3.3 Air Quality and Global Climate Change

Since publication of the Palmdale to Burbank Section Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS), the following substantive changes have been made to this section:

- Section 3.3 was updated to reflect refined hazardous materials spoils hauling assumptions (i.e., the estimated volume of hazardous spoils has been reduced) and assumptions for trucking of recycled water for the SR14A Build Alternative.
- Section 3.3.2.1 was updated to explain that the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule was repealed on December 21, 2021.
- A summary of the 2023 Council on Environmental Quality (CEQ) Guidance regarding greenhouse has (GHG) emissions and climate change was added to Section 3.3.2.1.
- A summary of the California Air Resources Board (CARB) 2022 *Scoping Plan for Achieving Carbon Neutrality* was added to Section 3.3.2.2.
- With respect to 40 Code of Federal Regulations (C.F.R.) Section 93.158, the term “Part” was replaced with “Section” throughout Chapter 3.3.
- Section 3.3.4.2, Impact Avoidance and Minimization Features, was updated to revise the requirements for AQ-IAMF#1 and AQ-IAMF#5. The description of AQ-IAMF#1 was updated to add the requirement that Contractors provide the fugitive dust control plan to Los Angeles Unified School District, Acton-Agua Dulce Unified School District, and any other potentially affected public school districts. The description of AQ-IAMF#5 was updated to revise the requirement that on-road trucks used for hauling during construction will be of model year 2020 or newer. References to the requirements for these IAMFs have also been revised throughout this section for consistency.
- Footnote 3 was added to Section 3.3.4.3, Methods for NEPA and CEQA Impact Analysis, to describe the Global Warming Potentials used in the analysis.
- Section 3.3.4.3, Methods for NEPA and CEQA Impact Analysis, was updated under the Heath Risk Assessment heading to describe consideration of recently approved or foreseeable projects.
- Federal Attainment statuses for fine particulate matter (2.5 microns or less in diameter) ($PM_{2.5}$) and nitrogen dioxide (NO_2) were revised in Table 3.3-6.
- The 3-year period detailed in Section 3.3.5.3 and Table 3.3-9 was updated to 2019–2021, and Table 3.3-8 ozone (O_3), carbon monoxide (CO), and NO_2 concentrations were updated to that period.
- With respect to “General Conformity” and “*de minimis*,” the term “threshold” was replaced with “level” throughout this section.
- Annual General Conformity *de minimis* level for $PM_{2.5}$ in Table 3.3-14, Table 3.3-17, Table 3.3-19, Table 3.3-24, Table 3.3-25, and Table 3.3-28 were revised from 100 to 70.
- Table 3.3-14, Table 3.3-16, Table 3.3-17, Table 3.3-19, Table 3.3-21, Table 3.3-23, Table 3.3-24, Table 3.3-26, Table 3.3-27, Table 3.3-29, Table 3.3-30, and Table 3.3-32 have been revised to reflect that a criteria pollutant emission that is equal to a General Conformity *de minimus* level is the same as an exceedance, NO_2 levels were added to tables showing the annual construction emissions in the South Coast Air Quality Management District (SCAQMD), and table note 1 has been updated to reflect the respective air basin rather than the management district.
- Impact AQ#3, Compliance with Air Quality Plans during Construction, was updated to reference the respective air basin rather than the management district, where applicable.

- Impact AQ#13, Statewide and Regional Operations Greenhouse Gas Emissions Analysis, was updated to reflect greenhouse gas emissions reduction goals established by Assembly Bill (AB) 1279.
- Section 3.3.6.2, No Project Alternative, was updated to clarify the two ridership scenarios.
- Footnote 2 was added to Table 3.3-28.
- Footnote 9 was added to include high- and medium-ridership numbers from the 2024 Business Plan.

The revisions and clarifications provided in this section of this Final EIR/EIS do not change the impact conclusions pertaining to air quality and global climate change presented in the Draft EIR/EIS.

3.3.1 Introduction

This section describes the regulatory and environmental setting associated with air quality and global climate change, and it identifies the increases in pollutant and GHG emissions that would result from implementation of the Palmdale to Burbank Project Section.[1] This section also discusses the programmatic impact avoidance and minimization features (IAMF) included as part of the six Build Alternatives (the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives) to reduce impacts on air quality and global climate change, and it presents mitigation measures to mitigate the remaining identified impacts on air quality and global climate change. Based on the analysis conducted for this Final EIR/EIS, construction of the Palmdale to Burbank Project Section would result in temporary impacts on air quality. Once operational, the Palmdale to Burbank Project Section would result in a net benefit.

> *Air Quality and Global Climate Change*
>
> The Clean Air Act is the comprehensive federal law that regulates air emissions from stationary and mobile sources. This law authorizes the United States Environmental Protection Agency to establish National Ambient Air Quality Standards to protect public health and public welfare and to regulate emissions of hazardous air pollutants. California has also implemented state-specific clean air requirements to protect the health and welfare of California citizens.

Air quality describes the degree to which ambient air and outside atmosphere accessible to the general public is pollution-free. *Air pollution* is a general term that refers to one or more chemical substances that degrade air quality; these pollutants reduce air quality by impairing human and animal health, reducing visibility, damaging property, and combining to form smog (atmospheric pollutants mixed with fog or haze). Programmatic IAMFs are incorporated into the Build Alternatives to prevent or reduce construction-period emissions associated with fugitive dust, construction equipment and trucks, and concrete batch plants (refer to Section 3.3.4.2 for further details).

This section summarizes information from the *Palmdale to Burbank Project Section: Air Quality and Global Climate Change Technical Report* (Air Quality Technical Report) (Authority 2020a). Additional information on impacts and avoidance measures related to air quality and global climate change can be found in the following Final EIR/EIS sections:

- Section 3.2, Transportation, discusses impacts on traffic conditions and circulation modifications.
- Section 3.6, Public Utilities and Energy, discusses emissions associated with the transportation sector and power consumption.

[1] The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 United States Code (U.S.C.) 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

- Section 3.10, Hazardous Materials and Wastes, analyzes impacts associated with asbestos and asbestos-containing materials (ACM).
- Section 3.12, Socioeconomics and Communities, analyzes impacts on communities from construction-related emissions and fugitive dust.
- Section 3.13, Station Planning, Land Use, and Development—Construction and operations impacts of the HSR Build Alternative on land uses and stations and a description of how growth is addressed in local land use regulations.
- Section 3.14, Agricultural Farmland and Forest Land, analyzes impacts of fugitive dust on agricultural operations.
- Section 3.19, Cumulative Impacts—Construction and operations impacts of the HSR Build Alternatives on cumulatively considerable impacts to air quality and global climate change.

Additional details on air quality are provided in the following appendices in Volume 2 of this Final EIR/EIS:

- Appendix 2-H, Regional and Local Policy Consistency Analysis, contains the Regional and Local Policy Consistency Table, which lists the air quality and GHG goals and policies applicable to the Palmdale to Burbank Project Section and notes the Build Alternatives' consistency or inconsistency with each.
- Appendix 2-E, Impact Avoidance and Minimization Features, lists IAMFs incorporated into the project.
- Appendix 3.1-B, United States Forest Service (USFS) Policy Consistency Analysis, assesses the consistency of the Palmdale to Burbank Project Section with applicable laws, regulations, plans, and policies governing proposed uses and activities within the Angeles National Forest (ANF) and the San Gabriel Mountains National Monument (SGMNM).

During public and stakeholder outreach efforts, commenters frequently expressed concern about air quality and global climate change impacts caused by the Palmdale to Burbank Project Section. These impacts are addressed in Section 3.3.6.3.

3.3.2 Laws, Regulations, and Orders

3.3.2.1 Federal

The United States Environmental Protection Agency (USEPA) is responsible for establishing the National Ambient Air Quality Standards (NAAQS), enforcing the federal Clean Air Act of 1963 (CAA) (42 United States Code [U.S.C.] 7401), and regulating transportation-related emission sources such as aircraft, ships, and certain types of locomotives under the exclusive authority of the federal government. The USEPA also establishes vehicular emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet stricter emission standards established by the CARB.

Federal Railroad Administration Procedures for Considering Environmental Impacts (64 Federal Register [Fed. Reg.] 28545)

Federal Railroad Administration (FRA) Procedures for Considering Environmental Impacts states that "the EIS should identify any significant changes likely to occur in the natural environment and in the developed environment. The EIS should also discuss the consideration given to design quality, art, and architecture in project planning and development as required by United States Department of Transportation Order 5610.4" (FRA 1999, p. 28555).

Clean Air Act (42 U.S.C. 7401) and Conformity Rule (40 Code of Federal Regulations [C.F.R.] Parts 51 and 93)

The CAA defines nonattainment areas as geographic regions that have not met one or more of the NAAQS. The CAA requires the preparation of a state implementation plan (SIP) for each nonattainment area and a maintenance plan for each former nonattainment area that subsequently demonstrated compliance with the standards. A SIP is a compilation of a state's air quality control plans and rules, approved by the USEPA. Section 176(c) of the CAA provides that federal agencies cannot engage, support, or provide financial assistance for licensing, permitting, or approving any project unless the project conforms to the applicable SIP. The goals of the state and USEPA are to eliminate or reduce the severity and number of violations of the NAAQS and to achieve expeditious attainment of these standards.

Pursuant to CAA Section 176(c) requirements, in November 1993, the USEPA promulgated two regulations: (1) 40 C.F.R. Part 51, Subpart W and (2) 40 C.F.R. Part 93, Subpart B, "Determining Conformity of General Federal Actions to State or Federal Implementation Plans" (75 Fed. Reg. 17253, amended April 2010). These regulations, commonly referred to as the General Conformity Rule, apply to all federal actions, including those by FRA—except for those that are excluded from review (e.g., stationary source emissions) or related to transportation plans, programs, and projects under 23 U.S.C. or the Federal Transit Act (which are subject to Transportation Conformity Regulations).

In states that have an approved SIP revision adopting General Conformity regulations, 40 C.F.R. Part 51W applies; in states that do not have an approved SIP revision adopting General Conformity regulations, 40 C.F.R. Part 93B applies. Because the state of California has an approved SIP revision adopting General Conformity regulations, 40 C.F.R. Part 51W applies.

The General Conformity Rule is used to determine if federal actions meet the requirements of the CAA and the applicable SIP by ensuring that air emissions related to the action do not:

- Cause or contribute to new violations of a NAAQS;
- Increase the frequency or severity of any existing violation of a NAAQS; or,
- Delay timely attainment of a NAAQS or interim emissions reduction.

A conformity determination under the General Conformity Rule is required if the federal agency determines the following:

> *the action will occur in a nonattainment or maintenance area; that one or more specific exemptions do not apply to the action; the action is not included in the federal agency's "presumed to conform" list; the emissions from the proposed action are not within the approved emissions budget for an applicable facility; and the total direct and indirect emissions of a pollutant (or its precursors) are at or above the* de minimis *levels established in the General Conformity regulations* (75 Fed. Reg. 17255).

Conformity regulatory criteria are listed in 40 C.F.R. Section 93.158. An action will be determined to conform to the applicable SIP if, for each pollutant that meets or exceeds the *de minimis* emissions level in 40 C.F.R. Section 93.153(b) or otherwise requires a conformity determination due to the total of direct and indirect emissions from the action, the action meets the requirements of 40 C.F.R. Section 93.158(c).

In addition, federal activities may not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions toward attainment. The proposed Palmdale to Burbank Project System, as part of the statewide California HSR System project, is subject to review under the General Conformity Rule.

National and State Ambient Air Quality Standards

As required by the CAA, the USEPA has established NAAQS for six major air pollutants, known as criteria pollutants, as follows:

- Ozone (O_3)
- Particulate matter—both respirable particulate matter (PM_{10}), which has an aerodynamic diameter less than or equal to 10 microns and fine particulate matter ($PM_{2.5}$), which has an aerodynamic diameter less than or equal to 2.5 microns

- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Sulfur dioxide (SO_2)
- Lead

The state of California has established California Ambient Air Quality Standards (CAAQS), which are generally more stringent than the corresponding federal standards, and which incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles (see Section 3.3.2.2 for more detail on the CAAQS).

Table 3.3-1 summarizes the state and federal ambient air quality standards as of May 2016, the most recent update. The primary standards have been established to protect public health. The secondary standards are intended to protect the nation's welfare and account for the impacts of air pollutants on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

Table 3.3-1 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone[8] (O_3)	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 (PM_{10})[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 ($PM_{2.5}$)[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 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	0.100 ppm (188 µg/m^3)	–	Gas Phase Chemilumin-escence
	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	0.075 ppm (196 µg/m^3)	–	Ultraviolet Fluorescence;

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Sulfur Dioxide (SO_2) (cont.)	3-Hour	–	Ultraviolet Fluorescence (cont.)	–	0.5 ppm (1300 µg/m³)	Spectrophoto-metry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 µg/m³)		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/m³	Atomic Absorption	–	–	
	Calendar Quarter	–		1.5 µg/m³ (for certain areas)[12]	Same as Primary Standard	High-Volume Sampler and Atomic Absorption
	Rolling 3-Month Average	–		0.15 µg/m³		
Visibility-Reducing Particles[14]	8-Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No Federal Standards		
Sulfates	24-Hour	25 µg/m³	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m³)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24-Hour	0.01 ppm (26 µg/m³)	Gas Chromatography			

Source: CARB 2016

[1] California standards for O_3, CO (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), NO_2, and suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles) are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth-highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the USEPA for further clarification and current federal 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 procedure which can be shown to the satisfaction of CARB 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 USEPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the USEPA.

[8] On October 1, 2015, the national 8-hour O^3 primary and secondary standards were lowered from 0.075 ppm to 0.070 ppm.

[9] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m³ to 12.0 µg/m³. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m³, as was the annual secondary standard of 15 µg/m³. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m³ 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 standards are in units of ppb. California standards are in units of ppm. To directly compare the

national standards 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 1 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 ppb. California standards are in units of ppm. To directly compare the one1-hour national standards 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] CARB 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 µg/m^3 as a quarterly average) remains in effect until one 1 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, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents. These are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.
°C = degrees Celsius; µg/m^3 = micrograms per cubic meter; CARB = California Air Resources Board; mg/m^3 = milligrams per cubic meter; ppb = parts per billion; ppm = parts per million; USEPA = U.S. Environmental Protection Agency

Mobile Source Air Toxics

In addition to the criteria pollutants for which there are NAAQS, the USEPA regulates mobile source air toxics (MSAT). In February 2007, the USEPA finalized a rule (Control of Hazardous Air Pollutants from Mobile Sources) to reduce hazardous air pollutants from mobile sources. The rule limits the benzene content of gasoline and reduces toxic emissions from passenger vehicles and gas cans. The USEPA estimates that, in 2030, this rule would reduce total emissions of MSATs by 330,000 tons and volatile organic compounds (VOC) emissions (precursors to O_3 and $PM_{2.5}$) by more than 1 million tons. The latest revision to this rule, in October 2008, added specific benzene control technologies that the previous rule did not include. However, no NAAQS or CAAQS ambient standards exist for MSATs. Specifically, the USEPA has not established NAAQS or provided standards for hazardous air pollutants.

The Federal Highway Administration (FHWA) released the *Interim Guidance Update on Air Toxic Analysis in NEPA Documents* in 2006. This guidance was last superseded on October 18, 2016, by the FHWA's *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. The purpose of the FHWA's guidance is to advise on when and how to analyze MSATs in the National Environmental Policy Act (NEPA) environmental review process for highways and other transportation-related projects. This guidance is considered interim as MSAT science is still evolving. As the science progresses, the FHWA will update the guidance.

Greenhouse Gas Regulations

GHG emissions are regulated at both the federal and State level. Laws, regulations, plans, and policies have been adopted to address global climate change issues. The key federal regulations relevant to the project are summarized below.

In September 2009, the USEPA published the Final Rule that requires mandatory reporting of GHG emissions from large sources in the United States (USEPA 2010). The gases covered by the Final Rule are carbon dioxide (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 does not apply to this project. However, the methodology developed as part of this regulation is helpful in identifying potential GHG emissions.

In December 2009, the Final Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the CAA was adopted by the USEPA. 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 (USEPA 2015b).

Based on the endangerment finding, the USEPA revised vehicle emissions standards. The USEPA and the National Highway Traffic Safety Administration (NHTSA) updated the Corporate Average Fuel Economy fuel standards in 2012 (77 Fed. Reg. 62623), requiring substantial improvements in fuel economy for all vehicles sold in the United States. The new standards apply to new passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2017–2025. USEPA GHG standards require that these vehicles meet an estimated combined average emissions level of 163 grams of CO_2 per mile in model year 2025, which would be equivalent to 54.5 miles per gallon if the automotive industry were to meet this CO_2 level entirely through fuel economy improvements. In March 2020, the standards were updated to require that model years 2021–2016 vehicles meet an estimated combined average emissions level of 202 grams of CO_2 per mile in model year 2026, roughly equivalent to 40.4 miles per gallon.

In September 2011, the USEPA and the NHTSA issued a Final Rule of GHG emissions and Fuel Efficiency standards for Medium- and Heavy-Duty Engines and Vehicles (76 Fed. Reg. 7106). This Final Rule is tailored to each of three regulatory categories of heavy-duty vehicles—combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. The USEPA and the NHTSA estimated that the new standards in this rule will reduce CO_2 emissions by approximately 270 million metric tons (MMT) and would save 530 million barrels of oil over the life of vehicles sold during the 2014 through 2018 model years.

In January 2012, CARB approved a vehicle emissions control program, the Advanced Clean Cars Program, for model years 2017 through 2025. In August 2012, the USEPA and the NHTSA issued a joint final rulemaking to establish 2017 through 2025 GHG emissions and Corporate Average Fuel Economy standards. To further California’s support of the national program to regulate emissions, CARB submitted a proposal that would allow automobile manufacturer compliance with the USEPA’s requirements to show compliance with California’s requirements for the same model years. The final rulemaking package was filed in early December 2012 and became effective on December 31, 2012.

On August 2, 2018, the USEPA and the NHTSA proposed the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks. The SAFE Vehicles Rule was proposed to amend certain existing Corporate Average Fuel Economy and tailpipe CO_2 emissions standards for passenger cars and light trucks and establish new standards, all covering model years 2021 through 2026. More specifically, the NHTSA is proposing new Corporate Average Fuel Economy standards for model years 2022 through 2026 and amending its 2021 model year Corporate Average Fuel Economy standards, and the USEPA is proposing to amend its CO_2 emissions standards for model years 2021 through 2025 in addition to establishing new standards for model year 2026. The agencies proposed to retain the model year 2020 standards for both programs through model year 2026, but they also requested comment on a range of other alternatives.

In April 2021, in response to President Biden’s Executive Order 13990, the USEPA began the process of repealing SAFE-1 (USEPA 2021). On December 21, 2021, the NHTSA published its CAFE Preemption rule (NHTSA 2021), which finalizes its repeal of the SAFE-1 Rule, thus reopening the pathway for state and local fuel economy laws. On April 1, 2022, NHTSA announced new, landmark CAFE standards requiring a 49 mpg average for passenger cars and light trucks in model year 2026, increasing fuel efficiency 8 percent annually for model years 2024-2025 and 10 percent annually for model year 2026 (NHTSA 2022). These standards are significantly more stringent for those model years than had been set by the 2020 SAFE-2 rule and somewhat more stringent than the prior standards adopted in 2012. Then, on April 12, 2023, USEPA proposed its multi-pollutant emissions standards for model years 2027 and later light- and medium-duty vehicles.

This EIR/EIS was drafted prior to the repeal of the SAFE rule, and as such, the analysis in this chapter considers the SAFE rule corrections factors.[2]

Greenhouse Gas Guidance

In February 2010, the CEQ released draft guidance on the consideration of GHGs in NEPA documents for federal actions. The draft guidelines include a presumptive criterion of 25,000 metric tons of carbon dioxide equivalent (CO_2e) emissions from a proposed action to trigger a quantitative analysis. The CEQ has not established when GHG emissions are “significant” under NEPA but rather poses that question to the public (Sutley 2010). In August 2016, the CEQ published final guidance on the consideration of GHG in NEPA documents that did not include a presumptive criterion of GHG emissions but recommended that agencies quantify a proposed agency action’s projected direct and indirect GHG emissions, taking into account available data and GHG quantification tools that are suitable for the proposed agency action.

In March 2017, a United States Presidential Executive Order (USEO) on Promoting Energy Independence and Economic Growth stated the CEQ “shall rescind its final guidance entitled ‘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,’ which is referred to in Notice of Availability, 81 Fed. Reg. 51866 (August 2016).” The USEO further decreed that the CEQ shall “as soon as practicable, suspend, revise, or rescind, or publish for notice and comment proposed rules suspending, revising, or rescinding” the final guidance on the consideration of GHG in NEPA documents for federal actions. The CEQ subsequently rescinded the guidance as directed by the USEO and issued new draft guidance in June 2019. In February 2021, the CEQ rescinded the June 2019 draft guidance, stating that the 2016 GHG Guidance will be reviewed for revisions and updates. In the interim, CEQ said that agencies should consider all available tools and resources in assessing GHG emissions and climate change effects of their proposed actions, including, as appropriate and relevant, the 2016 GHG Guidance.

In January 2023, the CEQ issued interim guidance to assist agencies in analyzing GHG and climate change effects of their proposed actions under NEPA. (CEQ 2023) The guidance states that NEPA reviews should quantify proposed actions’ GHG emissions, place GHG emissions in appropriate context and disclose relevant GHG emissions and relevant climate impacts, and identify alternatives and mitigation measures to avoid or reduce GHG emissions. CEQ encourages agencies to mitigate GHG emissions associated with their proposed actions to the greatest extent possible, consistent with national, science-based GHG reduction policies established to avoid the worst impacts of climate change.

United States Forest Service Authorities

Sources of air quality emissions in the ANF, including the SGMNM, are directed by several federal laws and their implementing regulations, as well as policies, plans, and orders. The primary laws governing air quality and global climate change are the Federal Land Policy and Management Act (FLPMA), the National Forest Management Act (NFMA), and the Antiquities Act of 1906. Appendix 3.1-B provides an analysis of the consistency of the six Build Alternatives with these laws, regulations, policies, plans, and orders.

3.3.2.2 State

California Clean Air Act

The California Clean Air Act requires that nonattainment areas achieve and maintain the health-based CAAQS by the earliest practicable date. The California Clean Air Act is administered by

[2] Although the SAFE rule has been repealed, the emissions that were calculated in the Draft EIR/EIS included the SAFE Vehicles Rule correction factors. As the correction factors increase the on-road emission rates, the results included in this document are considered conservative. Please note, as they were calculated after the rule was repealed, the revised emissions analysis for the trucking associated with hazardous materials did not include the SAFE Vehicles Rule correction factors. Although repealed, information about the SAFE rule is included here, because it was included in the analysis.

CARB at the State level and by local air quality management districts at the regional level. Air districts are required to develop plans and control programs for attaining the State standards.

CARB is responsible for ensuring implementation of the California Clean Air Act, meeting State requirements of the federal CAA, and establishing the CAAQS. CARB is also responsible for setting emissions standards for vehicles sold in California and for other emissions sources, such as consumer products and certain off-road equipment. CARB also establishes passenger vehicle fuel specifications.

