were evaluated as the main source of energy consumption that would be affected by the Build Alternative Options. Regional VMT estimates and EMFAC2017 emissions factors were used to estimate GHG emissions for the Build Alternative Options and No Build Alternative. Locomotive emissions were estimated using rail miles traveled estimates and EPA locomotive emissions factors.

4.2 Data Sources

The data sources listed in Table 4-2 were used to establish the existing conditions as part of the affected environment for the air quality and GHG emissions evaluation. Existing ambient air quality and GHG emissions data from the California ARB and U.S. EPA were collected and summarized. The current status of MPO-administered areas within the affected environment were described with regard to ambient air quality standards and EPA's Final Conformity Rule. GHG emissions were compiled from ARB for the affected environment. The ARB GHG emissions information is available on a statewide basis.

Table 4-2. Data Sources for the Evaluation Air Quality and Greenhouse Gases

Resource	Data Source	Data Application
EPA	• NAAQS attainment status and air quality standards • General Conformity *de minimis* levels • Passenger rail emissions factors	• Existing conditions • Criteria pollutant emission factors for the regional emissions analysis
California ARB	• CAAQS attainment status • Statewide GHG emissions inventory data • EMFAC2017 Web Database emissions factors	• Existing conditions

Resource	Data Source	Data Application
Air quality management districts	• Local thresholds/standards • Construction regulations/best management practices	• Existing conditions • Localized analysis • Regional emissions

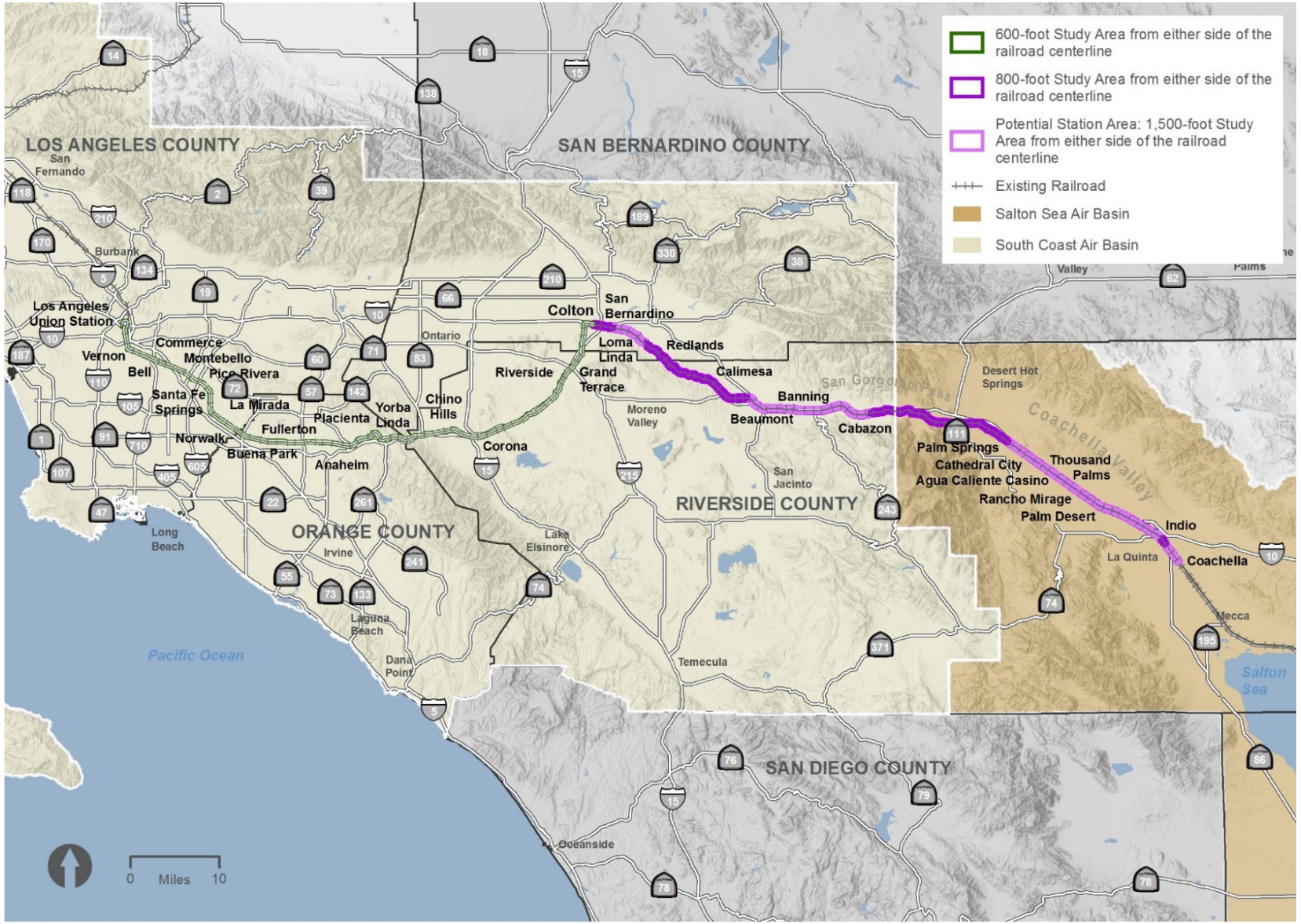
Notes:

ARB=Air Resources Board; CAAQS=California Ambient Air Quality Standards; EPA=Environmental Protection Agency; GHG=greenhouse gas; NAAQS=National Ambient Air Quality Standards

4.3 Tier 1/Program EIS/EIR Study Area

The Program Corridor crosses a large geographic area within Southern California, spanning approximately 144 miles from its western terminus in Los Angeles to its eastern terminus in Coachella. The Tier 1/Program EIS/EIR Study Area for air quality includes the affected air basins, SCAB for the Western Section and the Eastern Section (west of Cabazon), and the SSAB for the Eastern Section (east of Cabazon), as depicted on Figure 4-1. The Tier 1/Program EIS/EIR Study Area for GHGs includes the state of California.

Figure 4-1. Air Basins Traversed by the Program Corridor



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5 Existing Conditions

5.1 Air Quality

California is divided into 15 air basins to better manage air pollution. Air basin boundaries were determined by grouping together areas with similar geographical and meteorological features. Political boundaries were also considered in determining the air basin boundaries. The Tier 1/Program EIS/EIR Study Area is located partially within in the SCAB and partially within the SSAB as show on Figure 4-1. Table 5-1 summarizes the federal (under NAAQS) and state (under CAAQS) attainment status for the SCAB and SSAB.

Table 5-1. Federal and State Attainment Status of the South Coast Air Basin and Salton Sea Air Basin

Pollutant	SCAB Attainment Status: Federal	SCAB Attainment Status: State	SSAB Attainment Status: Federal	SSAB Attainment Status: State
O_3 1-hour	—	Non-attainment	—	Non-attainment
O_3 8-hour	Non-attainment/ extreme	Non-attainment	Non-attainment/ Severe 15	Non-attainment
PM_{10}	Attainment/ maintenance	Non-attainment	Non-attainment/ Serious	Non-attainment
$PM_{2.5}$	Non-attainment/ moderate	Non-attainment	Attainment/ unclassifiable	Attainment
CO	Attainment/ maintenance	Attainment	Attainment/ unclassifiable	Attainment
NO_2 1-hour	Attainment/ unclassifiable	Attainment	Attainment/ unclassifiable	Attainment
NO_2 Annual	Attainment/ maintenance	Attainment	Attainment/ unclassifiable	Attainment
SO_2	Attainment/ unclassifiable	Attainment	Attainment/ unclassifiable	Attainment

Pollutant	SCAB Attainment Status: Federal	SCAB Attainment Status: State	SSAB Attainment Status: Federal	SSAB Attainment Status: State
Pb	Non-attainment (partial Los Angeles County only) Attainment (rest of the SCAB)	Attainment	Attainment/ unclassifiable	Attainment
All others	—	Attainment	—	Attainment/ unclassifiable

Source: ARB 2018; EPA 2018a

Notes:

CO=carbon monoxide; NO_2=nitrogen dioxide; O_3=ozone; NA=not applicable; Pb=lead; $PM_{2.5}$=particulate matter 2.5 microns or less; PM_{10}=particulate matter 10 microns or less; SCAB=South Coast Air Basin; SO_2=sulfur dioxide; SSAB=Salton Sea Air Basin

Under the federal criteria, all counties in the SCAB are currently designated as non-attainment/extreme for the federal 8-hour O_3 standard; attainment/maintenance for the federal PM_{10}, CO, and annual NO_2 standards; non-attainment/serious for the federal $PM_{2.5}$ standard; unclassified for the federal 1-hour NO_2 and SO_2 standards; and attainment (except part of Los Angeles County) for the federal Pb standard. Emissions of $PM_{2.5}$ and nitrogen oxide (NO_x) from diesel locomotive engines currently contribute to the non-attainment of the NAAQS for $PM_{2.5}$ and O_3. U.S. EPA has established emission standards for these pollutants for newly manufactured and remanufactured locomotives (73 *Federal Register* 25098, Locomotive and Commercial Marine Rule). U.S. EPA is projecting that $PM_{2.5}$ and NO_x emissions will drop as a result of these standards. All counties in the SCAB are considered in non-attainment for the state 1-hour O_3, 8-hour O_3, PM_{10}, and $PM_{2.5}$ standards and in attainment for all other state standards. National and California area designation maps are provided in Appendix A. These maps show non-attainment area locations.

The SSAB is currently designated as non-attainment/severe 15 for the federal 8-hour O_3 standard; non-attainment/serious for the federal PM_{10} standard; and attainment/unclassified for all remaining federal standards. With respect to state standards, the SSAB is designated non-attainment for the O_3 and PM_{10} standards and attainment for all other standards.

5.1.1 Fugitive Dust

Fugitive dust is PM from unstable or disturbed soil surfaces that becomes airborne because of mechanical disturbance and has the potential to adversely affect human health or the environment. The most common forms of PM are known as PM_{10} and $PM_{2.5}$. Fugitive dust originates from agricultural, mining, construction, and manufacturing activities, among others. This evaluation primarily addresses fugitive dust generated from construction activities such as earth moving, paved road trackout, driving on haul roads, and disturbing surface areas, since such activities would likely be required during construction of the passenger rail system.

5.1.2 Class I Areas

Rail service contributes to visibility concerns in non-attainment and maintenance areas primarily through $PM_{2.5}$, SO_2, and NO_x diesel emissions, which contribute to the formation of secondary $PM_{2.5}$.

Under the provisions of the Clean Air Act, EPA has designated a number of areas in the state of California, including national parks and wilderness areas, as mandatory Class I Areas where visibility is an important value. These mandatory Class I areas are listed in 40 CFR 81.403. Under the EPA Regional Haze Rule, states must establish goals to improve visibility in Class I areas and develop long-term strategies to reduce emissions of air pollutants that cause visibility impairment. These goals are outlined in the SIP. Of the mandatory Class I areas in the Program vicinity, San Gorgonio Wilderness and San Jacinto Wilderness are the closest to the Program Corridor.

5.2 Greenhouse Gas Emissions

5.2.1 Statewide Greenhouse Gas Inventory

As a requirement of AB 32, ARB constructed a GHG emissions inventory to determine the 1990 emission level and 2020 limit of 431 MMT CO_2e, using the Intergovernmental Panel on Climate Change fourth assessment report GWPs (ARB 2014). GHGs are inventoried on a statewide basis because their effects are not localized or regional; this is because of their rapid dispersion into the global atmosphere. Because climate change is a global and not a regional issue, specific inventories have not been prepared for the individual air basins. The original statewide 2020 limit of 427 MMT CO_2e was approved on December 6, 2007, and was not sector-specific. A revised statewide 2020 limit of 431 MMT CO_2e was approved on May 22, 2014, and also was not sector-specific. Since development of the 1990 emissions inventory, ARB has prepared a statewide inventory for years 2000 through 2016. A summary of the 2018 statewide GHG emissions inventory is depicted in Table 5-2.