In December 2022, CARB released the *2022 Scoping Plan for Achieving Carbon Neutrality,* which lays out a roadmap for carbon neutrality in California by 2045 (CARB 2022). The plan also aims to reduce emissions by 85 percent below 1990 levels by replacing dependency on petroleum with clean energy alternatives.

Diesel Particulate Matter Control Measures

In August 1998, CARB identified diesel particulate matter (DPM) from diesel-fueled engines as a toxic air contaminant (TAC). In September 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce DPM from new and existing diesel-fueled engines and vehicles. CARB has also adopted regulations to reduce emissions from both on-road and off-road heavy-duty diesel vehicles (e.g., equipment used in construction). These regulations, known as Airborne Toxic Control Measures, reduce the idling of school buses and other commercial vehicles, control DPM, and limit the emissions of ocean-going vessels in state waters. The regulations also include measures to control emissions of air toxics from stationary sources. The California Toxics Inventory, developed by interpolating from CARB estimates of total organic gases and PM, provides emissions estimates by stationary, area-wide, on-road mobile, off-road mobile, and natural sources (CARB 2017a).

Asbestos Control Measures

CARB has adopted two airborne toxic control measures for controlling naturally occurring asbestos in California: (1) the Asbestos Airborne Toxic Control Measure for Surfacing Applications (17 Cal. Code Regs. 93106) and (2) the Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (17 Cal. Code Regs. 93105). Additionally, the USEPA is responsible for enforcing regulations relating to asbestos associated with renovations and demolitions; however, the USEPA can delegate this authority to State and local agencies. CARB and local air districts have been delegated authority to enforce the National Emission Standards for Hazardous Air Pollutants regulations for asbestos under section 112 of the CAA.

Greenhouse Gas Regulations

California has taken proactive steps to address the issues associated with GHG emissions and climate change. Key legislation and regulations applicable to the six Build Alternatives are described below.

Assembly Bill 1493

In 2002, with the passage of AB 1493, California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the State level. AB 1493 requires CARB 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 model year 2009. Although litigation challenged these regulations and the USEPA initially denied California's related request for a waiver, the waiver request was granted (CARB 2015). In September 2020, the USEPA again formally revoked the California waiver, and NHTSA issued a final rule preempting California's authority, to which the State filed suit. This litigation is currently ongoing.

Executive Order S-3-05

In June 2005, Governor Arnold Schwarzenegger signed California Executive Order (EO) S-3-05. The goal of this EO is to reduce California's GHG emissions to year 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below the 1990 levels by 2050. EO S-3-05 also calls for the California Environmental Protection Agency to prepare biennial science reports on the impact 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 Climate Adaptation Strategy was released in December 2009, following extensive interagency coordination and stakeholder input. The latest of these reports is the *Climate Action Team Report to Governor Schwarzenegger and the California Legislature* (Cal-EPA 2010).

Assembly Bill 32

In 2006, the goal of EO S-03-05 was further reinforced with the passage of AB 32 (Chapter 488, Statutes of 2006), the Global Warming Solutions Act of 2006. AB 32 sets overall GHG emissions reduction goals and mandates that CARB create a plan, which includes market mechanisms, and implements rules to achieve real, quantifiable, cost-effective reductions of GHGs. EO S-20-06 further directs State agencies to begin implementing AB 32, including the recommendations made by the State's Climate Action Team.

Among AB 32's specific requirements are the following:

- Prepare 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 (Health and Safety Code Section 38561). The scoping plan, approved by CARB in 2008 and updated in 2014 and 2017, provides the outline for future actions to reduce GHG emissions in California via regulations, market mechanisms, and other measures. The 2008 scoping plan included the implementation of HSR as a GHG reduction measure for the transportation sector.
- Identify the statewide level of GHG emissions in 1990 to serve as the emissions limit to be achieved by 2020 (Health and Safety Code Section 38550). In December 2007, CARB approved the 2020 emissions limit of 427 MMT CO_2e of GHG. Subsequently, in 2014, the emissions limit was recalculated using the scientifically updated Intergovernmental Panel on Climate Change 2007 fourth assessment report. In May 2014, CARB approved 431 MMT CO_2e of GHG as the 2020 emissions limit with approval of the First Update to the Scoping Plan. In 2016, the State Senate passed Senate Bill (SB) 32, which codifies a 2030 GHG emissions reduction target of 40 percent below 1990 levels. Along with SB 32, the State Assembly passed companion legislation AB 197, which provides additional direction for developing the Scoping Plan. CARB completed the second update to the Scoping Plan to reflect the 2030 target set by EO B-30-15 and codified by SB 32 in 2017.
- Adopt a regulation requiring the mandatory reporting of GHG emissions (Health and Safety Code Section 38530). In December 2007, CARB adopted a regulation requiring the largest industrial sources to report and verify their GHG emissions. The reporting regulation serves as a solid foundation for determining GHG emissions and tracking future changes in emissions levels.

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 was projected to be reduced by at least 10 percent by 2020.

Sustainable Communities and Climate Protection Act of 2008 (SB 375)

The Sustainable Communities and Climate Protection Act of 2008 (Chapter 728, Statutes of 2008) became effective in January 2009. This law requires CARB 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 metropolitan planning organizations. The 18 metropolitan planning organizations have been tasked with creating the regional land use and transportation plans called sustainable community strategies (SCS). The metropolitan planning organizations are required to develop the SCS through integrated land use and transportation planning and to demonstrate an ability to attain the proposed reduction targets by 2020 and 2035. This would be accomplished through either the financially constrained SCS as part of its Regional Transportation Plan (RTP) 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 benefit from certain streamlining benefits under the California Environmental Quality Act (CEQA).

Pursuant to SB 375, CARB appointed a Regional Targets Advisory Committee in January 2009 to provide recommendations on factors to be considered and methodologies to be used in CARB's target-setting process. The committee was required to provide a report of its recommendations to CARB by September. 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. CARB adopted the final targets in September 2010. CARB must update the regional targets every 8 years (or 4 years if it so chooses), consistent with each metropolitan planning organization update of its RTP. The targets were last revised in March 2018.

Executive Order S-13-08

EO S-13-08 (November 2008) is intended to hasten California's response to the impacts of global climate change, particularly sea-level rise. Therefore, the EO directs state agencies to take specified actions to assess and plan for such impacts. The final 2009 *California Climate Adaptation Strategy* report was issued in December 2009 by the California Natural Resources Agency (CNRA 2009) and an update, *Safeguarding California: Reducing Climate Risk*, followed in July 2014 (CNRA 2014). To assess the state's vulnerability, the report summarizes key climate change impacts on the state for the following areas: agriculture, biodiversity and habitat, emergency management, energy, forestry, ocean (coastal ecosystems and resources), public health, transportation, and water.

Executive Order B-30-15 and SB 350

In April 2015, Governor Edmund Gerald Brown issued EO B-30-15, which expanded the goals of EO S-3-05 by calling for a new target of 40 percent below 1990 levels by 2030. This EO also directed all state agencies with jurisdiction over GHG-emitting sources to implement measures designed to achieve the new interim 2030 goal, as well as the pre-existing, long-term 2050 goal identified in EO S-3-05 of reducing emissions 80 percent under 1990 levels by 2050. The new emissions reduction target of 40 percent below 1990 levels by 2030 is intended to make it possible to reach the state's goal set by EO S-3-05.

In October 2015, Governor Brown signed into legislation SB 350, which requires retail sellers and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030, with interim goals of 40 percent by 2024 and 45 percent by 2027 (Office of the Governor 2015).

100 Percent Clean Energy Act (SB 100)

SB 100, the 100 Percent Clean Energy Act of 2018, establishes a state goal to acquire 50 percent of California electricity from eligible renewable energy resources and zero-carbon resources by December 31, 2026, and 100 percent by December 31, 2045. SB 100 also requires electric utilities and other service providers to generate 60 percent of their power from renewable sources by 2030 and requires that the remaining 40 percent be generated by zero-carbon sources of electricity by 2045. In addition, 100 percent of electricity procured will serve all State agencies (including the Authority) by 2045.

California Global Warming Solutions Act of 2016 (SB 32)

On September 8, 2016, Governor Brown signed into law SB 32, effectively extending California's landmark AB 32 to the year 2030. SB 32 effectively establishes a new GHG reduction goal for statewide emissions of 40 percent below 1990 levels by 2030. This goal is 40 percent more stringent than the current AB 32 mandated goal of 1990 levels by 2020. In terms of metric tons, this means that, to meet SB 32 targets, California would have needed to reduce emissions from

441.5 MMT CO_2e in 2014 to 431 MMT CO_2e by 2020 and would need to reduce emissions to 258.6 MMT CO_2e by 2030.

Executive Order B-55-18

EO B-55-18 acknowledges the environmental, community, and public health risks posed by future climate change. It further recognizes the climate stabilization goal adopted by 194 countries and the European Union under the Paris Agreement. While the United States was not party to the agreement, California is committed to meeting the Paris Agreement goals and going beyond them wherever possible. Based on the worldwide scientific agreement that carbon neutrality must be achieved by midcentury, EO B-55-18 establishes a new State goal to achieve carbon neutrality as soon as possible—and no later than 2045—and to achieve and maintain net negative emissions thereafter. The EO charges the CARB with developing a framework for implementing and tracking progress toward these goals. This EO extends EO S-3-05, but it is only binding on state agencies.

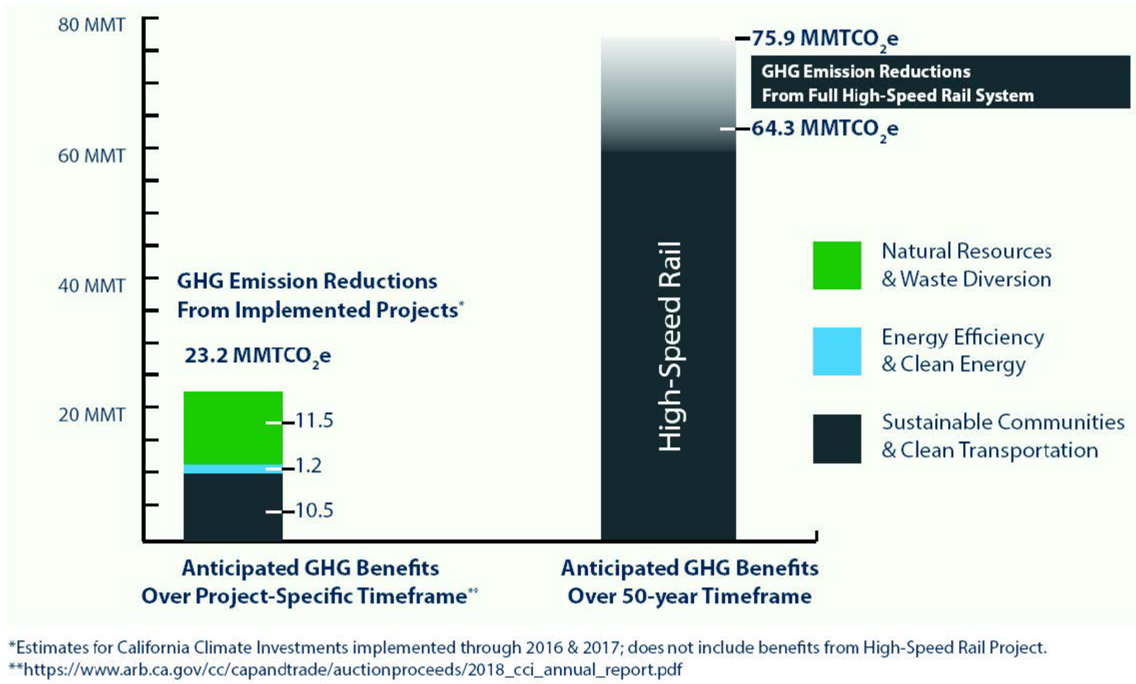
2017 Climate Change Scoping Plan

On December 14, 2017, CARB adopted the 2017 Climate Change Scoping Plan, the strategy for achieving California's 2030 GHG emissions target, per the State Legislature's direction in SB 32. The 2030 midterm target helps to frame the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure needed to continue driving down emissions. The plan builds on the State's existing policy (namely, the previous two scoping plans developed pursuant to AB 32), ties together a number of sector-specific strategies, and solidifies targets within sectors. The plan is intended to drive the state toward more electric vehicles, cleaner electricity to fuel those cars, denser, more walkable communities with more efficient buildings, and less-polluting agriculture. The scoping plan also reinforced legislative direction by confirming the role of the Cap-and-Trade Program to achieve more than one-third of the State's requisite reductions by 2030.[3]

California Climate Investments Program

California Climate Investments is a statewide initiative that puts billions of Cap-and-Trade dollars to work reducing GHG emissions, strengthening the economy, and improving public health and the environment. The Cap-and-Trade Program also creates a financial incentive for industries to invest in clean technologies and to develop innovative ways to reduce pollution. California Climate Investments projects include affordable housing, sustainable agriculture environmental restoration, waste diversion and recycling, renewable energy, public transportation, and zero-emission vehicles. According to the California Climate Investments program, the California HSR System will generate an aggregate reduction in statewide GHG emissions over a 50-year period. Figure 3.3-1 illustrates the estimated aggregate reductions in GHG emissions that would result from the California HSR System over a 50-year timeframe.

[3] The Cap-and-Trade Program sets a statewide limit on sources responsible for 85 percent of California's GHG emissions and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. Each year, fewer allowances are created and the annual cap on GHG emissions declines (CARB 2015c).



Source: Authority 2018

Figure 3.3-1 Aggregate GHG Emissions Reductions That Would Result from the California High-Speed Rail System

Air Quality Plans

Federal clean air laws require areas with unhealthy levels of O_3, inhalable particulate matter, CO, NO_2, and SO_2 to develop SIPs—comprehensive plans that describe how an area will attain NAAQS. The 1990 amendments to the federal CAA set deadlines for attainment based on the severity of an area's air pollution problem.

SIPs are not single documents. They are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, or permitting), district rules, state regulations, and federal controls. Many of California's SIPs rely on the same core set of control strategies, including emission standards for cars and heavy trucks, fuel regulations, and limits on emissions from consumer products. State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies, such as the Bureau of Automotive Repair and the Department of Pesticide Regulation, prepare elements of the SIP and submit them to CARB for review and approval. CARB forwards SIP revisions to the USEPA for approval and publication in the Federal Register. 40 C.F.R. Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items that are included in the California SIP. At any one time, several California submittals are pending USEPA approval.

3.3.2.3 Regional and Local

All six of the Build Alternatives—Refined SR14, SR14A, E1, E1A, E2, and E2A—would pass through several jurisdictions in Los Angeles County. These include the cities of Palmdale, Santa Clarita, Los Angeles, and Burbank, extensive unincorporated areas of the county, including the communities of Acton and Agua Dulce, and the ANF including SGMNM. The Build Alternative alignments would traverse two air quality management districts: Antelope Valley Air Quality Management District (AVAQMD) (responsible for a portion of the Mojave Desert Air Basin [MDAB]) and SCAQMD (responsible for South Coast Air Basin [SCAB]). In addition, haul trucks would dispose of spoil material within the San Joaquin Valley Air Pollution Control District (SJVAPCD) (responsible for the San Joaquin Valley Air Basin [SJVAB]). As shown on Figure 3.3-2, the Build Alternative alignments would be in the AVAQMD boundaries from approximately Palmdale to Acton and in the SCAQMD boundaries from Acton through Burbank. Regulations associated with each of these jurisdictions are discussed below.

Although the Palmdale to Burbank Project Section is not in the jurisdiction of the Mojave Desert Air Quality Management District, the Antelope Valley portion of Los Angeles County is in the Western Mojave Desert Ozone Nonattainment Area, and the Mojave Desert Air Quality Management District is responsible for preparation of the Clean Air Plan for this area. Therefore, regulations pertaining to the Western Mojave Desert and the Mojave Desert Air Quality Management District are also discussed below.

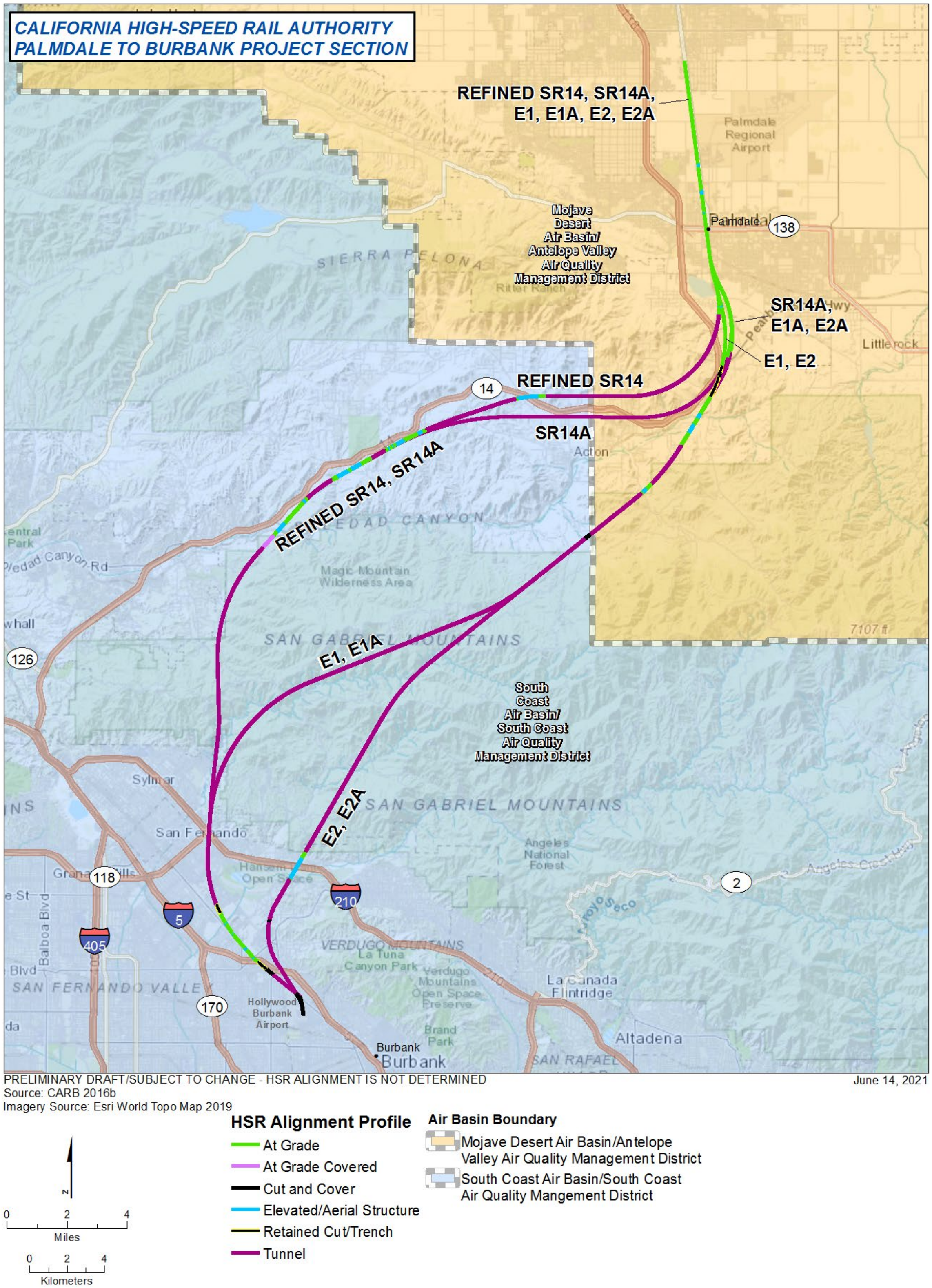


Figure 3.3-2 Air Quality Management District Boundaries

Regional Air Quality Management District Regulations

Discussions of recent air quality management plan (AQMP) documents prepared by the SCAQMD and AVAQMD are provided below.

South Coast Air Quality Management District

Through the NAAQS and CAAQS attainment planning process, the SCAQMD develops the SCAQMD Rules and Regulations to regulate sources of air pollution within its jurisdiction. The SCAQMD specific air quality-related planning documents, rules, and regulations most pertinent to construction and operation of the project are listed below. In addition, to the extent that maintenance facilities or traction power substation equipment would require SCAQMD permits, the project would be subject to additional SCAQMD rules that apply to stationary sources, such as Regulation XIII (New Source Review), Rule 1401 (New Source Review of Toxic Air Contaminants), or Rule 431.2 (Sulfur Content of Liquid Fuels).

SCAQMD Rule 402—Nuisance. This rule prohibits discharge of air pollutants or other material that:

- Cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to 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 business 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 beyond the emission source property line. During construction, best available control measures identified in the rule are required to minimize fugitive dust emissions from earth-moving and grading activities. These measures include site pre-watering and re-watering, as necessary, to maintain sufficient soil moisture content. Additional requirements apply to construction projects on properties with 50 or more acres of disturbed surface area, or for any earth-moving operation with a daily volume of 5,000 cubic yards or more occurring three times during the most recent 365-day period. These requirements include submitting a dust control plan, maintaining dust control records, and designating an SCAQMD-certified dust control supervisor.

SCAQMD Rule 1108—Cutback Asphalt. This rule sets forth VOCs content limits for cutback asphalt.

SCAQMD Rule 1113—Architectural Coatings. This rule limits the VOC content of architectural coatings used in the SCAQMD. Any person who supplies, sells, offers for sale, or manufactures any architectural coating for use in the SCAQMD must comply with the current VOC standards.

SCAQMD Rule 1403—Asbestos Emissions from Demolition/Renovation Activities. This rule limits emissions of asbestos, a TAC, from structural demolition/renovation activities. The rule requires people to notify the SCAQMD of proposed demolition/renovation activities and to survey these structures for the presence of ACM. The rule also includes notification requirements for any intent to disturb ACM, emission control measures, and ACM removal, handling, and disposal techniques.

SCAQMD Regulation XIII—New Source Review. This regulation sets forth preconstruction review requirements for new, modified, or relocated facilities to ensure that the operation of such facilities does not interfere with progress in attainment of the NAAQS and that future economic growth in the SCAQMD is not unnecessarily restricted. The specific air quality goal of this regulation is to achieve no net increases from new or modified permitted sources of nonattainment air contaminants or their precursors.

In addition to nonattainment air contaminants, this regulation also limits increases in emissions of ammonia and O_3-depleting compounds from new, modified, or relocated facilities by requiring the use of best available control technology.

SCAQMD Regulation XIV—Toxics and Other Criteria Pollutants. This regulation specifies limits for maximum individual cancer risk, cancer burden, and noncancer acute and chronic hazard index from new permit units, relocations, or modifications to existing permit units that emit TACs. The rule establishes allowable risks for permit units requiring new permits.

South Coast Air Quality Management District 2016 Air Quality Management Plan

In March 2017, the SCAQMD adopted the *Final 2016 Air Quality Management Plan* (SCAQMD 2017). The primary objective of the 2016 SCAQMD AQMP is to attain air quality in the SCAB that is healthy and consistent with federal O_3 and $PM_{2.5}$ air quality standards.