Table 5-2. California Greenhouse Gas Inventory (2018)

GHG Emission Category	2018 Emissions (MMT CO_2e)	Percentage of Total
Transportation	169.5	38.8
Electric power	63.1	14.4
Commercial and residential	41.4	9.5
Industrial	89.2	20.4
Agriculture and forestry	32.6	7.5
High global warming potential gases	20.5	4.7
Recycling and waste	20.5	4.7
Total California Emissions	**436.8**	**100**

Source: ARB 2020

Notes:

CO_2e=CO_2 equivalent; GHG=greenhouse gas; MMT=million metric tons

As depicted in the Table 5-2, the transportation sector accounts for 38.8 percent of the total statewide GHG emissions. Contributions from the transportation sector include emissions from on-road and off-road vehicles, aviation, rail, and water-borne vehicles, as well as a few other smaller sources.

6 Environmental Consequences

6.1 No Build Alternative

Under the No Build Alternative, a new passenger rail system would not be built, and effects on air quality and GHG emissions are not anticipated beyond what would occur as a result of other approved projects. Existing air quality, compared with future air quality without the Program, would be affected by two key factors: regional growth and air quality and GHG regulatory actions. Regional growth, such as increased residential development and density, along with additional industry, results in more and greater sources of air and GHG emissions. These increases in air emissions are offset by transportation projects, which generally reduce traffic congestion, thus minimizing local effects for emission hot spots, as well as vehicle regulatory programs that control the level of emissions from on-road and non-road vehicles.

While regional program efforts and changes in transportation technology (e.g., use of electrified and Tier IV equipment) would reduce future pollutant burdens for air quality criteria pollutants such as VOC, CO, NO_x, $PM_{2.5}$, and PM_{10}, and GHG emissions within the Program Corridor, several existing and committed transportation projects would occur in the Program Corridor under the No Build Alternative. These future projects would result in an increase in passenger and freight services resulting in more and greater sources of air quality and GHG emissions within the Program Corridor under the No Build Alternative.

As shown in Table 6-1, with projected regional growth, the No Build Alternative would result in an increase in traffic and VMT because more cars would be on the roadways.

Table 6-1. Estimate of Tier 1/Program EIS/EIR Study Area Annual Vehicle Miles Traveled

Year	No Build VMT
Existing Year (2018)	3,195,227,280
Opening Year (2024)	3,475,105,216
Future Year (2044)	4,335,611,649

Notes:

VMT=vehicle miles traveled

With the continued trend in increases in VMT within the Tier 1/Program EIS/EIR Study Area, energy consumption and GHG emissions would be likely to increase under the No Build Alternative. This assessment does not take into account other influences, including changes in corporate average fuel economy standards, bus and aircraft efficiency, fuel compositions, and other factors.

6.2 Build Alternative Options 1, 2, and 3

6.2.1 Air Quality

Western Section

Construction

The Western Section utilizes existing rail infrastructure, and no additional track improvements would be required to accommodate the proposed service. No new stations or construction to existing stations would be required to accommodate the proposed service because the existing railroad infrastructure and stations from LAUS to Colton would be used. As such, construction-related effects on air quality in the Western Section are not anticipated.

Operation

Current (2018) daily rail traffic volumes on the Western Section (as shown in Chapter 2 of the Tier 1/Program EIS/EIR) vary by segment (RCTC and FRA 2021a). The highest density segment is between Los Angeles and Fullerton and has an average of 86 daily trains, while the lowest density segment is between Fullerton and Atwood and has an average of 43 daily trains. An additional two daily round-trip intercity passenger trains, even when compared with the lowest density segment, would represent a minor increase in train activity compared with current (2018) traffic volume along the existing railroad ROW. In 2024 and 2044, the Program would add the same number of rail operations to higher baseline conditions. Therefore, the Program's effects in 2024 (as shown in Chapter 2 of the Tier 1/Program EIS/EIR) and 2044 (as shown in Chapter 2 of the Tier 1/Program EIS/EIR) would be lower than those evaluated under existing conditions for the lowest density segment. Changes to air quality within the Western Section, as a result of the operations associated with the Build Alternative Options, would be similar to that described under the Eastern Section, below. A full discussion and applicable data from operation of the Build Alternative Options are provided in the Eastern Section Operation section.

Eastern Section

Construction

The Eastern Section would include infrastructure improvements (such as sidings, additional main line track, wayside signals, drainage, grade-separation structures, and stations) to accommodate the proposed service and would result in short-term increases in dust and equipment-related emissions in and around the construction site. Exhaust emissions during construction would be generated by fuel combustion in motor vehicles and construction equipment, and particulate emissions would result from soil disturbance, earthwork, and other construction activities. Construction vehicle activity and disruption of normal traffic flow may also result in increased motor vehicle emissions within the construction area.

The air quality emissions that could be generated would vary depending on the length of the construction period, specific construction activity (e.g., grading, paving, pile driving), types of equipment, and number of personnel.

Construction of any of the Build Alternative Options would have the potential to cause temporary air quality effects. In general, the degree of adverse construction effects is proportional to the length of new rail proposed to be constructed, number of grade separations, number and size of new facilities, relationship of the improvements and facilities to populated areas, and the duration of construction at each site.

Potential air quality impacts from each construction project would be short term and would occur at a location only while construction work is in progress. Construction activities would be required to comply with applicable local, state, and federal regulations, in addition to the implementation of identified BMPs, to minimize emissions and construction effects.

Design specifics and locations of the rail infrastructure improvements and station facilities are not known at this time, so the air quality emissions that could be generated and potential sensitive receptors that could be affected during specific construction activities cannot be quantified at the Tier 1/Program-level evaluation. Once detailed construction information for the site-specific rail infrastructure improvement or station facility is available, a quantitative estimate of the total air quality emissions during construction would be conducted and impacts on sensitive receptors would be evaluated during the Tier 2/Project-level analysis.

Temporary dust emissions would also be expected from construction activities; however, fugitive dust generated from construction activities would be controlled in accordance with the SCAQMD District Rule 403. Construction activities would be required to comply with applicable local, state, and federal regulations, in addition to the implementation of identified BMPs, to minimize emissions and construction effects.

Construction emissions with expected regional emissions decreases during Program operation are not possible to offset because CEQA significance thresholds are daily emissions thresholds. Regarding local effects, local project and site specifics (unknown at this time) are needed to make a significance determination. Local specifics include construction duration and intensity at specific sites. Site-specific effects would be considered at the Tier 2/Project-level analysis.

Although construction of site-specific rail infrastructure and station facilities would be subject to applicable regulations and BMPs, when compared with the No Build Alternative, short-term localized construction air quality effects could be substantial within the Program Corridor under Build Alternative Option 1 if the implementation of BMPs does not bring construction emissions to below identified SCAQMD construction emission thresholds. The Tier 2/Project-level analysis would also evaluate mobile-source, air toxic emissions to assess construction period effects and SCAQMD regional and local daily significance thresholds. When compared with Build Alternative Option 1, Build Alternative Option 2 would have slightly reduced effects due to a shorter route alignment and reduced station options. However, the magnitude of effects would be similar for Build Alternative Option 2 and would be considered substantial when compared with the No Build Alternative. When compared with Build Alternative Options 1 or 2, Build Alternative Option 3 may have slightly reduced effects due to a slightly smaller footprint associated with a shorter route alignment, reduced station options, and reduced third rail track infrastructure.

Operation

Current (2018) daily rail traffic volumes on the Eastern Section (as shown in Chapter 2 of the Tier 1/Program EIS/EIR) average 43 daily trains along the Colton-Coachella segment, consisting of freight and passenger trains (RCTC and RA 2021a). The addition of two daily round-trip intercity passenger trains would represent a minor increase in train activity compared with current (2018) traffic volume along the existing railroad ROW. In 2024 and 2044, the Program would add the same number of rail operations to higher baseline conditions. Therefore, the Program's effects in 2024 (as shown in Chapter 2 of the Tier 1/Program EIS/EIR) and 2044 (as shown in Chapter 2 of the Tier 1/Program EIS/EIR) would be lower than those evaluated under existing conditions.

During operation, passenger train frequencies proposed as part of the Program would consist of the addition of two daily, round-trip intercity diesel-powered passenger trains operating the entire length of the Program Corridor between Los Angeles and Coachella. Operational activities are anticipated to be limited to maintenance of culverts, bridges, embankments, and station areas. Operation of any of the Build Alternative Options would generally result in a long-term net benefit to air quality by reducing emissions of criteria pollutants, toxic air pollutants, and GHGs. There are several factors that would contribute to the extent to which the operation any of the Build Alternative Options have a long-term effect on air quality. These include the operation of the stations and other supporting

facilities, the forecast ridership of the rail system, and the subsequent vehicle and airplane emission change due to the shift of travel mode.

Build Alternative Options with higher ridership would have the potential to shift more passengers from driving to riding the trains, thus decreasing the regional VMT and associated vehicle emissions. In addition, longer route segments would provide access to more locations and would likely have a greater reduction in regional VMT.

The estimated annual railroad emissions for operation of the Build Alternative Options are provided below in Table 6-2 and Table 6-3. These estimates do not consider future emission reductions associated with new emission standards or changes in transportation technology (e.g., U.S. EPA Tier IV equipment). As the Program Corridor operations would not change between Build Alternative Options, the emissions listed in Table 6-2 and Table 6-3 are applicable to both the Opening Year 2024 and Horizon Year 2044 conditions. Since rail emissions would occur across the SCAB and SSAB air basins, emissions estimates are provided for both.

Table 6-2. Estimate of Locomotive Emissions in Tons per Year Build Alternative Option 1 (Opening Year 2024 and Horizon Year 2044)

Air Basin	NOx	VOC	PM_{10}	$PM_{2.5}$	CO
Estimated Rail Emissions					
SCAB	5.0166	0.2007	0.0008	0.0007	6.4213
SSAB	1.7984	0.0719	0.0003	0.0003	2.3020
Total	***6.8150***	***0.2726***	***0.0011***	***0.0010***	***8.7233***
General Conformity de Minimis Level					
SCAB	10	10	100	100	100
SSAB	25	25	100	100	100

Notes:

See Appendix B for emissions estimate assumptions and calculations.

CO=carbon monoxide; NO_x=nitrogen oxide; $PM_{2.5}$=particulate matter 2.5 microns or less; PM_{10}=particulate matter 10 microns or less; SCAB=South Coast Air Basin; SSAB=Salton Sea Air Basin; VOC=volatile organic compounds

Table 6-3. Estimate of Locomotive Emissions in Tons per Year Build Alternative Option 2 and 3 (Opening Year 2024 and Horizon Year 2044)*

Air Basin	NOx	VOC	PM_{10}	$PM_{2.5}$	CO
Estimated Rail Emissions					
SCAB	4.9279	0.1971	0.0007	0.0007	6.3077
SSAB	1.7097	0.0684	0.0003	0.0003	2.1884
Total	***6.6376***	***0.2655***	***0.0010***	***0.0010***	***8.4961***
General Conformity de Minimis Level					
SCAB	10	10	100	100	100
SSAB	25	25	100	100	100

Notes:

See Appendix B for emissions estimate assumptions and calculations.

As the Program operations would not change, the emissions are applicable to both the Opening Year 2024 and Horizon Year 2044 conditions.

CO=carbon monoxide; NO_x=nitrogen oxide; $PM_{2.5}$=particulate matter 2.5 microns or less; PM_{10}=particulate matter 10 microns or less; SCAB=South Coast Air Basin; SSAB=Salton Sea Air Basin; VOC=volatile organic compounds

While operation of the Build Alternative Options would increase emissions from locomotives, those emissions would be offset by automobile emission reduction that would occur due to the travel mode shift from automobile to rail transport within the travel corridor. The projection of ridership and VMT reductions is provided below in Table 6-4 and Table 6-5 (see the *Transportation Impact Technical Memorandum* [RCTC and FRA 2021b] for detailed information about ridership).