Recognizing that mobile sources are the predominant sources of emissions contributing to air quality issues in the south coast region, the 2016 SCAQMD AQMP stresses the need for coordination with other agencies, namely CARB and USEPA, as these agencies are chiefly responsible for mobile sources emissions. Therefore, the 2016 SCAQMD AQMP accepts that focusing on emissions from mobile sources represents the best strategy for reducing emissions and the corresponding health impacts on residents in the region.

Key elements of the 2016 SCAQMD AQMP include the following:

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

The SCAQMD Governing Board adopted its 2016 AQMP in March 2017. There have been subsequent updates to the 2016 AQMP in 2018, 2019, 2020, and 2021 for 8-hour ozone, PM_{10}, and $PM_{2.5}$. On October 1, 2019, the USEPA ruled to approve all parts and updates to the 2016 AQMP, establishing this AQMP as the currently conforming plan for the SCAQMD. The most significant air quality challenge in the SCAB is to reduce NO_X emissions sufficiently to meet upcoming O_3 standard deadlines found in the 2016 SCAQMD AQMP. Mobile sources currently contribute about 88 percent of the region’s total NO_X emissions and represent the primary challenge in meeting air quality standards, because the SCAQMD has limited authority to regulate mobile sources. The SCAQMD is working closely with CARB and USEPA, which have primary authority over mobile sources, in ensuring that mobile sources are required to implement their fair share of pollution reduction strategies.

Because NO_X emissions also lead to the formation of $PM_{2.5}$, the NO_X reductions needed to meet the O_3 standards would lead to significant improvements in $PM_{2.5}$ levels. The 2016 SCAQMD AQMP includes $PM_{2.5}$ control strategies to ensure that NAAQS will also be met.

Antelope Valley Air Quality Management District

Through the NAAQS and CAAQS attainment planning process, the AVAQMD develops the AVAQMD Rules and Regulations to regulate sources of air pollution within its jurisdiction. The AVAQMD rules most pertinent to construction and operation of the Palmdale to Burbank Project Section are listed below. In addition, to the extent that maintenance facilities or traction power substation equipment would require AVAQMD permits, the project would be subject to additional

AVAQMD rules that apply to stationary sources, such as Regulation IX (Standards of Performance for New Stationary Sources), Regulation XIII (New Source Review), or Regulation XIV (Toxics and Other Non-Criteria Pollutants).

AVAQMD Rule 402—Nuisance. This rule forbids the discharge of certain quantities of air pollutants or other materials that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, that endanger the comfort, repose, health or safety of any such persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property.

AVAQMD Rule 403—Fugitive Dust. This rule specifies numerous fugitive dust restrictions to operators of construction/demolition for all projects greater than 0.5 acre in size (e.g., periodic watering, covering loaded haul vehicles, stabilize graded surfaces, cleanup project dust/debris on paved surfaces, reduce nonessential earth moving), and requires a dust control plan for any non-residential projects disturbing more than 5 acres per day.

AVAQMD Rule 404—Particulate Matter Concentration. This rule dictates that a person shall not discharge particulate matter into the atmosphere from any source, except for liquid sulfur compounds, in excess of the concentrations defined in Table 404(a) of the AVAQMD Rules and Regulations.

AVAQMD Rule 1108—Cutback Asphalt. This rule sets forth VOC content limits for cutback asphalt.

AVAQMD Rule 1113—Architectural Coatings. This rule limits the VOC content of architectural coatings used in the AVAQMD. Any person who supplies, sells, offers for sale, or manufactures any architectural coating for use in the AVAQMD must comply with the current VOC standards.

AVAQMD Rule 1300—New Source Review. This rule sets forth the requirements for the preconstruction review of all new or modified facilities, to ensure that the construction or modification of facilities subject to this regulation does not interfere with the attainment and maintenance of NAAQS and CAAQS.

Antelope Valley Air Quality Management District 2008 Air Quality Management Plan

In 2008, the AVAQMD adopted its *Federal 8-Hour Ozone Attainment Plan* (AVAQMD 2008), which updated the previous O_3 attainment plan adopted in 2004. The 2008 plan indicates that the AVAQMD will be in attainment of the 8-hour NAAQS for O_3 by 2021. The 2008 plan does not propose additional control measures to reduce O_3 levels, although the AVAQMD has committed to the adoption of all applicable federal reasonably-available control technology for the following categories:

- Internal combustion engines
- Fugitive dust
- Agricultural operations

Antelope Valley Air Quality Management District Federal 75 parts per billion (ppb) Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)

In March 2017, the AVAQMD adopted the *AVAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)*—which describes how the Western Mojave Desert Ozone Nonattainment Area would achieve the 75-ppb 8-hour O_3 NAAQS and serves as an update to all previously submitted federal O_3 plans (AVAQMD 2017). The 2017 plan updates the AVAQMD's 2008 O_3 attainment plan.

The plan does not propose to adopt control measures for direct O_3 precursor reduction purposes, but it does commit to adopting all applicable federal reasonably available control technology rules. The AVAQMD has proposed four pending reasonably available control technology rules that would result in O_3 precursor reductions:

- Rule 462—Organic Liquid Loading
- Rule 1110.2—Emissions from Stationary, Non-Road & Portable Internal Combustion Engine

- Rule 1151.1—Motor Vehicle and Mobile Equipment Coating Operations
- Rule 1171—Solvent Cleaning Operation

San Joaquin Valley Air Pollution Control District

The SJVAPCD is responsible for implementing air quality regulations, including developing plans and control measures for stationary sources of air pollution to meet the NAAQS and CAAQS; implementing permit programs for the construction, modification, and operation of sources of air pollution; and enforcing air pollution statutes and regulations governing stationary sources. The following regulations and guidance that may be relevant to the project, as administered by the SJVAPCD with CARB oversight, were identified and considered for analysis:

- Rule 2303 Mobile Source Emission Reduction Credits
- Rule 4201 and Rule 4202 Particulate Matter Concentration and Emission Rates
- Rule 9510 Indirect Source Review
- CEQA Guidelines

Mojave Desert Air Quality Management District

As stated above, although the Palmdale to Burbank Project Section is not in the jurisdiction of the Mojave Desert Air Quality Management District, the Antelope Valley portion of Los Angeles County is in the Western Mojave Desert Ozone Nonattainment Area, and the Mojave Desert Air Quality Management District is responsible for preparation of the Clean Air Plan for this area.

Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)

In February 2017, the Mojave Desert Air Quality Management District adopted the *Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)* (MDAQMD 2017)—which describes how the Western Mojave Desert Ozone Nonattainment Area would achieve the 75-ppb 8-hour O_3 NAAQS and serves as an update to all previously submitted federal O_3 plans.

The O_3 attainment plan does not propose to adopt control measures for direct O_3 precursor reductions, but it does commit to adopting the following applicable federal Reasonably Available Control Technology rules that would result in indirect O_3 precursor reductions:

- Rule 461—Gasoline Transfer and Dispensing
- Rule 462—Organic Liquid Loading
- Rule 463—Storage of Organic Liquids
- Rule 1104—Organic Solvent Degreasing
- Rule 1106—Marine Coating Operations
- Rule 1115—Metal Parts and Product Coating Operations
- Rule 1157—Boilers and Process Heaters
- Rule 1158—Electric Utility Operations
- Rule 1160—Internal Combustion Engines
- Rule 1161—Portland Cement Kilns
- Rule 1162—Polyester Resin Operations

Southern California Association of Governments' Regional Transportation Plan/Sustainable Communities Strategy

The Southern California Association of Governments (SCAG) is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties. It addresses regional issues relating to transportation, economy, community development, and the environment. SCAG is the federally designated metropolitan planning organization for the majority of the Southern California region and is the largest metropolitan planning organization in the nation.

With respect to air quality planning, SCAG has prepared the Regional Comprehensive Plan, which includes Growth Management and Regional Mobility chapters that form the basis for the land use and transportation components of the SCAQMD's *Final 2016 Air Quality Management*

Plan (SCAQMD 2017). These chapters are used in the preparation of air quality forecasts and the consistency analysis that is included in the 2016 SCAQMD AQMP.

With respect to air quality planning, SCAG prepares the RTP for the SCAG region every 3 years. SCAG's 2020–2045 RTP/SCS, known as the Connect SoCal plan, was adopted in September 2020. The plan demonstrates how the region will reduce emissions from transportation sources to comply with SB 375 and meet the NAAQS. One of the key strategies of the plan is to integrate land use, housing, and transportation planning to ensure sustainable regional growth. Goals and policies included in the Connect SoCal plan to reduce GHG emissions consist of adding density near transit stations, supporting mixed-use development, and encouraging active transportation (i.e., non-motorized transportation such as bicycling) (SCAG 2020).

Local Policies Considered

Table 3.3-2 lists county and city general plans and other plans relevant to air quality considered in this analysis.

Table 3.3-2 Regional and Local Policies Considered

Jurisdiction	General Plans and Other Plans
Los Angeles County	
Los Angeles County 2035 General Plan (2015)	The Air Quality Element of the *Los Angeles County 2035 General Plan* summarizes air quality issues and outlines the goals and policies intended to improve air quality and reduce GHGs.
City of Palmdale	
Palmdale 2045 General Plan (2022)	The *City of Palmdale General Plan* establishes specific emissions reductions targets, with an overall goal of reducing citywide emissions to 1990 levels by 2035.
City of Palmdale Energy Action Plan (2011)	The *City of Palmdale Energy Action Plan* identifies goals, measures, and actions designed to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency in the transportation, building, and other appropriate city sectors.
City of Los Angeles	
City of Los Angeles General Plan – Air Quality Element (1992)	The Air Quality Element of the *City of Los Angeles General Plan* establishes goals, objectives, and policies intended to guide the implementation of Los Angeles' air quality improvement programs and strategies.
Sustainable City Plan (2015)	The *Sustainable City Plan* establishes goals and policies related to GHG reduction as well as the growth of the clean energy industry in Los Angeles.
Green LA: An Action Plan to Lead the Nation in Fighting Global Warming (2007)	The *Green LA* climate action plan establishes a framework for confronting global climate change and includes community engagement strategies, sustainability-related goals and policies, and strategies to grow the green economy in Los Angeles.
City of Burbank	
Burbank 2035 General Plan (2013)	The Air Quality and Climate Change Element of the *Burbank 2035 General Plan* establishes goals and policies related to the improvement of air quality and the citywide reduction of criteria pollutants and GHG emissions.

Sources: City of Burbank 2013; City of Los Angeles 1992, 2007, 2015; City of Palmdale 2011, 2022; Los Angeles County 2015
GHG = greenhouse gas

3.3.3 Consistency with Plans and Laws

As indicated in Section 3.1.4.3, Consistency with Plans and Laws, the CEQA and the CEQ regulations require a discussion of inconsistencies or conflicts between a proposed undertaking and federal, state, regional, or local plans and laws. As such, this Final EIR/EIS evaluates inconsistencies between the six Build Alternatives and federal, state, regional, and local plans, and laws to provide planning context.

The Authority, as the lead state and federal agency proposing to construct and operate the California HSR System, is required to comply with all federal and state laws and regulations and to secure all applicable federal and state permits prior to initiating construction on the selected Build Alternative. Therefore, there would be no inconsistencies between the six Build Alternatives and these federal and state laws and regulations.

The Authority is a state agency and therefore is not required to comply with local land use and zoning regulations; however, it has endeavored to design and construct the California HSR System so that it is consistent with land use and zoning regulations. For example, the proposed Build Alternatives would incorporate IAMFs that require the contractor to prepare a plan to demonstrate how construction air quality and global climate change impacts will be maintained below applicable standards.

A total of eight plans including 18 policies were reviewed. Of the 18 policies, 17 polices are consistent with federal, state, and local plans while one policy is partially consistent, as shown in Appendix 2-H. The project is only partially consistent with Sustainability City Plan (City of Los Angeles 2015) because while statewide and regional criteria pollutant emissions associated with on-road vehicles would be reduced, there would be temporary increases in emissions related to the construction of the Palmdale to Burbank Project Section that may contribute toward exceedances in local pollutant thresholds.

Despite the inconsistencies, the project is still consistent overall. Although it may not be possible to fully meet the goal stated in the Sustainability City Plan which is to have zero days when air pollution reaches unhealthy levels by 2025 (Appendix 2-H), AQ-MM#1, AQ-MM#2, and AQ-MM#3 would generally minimize air quality and climate change impacts and would ultimately meet the overall objectives of the local policies.

3.3.4 Methods for Evaluating Impacts

The evaluation of impacts on air quality is a requirement of NEPA and CEQA. The following sections summarize the resource study areas (RSAs) and the methods used to analyze air quality and global climate change resources. Improvements in the Palmdale Subsection and Maintenance Facility area are included in this section to provide a conservative analysis; however, the air quality effects of these facilities are evaluated in the Bakersfield to Palmdale Project Section EIR/EIS.

3.3.4.1 Definition of Resource Study Area

As defined in Section 3.1, Introduction, RSAs are the geographic boundaries in which the environmental investigations specific to each resource topic were conducted. The RSA is the area in which all environmental investigations specific to air quality and global climate change are conducted to determine the resource characteristics and impacts of the Palmdale to Burbank Project Section. The boundaries of the RSA for air quality and global climate change extend beyond the Build Alternative footprint.

There are three RSAs for air quality and global climate change to evaluate specific impacts appropriately: statewide, regional, and local. All three RSAs include the Palmdale Station in the operations analysis, but not the construction analysis.

Statewide

The global climate change analysis evaluates the Palmdale to Burbank Project Section's impact on GHGs on a statewide basis. GHGs are estimated on a statewide basis because their impacts are not localized or regional; this is due to their rapid dispersion into the global atmosphere. Furthermore, the estimation of GHGs on a statewide basis provides a comprehensive study area for the analysis of the HSR's impact on statewide vehicle miles traveled (VMT), aircraft travel, and energy use consistent with state planning. Accordingly, the RSA for global climate change impacts is the entire state.

Regional

The regional air quality analysis evaluates the Palmdale to Burbank Project Section's contribution to pollutant concentrations in the air basins traversed by the Build Alternatives, and the Palmdale to Burbank Project Section's effect on the air basins' ability to reach attainment status for applicable pollutant thresholds. The Build Alternatives traverse the MDAB and SCAB, which are managed by the AVAQMD and SCAQMD, respectively. In addition, haul truck activity will occur within the SJVAB. Accordingly, the regional RSA comprises these three air basins (MDAB, SCAB, and SJVAB).

Local

The local air quality impact analysis focuses on the effects of pollutant emissions from both the construction and operation of the six Build Alternatives on nearby sensitive receptors. Sensitive receptors include residential dwellings, schools, churches, hospitals, and parks. The local RSA is defined as the Build Alternative footprint, plus 1,000 feet around the Palmdale and Burbank Stations, as well as roadway intersections projected to operate at unacceptable levels of service (i.e., generate localized pockets of traffic congestion and vehicle emissions) under future project conditions. The local RSA screening distances were established based on USEPA and CARB modeling guidance and project-specific factors of the HSR elements (e.g., location of the Maintenance Facility and Palmdale and Burbank Stations).

3.3.4.2 Impact Avoidance and Minimization Features

IAMFs are project features that are considered to be part of the project and are included as applicable in each of the Build Alternatives for purposes of the environmental impact analysis. The full text of the IAMFs that are applicable to the project is provided in Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features.

The following is a list of the IAMFs that were incorporated into the air quality and climate change analysis:

- **AQ-IAMF#1**: Fugitive Dust Emissions—This IAMF describes the Authority's commitment to requiring the contractor to prepare a fugitive dust control plan for each distinct construction segment during construction. Before finalizing the plan, the Contractor shall provide a draft of the plan to Los Angeles Unified School District, Acton-Agua Dulce Unified School District, and any other potentially affected public school districts on their request, for their review and comment.
- **AQ-IAMF#2**: Selection of Coatings—This IAMF describes the Authority's commitment to requiring the contractor to use low-VOC paint that contains less than 10 percent VOC contents (VOC, 10%) and super-compliant or clean air paint that has a lower VOC content than that required by SCAQMD Rule 1113 and AVAQMD Rule 1113, when available, during construction.
- **AQ-IAMF#3**: Renewable Diesel—This IAMF describes the Authority's commitment to minimizing and controlling exhaust emissions from all heavy-duty diesel-fueled construction equipment and on-road diesel trucks by requiring the contractor to use renewable diesel fuel during construction.
- **AQ-IAMF#4**: Reduce Criteria Exhaust Emissions from Construction Equipment—This IAMF describes the Authority's commitment to reducing criteria exhaust emissions from construction equipment. Prior to issuance of construction contracts, the Authority will require all heavy-duty equipment used during the construction phase to meet Tier 4 engine requirements and small diesel generators shall be avoided whenever feasible.
- **AQ-IAMF#5**: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment—This IAMF describes the Authority's commitment to reducing criteria exhaust emissions from on-road construction equipment. The Authority will incorporate material-hauling truck fleet mix requirements into the contract specifications, including that all on-road trucks used for hauling during construction will be model year 2020 or newer.

- **AQ-IAMF#6**: Reduce the Potential Impact of Concrete Batch Plants—This IAMF describes the Authority's commitment to reducing the potential impact of concrete batch plants. Prior to construction of any concrete batch plant, the contractor will provide the Authority with a technical memorandum documenting consistency with the Authority's concrete batch plant siting criteria and utilization of typical control measures.
- **HMW-IAMF#5**: Demolition Plans—This IAMF describes the Authority's commitment to requiring the contractor to prepare demolition plans for the safe dismantling and removal of building components and debris prior to construction that involves demolition.

This environmental impact analysis considers these IAMFs as part of the project design. Within Section 3.3.6, Environmental Consequences, each impact narrative describes how these project features are applicable and, where appropriate, effective at avoiding or minimizing potential impacts.

3.3.4.3 Methods for NEPA and CEQA Impact Analysis

Overview of Impact Analysis

This section describes the sources and methods the Authority used to analyze project impacts on air quality and global climate change. These methods apply to both NEPA and CEQA analyses unless otherwise indicated. Refer to Section 3.1.4.4, Methods for Evaluating Impacts, for a description of the general framework for evaluating impacts under NEPA and CEQA.

Table 3.3-3 lists the key topics and issues for the air quality and global climate change analysis.

Table 3.3-3 Key Topics and Issues for Air Quality and Global Climate Change Impacts

Key Topics	Issue to Evaluate
Construction Impacts	
Construction activities associated with the Palmdale and Burbank Stations and parking facilities with impacts on air quality and global climate change	▪ On-site combustion emissions ▪ On-site fugitive emissions ▪ Off-site hauling emissions ▪ Concrete batch plants ▪ Fugitive dust from on-site and off-site activities
Local construction	▪ Localized construction impacts at intersections and stations ▪ Violation of any air quality standard to contribute substantially to an existing or projected air quality violation ▪ Exposure of sensitive receptors to substantial pollutant concentrations
Regional construction	▪ Regional construction emissions of Build Alternatives to exceed regional emissions significance thresholds ▪ Conflict with or obstruct implementation of the applicable air quality plan ▪ Result in a cumulatively considerable net increase of any criteria pollutant for which the region is nonattainment under an applicable NAAQS or CAAQS (including releasing emissions that exceed quantitative thresholds for O_3 precursors)
Air toxics	▪ Construction of the Build Alternatives to result in generation of substantial air toxic emissions ▪ Exposure of sensitive receptors to substantial pollutant concentrations during construction

Key Topics	Issue to Evaluate
Operations Impacts	
Operations impacts resulting from ongoing activities of the California HSR System, including transportation activities associated with station and parking operations serving the project	▪ Localized criteria pollutants ▪ Localized MSATs ▪ Regional criteria pollutants ▪ Regional GHG emissions
Local operations	▪ Localized operations impacts at intersections and stations ▪ Violation of any air quality standard or substantial contribution to an existing or projected air quality violation ▪ Exposure of sensitive receptors to substantial pollutant concentrations
Regional operations	▪ Regional operation emissions of Build Alternatives to exceed allowable regional emission limits, including diesel-fueled buses that feed into the Palmdale and Burbank Stations ▪ Conflict with or obstruct implementation of the applicable air quality plan ▪ Result in a cumulatively considerable net increase of any criteria pollutant for which the region is in nonattainment under an applicable NAAQS or CAAQS (including releasing emissions that exceed quantitative thresholds for O_3 precursors)
Project-level conformity	▪ Localized CO, PM_{10}, or $PM_{2.5}$ hotspots from operation at intersections and stations ▪ Hotspots based on transportation conformity regulation
Greenhouse gas emissions	▪ Palmdale to Burbank Project Section to increase or decrease GHG emissions ▪ Conflict with State requirements for reducing GHG emissions in California ▪ Conflict with statewide GHG reduction targets established by CARB ▪ Generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment ▪ Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs
Air toxics	▪ Operations of the Build Alternatives to result in generation of substantial air toxic emissions ▪ Exposure of sensitive receptors to substantial pollutant concentrations during operation

CAAQS = California Ambient Air Quality Standards; CARB = California Air Resources Board; CO = carbon monoxide; GHG = greenhouse gas; HSR = high-speed rail; MSAT = mobile source air toxics; NAAQS = National Ambient Air Quality Standards; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter)

NEPA and CEQA require consideration of a No Project Alternative, which represents the conditions that would occur in the forecast year (in this case, 2040) if the proposed action is not implemented. In addition, in accordance with CEQA requirements, an EIR must include a description of the existing physical environmental conditions near the project. Those conditions, in turn, “will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant” (CEQA Guidelines, Section 15125[a]).

Pursuant to these requirements, temporary transportation-related effects, such as those from temporary road closures during construction, are evaluated against existing 2015 conditions. Construction of the California HSR System would reconfigure the existing roadway network, permanently redirecting existing traffic and causing traffic effects at intersections and road segments. The existing conditions baseline is appropriate for evaluating these construction-period effects, as well as mitigation based on the existing conditions baseline. For more information, refer to the detailed discussion under the subsection "Methodology for Construction Phase Impact Analysis" below.

The Build Alternatives' operations air quality and global climate change effects are evaluated against existing conditions (2015) and background (i.e., No Project) conditions as they are expected to be in the horizon year of 2040, with consideration of effects in the opening year of HSR operations. This approach complies with CEQA (*Neighbors for Smart Rail v. Exposition Metro Line Construction Authority, et al.* 2013). Details are presented in Appendix E of the Air Quality Technical Report (Authority 2020a).

Definition of Pollutants for Analysis

Three general classes of air pollutants are of concern for the Palmdale to Burbank Project Section: criteria pollutants, TACs, and GHGs. Criteria pollutants are those for which the USEPA has set NAAQS, and the State has set CAAQS that are chemical precursors to compounds for which ambient standards have been set. TACs of concern for the Palmdale to Burbank Project Section are nine MSATs identified by the USEPA as having significant contributions from mobile sources: acetaldehyde, acrolein, benzene, 1,3-butadiene, DPM and diesel exhaust organic gases, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. GHGs are gaseous compounds that limit the transmission of radiated heat from the earth's surface to the atmosphere. GHG includes CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases, including nitrogen trifluoride and hydrofluorinated ethers.

> *Definition of Ozone*
>
> Ozone is a colorless toxic gas found in the earth's upper and lower atmospheric levels. In the upper atmosphere, ozone is naturally occurring and helps to prevent the sun's harmful ultraviolet rays from reaching the earth.

Criteria Pollutants

Both the NAAQS and CAAQS are established to protect public health and welfare from high levels of the following criteria pollutants: O_3, PM_{10} and $PM_{2.5}$, CO, NO_X, lead, SO_2, TACs, asbestos, and GHGs. A description of these criteria pollutants is provided in the sections below.

Ozone

In the lower atmosphere, O_3 is largely human-generated. Although O_3 is not directly emitted, it forms in the lower atmosphere through a chemical reaction between certain hydrocarbons that are emitted from industrial sources and motor vehicles. Hydrocarbons are compounds composed primarily of hydrogen and carbon atoms. CARB inventories two classes of hydrocarbons: total organic gases and reactive organic gases (ROG). ROGs have relatively high photochemical reactivity. The principal nonreactive hydrocarbon is methane, which is also a GHG. The major source of ROG is the incomplete combustion of fossil fuels in internal combustion engines. Other sources of ROGs include the evaporative emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products. Adverse impacts on human health are not caused directly by ROGs but rather by reactions of ROGs that form secondary pollutants. ROGs are also transformed into organic aerosols in the atmosphere, contributing to higher levels of $PM_{2.5}$ and lower visibility. CARB uses the term ROG for air quality analysis, and ROG has the same definition as the federal term VOCs. For the air quality and global climate change analysis, ROG is assumed to be equivalent to VOCs.

Substantial O_3 formations generally require a stable atmosphere with strong sunlight; thus, high levels of O_3 are generally a concern in the summer. O_3 is the main ingredient of smog. O_3 enters the bloodstream through the respiratory system and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. O_3 also damages vegetation by inhibiting its growth. The air quality and global climate change analysis examines the impacts of changes in

VOC and NO_X emissions for the Palmdale to Burbank Project Section on a regional and statewide level.

Definition of PM_{10} and $PM_{2.5}$

PM_{10} (respirable particulate matter) refers to particulates that are 10 microns or less in diameter, or about 1/7 the thickness of a human hair. Particulate matter pollution consists of small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles undergo chemical reactions in the atmosphere.

$PM_{2.5}$ (fine particulate matter) is a subset of PM_{10} and refers to particulates that are 2.5 microns (or less) in diameter, roughly 1/28 the diameter of a human hair.

Particulate Matter

Particulate pollution is composed of solid particles or liquid droplets small enough to remain suspended in the air. In general, particulate pollution can include dust, soot, and smoke. These can be irritating but usually are not toxic. However, particulate pollution can include bits of solid or liquid substances that are highly toxic. Of particular concern are PM_{10} and $PM_{2.5}$.

Major sources of PM_{10} include motor vehicles; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires, brush, and waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. Suspended particulates produce haze and reduce visibility. Data collected through numerous nationwide studies indicate that most of the PM_{10} comes from fugitive dust, wind erosion, and agricultural and forestry sources.

A small portion of particulate matter is the product of fuel combustion processes. In the case of $PM_{2.5}$, the combustion of fossil fuels accounts for a significant portion of this pollutant. The main health impact of airborne particulate matter is on the respiratory system. $PM_{2.5}$ results from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can form in the atmosphere from gases such as SO_2, NO_X, and VOCs. Like PM_{10}, $PM_{2.5}$ can penetrate the human respiratory system's natural defenses and damage the respiratory tract when inhaled. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ can penetrate deeper into the lungs and damage lung tissues. The effects of PM_{10} and $PM_{2.5}$ emissions for the Palmdale to Burbank Project Section are examined on a localized (microscale) basis, on a regional basis, and on a statewide basis.

Carbon Monoxide

Definition of Carbon Monoxide

Carbon monoxide is a colorless gas that interferes with the transfer of oxygen to the brain. Carbon monoxide emits almost exclusively from the incomplete combustion of fossil fuels. On-road motor-vehicle exhaust is the primary source of carbon monoxide.

In cities, 85–95 percent of all CO emissions may come from motor vehicle exhaust. Prolonged exposure to high levels of CO can cause headaches, drowsiness, loss of equilibrium, or heart disease. CO levels are generally highest in the colder months when inversion conditions (when warmer air traps colder air near the ground) are more frequent.

CO concentrations can vary greatly over relatively short distances. Relatively high concentrations of CO are typically found near congested intersections, along heavily used roadways carrying slow-moving traffic, and in areas where atmospheric dispersion is inhibited by urban “street canyon” conditions. Consequently, CO concentrations must be predicted on a microscale basis.

According to the USEPA, very high levels of CO that could lead to negative health effects are not likely to occur outdoors. However, when local outdoor CO levels are elevated, they can be of particular concern to people with some types of heart disease, especially while exercising or under increased stress. High levels of CO may result in reduced oxygen to the heart and chest pain.

Oxides of Nitrogen

Nitrogen monoxide (also known as nitric oxide) and NO_2 are collectively referred to as NO_X and are major contributors to O_3. NO_2 also contributes to the formation of PM_{10}. At atmospheric concentrations, NO_2 is only potentially irritating. In high concentrations, the result is a brownishred cast to the atmosphere and reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. In addition, an increase in bronchitis in children (2 and 3 years old) has been observed at concentrations below 0.3 parts per million (ppm).

Lead

Lead levels from mobile sources in the urban environment have decreased largely due to the federally mandated switch to lead-free gasoline, and they are expected to continually decrease. An analysis of lead emissions from transportation projects is therefore not warranted.

Sulfur Dioxide

SO_2 can cause acute respiratory symptoms and diminished ventilation in children. SO_2 can also yellow plant leaves and corrode iron and steel. Although diesel-fueled heavy-duty vehicles emit SO_2, transportation sources are not considered by the USEPA (and other regulatory agencies) to be large sources of this pollutant. Therefore, an analysis of the impacts of SO_2 emissions from transportation projects is usually not warranted However, consistent with applicable air district guidance, an analysis of the impacts of SO_2 emissions was conducted for the Palmdale to Burbank Project Section.

Toxic Air Contaminants

California law defines a TAC as an air pollutant that "may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health." The USEPA uses the term "hazardous air pollutant" in a similar sense. Controlling air toxic emissions became a national priority with the passage of the CAA, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. TACs can be emitted from stationary and mobile sources.

Stationary sources of TACs from HSR operations include the use of solvent-based materials (cleaners and coatings) and combustion of fossil fuel in boilers, heaters, and ovens at maintenance facilities. Although the California HSR System would not emit TACs, MSATs would be associated with the Palmdale to Burbank Project Section chiefly through motor vehicle traffic to and from the Palmdale and Burbank Stations. The effects of TACs and other non-criteria pollutants are examined on a local level.

For MSATs, the USEPA has assessed the expansive list of 188 air toxics in its latest rule on the Control of Hazardous Air Pollutants from Mobile Sources and identified 93 compounds emitted from mobile sources that are listed in its Integrated Risk Information System. The USEPA identified nine compounds with significant contributions from mobile sources that are among the national- and regional-scale cancer risk drivers from its 1999 National Air Toxics Assessment. These nine compounds are acetaldehyde, acrolein, benzene, 1,3-butadiene, DPM and diesel exhaust organic gases, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter.

Asbestos

Asbestos minerals occurring in rocks and soil, known as naturally occurring asbestos, are the result of natural geologic processes in various areas in California. In addition, ACMs have historically been used in building construction, which could then be released to the air during demolition of buildings.

Natural weathering or human disturbance can break naturally occurring asbestos down to microscopic fibers, easily suspended in air. When inhaled, these thin fibers irritate tissues and resist the body's natural defenses. Chronic inhalation exposure to asbestos in humans can lead to a lung disease called asbestosis, which is a diffuse fibrous scarring of the lungs. Symptoms of asbestosis include shortness of breath, difficulty in breathing, and coughing. Asbestosis is a progressive disease (i.e., the severity of symptoms tends to increase with time, even after the exposure has stopped). In severe cases, this disease can lead to death caused by impairment of respiratory function. A large number of occupational studies have reported that exposure to asbestos by inhalation can cause lung cancer and mesothelioma, which is a rare cancer of the membranes lining the abdominal cavity and surrounding internal organs. The USEPA considers asbestos to be a human carcinogen (i.e., cancer-causing agent) (USEPA 2016a). The effects of asbestos for the Palmdale to Burbank Project Section are examined on a regional and local level.

Greenhouse Gases

GHGs trap heat in the atmosphere, keeping the earth's surface warmer than it otherwise would be. According to National Oceanic and Atmospheric Administration and National Aeronautics and Space Administration data, the earth's average surface temperature has increased by 1.2 degrees Fahrenheit (°F) to 1.4°F in the past 100 years. Eight of the top 10 warmest years on record for the contiguous 48 states have occurred since 1998, with 2012 and 2015 being the 2 warmest years on record. Worldwide, 2015 was the warmest year on record and 2006–2015 was the warmest decade on record since thermometer-based observations began (USEPA 2020). Most of the warming in recent decades is likely the result of human activities. Other aspects of the climate are also changing, such as rainfall patterns, snow and ice cover, and sea level.

Definition of Greenhouse Gases

Greenhouse gases are any gases that absorb infrared radiation in the atmosphere. Greenhouse gasses include, but are not limited to, water vapor, carbon dioxide, methane, nitrous oxide, hydrochlorofluorocarbons, ozone, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Greenhouse gases contribute to the global warming trend, a regional and ultimately a worldwide concern. What was once a natural phenomenon of climate has been changing because of human activities, resulting in an increase in carbon dioxide.

Some GHGs, such as CO_2, occur naturally and are emitted to the atmosphere through both natural processes and human activities. Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. GHGs differ in their ability to trap heat. For example, 1 ton of CO_2 emissions has a different effect than 1 ton of methane emissions. To compare emissions of different GHGs, inventory compilers use a weighting factor called a Global Warming Potential. To use this weighting factor, the heat-trapping ability of 1 metric ton (1,000 kilograms) of CO_2 is taken as the standard, and emissions are quantified in CO_2e (but can also be expressed in terms of carbon equivalent). Therefore, the Global Warming Potential of CO_2 is 1. The Global Warming Potential of methane is 21, whereas the Global Warming Potential of nitrous oxide is 310 (IPCC 2007).[4] The principal GHGs that enter the atmosphere because of human activities include CO_2, methane, nitrous oxide, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Methodology for Construction Phase Impact Analysis

This section identifies the models the Authority used to calculate construction emissions and general assumptions for construction activities used for this emissions modeling.

Models Used for Construction Emissions

The following modeling software was used to calculate construction-period emissions:

- The California Emissions Estimator Model (CalEEMod) model, version 2016.3.2 (CAPCOA 2016) was used to obtain default emission factors, load factors, and equipment horsepower for each type of construction equipment. This was the most recent version available for use at the time the analysis was conducted.
- The USEPA's AP-42: *Compilation of Air Pollutant Emission Factors* (USEPA 2006) was used to calculate fugitive dust emissions from dirt and aggregate handling.

[4] Table TS.2 of the Intergovernmental Panel on Climate Change's Fourth Assessment Report presents Global Warming Potentials for CO_2, methane, and nitrous oxide. This assessment used the Second Assessment Report values in the analysis. The Fourth Assessment Report Global Warming Potential values for CO_2, CH_4, and N_2O are 1, 25, and 298, respectively. Due to the ratio of CH_4 and N_2O for the Fourth Assessment Report, the Second Assessment Report values represent a conservative method of calculating CO_2e because each version of the Intergovernmental Panel on Climate Change assessment uses slightly different Global Warming Potential factors for CH_4 and N_2O.

- The Emissions Factors 2017 (EMFAC2017) model was used to calculate exhaust, brake wear, and tire wear mobile source emissions associated with worker, haul truck, and delivery truck trips.

General Assumptions for Construction Activities

This analysis quantitatively estimates construction phase emissions related to the earthwork and construction activity associated with the following Build Alternative components:

- Mobilization
- Site preparation/access roads
- Demolition
- Earthmoving
- Tunneling
- Roadway segment construction
- Grade separation construction
- Cut-and-cover
- Train station construction
- Retaining wall construction
- Viaduct construction
- Build Alternative alignment construction
- Demobilization

The construction of the Build Alternative alignments (elevated, retained fill, and at grade) and associated roadways (access roads and realigned roadways) would account for the majority of earthwork and material hauling along public streets as well as the largest amount of diesel-powered off-road construction equipment needed for the Build Alternatives. These activities account for the majority of the regional and localized emissions that would be generated by construction of the Build Alternatives. Minor construction activities, such as mobilization and demobilization of construction staging areas, would contribute fewer emissions. The estimated construction emissions from both major and minor activities are combined to calculate the overall regional and localized air quality effects during the construction phase of the Palmdale to Burbank Project Section.

Palmdale to Burbank Project Section engineers provided detailed assumptions related to earthwork, equipment specifications, and hauling routes for trucks carrying spoils and other materials to and from the construction staging areas. When specific design information was not available, such as for architectural coating, this analysis used CalEEMod default emission rates for the applicable construction activities.

Construction emissions calculations are included for each year of Build Alternative construction, which was assumed to occur from 2020 to 2029 at the time this analysis was conducted. While the year 2020 has passed, the listed construction years remain the same for purposes of this environmental analysis because the scope and scale of impacts on air quality are based on the number of construction years and activities, which would remain the same in an updated construction timeline. If construction activities were to change in the future (i.e., improved technology leading to greater efficiencies), these changes would lead to less construction-related emissions. Therefore, the construction assumptions listed below are conservative. Table 3.3-4 summarizes the assumptions associated with key construction activities of each Build Alternative and lists additional assumptions unique to the subsections. Additional detailed construction emission calculations are provided in Appendix D of the Air Quality Technical Report (Authority 2020a).

Table 3.3-4 Construction Activities

Construction Phase	Activities	Build Alternative Start Date and Duration	Additional Assumptions[1]
Mobilization	On-road deliveries	Refined SR14 – January 2020 (1 year) SR14A – January 2020 (1 year) E1A – January 2020 (1 year) E2 – January 2020 (1 year) E2A – January 2020 (1 year) E1 – October 2021 (1 year)	N/A
Site preparation: access roads	Off-road construction equipment, as well as on-road worker trips, deliveries, truck hauling, and grading activities	Refined SR14 – June 2020 (8 years) SR14A – April 2020 (5 years) E1 – October 2021 (2 years) E1A – January 2021 (2 years) E2 – November 2020 (3 years) E2A – November 2020 (3 years)	N/A
Demolition	Off-road construction equipment, as well as on-road worker trips, deliveries, truck hauling, and demolition activities	Refined SR14 – January 2021 (3 years) SR14A – January 2021 (3 years) E1 – January 2021 (3 years) E1A – January 2021 (3 years) E2 – January 2021 (3 years) E2A – January 2021 (3 years)	**Central Subsection** ▪ Demolished one-story buildings totaling 969,700 to 1,030,131 square feet ▪ Removed 9,417 to 21,556 feet of track **Burbank Subsection** ▪ Demolished one-story buildings totaling 521,469 to 661,944 square feet ▪ Removed 0 to 32,462 feet of track
Earthmoving (including spoils hauling)	Off-road construction equipment, as well as on-road worker trips, deliveries, and truck hauling activities	Refined SR14 – August 2020 (6 years) SR14A – May 2020 (7 years) E1 – January 2021 (6 years) E1A – May 2020 (7 years) E2 – January 2021 (7 years) E2A – May 2020 (7 years)	**Central Subsection** ▪ 2,743,779 to 6,751,605 cubic yards of excavated material ▪ 1,453,100 to 1,636,456 cubic yards of fill **Burbank Subsection** ▪ 1,604,391 to 2,330,370 cubic yards of excavated material ▪ 639,517 to 1,068,524 cubic yards of fill

Construction Phase	Activities	Build Alternative Start Date and Duration	Additional Assumptions[1]
Tunneling	Off-road construction equipment, as well as on-road worker trips, deliveries, and truck hauling activities	Refined SR14 – April 2020 (8 years) SR14A – April 2020 (10 years) E1 – January 2020 (9 years) E1A – April 2020 (9 years) E2 – April 2020 (9 years) E2A – April 2020 (9 years)	N/A
Roadway segment construction	Off-road construction equipment, as well as on-road worker trips, deliveries, truck hauling, grading, and paving activities	Refined SR14 – July 2021 (6 years) SR14A – May 2020 (7 years) E1 – April 2020 (7 years) E1A – April 2020 (7 years) E2 – April 2020 (6 years) E2A – April 2020 (7 years)	N/A
Grade separation construction	Off-road construction equipment, as well as on-road worker trips, deliveries, truck hauling, grading, and paving activities	Refined SR14 – July 2021 (6 years) SR14A – July 2021 (6 years) E1 – April 2020 (7 years) E1A – July 2021 (6 years) E2 – April 2020 (5 years) E2A – July 2021 (4 years)	N/A
Cut-and-cover	Off-road construction equipment, as well as on-road worker trips, deliveries, and truck hauling activities	Refined SR14 – April 2021 (4 years) SR14A – April 2021 (4 years) E1 – January 2022 (5 years) E1A – January 2022 (4 years) E2 – January 2022 (6 years) E2A – January 2024 (4 years)	N/A
Train station construction	Off-road construction equipment, as well as on-road worker trips, deliveries, truck hauling, grading, architectural coating, and paving activities	Refined SR14 – March 2023 (4 years) SR14A – March 2023 (4 years) E1 – March 2023 (4 years) E1A – March 2023 (4 years) E2 – March 2023 (4 years) E2A – March 2023 (4 years)	**Burbank Airport Station Buildings** ▪ Primary: 141,954 square feet ▪ Secondary: 23,784 square feet ▪ Substation: 10,000 square feet

Construction Phase	Activities	Build Alternative Start Date and Duration	Additional Assumptions[1]
Retaining wall construction	Off-road construction equipment, as well as on-road worker trips, deliveries, truck hauling, and grading activities	Refined SR14 – July 2021 (5 years) SR14A – August 2020 (5 years) E1 – July 2021 (6 years) E1A – April 2020 (5 years) E2 – July 2021 (6 years) E2A – April 2020 (5 years)	**Central Subsection** ▪ Structure area: 184,353 to 506,313 square feet ▪ Total concrete: 51,600 to 141,700 cubic yards ▪ Total area graded: 4.2 to 11.6 acres **Burbank Subsection** ▪ Structure area: 137,280 square feet ▪ Total concrete: 10,200 cubic yards ▪ Total area graded: 3.2 acres
Viaduct construction	Off-road construction equipment, as well as on-road worker trips, deliveries, truck hauling, and grading activities	Refined SR14 – April 2020 (6 years) SR14A – April 2020 (5 years) E1 – October 2020 (8 years) E1A – September 2020 (5 years) E2 – October 2020 (7 years) E2A – September 2020 (7 years)	N/A
Build Alternative alignment construction	Off-road construction equipment, as well as on-road worker trips, deliveries, and truck hauling activities	Refined SR14 – November 2020 (2 years) SR14A – November 2026 (2 years) E1 – January 2027 (1 year) E1A – January 2027 (1 year) E2 – October 2027 (2 years) E2A – October 2027 (2 years)	N/A
Demobilization	On-road deliveries	Refined SR14 – April 2026 (3 years) SR14A – April 2026 (3 years) E1 – June 2026 (3 years) E1A – June 2026 (3 years) E2 – March 2027 (3 years) E2A – March 2027 (3 years)	N/A

[1] Construction activities associated with the Palmdale Subsection are evaluated in the Bakersfield to Palmdale Project Section EIR/EIS.
N/A = not applicable

Health Risk Assessment

Construction activities associated with the Build Alternatives that utilize diesel-powered equipment would increase and/or change TAC concentrations at receptors in the local RSA. Construction activities associated with realignment of freight, Amtrak, and Metrolink tracks that may occur as a result of the Build Alternatives would also increase and/or change TAC concentrations. Because diesel-related exhaust, specifically DPM, is considered a carcinogenic TAC by CARB, a Health Risk Assessment (HRA) was conducted to assess the risk (i.e., cancer and noncancer chronic acute risks) associated with construction of the Build Alternatives. The HRA was conducted using the Office of Environmental Health Hazard Assessment's *Guidance Manual for Preparation of Health Risk Assessments* (OEHHA 2015) for the Air Toxics Hot Spots Program and the HRA guidelines developed by the California Air Pollution Control Officers Association (CAPCOA 2009). Specific details of the air dispersion modeling and HRA are found in Appendix C of the Air Quality Technical Report (Authority 2020a).

The HRA consists of three parts: (1) DPM emissions inventory, (2) air dispersion modeling to evaluate off-site concentrations of DPM emissions, and (3) assessment of health risks associated with predicted concentrations. These three components are described below.

Since publication of the Draft EIR/EIS, the Authority considered whether there are recently approved or foreseeable future projects that would affect the HRA. The communities along the Build Alternative alignments are relatively stable/mature in nature, meaning that they have well established land use patterns. The primary areas where Build Alternative alignments occur aboveground are south of the city of Palmdale, in Bee Canyon, and in the San Fernando Valley. The area south of the city of Palmdale is a rural residential community that has remained quite stable. If land use changes were to occur in this area, they would likely be limited to construction of isolated residences on large parcels. The Bee Canyon area is and remains undeveloped, with much of the property in this area having been purchased by the city of Santa Clarita for the purpose of expanding the city's existing open space. The area was acquired to remain undeveloped as open space (Lunetta 2022). The San Fernando Valley is highly urbanized and land uses have tended to be very stable. This area was the focus of the HRA, and the sensitive land uses evaluated in the analysis have not changed.

Diesel Particulate Matter Inventory

The DPM inventory includes emissions generated by diesel-fueled construction equipment and vehicle exhaust. While DPM is a complex mixture of gases and fine particles that includes over 40 substances listed by the USEPA and CARB as hazardous air pollutants (OEHHA 2001), the Office of Environmental Health Hazard Assessment guidance indicates that the cancer potency factor developed to evaluate cancer risks was developed based on total (gas and particulate matter) diesel exhaust and that the surrogate for total diesel exhaust is DPM, with PM_{10} serving as the basis for the potential risk calculations (OEHHA 2015). Furthermore, the Office of Environmental Health Hazard Assessment indicates that cancer risk from inhalation exposure to whole diesel exhaust will outweigh the risk from the smaller chemical components that make up particulate matter (OEHHA 2015). Accordingly, the DPM inventory uses PM_{10} emissions as a surrogate for whole, non-speciated DPM emissions.

Air Dispersion Modeling

The USEPA's AERMOD dispersion model (version 21112) was used to quantify annual average DPM concentrations at nearby receptor locations. Meteorological data used in the analysis were obtained from the SCAQMD and CARB. SCAQMD obtained Burbank monitoring station (KBUR) preprocessed AERMOD-ready files for all sites in SCAQMD. No representative SCAQMD data were available for areas located in the remote northern edge of the county near Acton. For these areas, Sandberg data preprocessed by CARB were used.

As most of the regional RSA has sources and receptors that vary in elevation across the studied region, AERMOD simulations were run twice: once using the nondefault flat terrain option, and once using the default complex terrain option determined with the AERMAP model (version 18081), consistent with SCAQMD recommendations. The maximum ground-level concentration from both runs were reported.