Table 6-4. Annual Ridership and Annual Vehicle Miles Traveled by Horizon Year (Build Alternative Option 1)

Alternative Scenarios	Annual Ridership (one-way trips)	VMT (million)
Existing Year (2018)[a]		
2018 baseline/existing conditions	—	3,200.0
Opening Year (2024)		
No Build Alternative	—	3,500.0
Build Alternative Option 1	204,107	3,489.5

Alternative Scenarios	Annual Ridership (one-way trips)	VMT (million)
Change in VMTs from No Build Alternative	—	**10.5**
Future Year (2044)		
No Build Alternative	—	4,300.0
Build Alternative Option 1	338,540	4,282.6
Change in VMTs from No Build Alternative	—	**17.4**

Source: RCTC and FRA 2021b

Notes:

[a] Existing Year (2018) assumes no reductions from emissions, as the Program would not be in operation.

VMT=vehicle miles traveled

Table 6-5. Annual Ridership and Annual Vehicle Miles Traveled by Horizon Year (Build Alternative Option 2 and 3)

Alternative Scenarios	Annual Ridership (one-way trips)	VMT (million)
Existing Year (2018)[a]		
2018 baseline/existing conditions	—	3,200.0
Opening Year (2024)		
No Build Alternative	—	3,500.0
Build Alternatives Options 2 and 3	188,290	3,490.3
Change in VMTs from No Build Alternative	—	**9.7**
Future Year (2044)		
No Build Alternative	—	4,300.0
Build Alternative Options 2 and 3	312,306	4,283.9
Change in VMTs from No Build Alternative	—	**16.1**

Source: RCTC and FRA 2021b

Notes:

[a] Existing Year (2018) assumes no reductions from emissions, as the Program would not be in operation.

VMT=vehicle miles traveled

Operation of the Build Alternative Options would be largely beneficial to air quality in the region and would be expected to contribute to the region's long-term attainment of air quality goals by reducing VMT and vehicle emissions. A conservative estimate of regional criteria pollutant reductions related to the VMT reduction estimates discussed above is provided in Table 6-6 and Table 6-7. These emissions reduction estimates would be partially offset by new locomotive and station operations emissions.

For Tier 2/Project-level analysis, the amount of mobile source air toxics emitted would be proportional to the resulting VMT, assuming that other variables, such as fleet mix, are the same for the Program Corridor. A comprehensive quantitative air quality analysis would be performed during Tier 2/Project-level analysis to determine air pollutant effects and quantify on-road mobile-source emissions reductions, as well as locomotive operations and train station operations area-source emissions.

Table 6-6. Regional Air Quality Criteria Pollutant Estimates in Tons by Horizon Year (Build Alternative Option 1)

Station Options	VOC	NO_X	CO	SO_x	PM_{10}	$PM_{2.5}$
Existing Conditions						
2018 Baseline/Existing Emissions	96.3	349.3	4,282.4	11.2	164.8	69.1
Opening Year 2024						
2024 No Build Emissions	40.9	163.0	2,637.7	10.1	177.5	73.5
Build Alternative Option 1	40.7	162.0	2,621.8	10.0	176.4	73.1
Change in emissions from No Build Alternative	-0.2	-1.0	-15.9	-0.1	-1.1	-0.4
Future Year 2044						
2044 No Build Emissions	10.1	79.4	1,918.8	9.4	216.7	87.4
Build Alternative Option 1	10.0	78.8	1,903.4	9.3	215.0	86.7
Change in emissions from No Build Alternative	-0.1	-0.6	-15.4	-0.1	-1.7	-0.7

Notes:

See Appendix B for emissions estimate assumptions and calculations.

CO=carbon monoxide; NO_x=nitrogen oxide; $PM_{2.5}$=particulate matter 2.5 microns or less; PM_{10}=particulate matter 10 microns or less; SO_x=sulfur oxides; SCAB=South Coast Air Basin; SSAB=Salton Sea Air Basin; VOC=volatile organic compounds

Table 6-7. Regional Air Quality Criteria Pollutant Estimates in Tons by Horizon Year (Build Alternative Option 2 and 3)

Station Options	VOC	NO_X	CO	SO_x	PM_{10}	$PM_{2.5}$
Existing Conditions						
2018 Baseline/Existing Emissions	96.3	349.3	4,282.4	11.2	164.8	69.1
Opening Year 2024						
No Build Alternative	40.9	163.0	2,637.7	10.1	177.5	73.5
Build Alternatives Options 2 and 3	40.7	162.1	2,623.0	10.0	176.5	73.1
Change in emissions from No Build Alternative	-0.2	-0.9	-14.7	-0.1	-1.0	-0.4
Future Year 2044						
No Build Alternative	10.1	79.4	1,918.8	9.4	216.7	87.4
Build Alternative Options 2 and 3	10.0	78.8	1,904.6	9.3	215.1	86.8
Change in emissions from No Build Alternative	-0.1	-0.6	-14.2	-0.1	-1.6	-0.6

Notes:

See Appendix B for emissions estimate assumptions and calculations.

CO=carbon monoxide; NO_x=nitrogen oxide; $PM_{2.5}$=particulate matter 2.5 microns or less; PM_{10}=particulate matter 10 microns or less; SO_x=sulfur oxides; SCAB=South Coast Air Basin; SSAB=Salton Sea Air Basin; VOC=volatile organic compounds

Localized activities, including locomotive idling and vehicular queuing in and around commuter parking lots, have the potential to result in air quality effects. Locations adjacent to station-related commuter parking lots could potentially experience increases in localized air quality pollutant concentrations, as additional traffic could be concentrated in these areas in addition to increased train idling at the station. The generation of localized CO, $PM_{2.5}$, and PM_{10} emissions tend to occur at locations with a large number of vehicles idling, such as at congested intersections. Implementation of the Program under any of the Build Alternative Options could result in beneficial localized air quality effects through relieving traffic congestion in a local area.

The Eastern Section would use the existing station in the City of Palm Springs. Additionally, up to five new potential stations could be constructed within the following areas: 1) Loma Linda/Redlands Area (serving the Cities of Loma Linda and Redlands), 2) the Pass Area (serving the communities of Beaumont, Banning, and Cabazon), 3) the Mid-Valley (serving the communities of Cathedral City, Thousand Palms, the Agua Caliente Casino area, Rancho Mirage, and Palm Desert), 4) the City of

Indio, and/or 5) the City of Coachella as the eastern terminus. The operation (e.g., local emissions from train idling) of each of the five new potential station options would be considered under a Tier 2/Project-level analysis once station location and construction design are identified and informed by the results of operations modeling work to be carried out as part of the Program. Locations adjacent to station-related commuter parking lots could possibly experience increases in localized pollutant concentrations, since traffic would now be concentrated in these areas, in addition to increased train idling at the station. As a result, a quantitative air quality analysis would be undertaken at representative locations during the Tier 2/Project-level analysis.

Implementation of the Program could add new at-grade rail crossings that would increase localized vehicle emissions at those locations, other rail infrastructure improvements, such as grade-separated crossings, could also be implemented, which could also relieve traffic congestion at the local level.

Localized air quality emissions from Program operation would have the potential to expose nearby population to air pollutants such as diesel particulate matter. Potential localized air quality emissions associated with Program operation would be mostly from diesel locomotives idling. However, localized air quality emissions from diesel train travel are expected to be limited due to the low number of diesel locomotives that would idle at particular locations. Localized air quality effects would be higher in urban or populated areas due to the exposure of sensitive receptors. Facilities located mostly in suburban or rural areas, such as those in the Eastern Section, would likely have lower potential to cause localized air quality emission exposure than facilities in the Western Section, where there are more densely populated areas.

Similar to construction activities, operational activities would be subject to applicable local, state, and federal regulations, and operational BMPs would be implemented to minimize emissions and operational effects. Although operation of site-specific rail infrastructure and station facilities would be subject to applicable regulations and BMPs, when compared with the No Build Alternative, localized operational air quality effects could be substantial within the Program Corridor under Build Alternative Option 1, if the implementation of BMPs does not bring operational emissions to below identified localized SCAQMD operational emission thresholds. The Tier 2/Project-level analysis would also evaluate mobile source air toxics emissions to assess operational effects and SCAQMD regional and local daily significance thresholds. As shown in Table 6-6 and Table 6-7, when compared with Build Alternative Option 1, Build Alternative Options 2 and 3 could have nominally greater operational emissions of NO_x, sulfur oxide (SO_x), PM_{10}, and $PM_{2.5}$. As previously discussed, construction emissions with expected regional emissions decreases during Program operation are not possible to offset because CEQA significance thresholds are daily emissions thresholds. Regarding local effects, local project and site specifics (unknown at this time), including locations of

residential uses and train idle location areas, are needed to make a significance determination. Site-specific effects would be considered at the Tier 2/Project-level analysis.

Implementation of the Build Alternative Options would not be expected to have any measurable air quality effects on Mandatory Federal Class I areas, including the San Gorgonio Wilderness and San Jacinto Wilderness. Nevertheless, further evaluation to assess visibility concerns, such as regional haze, would be considered during Tier 2/Project-level analysis.

According to the SCAQMD CEQA Air Quality Handbook, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. Implementation of any of the Build Alternative Options is not anticipated to have any measurable odor effects, as the Program does not include any uses identified by SCAQMD as being associated with odor complaints. When compared with the No Build Alternative, odor effects would be negligible under Build Alternative Option 1. When compared with Build Alternative Option 1, Build Alternative Options 2 and 3 would have the same magnitude of effect and would be considered negligible when compared with the No Build Alternative.

6.2.2 Greenhouse Gas Emissions

Western Section

Construction

The Build Alternatives Options utilize existing rail infrastructure, and no additional track improvements would be required to accommodate the proposed service. No new stations or construction to existing stations would be required to accommodate the proposed service. As such, construction-related effects associated with GHG emissions in the Western Section of the Program Corridor are not anticipated.

Operation

Current (2018) daily rail traffic volumes on the Western Section (as shown in Chapter 2 of the Tier 1/Program EIS/EIR) vary by segment (RCTC and FRA 2021a). The highest density segment is between Los Angeles and Fullerton and has an average of 86 daily trains, while the lowest density segment is between Fullerton and Atwood and has an average of 43 daily trains. An additional two daily round-trip intercity passenger trains, even when compared with the lowest density segment, would represent a minor increase in train activity compared with current (2018) traffic volume along the existing railroad ROW. In 2024 and 2044, the Program would add the same number of rail operations to higher baseline conditions. Therefore, the Program's effects in 2024 (as shown in

Chapter 2 of the Tier 1/Program EIS/EIR) and 2044 (as shown in Chapter 2 of the Tier 1/Program EIS/EIR) would be lower than those evaluated under existing conditions for the lowest density segment. Changes to GHG emissions within the Western Section as a result of the operations associated with the Build Alternative Options would be similar to that described under the Eastern Section, below. A full discussion and applicable data from operation of the Build Alternative Options are provided in the Eastern Section Operation section.

Eastern Section

Construction

Construction equipment and vehicles operated during Program construction would result in a temporary increase in fuel consumption, which would cease at the end of the construction activity. This increase in fuel consumption is highly likely to be minimal; however, project-specifics, including construction duration and intensity, are needed to demonstrate and model potential effects. GHG emissions would be generated from the use of equipment to conduct vegetation clearing, grading and excavation, and transport of materials and waste. The GHG emissions that could be generated would vary depending on the length of the construction period, specific construction activity (e.g., grading, paving, pile driving), types of equipment, and number of personnel. In some situations, construction GHG emissions associated from a project may be orders of magnitude lower than the operational emissions from the project due to construction emissions generally being short in duration compared with the project's overall lifetime.

The generation of GHG emissions from each Tier 2 construction project would be short term. Construction activities would be required to comply with applicable local, state, and federal regulations, in addition to the implementation of identified BMPs, to minimize GHG emissions and construction effects.