Receptors were modeled using both grids of receptors (flat and complex terrain) and discrete receptors, depending on the cases analyzed. Rather than modeling the entire 31- to 38-mile Build Alternative alignment, six discrete areas (or "cases") were selected for analysis. These cases were designed to represent reasonably foreseeable significant effects, referred to here as the "worst-case" in terms of construction-related air quality and health risk impacts, typically those that have a large amount of construction activity with exhaust vented to the air near sensitive receptors. The locations of the six cases are presented on Figure 3.3-3 below for the Refined SR14, E1, and E2 Build Alternatives. The SR14A, E1A, and E2A Build Alternatives were not included in the case modeling shown in Figure 3.3-3. However, because the SR14A, E1A, and E2A Build Alternative alignments are the same as the Refined SR14, E1, and E2 Build Alternative alignments, respectively, at the Case 4, 5, 6, 7, and 8 case locations, they can be applied for the purposes of this analysis. Figure 3.3-3 shows Cases 2, 4, 5, 6, 7, and 8. Cases 1 and 3 were later eliminated based on the level of emissions and proximity of nearby sensitive receptors. The selection of locations was independent of Build Alternative, but the range of cases was designed to capture risks from all six Build Alternatives (Table 3.3-5). In cases where multiple Build Alternatives pass through a case, the case was defined using the highest emissions modeled. AERMOD simulations for the HRA consisted of either single receptors representing individual sensitive receptors or a 25-meter-spaced grid of receptors in areas of high residential density. All HRA receptors used a height of 1.2 meters consistent with Office of Environmental Health Hazard Assessment (OEHHA) recommended breathing heights.

Table 3.3-5 Build Alternatives used for Worst-Case Health Risk Assessment

Case	Build Alternative
2	Refined SR14 Build Alternative
4	E2 and E2A Build Alternatives
5	E2 and E2A Build Alternatives
6	E2 and E2A Build Alternatives
7	Refined SR14 and SR14A Build Alternatives
8	E1 and E1A Build Alternatives

Source: Authority 2020a
Note: The SR14A, E1A, and E2A Build Alternatives were not included in the case modeling shown in this table. However, because the SR14A, E1A, and E2A Build Alternative alignments are the same as the Refined SR14, E1, and E2 Build Alternative alignments, respectively, at the Case 4, 5, 6, 7, and 8 case locations, they can be applied for the purposes of this analysis.

Further information on the cases is provided in Appendix C of the Air Quality Technical Report (Authority 2020a).

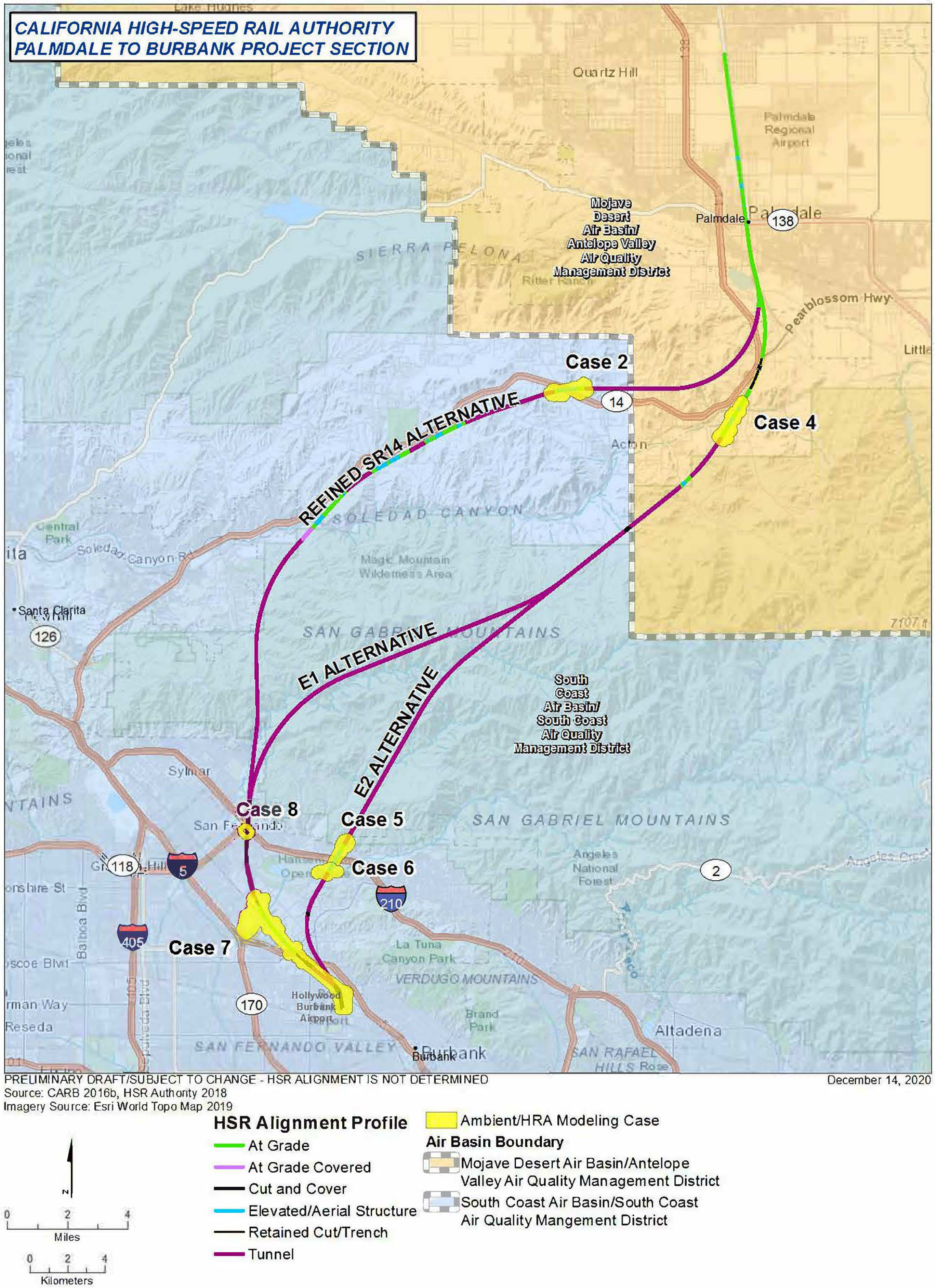


Figure 3.3-3 Construction Scenario—Areas Selected for Health Risk Analysis

Risk Calculations

Consistent with the USEPA, CARB, and relevant air district regulatory guidance, the HRA examines cancer and non-cancer (chronic) exposure to the surrounding community and uses the Office of Environmental Health Hazard Assessment's guidance on risk calculations (OEHHA 2015).

- **Cancer Risk**—Cancer risk is defined as the lifetime probability (chance) of developing cancer from exposure to a carcinogen, typically expressed as the increased chance in 1 million. The default cancer risk calculation for residents and workers is based on the 95th percentile breathing rate, as recommended by the OEHHA. It also includes accounting for varying sensitivities to exposure based on age. This includes higher age sensitivity factors for the first 16 years of life, 95th percentile as a breathing rate as a function of age, exposure duration, and adjustment for time spent at home.
- **Chronic Non-cancer Risk**—Non-cancer chronic inhalation impacts were calculated by dividing the annual average concentration by the reference exposure level for DPM. The reference exposure level is defined as the concentration at which no adverse noncancer health effects are anticipated. Consistent with OEHHA (2015) guidance, a reference exposure level of 5 micrograms per cubic meter was assumed in the calculation.

Localized Criteria Pollutants

The same general approach and guidance used for the HRA was used to evaluate localized criteria pollutant effects during construction. However, unlike the HRA, which considers the long-term effects of DPM, the localized criteria pollutant analysis considers both short-term (less than 24 hours) and long-term (24 hours or longer) emissions effects, and assesses the localized effects based on the NAAQS and CAAQS. The criteria pollutants considered in the analysis of potential localized air quality effects consist of CO, NO_2, PM_{10}, $PM_{2.5}$, and SO_2.

Of these pollutants, long-term standards have been established for NO_2, PM_{10}, and $PM_{2.5}$. The pollutants of concern with established short-term standards include the following:

- CO (1 hour and 8 hours)
- PM_{10} (24 hours)
- $PM_{2.5}$ (24 hours)
- NO_2 (1 hour)
- SO_2 (1 hour and 24 hours)

The approach to modeling the short-term emissions requires an emissions inventory that represents at least a peak-hour pollutant emission rate generated by construction activities along with those activities that may overlap in location and time.

Similar to the HRA analysis, air dispersion modeling of construction emissions using AERMOD was used to predict the ambient impacts of criteria pollutant emissions. Separate dispersion modeling simulations were conducted for each of the modeled criteria pollutants. AERMOD simulations for criteria air pollutants consisted of rings of receptor locations placed at the borders of construction areas and spaced at 25 meters (smaller than SCAQMD's maximum receptor spacing for any of these cases), and a grid of receptors at 50-meter spacing surrounding the construction area. PM_{10} and $PM_{2.5}$ emissions were modeled from the Refined SR14 Build Alternative at the Case 7 location and from the E1 Build Alternative at the Case 8 location. CO, NO_2, and SO_2 emissions were modeled from the E1 Build Alternative at the Case 7 location and the Refined SR14 Build Alternative at the Case 8 location (Table 3.3-5).

Within the SCAB, the modeled construction localized criteria pollutant effects would also serve to satisfy SCAQMD's localized significance thresholds analysis for CO, NO_2, PM_{10}, and $PM_{2.5}$.

Methodology for Operations Phase Impact Analysis

Statewide and Regional Operations Emissions Calculations

The operations emissions analysis calculated emissions for two ridership scenarios based on forecasts developed for the 2016 Business Plan:

- **Medium Ridership**—Forecasts 42.8 million riders in 2040 for the Phase 1 California HSR System[5]
- **High Ridership**—Forecasts 56.8 million riders in 2040 for the Phase 1 California HSR System[6]

Refer to Chapter 2, Alternatives, and Section 3.1, Introduction, for further discussion of the ridership forecasts and for a comparison of the forecasts used in this analysis with the Authority's 2018 Business Plan and 2020 Business Plan ridership forecasts. Existing and projected statewide energy demand for the state, including implementation of the Build Alternatives, is presented in Section 3.6, Public Utilities and Energy. The tables in the environmental consequences discussion (see Section 3.3.6) present two values for the operations emissions for each pollutant, corresponding to these two ridership scenarios.

The operations analysis includes the following modeling years:

- Existing Year—No Project (2015)
- Horizon Year—No Project and Plus Project (2040)

The Air Quality Technical Report (Authority 2020a) includes additional data and information about anticipated emissions for the 2029 (as assumed when the analysis was conducted) Phase 1 opening year.

On-Road Vehicles

This analysis calculated on-road vehicle emissions using average daily VMT estimates and associated average daily speed estimates for each county in the regional RSA. CARB EMFAC2017 emission factor program used in this model accounts for existing regulations that would reduce emissions, such as the Pavley Clean Car Standards (AB 1493) and the SAFE Vehicles Rule.[7]

To determine overall pollutant burdens generated by on-road vehicles, the Authority multiplied the estimated VMT by the applicable pollutant's emission factors, which are based on speed, vehicle mix, and analysis year.

Trains

Because the California HSR System would be electrically powered, operation of the Palmdale to Burbank Project Section would not generate direct combustion emissions along the railways that would cause substantial health concerns, such as asthma or other respiratory diseases. However, the operation of California HSR System's trains creates an aerodynamic wake behind the train that results in airflow in the general direction of the moving train. A detailed analysis of existing credible scientific evidence related to evaluating impacts from induced winds from California HSR System trains is included in Appendix F of the Air Quality Technical Report (Authority 2020a). Specifically, the appended analysis evaluates the potential for generating fugitive dust emissions from HSR-induced winds.

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[5] The Draft 2024 Business Plan further reduced the ridership estimates: 2040 Phase 1 medium ridership is projected to be 28.4 million riders annually. While ridership levels projected in the 2024 Business plan are lower, the project would still result in substantial AQ benefits when compared to the No Build Alternative and the reduced ridership does not change the conclusions presented in this EIR/EIS nor change the project benefits in terms of GHG reduction and pay-back period.

[6] The Draft 2024 Business Plan further reduced the ridership estimates: 2040 Phase 1 high ridership is forecasted to be 30.6 million riders. While ridership levels projected in the 2024 Business plan are lower, the project would still result in substantial AQ benefits when compared to the No Build Alternative and the reduced ridership does not change the conclusions presented in this EIR/EIS nor change the project benefits in terms of GHG reduction and pay-back period.

[7] Although the SAFE rule has been repealed (as described in Section 3.3.2.1), the emissions that were calculated in the Draft EIR/EIS included the SAFE Vehicles Rule correction factors. As the correction factors increase the on-road emission rates, the results included in this document are considered conservative. Please note, as they were calculated after the rule was repealed, the revised emissions analysis for the trucking associated with hazardous spoils did not include the SAFE Vehicles Rule correction factors. Although repealed, information about the SAFE rule is included here, since it was included in the analysis.

Aircraft

The California HSR System is expected to reduce air travel in that it would provide a new intrastate mode of transportation. The Authority used the Federal Aviation Administration's Aviation Environmental Design Tool (FAA 2016) to estimate aircraft emissions, both with and without the Palmdale to Burbank Project Section. This tool estimates the emissions generated from specified numbers of landing and take-off cycles. Along with emissions from the aircraft themselves, emissions generated from associated ground maintenance requirements are included. Average aircraft emissions were estimated based on the profile of intrastate aircraft currently servicing the San Jose to Los Angeles corridor. Ridership estimates from the Authority's 2016 Business Plan (Authority 2016) were used to estimate the number of air trips that would be replaced by rail trips attributable to the Palmdale to Burbank Project Section through travel demand modeling analysis.

Power Plants

The electrical demands for train propulsion and the operation of the Palmdale and Burbank Stations and Maintenance Facility, were calculated for the Build Alternatives (Authority 2017a). Peak-period electricity demand was calculated in terms of kilowatt-hours and compared to current estimates of peak demand and supply capacity in the grid controlled by the California Independent System Operator. The Authority derived average emission factors for each kilowatt-hour required from CARB statewide emission inventories of electrical and cogeneration facilities data along with USEPA eGRID electrical generation data. The energy estimates used in this analysis for the propulsion of the HSR include the use of regenerative brake power. In addition, because of the State requirement that an increasing percentage (100 percent by 2045) of electricity generated for the state's power portfolio come from renewable energy sources, the emissions generated for the California HSR System are expected to be lower in the future than the emissions estimated for this analysis.

Analysis of Local Operation Mass Emission Sources

Operation of the HSR traction power, switching, and paralleling stations would not result in appreciable air pollutants, as site visits would be infrequent and power usage would be limited. Therefore, localized emissions from these traction power stations were not quantified.

Station Sites

The Palmdale to Burbank Project Section includes expansion of the existing Palmdale Station and a new Burbank Airport Station. Criteria pollutant and GHG emissions associated with the operation of the stations would primarily result from area and stationary sources, electricity and water consumption, waste generation, emergency generator testing, and vehicle traffic. The methodology used to evaluate each of these sources is described in the following subsections.

Area Sources

Criteria pollutant and GHG emissions from area sources—which include landscaping activities, consumer products, and periodic paint emissions from facility upkeep—were calculated using CalEEMod. Emissions were based on the land use data, entered as the size of the station buildings (square feet). The parking areas were excluded from the land use as they would require minimal landscaping.

Natural Gas

The Palmdale and Burbank Stations would generate criteria pollutant and GHG emissions from natural gas consumption for water and space heating associated with station operations. Analysts calculated the emissions from this natural gas consumption based on the building square footage and emission factors from CalEEMod.

Indirect Emissions from Electricity

The Palmdale and Burbank Stations would generate indirect criteria pollutant and GHG emissions from purchased electricity consumed for facility lighting and general station operations. It is expected that the power used by the California HSR System stations would be substantially less than the power used by train operations; however, the indirect emissions from power consumption have been included in the overall emission estimates for the Palmdale to Burbank Project Section. Indirect emissions from purchased electricity consumed by the stations were calculated based on the building square footage and electricity consumption rates and emission factors from CalEEMod.

Indirect Emissions from Water and Wastewater Generation

The Palmdale and Burbank Stations would generate indirect GHG emissions from purchased water consumed for facility restrooms, drinking fountains, landscaping, and other miscellaneous uses. Indirect GHG emissions from purchased water consumed by the California HSR System stations were calculated based on the building square footage, electricity associated with sourcing, treatment, and distribution of water, and emission factors from CalEEMod.

Indirect Emissions from Solid Waste

The Palmdale and Burbank Stations would generate indirect GHG emissions from solid waste disposal. The indirect GHGs from solid waste generation were calculated CalEEMod defaults.

Vehicular Traffic

Mobile source emissions would occur from both passenger and employee commutes. The estimated number of daily passenger vehicle trips to the Palmdale Station in 2040 would be 10,800 trips and the estimated daily passenger vehicle trips to the Burbank Airport Station in 2040 would be 24,320 trips (see Section 3.2, Transportation). Vehicular exhaust emissions from passengers arriving via car were estimated using CalEEMod with EMFAC2017 vehicle emission factors and using the model default vehicle fleet mix. The EMFAC2017 vehicle emission factors used in CalEEMod also incorporated adjustment factors, as per CARB guidance, to account for impacts from the NHTSA and USEPA's SAFE Vehicles Rule.[8]

Maintenance Facility

The operations emissions for the Maintenance Facility were calculated using CalEEMod with EMFAC2017 vehicle emission factors that have been adjusted to account for the SAFE Vehicle Rule based on the building square footage provided.[9]

Local Emissions in SCAB

The SCAQMD has issued Localized Significance Thresholds (LSTs) and guidance on conducting localized analyses of CO, NO_2, PM_{10}, and $PM_{2.5}$ emissions. The LST analysis assesses whether the local air quality concentrations of these four pollutants generated by a project would result in an exceedance of the most stringent applicable federal or State ambient air quality standards. The LST analysis only applies to emissions generated from on-site activities and does not apply to off-site mobile emissions.

The Burbank Airport Station's operations emissions would occur in the SCAB and would therefore be subject to SCAQMD's LST analysis. The CalEEMod modeling results for on-site emissions generated at this station were assessed against SCAQMD's applicable LSTs.

Carbon Monoxide Hot-Spot Analysis

Traffic around the Palmdale and Burbank Stations may contribute to localized increases in CO, known as CO "hot-spots." A microscale CO hot-spot analysis was performed at 10 locations to verify that station traffic would not cause or contribute to a violation of the CO CAAQS, assuming a high ridership scenario. Methodology for analysis of potential CO hot-spots is included in the Air

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[8] Although the SAFE rule has been repealed (as described in Section 3.3.2.1), the emissions that were calculated in the Draft EIR/EIS included the SAFE Vehicles Rule correction factors. As the correction factors increase the on-road emission rates, the results included in this document are considered conservative. Please note, as they were calculated after the rule was repealed, the revised emissions analysis for the trucking associated with hazardous spoils did not include the SAFE Vehicles Rule correction factors. Although repealed, information about the SAFE rule is included here, since it was included in the analysis.

[9] Ibid., 9

Quality Technical Report (Authority 2020a). The CO analysis was conducted in accordance with the CO Protocol from the University of California, Davis (Garza et al. 1997), which details a step-by-step procedure to determine whether Build Alternative-related CO concentrations have the potential to generate new air quality violations, worsen existing violations, or delay attainment of CAAQS or NAAQS for CO. Additional details of the modeling are described below.

Intersection Selection

A CO hot-spot analysis was performed for the 10 intersections that would experience localized increases in vehicle emissions. The 10 intersections selected were identified in the *Palmdale to Burbank Project Section: Transportation Technical Report* (Authority 2019) as the intersections that would experience the greatest traffic impacts due to shifts in traffic patterns (i.e., highest traffic volumes) under 2040 Project conditions. These intersections are located near the proposed Palmdale and Burbank Stations, where a large number of people would travel to park and ride on the California HSR System. Analyzing the intersections with the greatest traffic congestion ensures a worst-case assessment of CO impacts. The intersections included in the analysis are as follows:

- Palmdale Station
  - Tenth Street West/Rancho Vista Boulevard
  - Sierra Highway/Rancho Vista Boulevard
  - Tenth Street/Palmdale Boulevard
  - Forty-Seventh Street East/Avenue S
  - Forty-Seventh Street/Avenue R
- Burbank Airport Station
  - Burbank Boulevard/Victory Boulevard
  - State Route 170/Victory Boulevard
  - Laurel Canyon/Victory Boulevard
  - Laurel Canyon/Sherman Way
  - Hollywood Way/Victory Boulevard

Emission Model

Vehicular emissions were estimated using the EMFAC2017 program. Consistent with the traffic analysis and the anticipated design year of the Palmdale to Burbank Project Section, CO emission factors are based on a 2040 vehicle mix during conditions in Los Angeles County. CARB designed EMFAC2017 to address a wide variety of air pollution modeling needs, and the program incorporates information on basic emission rates, realistic driving patterns, separation of start and running emissions, correction factors, and changing fleet composition. The emission factors from EMFAC2017 used in the analysis also incorporated CARB's adjustment factors to account for the SAFE Vehicles Rule.[10]

Dispersion Model

Mobile source dispersion models are the basic analytical tools used to estimate CO concentrations expected under given traffic, roadway geometry, and meteorological conditions. The mathematical expressions and formulations that constitute the various models attempt to describe as closely as possible a complex physical phenomenon. The dispersion modeling program used in this analysis for estimating pollutant concentrations near roadway intersections is the California Department of Transportation's CALINE4 dispersion model. For more information on this model, refer to the Air Quality Technical Report (Authority 2020a).

[10] Although the SAFE rule has been repealed (as described in Section 3.3.2.1), the emissions that were calculated in the Draft EIR/EIS included the SAFE Vehicles Rule correction factors. As the correction factors increase the on-road emission rates, the results included in this document are considered conservative. Please note, as they were calculated after the rule was repealed, the revised emissions analysis for the trucking associated with hazardous spoils did not include the SAFE Vehicles Rule correction factors. Although repealed, information about the SAFE rule is included here, since it was included in the analysis.

Meteorological Conditions

The transport and concentration of pollutants emitted from motor vehicles are influenced by three principal meteorological factors: wind direction, wind speed, and the temperature profile of the atmosphere. The selection of meteorological parameters was based on recommendations from the CEQA *Air Quality Handbook* (SCAQMD 1993), the California Department of Transportation's CO Protocol (Garza et al. 1997), and the USEPA's Guidelines (USEPA 2015a). The following parameters are considered to be conservative representations of the conditions existing in the statewide RSA:

- **Wind Direction**—Maximum CO concentrations are normally found when the wind is assumed to blow approximately parallel to a single roadway adjacent to the receptor location. However, at complex intersections, it is difficult to predict which wind angle would result in maximum concentrations. Therefore, at each receptor location, the approximate wind angle that would result in maximum pollutant concentrations was used in the analysis. All wind angles from 0 to 360 degrees were considered.
- **Wind Speed**—CO concentrations are greatest at low wind speeds. A conservative wind speed of 1 mile per hour (mph) was used to predict CO concentrations during peak traffic periods.
- **Temperature and Profile of the Atmosphere**—An ambient temperature was chosen based on the CO Protocol, at a mixing height (the height in the atmosphere to which pollutants rise) of 1,000 feet. Neutral atmospheric stability (stability class G) conditions were used in estimating microscale CO concentrations. Winter low temperatures of 34°F and 41°F were assumed for Palmdale and Burbank, respectively, based on the monthly average/record low temperature (based on data from The Weather Channel, accessed in February 2017). The stability class G was chosen, as recommended in Table B.11 of the CO Protocol.