Design specifics and locations of the rail infrastructure improvements and station facilities are not known at this time, so the GHG emissions that could be generated during specific construction activities cannot be quantified at the Tier 1/Program-level evaluation. Once detailed construction information for the site-specific rail infrastructure improvement or station facility is available, a quantitative estimate of the total GHG emissions during construction would be conducted and impacts would be evaluated during the Tier 2/Project-level analysis.

Although construction of site-specific rail infrastructure and station facilities would be subject to applicable regulations and BMPs, when compared with the No Build Alternative, short-term construction GHG effects could be moderate within the Program Corridor under Build Alternative Option 1. When compared with Build Alternative Option 1, Build Alternative Option 2 would have slightly reduced effects due to a shorter route alignment and reduced station options. However, the

magnitude of effects would be similar for Build Alternative Option 2 and would be considered moderate when compared with the No Build Alternative. When compared with Build Alternative Option 1 or 2, Build Alternative Option 3 may have slightly reduced effects due to a slightly smaller footprint associated with a shorter route alignment, reduced station options, and reduced third rail track infrastructure.

Operation

Current (2018) daily rail traffic volumes on the Eastern Section (as shown in Chapter 2 the Tier 1/Program EIS/EIR) average 43 daily trains along the Colton-Coachella segment, consisting of freight and passenger trains (RCTC and FRA 2021a). The addition of two daily round-trip intercity passenger trains would represent a minor increase in train activity compared with current (2018) traffic volume along the existing railroad ROW. In 2024 and 2044, the Program would add the same number of rail operations to higher baseline conditions. Therefore, the Program's effects in 2024 (as shown in Chapter 2 of the Tier 1/Program EIS/EIR) and 2044 (4.5 percent increase; as shown in Chapter 2 of the Tier 1/Program EIS/EIR) would be lower than those evaluated under existing conditions. Implementation of any of the Build Alternative Options has the potential to provide energy savings and reduce the transportation system's effect on climate change. Based on projected ridership and VMT reductions, passenger rail use within the Program Corridor would decrease VMT and related mobile-source emissions. Emission reductions of GHG would mainly be attributed to the reduced travel time and resulting reduced fuel usage that would occur with operation of the Build Alternative Options. Emissions estimates associated with new locomotive service are shown below in Table 6-8 and Table 6-9.

Table 6-8. Greenhouse Gas Emission Estimates (Build Alternative Option 1)

Emissions	No Build Alternative (metric tons per year)	Build Alternative Option 1 (metric tons per year)
Existing (2018)		
Automobile emissions	1,033,792	1,033,792
Passenger rail emissions	—	—
Total GHG emissions	**1,033,792**	**1,033,792**
Change in GHG emissions from No Build Alternative	—	—

Emissions	No Build Alternative (metric tons per year)	Build Alternative Option 1 (metric tons per year)
Opening Year (2024)		
Automobile emissions	934,560	934,560
Passenger rail emissions	—	3,017
Total GHG emissions	**934,560**	**934,560**
Change in GHG emissions from No Build Alternative	**—**	**-2,630**
Change in GHG emissions from Existing Year (2018)	**-99,232**	**-101,862**
Future Year (2044)		
Automobile emissions	859,625	859,401
Passenger rail emissions	—	3,017
Total GHG emissions	**862,642**	**858,380**
Change in GHG emissions from No Build Alternative	**—**	**-3,909**
Change in GHG emissions from Existing Year (2018)	**-171,503**	**-175,412**

Notes:

See Appendix B for emissions estimate assumptions and calculations.

GHG=greenhouse gas

Table 6-9. Greenhouse Gas Emission Estimates (Build Alternative Options 2 and 3)

Emissions	No Build Alternative (metric tons per year)	Build Alternative Option 2 and 3 (metric tons per year)
Existing (2018)		
Automobile emissions	1,033,792	1,033,792
Passenger rail emissions	—	Not Applicable
Total GHG emissions	**1,033,792**	**1,033,792**

Emissions	No Build Alternative (metric tons per year)	Build Alternative Option 2 and 3 (metric tons per year)
Change in GHG emissions from No Build Alternative	—	—
Opening Year (2024)		
Automobile emissions	934,560	929,352
Passenger rail emissions	—	3,017
Total GHG emissions	**934,560**	**932,369**
Change in GHG emissions from No Build Alternative	**—**	**-2,191**
Change in GHG emissions from Existing Year (2018)	**-99,232**	**-101,423**
Future Year (2044)		
Automobile emissions	862,289	855,901
Passenger rail emissions	—	3,017
Total GHG emissions	**862,642**	**858,918**
Change in GHG emissions from No Build Alternative	**—**	**-3,371**
Change in GHG emissions from Existing Year (2018)	**-171,503**	**-174,874**

Notes:

See Appendix B for emissions estimate assumptions and calculations.

GHG=greenhouse gas

As shown in Table 6-8 and Table 6-9, when compared with the No Build Alternative, GHG effects would be beneficial within the Program Corridor under Build Alternative Option 1. When compared with Build Alternative Option 1, Build Alternative Options 2 and 3 would have slightly reduced beneficial effects due to a shorter route alignment and reduced station options. However, the magnitude of effects would be similar for Build Alternative Option 2 and 3 and would be considered beneficial when compared with the No Build Alternative. A comprehensive quantitative GHG analysis would be performed during Tier 2/Project-level analysis to determine GHG effects and quantify on-road mobile-source emissions reductions, as well as locomotive operations and train station operations area-source emissions.

7 Tier 2 Environmental Review Considerations

The Tier 1/Program EIS/EIR evaluation provides an overview of potential effects resulting from development of the Build Alternative Options. Specific station locations, project design, and construction methods have not been determined.

Tier 2/Project-level analysis would address site-specific potential effects resulting from construction and operation of infrastructure improvements (such as sidings, additional main line track, wayside signals, drainage, grade-separation structures, and stations). The Tier 2/Project-level analysis would analyze regional criteria pollutant emissions, GHG emissions, and mobile-source TACs emissions related to project-related changes in regional VMT and locomotive operations. Tier 2/Project-level analysis would also evaluate the potential for effects on visual quality and potential for odors.

7.1 Air Quality

Air quality modeling would be required for Tier 2/Project-level analysis to quantify potential emissions for station alternatives studied in detail. Mitigation measures would also be identified at that time for any potential air quality effects. In addition, temporary construction effects would be quantified, and temporary control measures would be recommended. Typical construction mitigation measures that would be employed to the extent practicable include:

- Minimize idling time to save fuel and reduce emissions
- Use the cleanest fuels available at the time for construction equipment and vehicles to reduce exhaust emissions
- Keep construction equipment well maintained to ensure that exhaust systems are in good working order
- Control fugitive dust through a fugitive dust control plan, including watering disturbed areas
- To minimize wind-blown dust from blasting, particularly near community areas, control blasting and avoid blasting on days with high winds
- Develop a traffic plan to minimize traffic flow interference from construction equipment movement and activities

In addition, the Tier 2 projects would comply with applicable SCAQMD Rules, such as Rule 402 (Nuisance), Rule 403 (Fugitive Dust), Rule 1108 (Cutback Asphalt), and Rule 1113 (Architectural Coatings).

During Tier 2/Project-level analysis, a detailed air quality analysis would be conducted for the projects to ascertain construction- and operation-period effects. Regional criteria pollutant emissions related to project-related changes in regional VMT and locomotive operations would be modeled and quantified for comparison to the general conformity *de minimis* thresholds. The potential effects of project-related motor vehicle emissions on local roadways in the vicinity of stations would also be assessed.

The Tier 2/Project-level analysis would also evaluate mobile source air toxics emissions to assess construction-and operation-period effects and SCAQMD regional and local daily significance thresholds. The operation-period assessment would consider locomotive emissions along the 144-mile alignment and at each proposed station location. As previously discussed, EPA is projecting that $PM_{2.5}$ and NO_x emissions would drop as a result of new emissions standards for newly manufactured and remanufactured locomotives. For Tier 2/Project-level analysis, the amount of mobile source air toxics emitted would be proportional to the resulting VMT, assuming that other variables, such as fleet mix, are the same for the Program Corridor. A TAC health risk assessment may be required to fully assess optional construction and/or operation period effects. The Tier 2/Project-level air quality analysis would include analysis of construction and operational air quality impacts, including identification and analysis of:

- Construction equipment to be used and corresponding air quality emissions that could be generated from construction activities;
- Construction and operational traffic impacts analysis, including quantification of construction emissions and comparison with SCAQMD significance thresholds;
- Sensitive receptors and exposure of those sensitive receptors to air quality emissions during construction and operational activities. If sensitive receptors are located within or adjacent to the Project site, a health risk assessment to assess cancer risks and non-carcinogenic hazards for sensitive receptors may be required;
- BMPs to be implemented during construction activities, such as practices to limit idling and construction emissions, the use of ozone precursor emission controls, implementation of diesel emission reduction plans, and use of California ARB certified equipment for combustion controls; and

- If a project is located within an area designated as non-attainment for federal PM_{10} and $PM_{2.5}$ standards, a PM_{10} and $PM_{2.5}$ hot spot analysis shall be prepared based on guidance provided in *Transportation Conformity Guidance for Qualitative Hot Spot Analyses in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas* (U.S. EPA 2006). As part of the hot-spot analyses, a project-level conformity determination shall include a finding of whether the Project is a Project of Air Quality Concern.

7.2 Greenhouse Gas Emissions

The potential effects of Tier 2/Project-related motor vehicle emissions on local roadways in the vicinity of up to five new potential stations would be assessed during the Tier 2/Project-level analysis. Detailed mitigation measures would also be developed and refined during Tier 2/Project-level analysis.

Mitigation may not be required for GHG emissions because of the net benefits expected from reduced energy use, displaced emissions because of a mode shift to transit and the resulting reduced congestion, and new emission standards governing locomotives. Once a break-even point is reached, increased ridership would be expected to result in reduced overall GHG emissions in the Program Corridor. Further reduction of GHG emissions could be expected by employing best management practices associated with construction (e.g., conserving fuel and reducing GHG emissions during construction activities) and/or operation (e.g., improving fuel efficiency of locomotives, fueling with low-carbon footprint sources). Any efforts to increase displacement of riders from light vehicles to rail (e.g., advertising, incentives) could be developed into project design or set up as additional mitigation.

The Council on Environmental Quality withdrew its “Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews,” effective April 5, 2017. As such, CEQA significance thresholds would also be used to satisfy the National Environmental Policy Act considerations, which would be considered during the Tier 2/Project-level analysis. Construction- and operation-period GHG emissions would be quantified, and the overall project would be evaluated for consistency with AB 32, among other regulations.

Specific measures that would be incorporated into Tier 2/Project-level design or developed as mitigation measures to the extent practicable include:

- Identifying state-of-the-art locomotives to maximize fuel efficiency
- Target-marketing to drivers of single-occupancy vehicles to maximize the effects of rail modal use on energy conservation and reduction of GHG emissions

- Concentrating bus-service routes to feed passengers to train stations
- Bringing dispersed riders to train stations through other methods (e.g., demand response systems, such as paratransit, taxi, shuttle, and call-and-ride

Typical construction mitigation measures that would be employed to the extent practicable include:

- Limiting construction and operational equipment idling
- Encouraging workers to carpool
- Locating staging areas near work sites
- Scheduling material deliveries during off-peak hours to minimize highway congestion
- Construction energy conservation plan: a plan would be developed to avoid excess energy consumption shall be required for the specific rail infrastructure or station facility proposed. The construction energy conservation plan shall identify best management practices including, but not limited to, the following:
    - Identification of opportunities to use newer, more energy efficient construction equipment, vehicles, and materials
    - Limit construction equipment idling
    - Develop and implement a program encouraging construction workers to carpool or use public transportation for travel to and from construction sites
    - Locate construction materials production facilities on site or in proximity to Tier 2/Project work sites
    - Schedule material deliveries during off-peak hours to minimize highway congestion
- Operational energy conservation plan: a plan shall be required for the specific rail infrastructure or station facility proposed. The operational energy conservation plan shall identify best management practices, including, but not limited to, the following:
    - Limit operational idling at stations
    - Identify state-of-the-art locomotives to maximize fuel efficiency
    - Target market to drivers of single-occupancy vehicles to maximize the effects of rail modal use on energy conservation and reduction of greenhouse gas emissions
    - Concentrate bus-service routes to feed passengers to train stations
    - Bring dispersed riders to train stations through other methods (e.g., demand response systems [paratransit, taxi, shuttle, call-and-ride])

Ridership data may change before Tier 2/Project-level analysis is initiated for many reasons, including that population trends may not follow projections, growth may occur in different communities than anticipated, and cultural values for different modes of transportation may change. In addition, engineering design, site-specific alignment decisions, and modeling programs are expected to be further refined. Depending on the availability of data and public concerns regarding GHG emissions, it may be appropriate to refine the analysis during Tier 2/Project-level studies.

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Appendix A. National and California Area Designation Maps

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Area Designations
for
National Ambient Air Quality Standards

CARBON MONOXIDE

Last Reviewed: December 2015
Air Quality Planning Branch, AQPSD, CARB

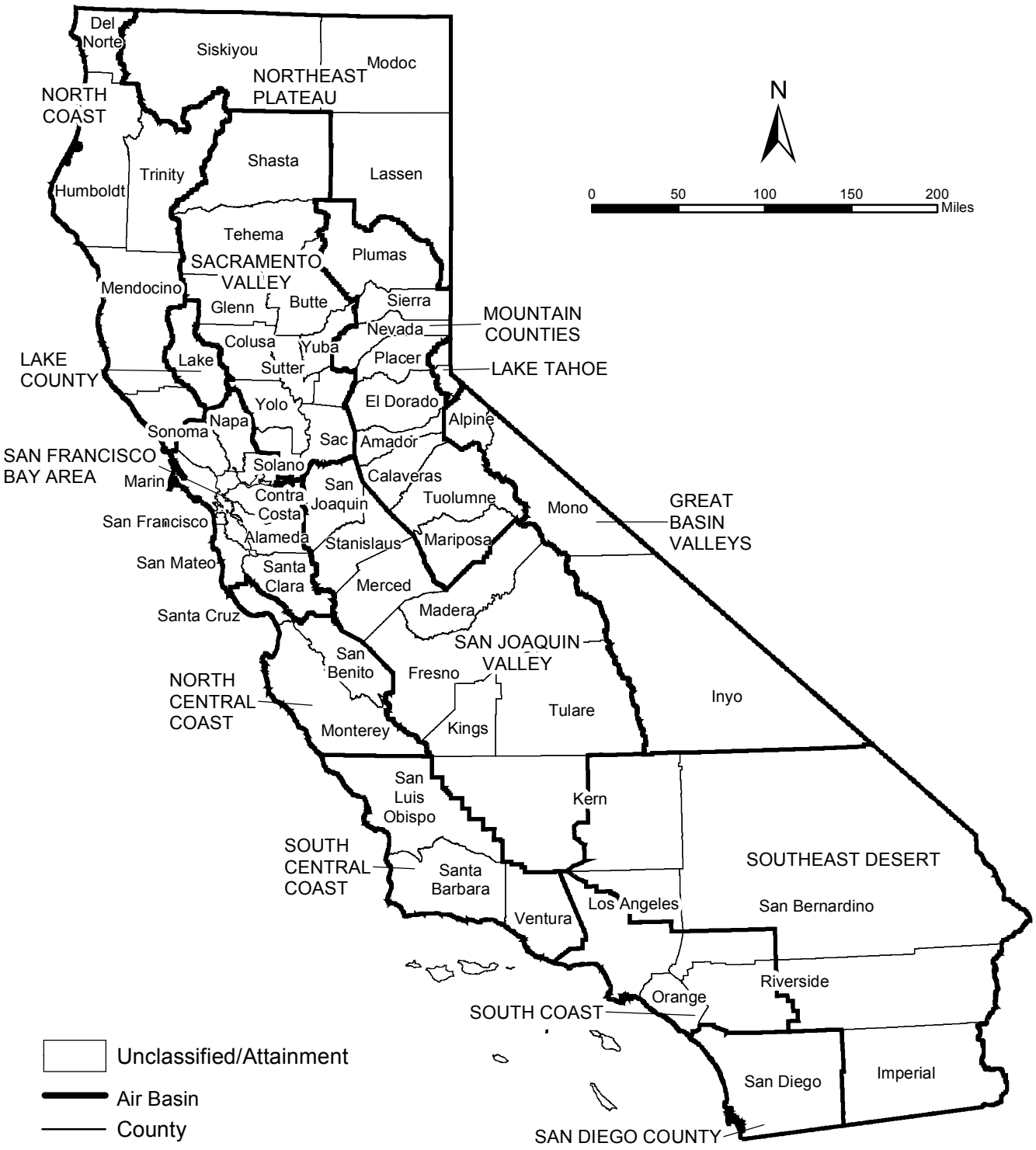
Area Designations
for
National Ambient Air Quality Standards