Persistence Factor

Peak 8-hour concentrations of CO were calculated by multiplying the highest peak-hour CO estimates by a persistence factor. The persistence factor accounts for the following:

- Over an 8-hour period (as distinct from a single hour), vehicle volumes will fluctuate downward from the peak hour.
- Vehicle speeds may vary.
- Meteorological conditions, including wind speed and wind direction, will vary compared with the conservative assumptions used for the single hour.
- A persistence factor of 0.7 was used in this analysis, which is recommended in the CO Protocol (Garza et al. 1997).

Background Concentrations

To account for sources of CO not included in the modeling, maximum monitored 1- and 8-hour CO values between 2017 and 2019 were averaged to obtain a background CO concentration assumption. Background concentrations for buildout (2040) year conditions were assumed to be the same as existing conditions. Actual 1- and 8-hour background CO concentrations in future years would likely be lower than the existing levels used in the modeling analysis, because the trend in CO emissions and concentrations is decreasing with continuing improvements in engine technology and the retirement of older, higher-emitting vehicles.

Particulate Matter Analysis

The California HSR System is subject to localized PM_{10} and $PM_{2.5}$ hot-spot analysis, assuming a high ridership forecast, because the SCAB portion of the local RSA is designated nonattainment for the $PM_{2.5}$ NAAQS and maintenance for the PM_{10} NAAQS. In November 2015, the USEPA updated its Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (USEPA 2015c), which was used for this analysis.

Although the Palmdale to Burbank Project Section is subject to the General Conformity Rule and not subject to the Transportation Conformity Rule, the Transportation Conformity Guidance was used because it provides an appropriate methodology for PM_{10} and $PM_{2.5}$ hot-spot analysis. Pursuant to the USEPA Transportation Conformity Guidance, if a project meets one of the following criteria during operations, it would be considered a project of air quality concern and a quantitative $PM_{10}/PM_{2.5}$ analysis would be required:

- New or expanded highway projects that have a significant number of, or a significant increase in, diesel vehicles. The project is not a new highway project, nor would it expand an existing highway beyond its current capacity. The California HSR System would be electrically powered. The Palmdale to Burbank Project Section would not measurably affect traffic conditions on roadways that have been realigned to accommodate the HSR right-of-way, because the roadways would be grade-separated, and it would not measurably affect truck volumes on the affected roadways. Furthermore, the Palmdale to Burbank Project Section would improve regional traffic conditions by reducing traffic congestion, increasing vehicle speeds, and reducing regional VMT in the regional RSA.
- Projects affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles or those that will degrade to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the Palmdale to Burbank Project Section. The Build Alternatives would not change the existing traffic mix at signalized intersections. Roadways would be realigned to accommodate the HSR right-of-way and maintain local circulation, possibly affecting some intersections at LOS D, E, or F. However, realignment would not result in increased traffic volumes that would involve a substantial amount of diesel vehicles (Authority 2019). Therefore, the Palmdale to Burbank Project Section would not measurably increase the number of diesel vehicles at affected intersections.
- New or expanded bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location. The Palmdale to Burbank Project Section would not include diesel rail or bus terminals or transfer points and therefore would not affect diesel vehicles congregating at a single location. The trains used for the California HSR System would be electric multiple units, powered by electricity, not diesel fuel.
- Projects in or affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$- or PM_{10}-applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation. The regional RSA is not in an area identified as sites of violation or possible violation in the USEPA-approved SIP.

For these reasons, the Palmdale to Burbank Project Section would not be considered a project of air quality concern as defined by 40 C.F.R. 93.123(b)(1) and would not likely cause violations of $PM_{10}/PM_{2.5}$ NAAQS during its operation. Therefore, quantitative $PM_{2.5}$ and PM_{10} hot-spot evaluations are not required by the guidance. CAA 40 C.F.R. 93.116 requirements are therefore met without a quantitative hot-spot analysis. The Palmdale to Burbank Project Section would not likely cause an adverse effect on air quality for $PM_{10}/PM_{2.5}$ standards, because, based on these criteria, it is not a project of air quality concern.

Notwithstanding the decision to use this analytical structure, additional analysis or associated activities required to comply with transportation conformity will be carried out only if discrete project elements become subject to the transportation conformity requirements in the future.

Mobile Source Air Toxics Analysis

In February 2006, the FHWA released an interim guidance on air toxics analysis. This document was superseded in September 2009 and was most recently updated in 2016 as *Updated Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents* (FHWA 2016). The interim guidance advises on when and how to analyze MSATs in the NEPA process for highway projects. This guidance is “interim” because MSAT science is evolving. As the science continues to progress, the FHWA is expected to continue updating the guidance document. The Authority considers the most recent FHWA guidance when evaluating the impacts of projects that have the potential to affect MSAT emissions.

A qualitative analysis provides a basis for identifying and comparing the potential differences in MSAT emissions, if any, among the six Build Alternatives. The FHWA interim guidance groups projects into the following categories:

- **Tier 1**—No analysis for projects without any potential for meaningful MSAT effects
- **Tier 2**—Qualitative analysis for projects with low potential MSAT effects
- **Tier 3**—Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects

The Palmdale to Burbank Project Section would reduce regional VMT, traffic congestion, and aircraft operations, resulting in an overall reduction in MSAT emissions. However, localized MSAT increases could occur at intersections that would experience project-related shifts in traffic patterns and increased traffic congestion. The potential level of effects from these circumstances corresponds to the FHWA's Tier 2, *Projects with Low Potential MSAT Effects* (FWHA 2011). Accordingly, a qualitative analysis was used to provide a basis for identifying and comparing the potential differences in local MSAT emissions, if any, among the six Build Alternatives. The qualitative assessment is derived, in part, from an FHWA study titled *A Methodology for Evaluating Mobile Source Air Toxic Emissions among Transportation Project Alternatives* (FHWA 2011).

Asbestos

Asbestos causes cancers of the lung and the lining of internal organs, as well as asbestosis and pleural disease, which inhibit lung function. The USEPA is addressing concerns about potential effects of naturally occurring asbestos in various areas in California.

The California Geological Survey has identified ultramafic rocks in California to be the source of naturally occurring asbestos. The Authority used the California Division of Mines and Geology's *A General Location Guide for Ultramafic Rocks in California Areas More Likely to Contain Naturally Occurring Asbestos* (CDMG 2000) to determine if naturally occurring asbestos occurs in the local RSA.

Greenhouse Gas Analysis

Because of the global nature of GHG emissions and the nature of the electrical grid system, GHG emissions were examined on a statewide level. The methodology for estimating GHG emissions associated with construction and operations of the Palmdale to Burbank Project Section is discussed below.

On-Road Vehicle Emissions

The Authority conducted the on-road vehicle emission analysis using the same methods and RSAs as described for the statewide and regional operations emissions calculations, previously described.

Aircraft Emissions

This analysis calculated aircraft emissions by using the fuel consumption factors and emission factors from the CARB 2000–2018 *Documentation of California's Greenhouse Gas Inventory* (13th Edition) and accompanying support documentation. The emission factor includes both landing and take-off and cruise operations. Average aircraft GHG emissions were estimated based on the profile of intrastate aircraft currently servicing the San Francisco to Los Angeles corridor. Ridership estimates from the Authority's 2016 Business Plan (Authority 2016) were used to estimate the number of air trips that would be replaced by rail trips attributable to the project section through the travel demand modeling analysis conducted for the Palmdale to Burbank Project Section.

Power Plant Emissions

The electrical demands were calculated as part of the design of the six Build Alternatives. Electrical demands would come from propulsion of the trains, stations, storage depots, and at the Maintenance Facility site. Average GHG emission factors for each kilowatt-hour required were derived from USEPA eGRID2018 electrical generation data. The electrical demand estimates used in this analysis for the propulsion of the California HSR System include the use of regenerative brake power.

In addition, because of the state requirement that an increasing fraction (100 percent by 2045) of electricity generated for the state's power portfolio come from renewable energy sources, the emissions generated for the power supply are expected to be lower in the future than the emissions estimated for this analysis.

3.3.4.4 Methods for Evaluating Impacts under NEPA

Pursuant to NEPA, adverse impacts on air quality would occur if the project criteria pollutant emissions would be equal to or exceed the General Conformity *de minimis* levels (dependent on attainment status of each air basin) or if the project would result in the creation or worsening of PM_{10}/$PM_{2.5}$ or CO hot spots. CEQ NEPA regulations (40 C.F.R. Parts 1500–1508) provide the basis for evaluating project effects (Section 3.1.4.4). As described in Section 1508.27 of these regulations, the criteria of context and intensity are considered together when determining the severity of the change introduced by the project. "Context" is defined as the affected environment in which a proposed project occurs. Context includes existing conditions in the SCAB, MDAB, and SJVAB, including the regional attainment status, existing ambient air quality monitoring data, and applicable regulations, as established by USEPA and the CARB, as well as existing conditions along the Build Alternative footprint and within 1,000 feet of construction work areas and permanent project features, including the number and location of sensitive receptors.

"Intensity" refers to the severity of the effect, which is examined in terms of the type, quality, and sensitivity of the resource involved; location and extent of the effect; duration of the effect (short- or long-term); and other considerations of context. For air quality, intensity is determined by assessing the following conditions: (1) whether the project would conflict with implementation of applicable air quality plans, (2) whether the project threatens to violate or contributes to an existing or projected air quality violation, and (3) the degree to which the project would affect public health by exposing sensitive receptors to pollutant concentrations.

Beneficial effects are also considered. When no measurable effect exists, no impact is found to occur. For the purposes of NEPA compliance, the same methods used to identify and evaluate impacts under CEQA are applied here.

3.3.4.5 Method for Determining Significance under CEQA

The Authority is using the following thresholds to determine if a significant impact on air quality and global climate change would occur as a result of the project. A significant impact is one that would:

- Conflict with or obstruct implementation of the applicable air quality plan
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Palmdale to Burbank Project Section region is nonattainment under an applicable NAAQS or CAAQS
- Expose sensitive receptors to substantial pollutant concentrations
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment

- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs

3.3.5 Affected Environment

3.3.5.1 Meteorology and Climate

California is divided into 15 air basins based on geographic features that create distinctive regional climates. As discussed above, the air quality regional RSA is located in the SCAB and MDAB. The following section discusses climate and meteorological information associated with the SCAB and MDAB. Improvements in the Palmdale Subsection and Maintenance Facility area are included in this section for context; however, the air quality effects of these facilities are evaluated in the Bakersfield to Palmdale Project Section EIR/EIS.

South Coast Air Basin

The SCAB covers approximately 6,745 square miles. It is bounded by the Pacific Ocean to the west and south and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. The SCAB includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties, as well as the San Gorgonio Pass area in Riverside County. The terrain and geographical location determine the distinctive climate of the SCAB, which is a coastal plain with connecting broad valleys and low hills. SCAQMD is wholly in the SCAB.

The Southern California region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild and tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of air pollution in the SCAB is a function of the area’s natural physical characteristics (weather and topography) as well as human-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, temperature inversion, humidity, rainfall, and topography all affect the accumulation and dispersion of pollutants throughout the SCAB, making it an area of high pollution potential.

The greatest air pollution impacts in the SCAB occur from June through September. These are generally attributed to the large amount of pollutant emissions, light winds, temperature inversion, and shallow vertical atmospheric mixing. This condition frequently reduces pollutant dispersion, thereby causing elevated air pollution levels. Pollutant concentrations in the SCAB vary with location, season, and time of day. O_3 concentrations, for example, tend to be lower along the coast, higher in the near inland valleys, and lower in the far inland areas of the SCAB and adjacent desert.

Mojave Desert Air Basin

The MDAB covers an area of over 18,000 square miles of desert in southeastern California. The MDAB is primarily rural with a few sparsely populated urban centers. The climate is typical of the desert, with generally hot and dry summers and mild winters with little annual rainfall (2-5 inches per year). Due to the San Bernardino and San Gabriel Mountain ranges, which block cool, moist coastal air from flowing into the region from the SCAB, the region is affected by a moderately intense high-pressure circulation (sinking and warming of the air), except during winter periods of frontal activity. An average of 20 to 30 frontal systems move into the area each winter, with prevailing winds being mostly westerly and southerly and the most common wind direction being west to east. The AVAQMD is wholly located in the MDAB.

The MDAB’s proximity to SCAB and the prevailing southwest winds that transport pollutants from more congested urban areas into the region raises ground-level ozone to levels that affect ambient air quality. Violations of the federal O_3 standard occur several times each summer, as do violations of the State standard for PM_{10}, usually in the fall and winter. The largest contributor of air pollution is motor vehicles (AVAQMD 2021).

San Joaquin Valley Air Basin

Elevation and topography can greatly affect localized air quality. The hills and mountains surrounding the San Joaquin Valley restrict air movement through and out of the majority of the basin. The SJVAB encompasses the southern two-thirds of California's Central Valley. Mountain ranges border the sides and southern boundary of the basin. The valley's weather conditions include frequent temperature inversions; long, hot summers; and stagnant, foggy winters, all of which are conducive to forming and retaining air pollutants (SJVAPCD 2024).

The SJVAB is typically arid in the summer, with cool temperatures and prevalent Tule fog (i.e., a dense ground fog) in the winter and fall. The average high temperature in the summer is in the mid-90s, and the average low temperature in the winter is in the high 40s. January is typically the wettest month of the year, with an average of about 2 inches of rain. Wind direction is typically from the northwest, with speeds around 30 mph (Western Regional Climate Center 2024).

3.3.5.2 Attainment Status

Local monitoring data (see Section 3.3.5.3) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS and CAAQS. The four designations are further defined as:

- Nonattainment—Areas where monitored pollutant concentrations consistently violate the standard in question
- Maintenance—Areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard
- Attainment—Areas where pollutant concentrations meet the standard in question over a designated period of time
- Unclassified—Areas where data are insufficient to determine whether a pollutant is violating the standard in question

Table 3.3-6 summarizes the attainment status of the portions of the SCAB with regard to the NAAQS and CAAQS. Table 3.3-7 summarizes the attainment status of the portions of the MDAB with regard to the NAAQS and CAAQS. Table 3.3-8 summarizes the attainment status of the portions of the SJVAB with regard to the NAAQS and CAAQS.

Table 3.3-6 Federal and State Attainment Status of the South Coast Air Basin

Pollutant	Attainment Status	
	Federal	State
Ozone	Nonattainment (extreme)	Nonattainment
PM_{10}	Attainment/Maintenance (serious)	Nonattainment
$PM_{2.5}$	Nonattainment (Serious)	Nonattainment
Carbon Monoxide	Attainment/Maintenance	Attainment
Sulfur Dioxide	Attainment/unclassified	Attainment
Nitrogen Dioxide	Attainment/Maintenance	Attainment
Lead	Nonattainment (partial Los Angeles County only) Attainment (rest of the South Coast Air Basin)	Attainment

Source: Authority 2020a

PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter).

Table 3.3-7 Federal and State Attainment Status of the Mojave Desert Air Basin

Pollutant	Attainment Status	
	Federal	State
Ozone	Nonattainment (Severe – 15)[1]	Nonattainment
PM_{10}	Unclassified	Nonattainment
$PM_{2.5}$	Attainment/unclassified	Unclassified
Carbon Monoxide	Attainment	Attainment
Nitrogen Dioxide	Attainment/unclassified	Attainment
Sulfur Dioxide	Attainment/unclassified	Attainment

Source: Authority 2020a
[1] The "Nonattainment (Severe – 15)" classification represents that the expected timeline for attainment is 15 years.
PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter)

Table 3.3-8 Federal and State Attainment Status of the San Joaquin Valley Air Basin

Pollutant	Attainment Status	
	Federal	State
Ozone	Nonattainment (extreme)	Nonattainment
PM_{10}	Maintenance	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Carbon Monoxide	Attainment	Attainment
Nitrogen Dioxide	Attainment/unclassified	Attainment
Sulfur Dioxide	Attainment/unclassified	Attainment

Source: Authority 2020a
PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter)

3.3.5.3 Ambient Air Quality

The existing air quality conditions in the study area can be characterized by monitoring data collected in the region. CARB and the various air districts operate air quality monitoring stations throughout California to monitor pollutant concentrations. There are 22 currently active air quality monitoring stations in Los Angeles County (CARB 2023). For the purposes of this analysis, three stations—near the northern, central, and southern Build Alternative limits—were selected to represent conditions along the corridor. These stations were selected because they are the three closest stations to the Build Alternatives' footprint and construction activities that provide recent air quality data. They are as follows:

- Lancaster—43301 Division Street, Lancaster, California 93535
- Santa Clarita—22224 Placerita Canyon Road, Santa Clarita, California 91321
- Reseda—18330 Gault Street, Reseda, California 91702

Figure 3.3-4 depicts the locations of these monitoring stations. Table 3.3-9 summarizes the results of ambient monitoring at the three stations, where available, for the most recent 3 years of available data. This 3-year period is between 2019 and 2021 for all three monitoring stations During this period, monitored CO and NO_2 concentrations did not exceed their applicable federal or State standards at the three monitoring locations. However, the State and federal standards for O_3 were exceeded, as well as certain federal and State standards for PM_{10} and $PM_{2.5}$.

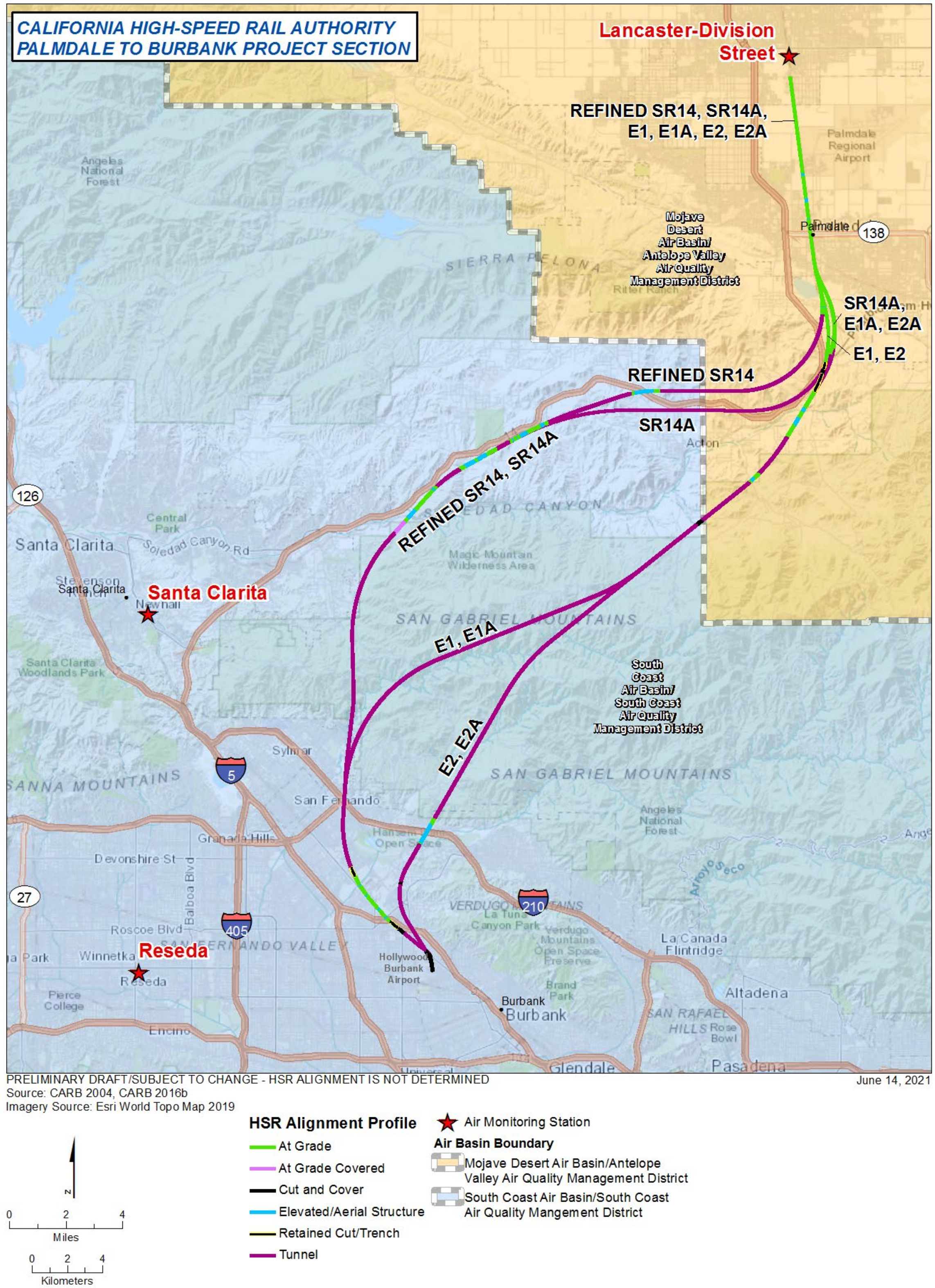


Figure 3.3-4 Air Quality Monitoring Station Locations

Table 3.3-9 Ambient Criteria Pollutant Concentrations at Air Quality Monitoring Stations Along the Palmdale to Burbank Project Section

Pollutant and Standards	Lancaster			Santa Clarita			Reseda		
	2019	2020	2021	2019	2020	2021	2019	2020	2021
Ozone									
Maximum 1-hour concentration (ppm)	0.096	0.099	0.086	0.128	0.148	0.125	0.122	0.142	0.110
Maximum 8-hour concentration (ppm)	0.081	0.083	0.079	0.106	0.122	0.103	0.094	0.115	0.083
Number of days standard exceeded[1]									
CAAQS 1-hour (>0.09 ppm)	1	4	0	34	44	30	14	33	4
NAAQS 8-hour (>0.070 ppm)	13	8	3	56	74	61	34	62	31
CAAQS 8-hour (>0.070 ppm)	14	8	3	57	74	61	37	62	31
Carbon Monoxide									
Maximum 8-hour concentration (ppm)	0.9	1.1	1.1	1.2	0.8	0.7	2.2	1.7	1.9
Maximum 1-hour concentration (ppm)	1.4	1.6	1.4	1.5	1.2	1.0	2.6	2.0	2.6
Number of days standard exceeded[1]									
NAAQS 8-hour (≥9 ppm)	0	0	0	0	0	0	0	0	0
CAAQS 8-hour (≥9.0 ppm)	0	0	0	0	0	0	0	0	0
NAAQS 1-hour (≥35 ppm)	0	0	0	0	0	0	0	0	0
CAAQS 1-hour (≥20 ppm)	0	0	0	0	0	0	0	0	0
Nitrogen Dioxide									
National maximum 1-hour concentration (ppm)	0.050	0.052	0.46	0.046	0.046	0.057	0.064	0.050	0.054
State maximum 1-hour concentration (ppm)	0.049	0.051	0.046	0.046	0.046	0.056	0.064	0.049	0.054
State annual average concentration (ppm)	0.008	0.008	0.008	0.009	0.009	0.010	0.010	0.010	0.010
Number of days standard exceeded[1]									
NAAQS 1-hour (98th Percentile >0.100 ppm)	0	0	0	0	0	0	0	0	0
CAAQS 1-hour (0.18 ppm)	0	0	0	0	0	0	0	0	0