LEAD

Last Reviewed: December 2015
Air Quality Planning Branch, AQPSD, CARB

Area Designations
for
National Ambient Air Quality Standards

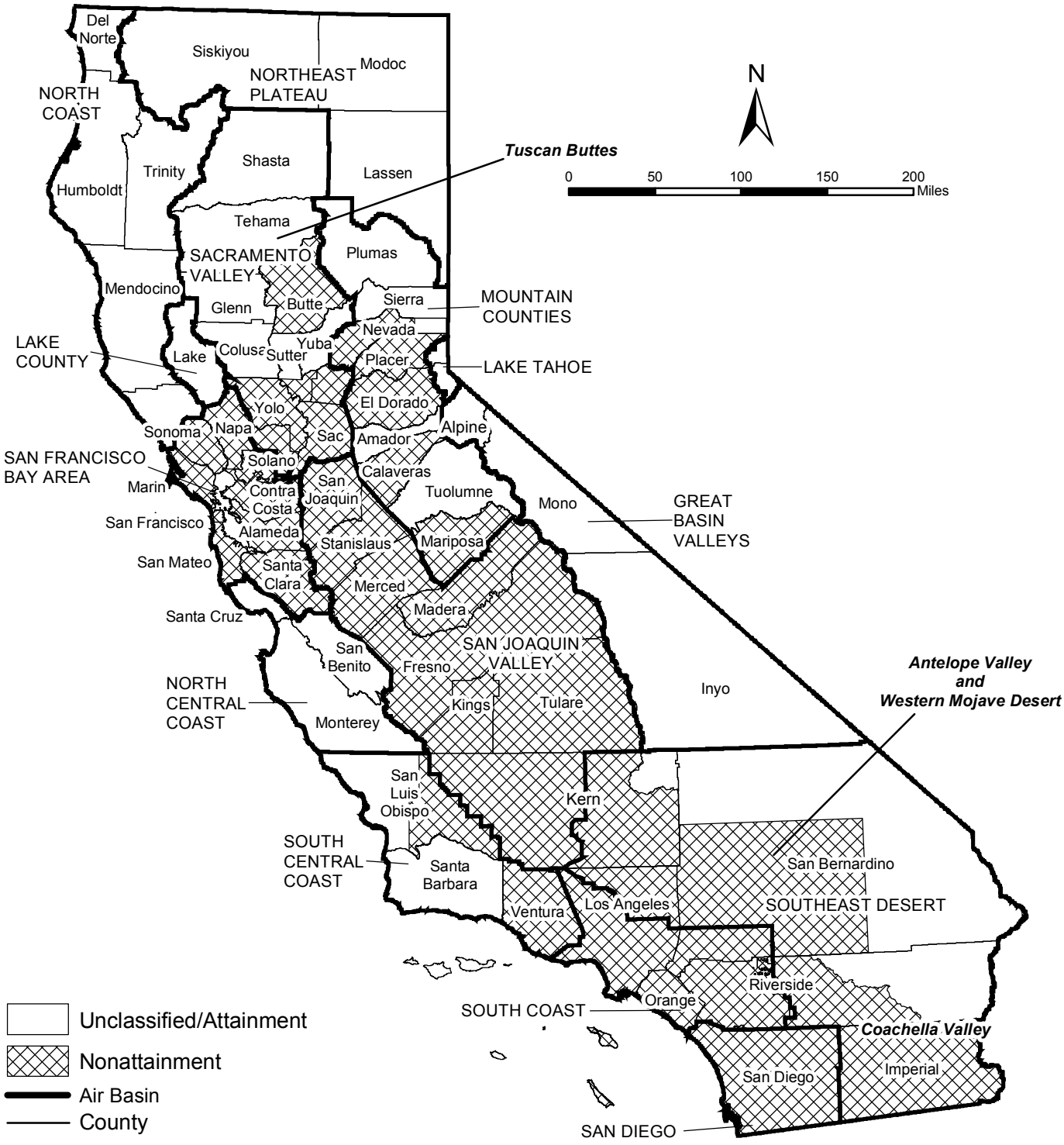
NITROGEN DIOXIDE



Last Reviewed: December 2015
Air Quality Planning Branch, AQPSD, CARB

Area Designations
for
National Ambient Air Quality Standards

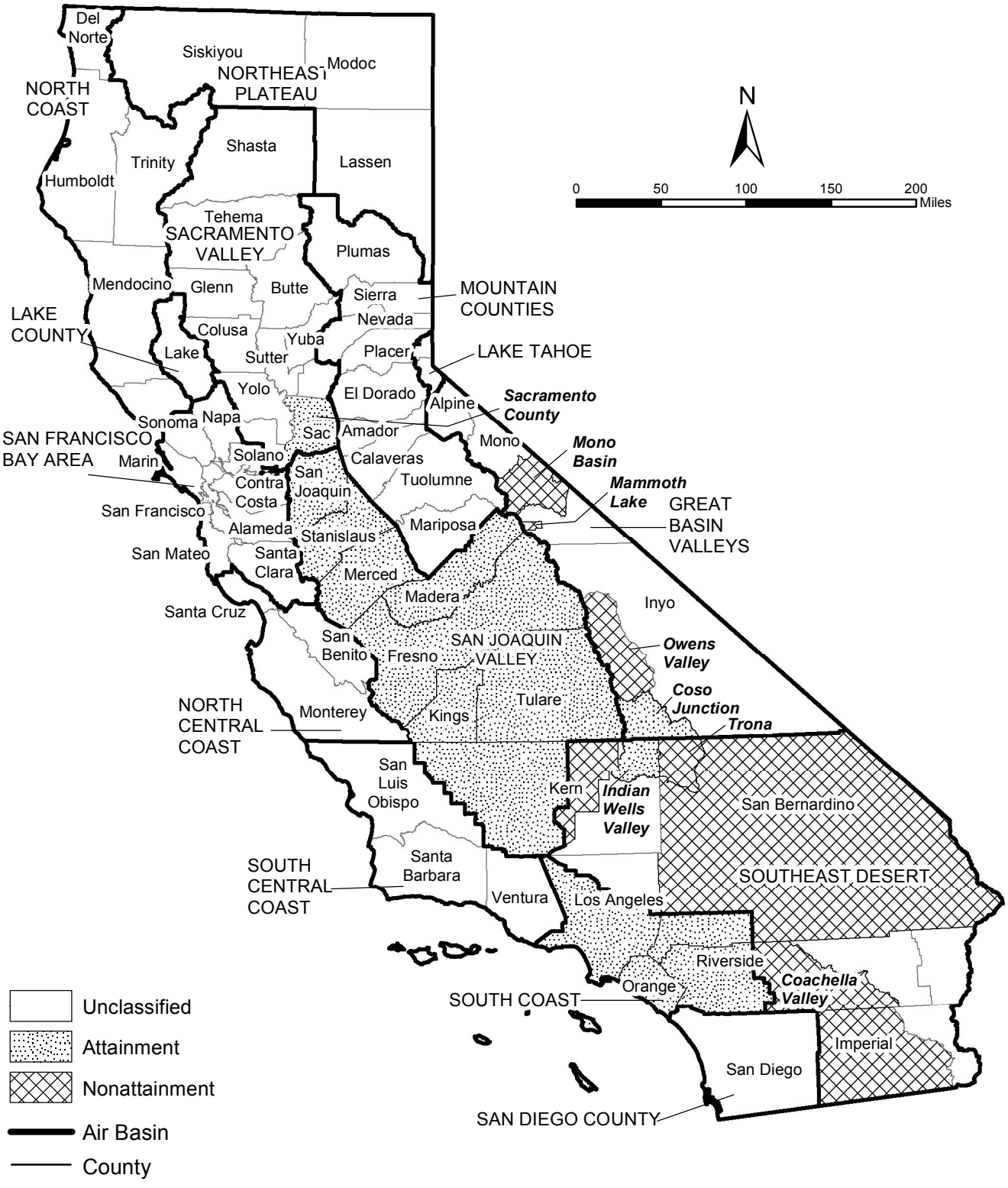
8-HOUR OZONE



Last Reviewed: December 2015
Air Quality Planning Branch, AQPSD, CARB

Area Designations
for
National Ambient Air Quality Standards

PM10



Last Reviewed: December 2015
Air Quality Planning Branch, AQPSD, CARB

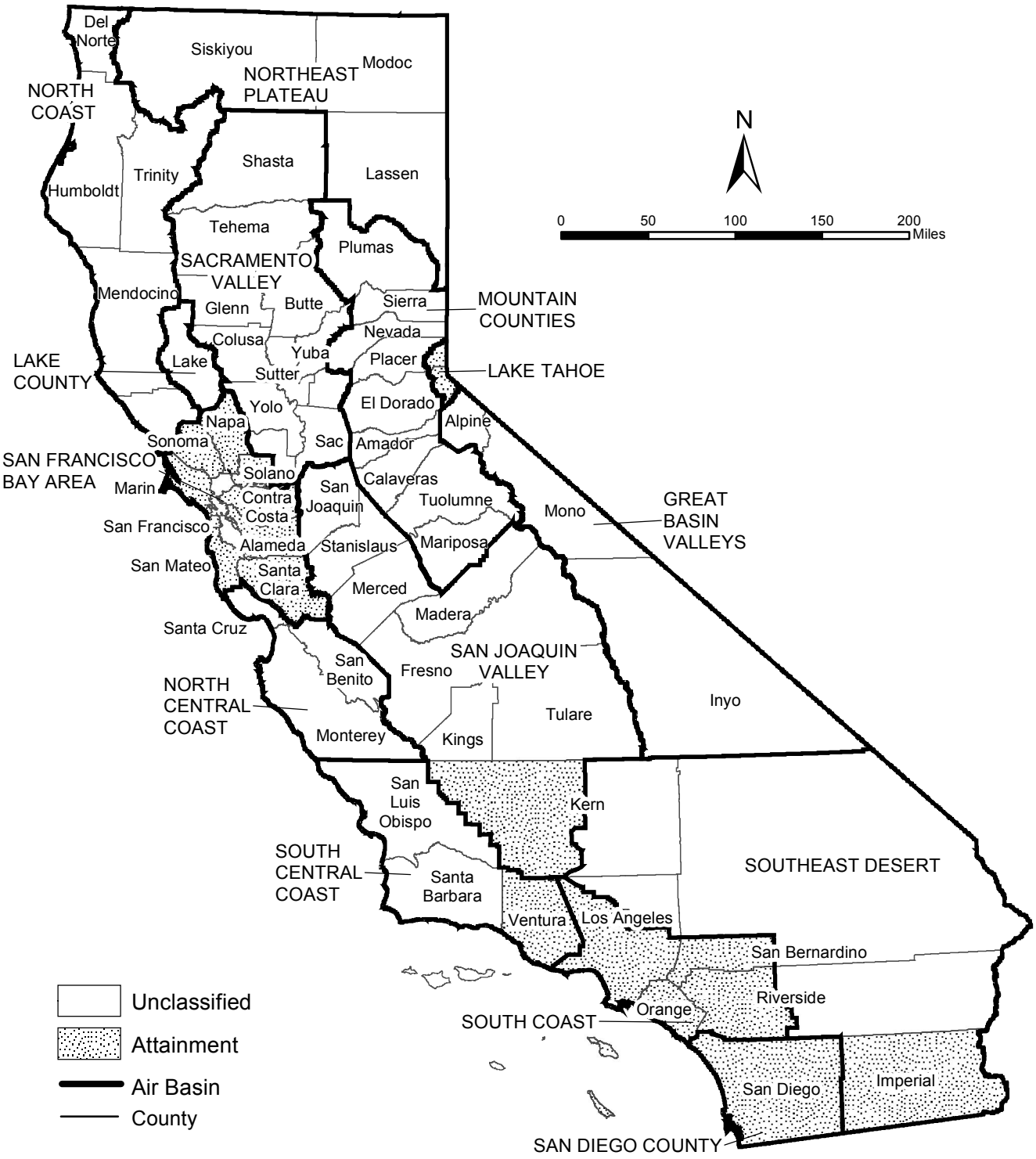
Area Designations
for
National Ambient Air Quality Standards

PM2.5

Last Reviewed: December 2015
Air Quality Planning Branch, AQPSD, CARB

Area Designations
for
National Ambient Air Quality Standards

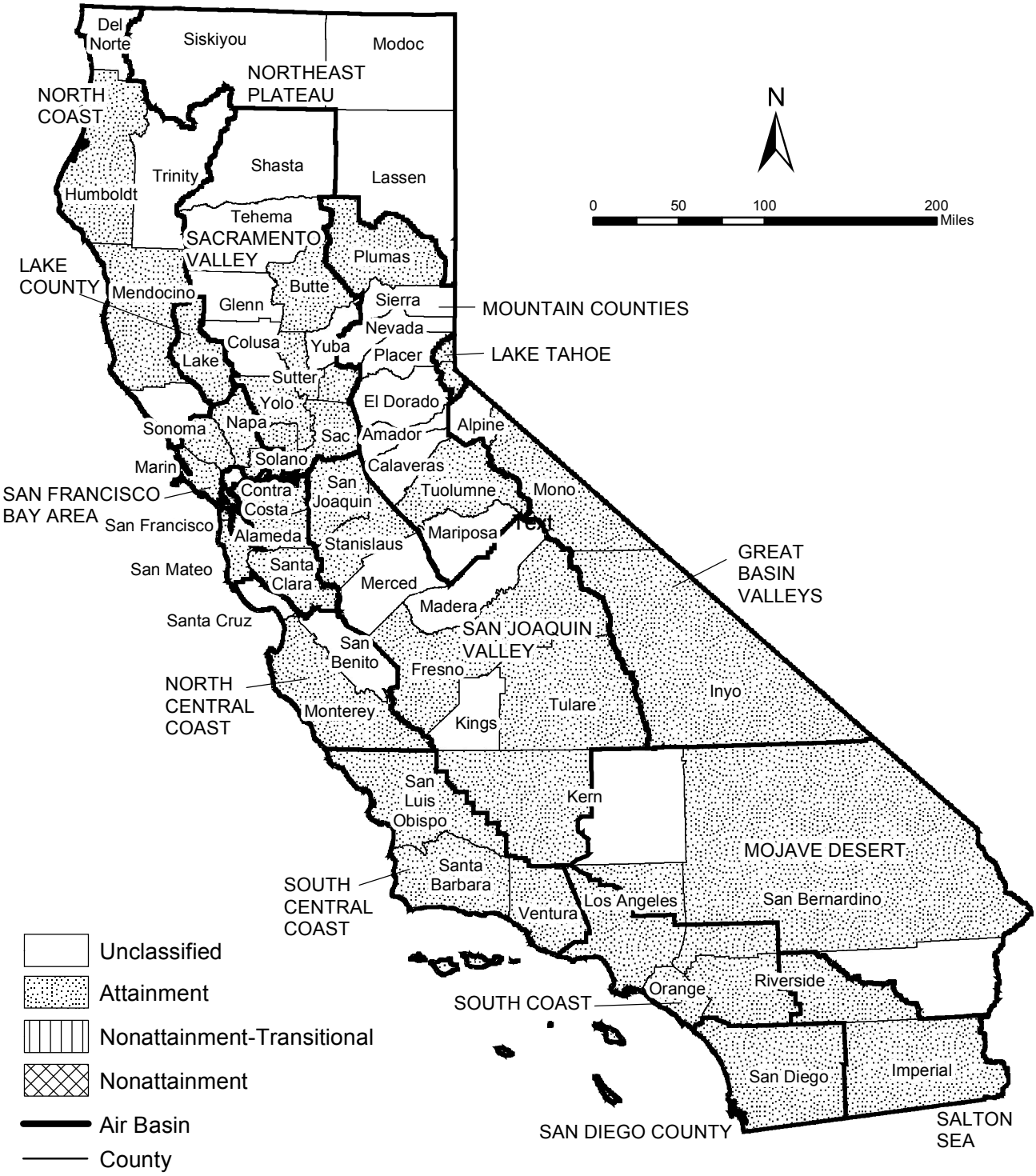
SULFUR DIOXIDE



Last Reviewed: December 2015
Air Quality Planning Branch, AQPSD, CARB

Area Designations
for
State Ambient Air Quality Standards

CARBON MONOXIDE



Source Date:
December 2015
Air Quality Planning Branch, AQPSD

Area Designations
for
State Ambient Air Quality Standards

HYDROGEN SULFIDE

Source Date:
December 2015
Air Quality Planning Branch, AQPSD

Area Designations
for
State Ambient Air Quality Standards

LEAD

Source Date:
December 2015
Air Quality Planning Branch, AQPSD

Area Designations
for
State Ambient Air Quality Standards

NITROGEN DIOXIDE

Source Date:
December 2015
Air Quality Planning Branch, AQPSD

Area Designations
for
State Ambient Air Quality Standards

OZONE

Source Date:
June 2017
Air Quality Planning Branch, AQPSD

Area Designations
for
State Ambient Air Quality Standards

PM10

Source Date:
December 2015
Air Quality Planning Branch, AQPSD

Area Designations
for
State Ambient Air Quality Standards

PM2.5

Source Date:
December 2015
Air Quality Planning Branch, AQPSD

Area Designations
for
State Ambient Air Quality Standards

SULFUR DIOXIDE

Source Date:
December 2015
Air Quality Planning Branch, AQPSD

Area Designations
for
State Ambient Air Quality Standards

SULFATES

Source Date:
December 2015
Air Quality Planning Branch, AQPSD

Area Designations
for
State Ambient Air Quality Standards

VISIBILITY REDUCING PARTICLES

Source Date:
December 2015
Air Quality Planning Branch, AQPSD

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Appendix B. Emissions Calculation Worksheets

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Emissions Summary

2018 Emissions

	TPY					Metric TPY
	NOX	VOC	PM10	PM2.5	CO	CO2
Railway	6.81504	0.27260	0.00102	0.00099	8.72326	3,017.36017
Reductions						
3 stations	(0.76)	(0.21)	(0.36)	(0.15)	(9.31)	(2,246.82)
4 stations	(0.82)	(0.23)	(0.39)	(0.16)	(10.09)	(2,435.05)
5 stations	(0.91)	(0.25)	(0.43)	(0.18)	(11.16)	(2,693.69)
6 stations	(0.99)	(0.27)	(0.47)	(0.20)	(12.10)	(2,920.57)
Net Emissions						
3 stations	6.06	0.06	(0.36)	(0.15)	(0.58)	770.54
4 stations	5.99	0.05	(0.39)	(0.16)	(1.36)	582.31
5 stations	5.90	0.02	(0.43)	(0.18)	(2.44)	323.67
6 stations	5.83	0.00	(0.46)	(0.19)	(3.38)	96.79

Emissions Summary

2018 Emissions	SCAB TPY					SSAB TPY				
	NOX	VOC	PM10	PM2.5	CO	NOX	VOC	PM10	PM2.5	CO
Railway	5.01663	0.20067	0.00075	0.00073	6.42129	1.79841	0.07194	0.00027	0.00026	2.30197
Reductions										
3 stations	(0.56)	(0.15)	(0.27)	(0.11)	(6.89)	(0.20)	(0.05)	(0.09)	(0.04)	(2.42)
4 stations	(0.61)	(0.17)	(0.29)	(0.12)	(7.46)	(0.21)	(0.06)	(0.10)	(0.04)	(2.62)
5 stations	(0.67)	(0.19)	(0.32)	(0.13)	(8.26)	(0.24)	(0.07)	(0.11)	(0.05)	(2.90)
6 stations	(0.73)	(0.20)	(0.34)	(0.14)	(8.95)	(0.26)	(0.07)	(0.12)	(0.05)	(3.15)
Net Emissions										
3 stations	4.45	0.05	(0.26)	(0.11)	(0.47)	1.60	0.02	(0.09)	(0.04)	(0.12)
4 stations	4.41	0.03	(0.29)	(0.12)	(1.04)	1.58	0.01	(0.10)	(0.04)	(0.32)
5 stations	4.34	0.01	(0.32)	(0.13)	(1.84)	1.56	0.01	(0.11)	(0.05)	(0.60)
6 stations	4.29	(0.00)	(0.34)	(0.14)	(2.53)	1.54	0.00	(0.12)	(0.05)	(0.84)

Emissions Summary

2024 Emissions

	TPY					Metric TPY
	NOX	VOC	PM10	PM2.5	CO	CO2
Railway	6.81504	0.27260	0.00102	0.00099	8.72326	3,017.36017
Reductions						
3 stations	(0.38)	(0.10)	(0.41)	(0.17)	(6.13)	(2,171.98)
4 stations	(0.41)	(0.10)	(0.45)	(0.19)	(6.64)	(2,353.94)
5 stations	(0.45)	(0.11)	(0.49)	(0.20)	(7.35)	(2,603.97)
6 stations	(0.49)	(0.12)	(0.54)	(0.22)	(7.97)	(2,823.29)
Net Emissions						
3 stations	6.44	0.18	(0.41)	(0.17)	2.59	845.38
4 stations	6.40	0.17	(0.45)	(0.18)	2.08	663.42
5 stations	6.36	0.16	(0.49)	(0.20)	1.37	413.39
6 stations	6.32	0.15	(0.54)	(0.22)	0.75	194.07

Emissions Summary

2024 Emissions	SCAB TPY					SSAB TPY				
	NOX	VOC	PM10	PM2.5	CO	NOX	VOC	PM10	PM2.5	CO
Railway	5.01663	0.20067	0.00075	0.00073	6.42129	1.79841	0.07194	0.00027	0.00026	2.30197
Reductions										
3 stations	(0.28)	(0.07)	(0.31)	(0.13)	(4.54)	(0.10)	(0.02)	(0.11)	(0.04)	(1.59)
4 stations	(0.30)	(0.08)	(0.33)	(0.14)	(4.92)	(0.11)	(0.03)	(0.12)	(0.05)	(1.73)
5 stations	(0.34)	(0.08)	(0.37)	(0.15)	(5.44)	(0.12)	(0.03)	(0.13)	(0.05)	(1.91)
6 stations	(0.36)	(0.09)	(0.40)	(0.16)	(5.90)	(0.13)	(0.03)	(0.14)	(0.06)	(2.07)
Net Emissions										
3 stations	4.74	0.13	(0.30)	(0.13)	1.88	1.70	0.05	(0.11)	(0.04)	0.71
4 stations	4.71	0.12	(0.33)	(0.14)	1.50	1.69	0.05	(0.12)	(0.05)	0.57
5 stations	4.68	0.12	(0.37)	(0.15)	0.98	1.68	0.04	(0.13)	(0.05)	0.39
6 stations	4.65	0.11	(0.40)	(0.16)	0.52	1.67	0.04	(0.14)	(0.06)	0.23

Emissions Summary

2044 Emissions

	TPY					Metric TPY
	NOX	VOC	PM10	PM2.5	CO	CO2
Railway	6.81504	0.27260	0.00102	0.00099	8.72326	3,017.36017
Reductions						
3 stations	(0.25)	(0.03)	(0.67)	(0.27)	(5.93)	(2,664.22)
4 stations	(0.27)	(0.03)	(0.73)	(0.29)	(6.43)	(2,887.42)
5 stations	(0.29)	(0.04)	(0.80)	(0.32)	(7.11)	(3,194.13)
6 stations	(0.32)	(0.04)	(0.87)	(0.35)	(7.71)	(3,463.15)
Net Emissions						
3 stations	6.57	0.24	(0.67)	(0.27)	2.79	353.14
4 stations	6.55	0.24	(0.72)	(0.29)	2.30	129.94
5 stations	6.52	0.24	(0.80)	(0.32)	1.62	(176.77)
6 stations	6.50	0.23	(0.87)	(0.35)	1.02	(445.79)

Emissions Summary

2044 Emissions	SCAB TPY					SSAB TPY				
	NOX	VOC	PM10	PM2.5	CO	NOX	VOC	PM10	PM2.5	CO
Railway	5.01663	0.20067	0.00075	0.00073	6.42129	1.79841	0.07194	0.00027	0.00026	2.30197
Reductions										
3 stations	(0.18)	(0.02)	(0.50)	(0.20)	(4.39)	(0.06)	(0.01)	(0.17)	(0.07)	(1.54)
4 stations	(0.20)	(0.03)	(0.54)	(0.22)	(4.75)	(0.07)	(0.01)	(0.19)	(0.08)	(1.67)
5 stations	(0.22)	(0.03)	(0.59)	(0.24)	(5.26)	(0.08)	(0.01)	(0.21)	(0.08)	(1.85)
6 stations	(0.24)	(0.03)	(0.64)	(0.26)	(5.70)	(0.08)	(0.01)	(0.23)	(0.09)	(2.00)
Net Emissions										
3 stations	4.84	0.18	(0.49)	(0.20)	2.03	1.73	0.06	(0.17)	(0.07)	0.76
4 stations	4.82	0.18	(0.54)	(0.22)	1.67	1.73	0.06	(0.19)	(0.08)	0.63
5 stations	4.80	0.17	(0.59)	(0.24)	1.16	1.72	0.06	(0.21)	(0.08)	0.45
6 stations	4.78	0.17	(0.64)	(0.26)	0.72	1.72	0.06	(0.23)	(0.09)	0.30

Rail Emissions

	Rail Miles		
	Total	SCAB	SSAB
West Section	68	68	-
East Section	76	38	38
	144	106	38
	100%	74%	26%

Estimate os Siemens Charger average fuel consumption per mile 2015 Amtrak average of 1.64 gal/1.16 1.41

bhp-hr/gal conversion factor 20.8

Tier 4 Emissions Factors

NOX	HC	PM10	PM2.5	CO
1.000000	0.040000	0.000150	0.000146	1.280000

Passenger Rail Emissions Factors (grams/gallon)

Year	NOX	VOC	PM10	PM2.5	CO	CO2
2018	20.80000	0.83200	0.00312	0.00303	26.62400	10,151.40
2024	20.80000	0.83200	0.00312	0.00303	26.62400	10,151.40
2044	20.80000	0.83200	0.00312	0.00303	26.62400	10,151.40

Year	Grams per mile emissions factors					
2018	29.40690	1.17628	0.00441	0.00428	37.64083	14,351.98
2024	29.40690	1.17628	0.00441	0.00428	37.64083	14,351.98
2044	29.40690	1.17628	0.00441	0.00428	37.64083	14,351.98

Rail Emissions

Locomotive Emissions (grams per day)

Year 2018	NOX	VOC	PM10	PM2.5	CO	CO2
SCAB	12,469	499	2	2	15,960	6,085,239
SSAB	4,470	179	1	1	5,721	2,181,501
Total	16,938	678	3	2	21,681	8,266,740
Year 2024						
SCAB	12,469	499	2	2	15,960	6,085,239
SSAB	4,470	179	1	1	5,721	2,181,501
Total	16,938	678	3	2	21,681	8,266,740
Year 2044						
SCAB	12,469	499	2	2	15,960	6,085,239
SSAB	4,470	179	1	1	5,721	2,181,501
Total	16,938	678	3	2	21,681	8,266,740

Locomotive Emissions (tons per year)

	NOX	VOC	PM10	PM2.5	CO	CO2
Year 2018						metric tons
SCAB	5.0166	0.2007	0.0008	0.0007	6.4213	2,221.1124
SSAB	1.7984	0.0719	0.0003	0.0003	2.3020	796.2478
Total	6.8150	0.2726	0.0010	0.0010	8.7233	3,017.3602
Year 2024						
SCAB	5.0166	0.2007	0.0008	0.0007	6.4213	2,221.1124
SSAB	1.7984	0.0719	0.0003	0.0003	2.3020	796.2478
Total	6.8150	0.2726	0.0010	0.0010	8.7233	3,017.3602
Year 2044						
SCAB	5.0166	0.2007	0.0008	0.0007	6.4213	2,221.1124
SSAB	1.7984	0.0719	0.0003	0.0003	2.3020	796.2478
Total	6.8150	0.2726	0.0010	0.0010	8.7233	3,017.3602

EMFAC2017 (v1.0.2) Emission Rates
Region Type: MPO
Region: SCAG
Calendar Year: 2018
Season: Annual

Region	Vehicle Category	Model Year	Speed	Fuel	VMT	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUNEX	PM10_PMTW	PM10_PMBW	PM2_5_RUNEX
SCAG	LDA	Aggregated	Aggregated	GAS	284,521,907	0.02173167	0.071010584	1.036415093	0.002970015	0.00183288	0.008000002	0.036750011	0.00168562
SCAG	LDA	Aggregated	Aggregated	DSL	2,063,200	0.029427671	0.157727621	0.317233465	0.00218628	0.016528873	0.008000002	0.036750011	0.015813842
SCAG	LDA	Aggregated	Aggregated	ELEC	2,771,536	0	0	0	0	0	0.008000002	0.036750011	0
SCAG	LDT1	Aggregated	Aggregated	GAS	28,344,033	0.061908374	0.214118165	2.332531608	0.003459986	0.003312567	0.008000002	0.036750011	0.003047358
SCAG	LDT1	Aggregated	Aggregated	DSL	14,766	0.249834621	1.315245493	1.400500183	0.004367519	0.191914937	0.008000002	0.036750011	0.183612782
SCAG	LDT1	Aggregated	Aggregated	ELEC	46,835	0	0	0	0	0	0.008000002	0.036750011	0
SCAG	LDT2	Aggregated	Aggregated	GAS	94,234,139	0.034735071	0.151590698	1.486507028	0.003846655	0.001963922	0.008000002	0.036750011	0.00180675
SCAG	LDT2	Aggregated	Aggregated	DSL	448,342	0.025639446	0.073523442	0.173136529	0.003012419	0.010294865	0.008000002	0.036750011	0.009849513
SCAG	LDT2	Aggregated	Aggregated	ELEC	290,562	0	0	0	0	0	0.008000002	0.036750011	0
					412,735,319								

EMFAC2017 (v1.0.2) Emissior
Region Type: MPO
Region: SCAG
Calendar Year: 2018
Season: Annual

Region	Vehicle Category	PM2_5_PMTW	PM2_5_PMBW	CO2_RUNEX	CH4_RUNEX	N2O_RUNEX
SCAG	LDA	0.002000001	0.015750005	300.1285205	0.005105737	0.006653536
SCAG	LDA	0.002000001	0.015750005	231.2643691	0.001366859	0.036351538
SCAG	LDA	0.002000001	0.015750005	0	0	0
SCAG	LDT1	0.002000001	0.015750005	349.6414939	0.013202938	0.014181173
SCAG	LDT1	0.002000001	0.015750005	461.9955141	0.011604341	0.072619261
SCAG	LDT1	0.002000001	0.015750005	0	0	0
SCAG	LDT2	0.002000001	0.015750005	388.7154538	0.007778467	0.010847875
SCAG	LDT2	0.002000001	0.015750005	318.6532639	0.001190903	0.050087856
SCAG	LDT2	0.002000001	0.015750005	0	0	0