Pollutant and Standards	Lancaster			Santa Clarita			Reseda		
	2019	2020	2021	2019	2020	2021	2019	2020	2021
Annual standard exceeded?									
NAAQS Annual (>0.053 ppm)	No	No	No	No	No	No	No	No	No
CAAQS Annual (>0.030 ppm)	No	No	No	No	No	No	No	No	No
PM_{10}[b]									
National[3] maximum 24-hour concentration (µg/m^3)	165.1	192.3	411.2	62.9	67.8	47.1	N/A	N/A	N/A
National[3] second-highest 24-hour concentration (µg/m^3)	159.9	121.1	99.7	42.0	48.2	39.0	N/A	N/A	N/A
State[4] maximum 24-hour concentration (µg/m^3)	N/A	N/A	N/A	60.1	64.7	45.0	N/A	N/A	N/A
State[4] second-highest 24-hour concentration (µg/m^3)	N/A	N/A	N/A	40.2	46.0	37.3	N/A	N/A	N/A
National annual average concentration (µg/m^3)	22.5	30.6	29.6	18.9	21.5	20.3	N/A	N/A	N/A
State annual average concentration (µg/m^3)[5]	N/A	N/A	N/A	17.9	N/A	19.3	N/A	N/A	N/A
Number of days standard exceeded[1]									
NAAQS 24-hour (>150 µg/m^3)[6]	2	1	1	0	0	0	N/A	N/A	N/A
CAAQS 24-hour (>50 µg/m^3)[6]	N/A	N/A	N/A	1	1	0	N/A	N/A	N/A
Annual standard exceeded?									
CAAQS Annual (>20 µg/m^3)	N/A	N/A	N/A	No	N/A	No	N/A	N/A	N/A
$PM_{2.5}$									
National[2] maximum 24-hour concentration (µg/m^3)	13.6	74.7	35.7	N/A	N/A	N/A	30.0	73.8	55.5
National[2] second-highest 24-hour concentration (µg/m^3)	13.1	73.9	34.9	N/A	N/A	N/A	27.1	36.4	52.0
State[3] maximum 24-hour concentration (µg/m^3)	13.6	74.7	35.7	29.0	43.3	30.1	120.9	80.1	55.5

Pollutant and Standards	Lancaster			Santa Clarita			Reseda		
	2019	2020	2021	2019	2020	2021	2019	2020	2021
State[3] second-highest 24-hour concentration (µg/m³)	13.1	73.9	34.9	20.4	39.7	27.9	33.2	39.8	52.0
National annual average concentration (µg/m³)	6.1	9.2	8.1	N/A	N/A	N/A	9.1	11.0	10.0
State annual average concentration (µg/m³)[5]	6.1	9.3	8.1	N/A	9.0	N/A	11.9	11.0	11.6
Number of days standard exceeded[1]									
NAAQS 24-hour (>35 µg/m³)	0	9	1	N/A	N/A	N/A	0	3	3
Annual standard exceeded?									
NAAQS Annual (>12.0 µg/m³)	No	No	No	N/A	N/A	N/A	No	No	No
CAAQS Annual (>12 µg/m³)	No	No	No	N/A	No	N/A	No	No	No
Sulfur Dioxide									
No data available	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: Authority 2020a

[1] National and State air quality violations are calculated from measured average maximum concentrations of pollutants over extended periods of time. In contrast, an exceedance of a threshold is a measurement representing a single day. Refer to Table 3.3-1 for more information on air quality standards.
[2] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.
[3] State statistics are based on local conditions data, except in the SCAB, for which statistics are based on standard conditions data. In addition, state statistics are based on California-approved samplers.
[4] Measurements usually are collected every six days.
[5] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
[6] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.
CAAQS = California Ambient Air Quality Standards; µg/m³ = micrograms per cubic meter; N/A = not applicable (or insufficient/no data available to determine the value); NAAQS = National Ambient Air Quality Standards; ppm = parts per million; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAB = South Coast Air Basin;
> = greater than; ≥ = greater than or equal to.

3.3.5.4 Emissions Inventory

An emissions inventory is an accounting of the total emissions from all sources in a particular geographic area over a specified time period. Emission inventories are used in air quality planning and can provide a general indication of existing air quality in an area.

Criteria Pollutants

CARB maintains an annual emission inventory for each county and air basin in California. The inventory for Los Angeles County is composed of data submitted to CARB by the local air districts plus estimates for certain source categories, which are provided by CARB staff.

The 2012 air pollutant inventory data for Los Angeles County are summarized in Table 3.3-10. Mobile source (i.e., on-road vehicles such as cars and truck as well as off-road vehicles such as ships, airplanes, and agricultural equipment) emissions represent the majority of ROG, NO_X, and CO emissions, while area sources (i.e., small, stationary sources such as dry cleaners or auto body paint shops) represent the majority of PM_{10} and $PM_{2.5}$ emissions.

Statewide Greenhouse Gas

CARB maintains a statewide emissions inventory of GHGs. The most recent inventory (2018) is provided in Table 3.3-11 (CARB 2020). In 2018, the largest contributor to GHG emissions was the transportation sector (41 percent). This sector includes emissions from on-road vehicles, waterborne vessels, and rail operations. The next largest contributor to emissions was the industrial sector (24 percent), followed by electricity generations (in-state and imports).

Table 3.3-10 Estimated Annual Average Emissions for Los Angeles County[1] (tons/day)

Source Category	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Stationary Sources						
Fuel combustion	8	35	34	6	6	5
Waste disposal	5	1	2	<1	<1	<1
Cleaning and surface coatings	22	<1	<1	<1	1	1
Petroleum production and marketing	23	5	1	2	2	1
Industrial processes	6	1	<1	<1	14	5
Total stationary sources	65	41	38	9	22	13
Stationary sources percentage of total	*22%*	*3%*	*11%*	*56%*	*22%*	*30%*
Areawide Sources						
Solvent evaporation	65	0	0	0	<1	<1
Miscellaneous processes	7	37	13	<1	53	17
Total areawide sources	72	37	13	<1	53	17
Stationary sources percentage of total	*25%*	*3%*	*4%*	*2%*	*54%*	*39%*
Mobile Sources						
Solvent evaporation	101	857	195	1	17	9
Miscellaneous processes	56	405	103	5	6	5
Total areawide sources	157	1,262	298	7	22	14
Mobile sources percentage of total	*54%*	*94%*	*85%*	*44%*	*22%*	*32%*
Total[2]	**293**	**1,340**	**349**	**16**	**98**	**44**

Source: Authority 2020a
[1] 2012 data published in 2017.
[2] Totals may not add up exactly due to rounding.
< = less than CO = carbon monoxide; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); ROG = reactive organic gas; SO_X = sulfur oxides

Table 3.3-11 California Greenhouse Gas Inventory (2018)

Sector	Emissions (MMT CO_2e)	Percentage of Inventory
Transportation	174	41%
Industrial	102	24%
Electricity generation (in-state)	38	9%
Electricity generation (imports)	25	6%
Agriculture and forestry	34	8%
Residential	30	7%
Commercial	21	5%
Total[1]	**425**	**100%**

Source: CARB 2020
[1] Totals may not add up exactly due to rounding.
CO_2e = carbon dioxide equivalent; MMT = million metric tons; < = less than

3.3.5.5 Sensitive Receptors

The people in some locations are considered more sensitive to adverse effects from air pollution than in others. These locations, termed "sensitive receptors," include schools, daycare facilities, elderly care establishments, medical facilities, and other areas with people considered particularly vulnerable to the effects of poor air quality. Residential uses are also considered sensitive because people in residential areas are often at home—and therefore exposed to pollutants—for extended periods of time. Recreational areas are considered moderately sensitive to poor air quality because vigorous exercise associated with recreation places a high demand on the human respiratory function.

Providing a separation of at least 1,000 feet from diesel sources and high-traffic areas substantially reduces exposure to air contaminants and decrease asthma symptoms in children (CARB 2005). Non-residential sensitive receptors located within 1,000 feet from the Build Alternative right-of-way are shown in Table 3.3-12, and all sensitive receptors are shown on Figure 3.3-5 through Figure 3.3-14. As depicted in the figure sets, residential land uses are the most common sensitive receptors along the corridor, including uses that are adjacent to the Build Alternative alignments. Other sensitive receptors along the corridor include schools, hospitals, and recreational areas.

Table 3.3-12 Non-Residential Sensitive Receptors within 1,000 Feet of the Build Alternatives

Sensitive Receptors	Distance from Build Alternative Alignment (feet)					
	Refined SR14	SR14A	E1	E1A	E2	E2A
AERO Institute, Palmdale	796	796	796	796	796	796
BHC Child Development Center, Burbank	859	859	859	859	859	859
Californian RV Resort, Acton	N/A	33	N/A	N/A	N/A	N/A

Sensitive Receptors	Distance from Build Alternative Alignment (feet)					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Doctor Robert C. Saint Clair Parkway, Palmdale	Adjacent	Adjacent	Adjacent	Adjacent	Adjacent	Adjacent
Embry-Riddle Aeronautical University, Palmdale	274	274	274	274	274	274
High Desert School, Acton	N/A	445	N/A	N/A	N/A	N/A
Hillery Broadous Early Educational Center, Pacoima	Adjacent	Adjacent	Adjacent	Adjacent	N/A	N/A
Hillery T. Broadous Elementary School, Pacoima	Adjacent	Adjacent	Adjacent	Adjacent	N/A	N/A
Hubert M. Humphrey Memorial Park, Pacoima	Adjacent	Adjacent	Adjacent	Adjacent	N/A	N/A
Maclay Middle School, Pacoima	137	137	137	137	N/A	N/A
Pacifica Hospital of the Valley, Sun Valley	397	397	397	397	N/A	N/A
R. Rex Parris High School, Palmdale	100	100	100	100	100	100
River's End Recreational Park, Santa Clarita	390	390	N/A	N/A	N/A	N/A
Roscoe Elementary School, Sun Valley	Adjacent	Adjacent	Adjacent	Adjacent	N/A	N/A
Stonehurst Avenue Elementary School, Sun Valley	N/A	N/A	N/A	N/A	Adjacent	Adjacent
Stonehurst Recreation Center, Sun Valley	N/A	N/A	N/A	N/A	867	867
Sun Valley Recreation Center, Sun Valley	Adjacent	Adjacent	Adjacent	Adjacent	N/A	N/A
Vasquez High School, Acton	N/A	735	N/A	N/A	N/A	N/A

Note: As described above, only sensitive receptors within 1,000 feet of the Build Alternative right-of-way are included in this table and in the subsequent analysis.
N/A = not applicable (i.e., sensitive receptors located beyond 1,000 feet of the Build Alternative)

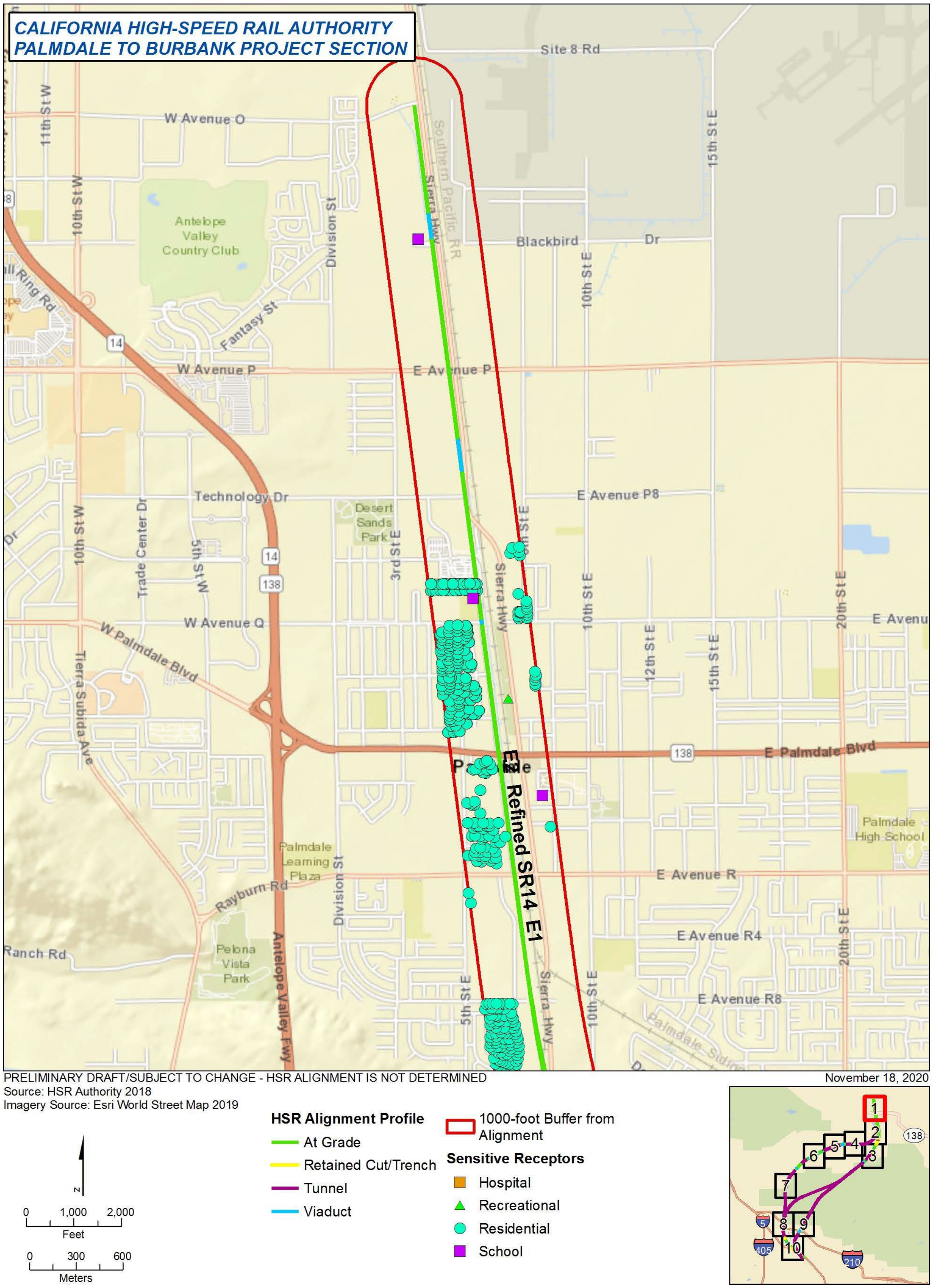


Figure 3.3-5 Sensitive Receptors in Resource Study Area (Map 1 of 10)

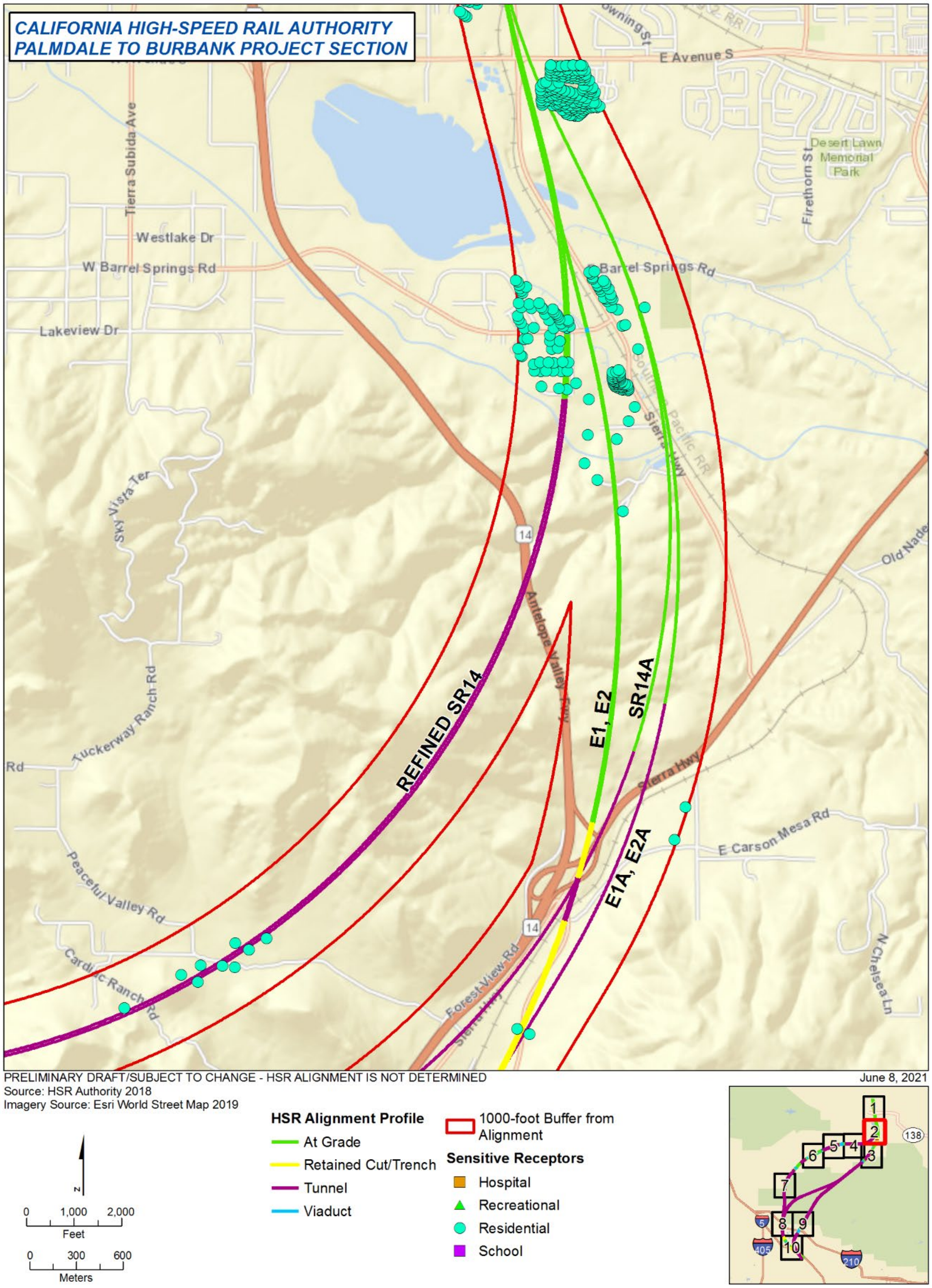


Figure 3.3-6 Sensitive Receptors in Resource Study Area (Map 2 of 10)

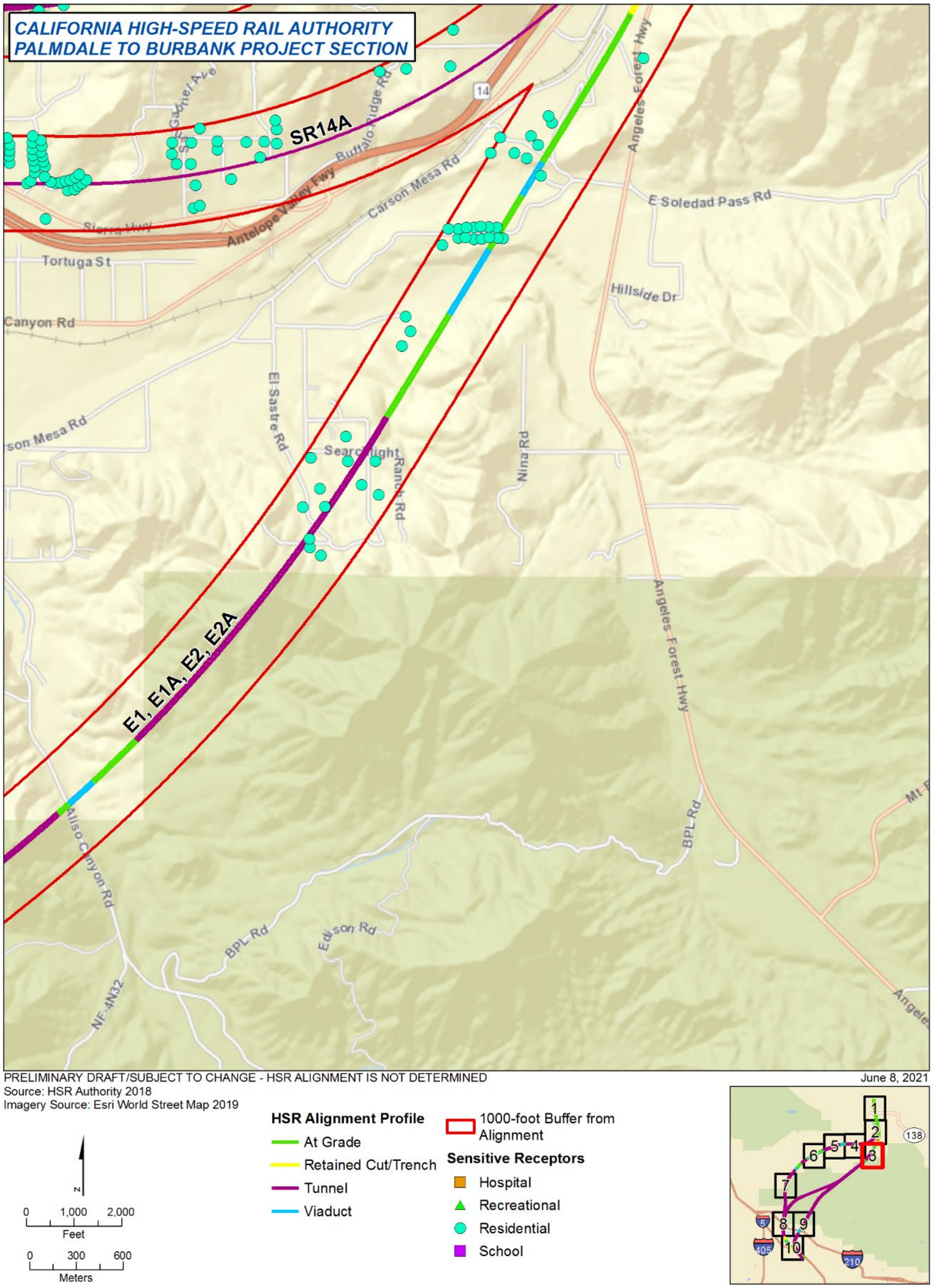


Figure 3.3-7 Sensitive Receptors in Resource Study Area (Map 3 of 10)