2018 Auto Emissions

Weighted average grams/mile emissions factors

		ROG	NOX	CO	SOX	PM10	PM2.5	CO2e
LDA	GAS	0.014981	0.048952	0.714460	0.002047	0.032112	0.013398	208.209658
LDA	DSL	0.000147	0.000788	0.001586	0.000011	0.000306	0.000168	1.204401
LDA	ELEC	-	-	-	-	0.000300	0.000119	-
LDT1	GAS	0.004251	0.014704	0.160183	0.000238	0.003301	0.001428	24.294615
LDT1	DSL	0.000009	0.000047	0.000050	0.000000	0.000008	0.000007	0.017228
LDT1	ELEC	-	-	-	-	0.000005	0.000002	-
LDT2	GAS	0.007931	0.034611	0.339394	0.000878	0.010666	0.004465	89.456079
LDT2	DSL	0.000028	0.000080	0.000188	0.000003	0.000060	0.000030	0.360598
LDT2	ELEC	-	-	-	-	0.000032	0.000012	-
		0.027347	0.099182	1.215861	0.003178	0.046790	0.019630	323.542579

2018 Auto Emissions

No Build Annual VMT and Reduction Estimates		ROG	NOX	CO	SOX	PM10	PM2.5	CO2e
		TPY						Metric TPY
No Build	3,195,227,280	96.3	349.3	4,282.4	11.2	164.8	69.1	1,033,792
3 stations	(6,944,436)	(0.2)	(0.8)	(9.3)	(0.0)	(0.4)	(0.2)	(2,247)
4 stations	(7,526,199)	(0.2)	(0.8)	(10.1)	(0.0)	(0.4)	(0.2)	(2,435)
5 stations	(8,325,626)	(0.3)	(0.9)	(11.2)	(0.0)	(0.4)	(0.2)	(2,694)
6 stations	(9,026,845)	(0.3)	(1.0)	(12.1)	(0.0)	(0.5)	(0.2)	(2,921)

EMFAC2017 (v1.0.2) Emission Rates
Region Type: MPO
Region: SCAG
Calendar Year: 2024
Season: Annual

Region	Vehicle Category	Model Year	Speed	Fuel	VMT	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUNEX	PM10_PMTW	PM10_PMBW	PM2_5_RUNEX
SCAG	LDA	Aggregated	Aggregated	GAS	290,863,377	0.008088803	0.031149026	0.612580777	0.002546172	0.001504134	0.008000002	0.036750011	0.001382996
SCAG	LDA	Aggregated	Aggregated	DSL	2,981,132	0.014165702	0.050449316	0.239504151	0.001872451	0.005922826	0.008000002	0.036750011	0.005666607
SCAG	LDA	Aggregated	Aggregated	ELEC	8,462,586	0	0	0	0	0	0.008000002	0.036750011	0
SCAG	LDT1	Aggregated	Aggregated	GAS	32,024,682	0.024277457	0.090627666	1.151601267	0.002979599	0.002123078	0.008000002	0.036750011	0.001952119
SCAG	LDT1	Aggregated	Aggregated	DSL	8,909	0.175338535	0.935343746	1.041932265	0.004094766	0.131995211	0.008000002	0.036750011	0.126285157
SCAG	LDT1	Aggregated	Aggregated	ELEC	442,005	0	0	0	0	0	0.008000002	0.036750011	0
SCAG	LDT2	Aggregated	Aggregated	GAS	97,270,408	0.014894761	0.064923562	0.853112259	0.003140765	0.001597729	0.008000002	0.036750011	0.001469061
SCAG	LDT2	Aggregated	Aggregated	DSL	776,533	0.019274904	0.040231471	0.17385813	0.002546796	0.004965549	0.008000002	0.036750011	0.004750742
SCAG	LDT2	Aggregated	Aggregated	ELEC	1,246,997	0	0	0	0	0	0.008000002	0.036750011	0
					434,076,627								

EMFAC2017 (v1.0.2) Emissior
Region Type: MPO
Region: SCAG
Calendar Year: 2024
Season: Annual

Region	Vehicle Category	PM2_5_PMTW	PM2_5_PMBW	CO2_RUNEX	CH4_RUNEX	N2O_RUNEX
SCAG	LDA	0.002000001	0.015750005	257.2979596	0.002195742	0.003947969
SCAG	LDA	0.002000001	0.015750005	198.0675658	0.00065797	0.031133463
SCAG	LDA	0.002000001	0.015750005	0	0	0
SCAG	LDT1	0.002000001	0.015750005	301.0969766	0.005598932	0.007190658
SCAG	LDT1	0.002000001	0.015750005	433.1436949	0.00814414	0.068084157
SCAG	LDT1	0.002000001	0.015750005	0	0	0
SCAG	LDT2	0.002000001	0.015750005	317.3832654	0.003727776	0.005729832
SCAG	LDT2	0.002000001	0.015750005	269.399663	0.000895282	0.042345875
SCAG	LDT2	0.002000001	0.015750005	0	0	0

2024 Auto Emissions

Weighted average grams/mile emissions factors

		ROG	NOX	CO	SOX	PM10	PM2.5	CO2e
LDA	GAS	0.005420	0.020872	0.410474	0.001706	0.030994	0.012821	173.150858
LDA	DSL	0.000097	0.000346	0.001645	0.000013	0.000348	0.000161	1.417067
LDA	ELEC	-	-	-	-	0.000872	0.000346	-
LDT1	GAS	0.001791	0.006686	0.084961	0.000220	0.003458	0.001454	22.366049
LDT1	DSL	0.000004	0.000019	0.000021	0.000000	0.000004	0.000003	0.009265
LDT1	ELEC	-	-	-	-	0.000046	0.000018	-
LDT2	GAS	0.003338	0.014548	0.191170	0.000704	0.010386	0.004307	71.484725
LDT2	DSL	0.000034	0.000072	0.000311	0.000005	0.000089	0.000040	0.502057
LDT2	ELEC	-	-	-	-	0.000129	0.000051	-
		0.010684	0.042544	0.688583	0.002647	0.046325	0.019200	268.930022

2024 Auto Emissions

No Build Annual VMT and Reduction Estimates		ROG	NOX	CO	SOX	PM10	PM2.5	CO2e
		TPY						Metric TPY
No Build	3,475,105,216	40.9	163.0	2,637.7	10.1	177.5	73.5	934,560
3 stations	(8,076,363)	(0.1)	(0.4)	(6.1)	(0.0)	(0.4)	(0.2)	(2,172)
4 stations	(8,752,975)	(0.1)	(0.4)	(6.6)	(0.0)	(0.4)	(0.2)	(2,354)
5 stations	(9,682,718)	(0.1)	(0.5)	(7.3)	(0.0)	(0.5)	(0.2)	(2,604)
6 stations	(10,498,246)	(0.1)	(0.5)	(8.0)	(0.0)	(0.5)	(0.2)	(2,823)

EMFAC2017 (v1.0.2) Emission Rates
Region Type: MPO
Region: SCAG
Calendar Year: 2044
Season: Annual

Region	Vehicle Category	Model Year	Speed	Fuel	VMT	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUNEX	PM10_PMTW	PM10_PMBW	PM2_5_RUNEX
SCAG	LDA	Aggregated	Aggregated	GAS	307,210,839	0.001918241	0.017187083	0.408405606	0.001974674	0.000591135	0.008000002	0.036750011	0.000543527
SCAG	LDA	Aggregated	Aggregated	DSL	3,821,949	0.005559494	0.009332097	0.183410432	0.001504504	0.000794243	0.008000002	0.036750011	0.000759884
SCAG	LDA	Aggregated	Aggregated	ELEC	20,160,426	0	0	0	0	0	0.008000002	0.036750011	0
SCAG	LDT1	Aggregated	Aggregated	GAS	37,724,797	0.00221563	0.019115616	0.420814582	0.002299305	0.000665028	0.008000002	0.036750011	0.000611469
SCAG	LDT1	Aggregated	Aggregated	DSL	5,294	0.020093669	0.051501803	0.213021107	0.002916573	0.005323024	0.008000002	0.036750011	0.005092752
SCAG	LDT1	Aggregated	Aggregated	ELEC	1,485,005	0	0	0	0	0	0.008000002	0.036750011	0
SCAG	LDT2	Aggregated	Aggregated	GAS	106,733,997	0.002881427	0.018055011	0.479056288	0.002270406	0.000621415	0.008000002	0.036750011	0.000571369
SCAG	LDT2	Aggregated	Aggregated	DSL	1,100,726	0.018884696	0.033298125	0.195208937	0.002008144	0.004572959	0.008000002	0.036750011	0.004375135
SCAG	LDT2	Aggregated	Aggregated	ELEC	3,438,702	0	0	0	0	0	0.008000002	0.036750011	0
					481,681,736								

EMFAC2017 (v1.0.2) Emissior
Region Type: MPO
Region: SCAG
Calendar Year: 2044
Season: Annual

Region	Vehicle Category	PM2_5_PMTW	PM2_5_PMBW	CO2_RUNEX	CH4_RUNEX	N2O_RUNEX
SCAG	LDA	0.002000001	0.015750005	199.5464956	0.000701739	0.002935537
SCAG	LDA	0.002000001	0.015750005	159.146234	0.000258228	0.025015572
SCAG	LDA	0.002000001	0.015750005	0	0	0
SCAG	LDT1	0.002000001	0.015750005	232.351328	0.000787608	0.003121956
SCAG	LDT1	0.002000001	0.015750005	308.5146721	0.000933313	0.04849421
SCAG	LDT1	0.002000001	0.015750005	0	0	0
SCAG	LDT2	0.002000001	0.015750005	229.431077	0.000991891	0.002972771
SCAG	LDT2	0.002000001	0.015750005	212.4211896	0.000877158	0.033389653
SCAG	LDT2	0.002000001	0.015750005	0	0	0

2044 Auto Emissions

Weighted average grams/mile emissions factors

		ROG	NOX	CO	SOX	PM10	PM2.5	CO2e
LDA	GAS	0.001223	0.010962	0.260476	0.001259	0.028918	0.011667	127.777042
LDA	DSL	0.000044	0.000074	0.001455	0.000012	0.000361	0.000147	1.315418
LDA	ELEC	-	-	-	-	0.001873	0.000743	-
LDT1	GAS	0.000174	0.001497	0.032958	0.000180	0.003557	0.001438	18.264029
LDT1	DSL	0.000000	0.000001	0.000002	0.000000	0.000001	0.000000	0.003532
LDT1	ELEC	-	-	-	-	0.000138	0.000055	-
LDT2	GAS	0.000638	0.004001	0.106152	0.000503	0.010054	0.004060	51.019463
LDT2	DSL	0.000043	0.000076	0.000446	0.000005	0.000113	0.000051	0.505695
LDT2	ELEC	-	-	-	-	0.000319	0.000127	-
		0.002123	0.016610	0.401490	0.001959	0.045334	0.018287	198.885179

2044 Auto Emissions

		ROG	NOX	CO	SOX	PM10	PM2.5	CO2e
No Build Annual VMT and Reduction Estimates				TPY				Metric TPY
No Build	4,335,611,649	10.1	79.4	1,918.8	9.4	216.7	87.4	862,289
3 stations	(13,395,795)	(0.0)	(0.2)	(5.9)	(0.0)	(0.7)	(0.3)	(2,664)
4 stations	(14,518,027)	(0.0)	(0.3)	(6.4)	(0.0)	(0.7)	(0.3)	(2,887)
5 stations	(16,060,152)	(0.0)	(0.3)	(7.1)	(0.0)	(0.8)	(0.3)	(3,194)
6 stations	(17,412,809)	(0.0)	(0.3)	(7.7)	(0.0)	(0.9)	(0.4)	(3,463)