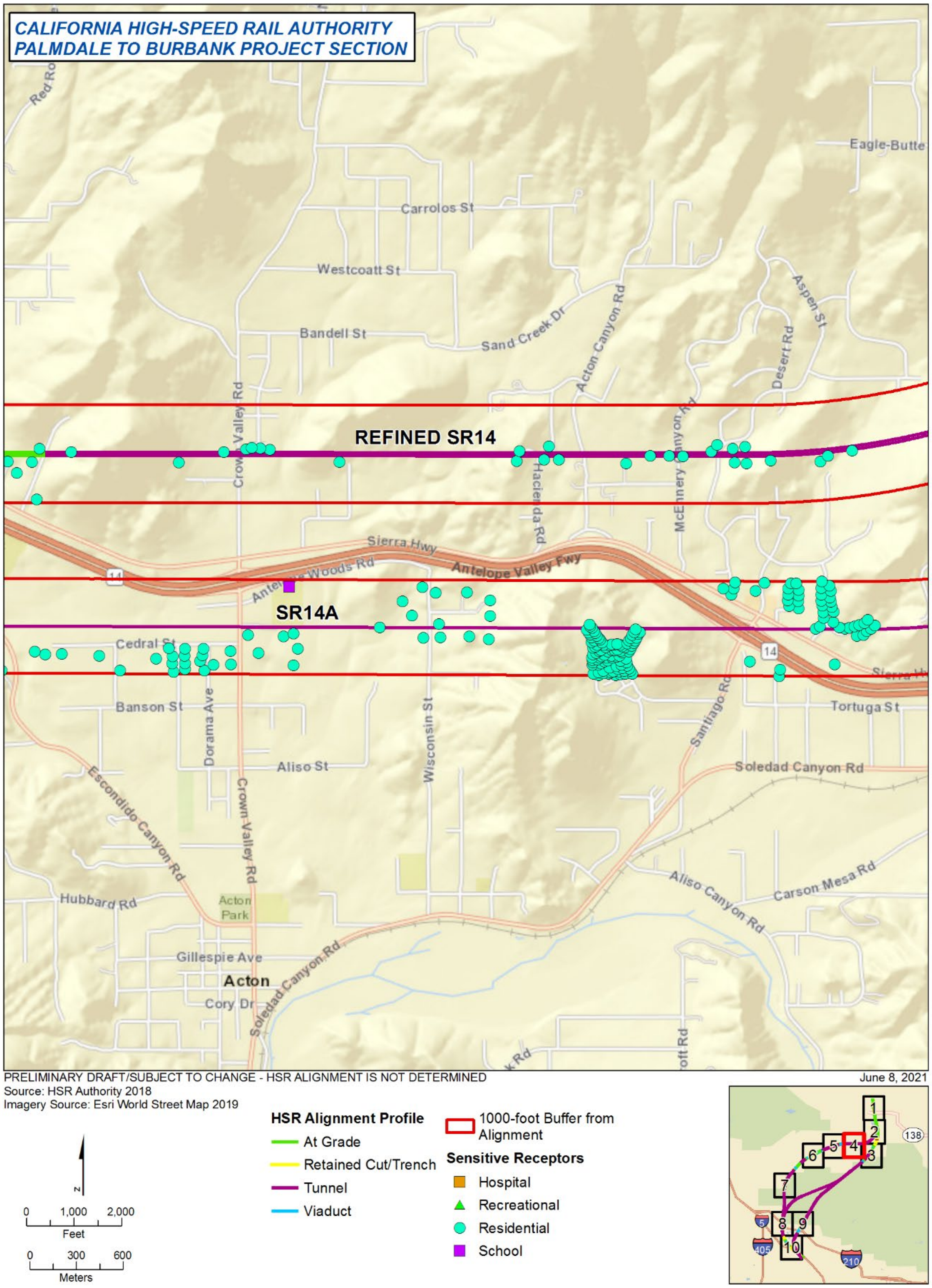


Figure 3.3-8 Sensitive Receptors in Resource Study Area (Map 4 of 10)

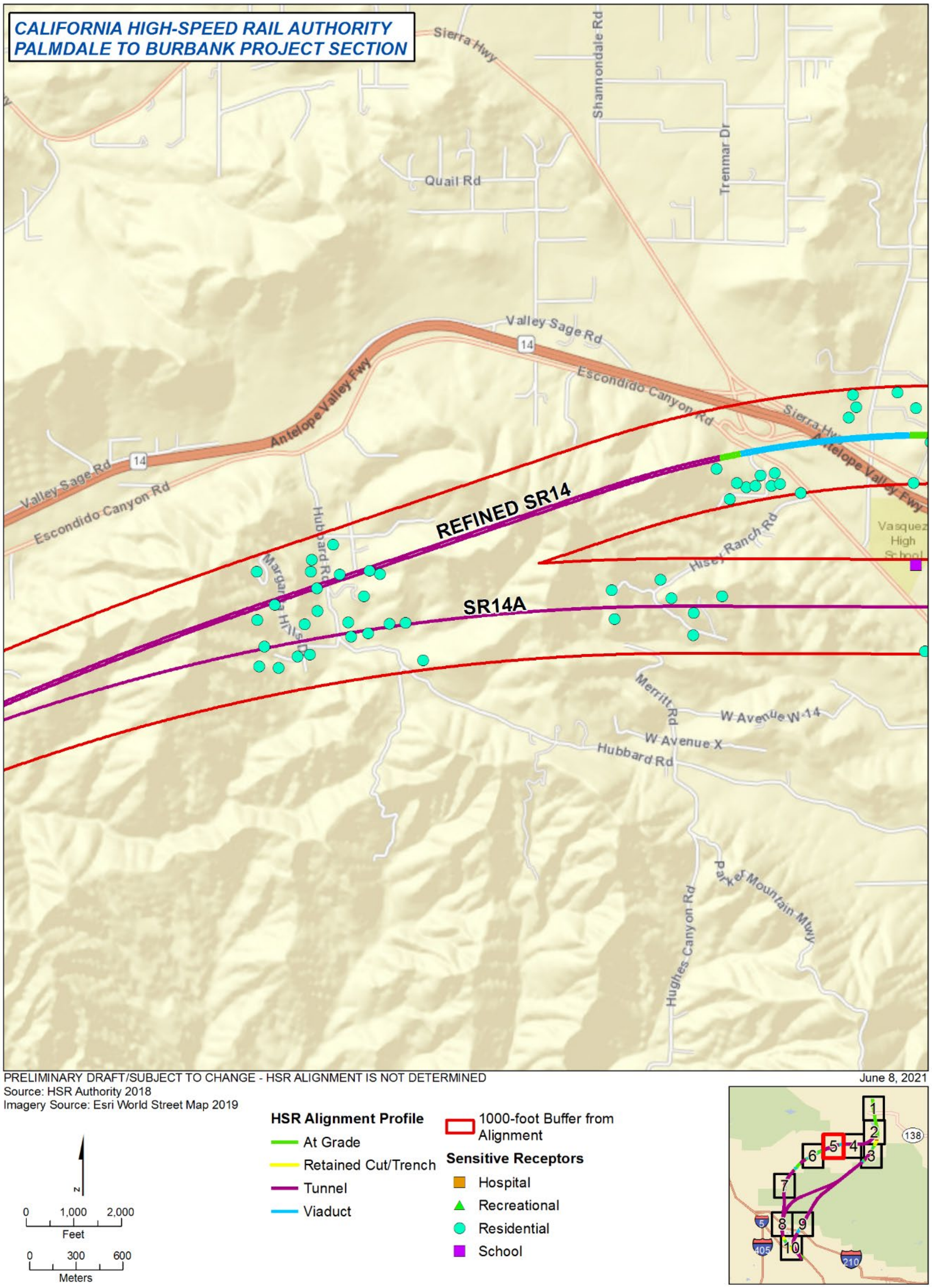


Figure 3.3-9 Sensitive Receptors in Resource Study Area (Map 5 of 10)

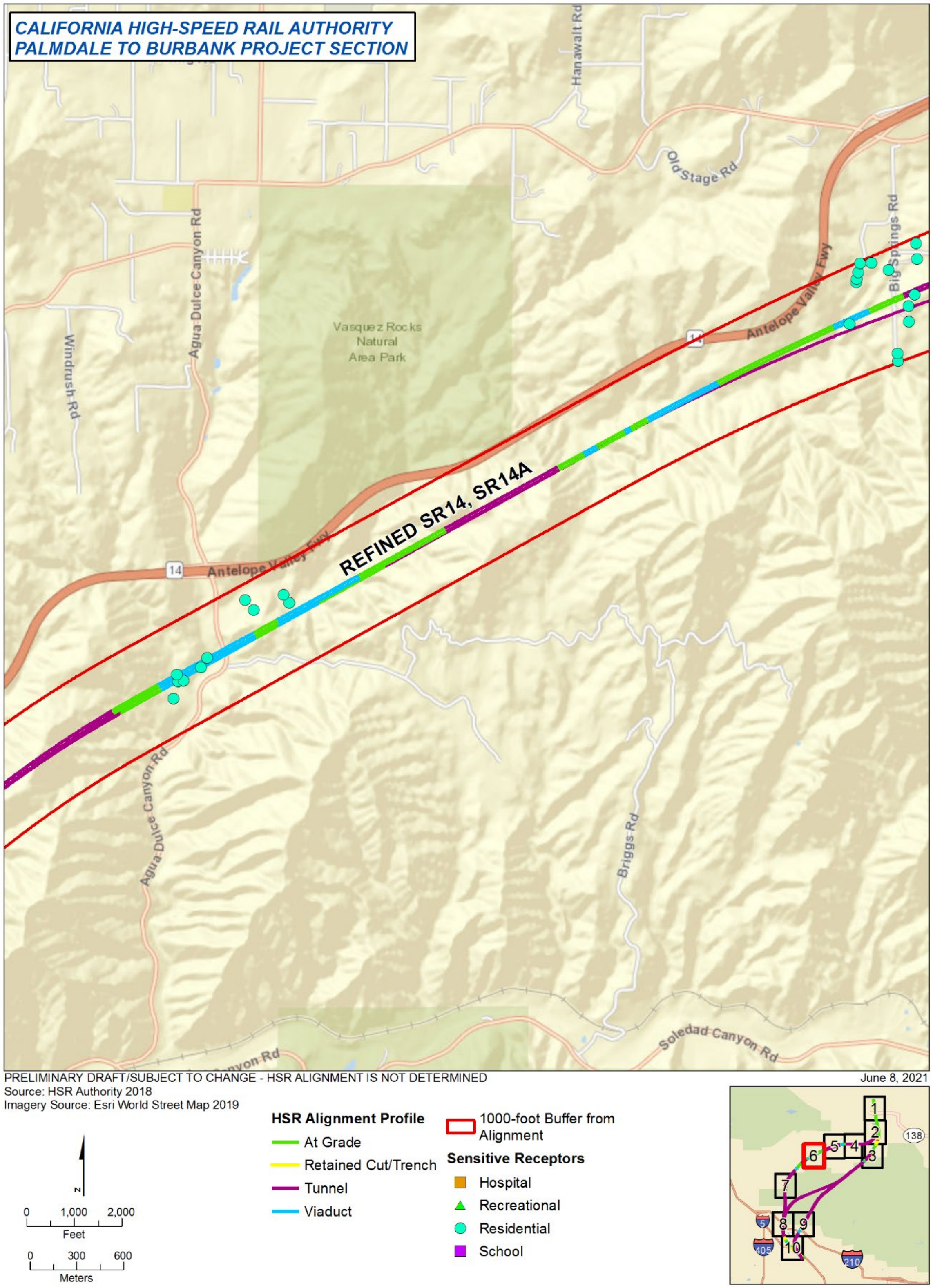


Figure 3.3-10 Sensitive Receptors in Resource Study Area (Map 6 of 10)

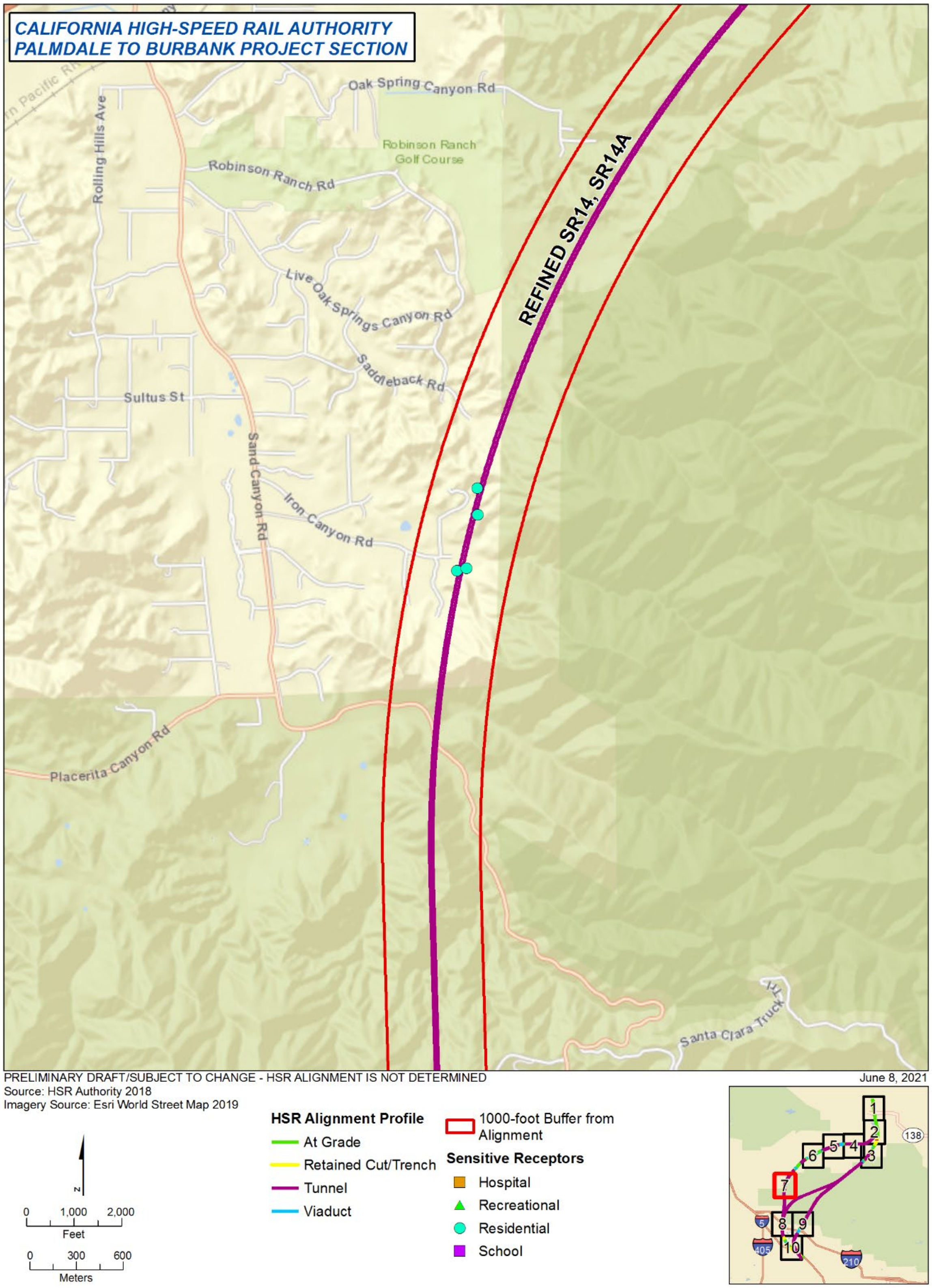


Figure 3.3-11 Sensitive Receptors in Resource Study Area (Map 7 of 10)

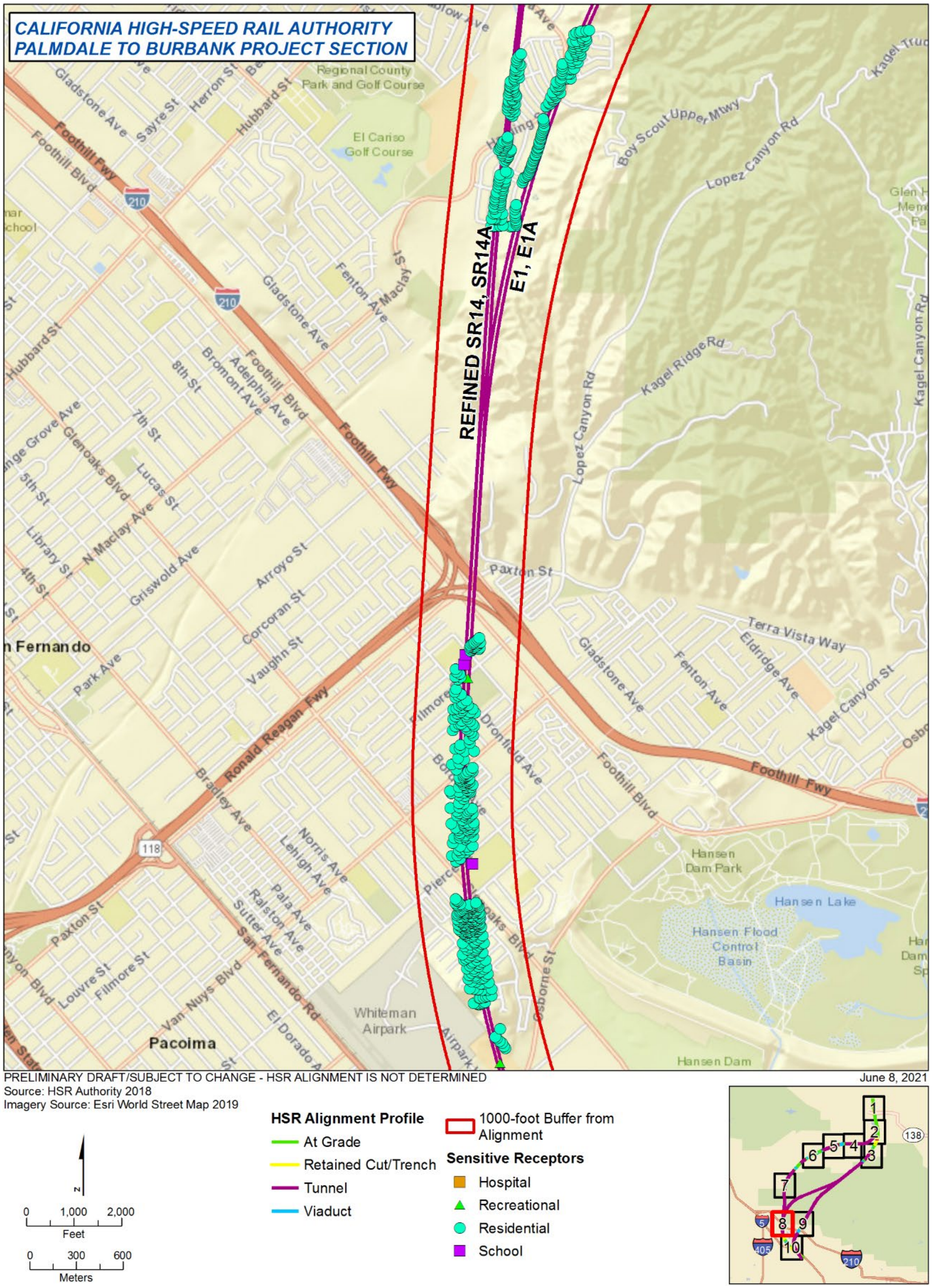


Figure 3.3-12 Sensitive Receptors in Resource Study Area (Map 8 of 10)

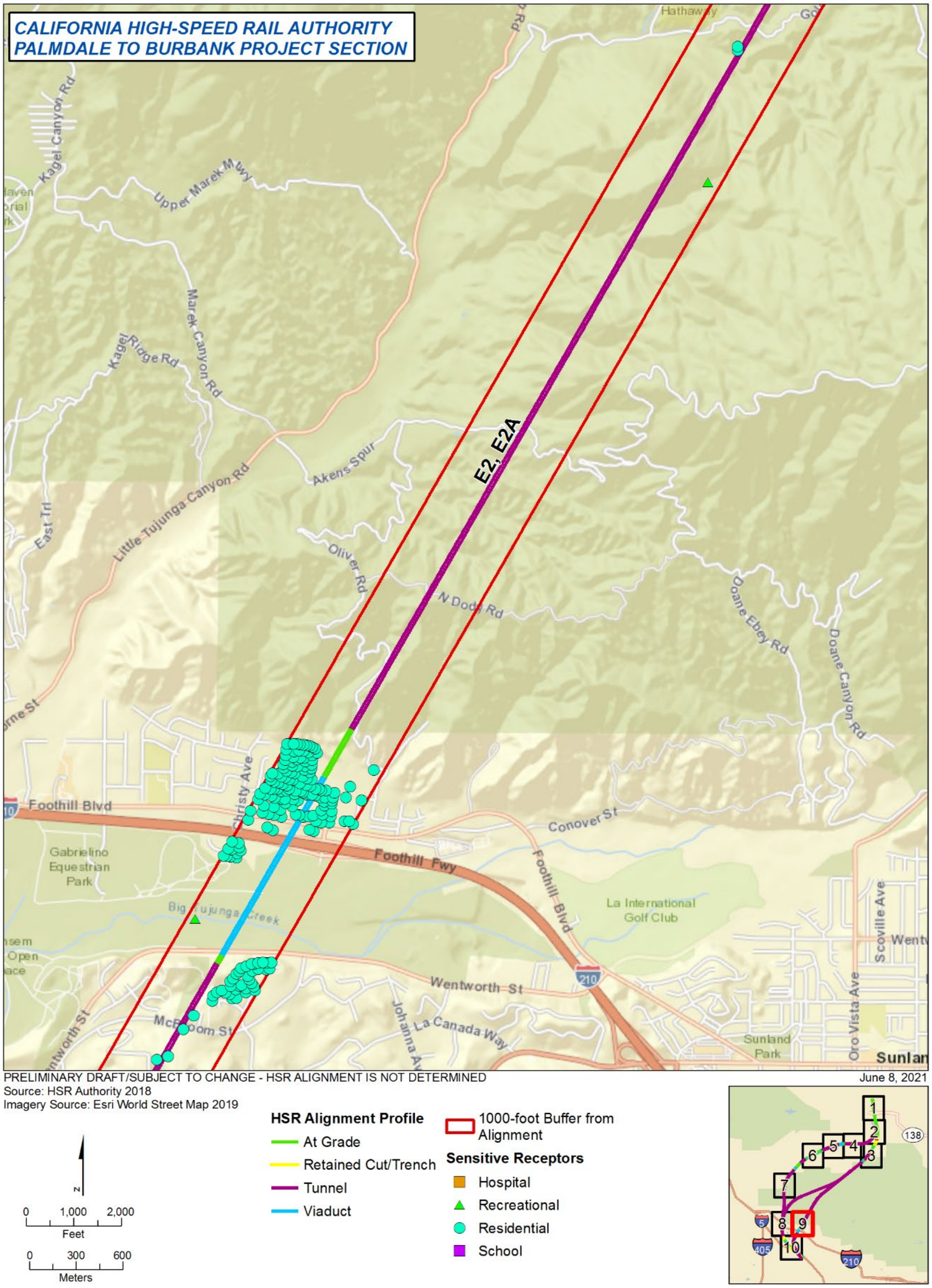


Figure 3.3-13 Sensitive Receptors in Resource Study Area (Map 9 of 10)

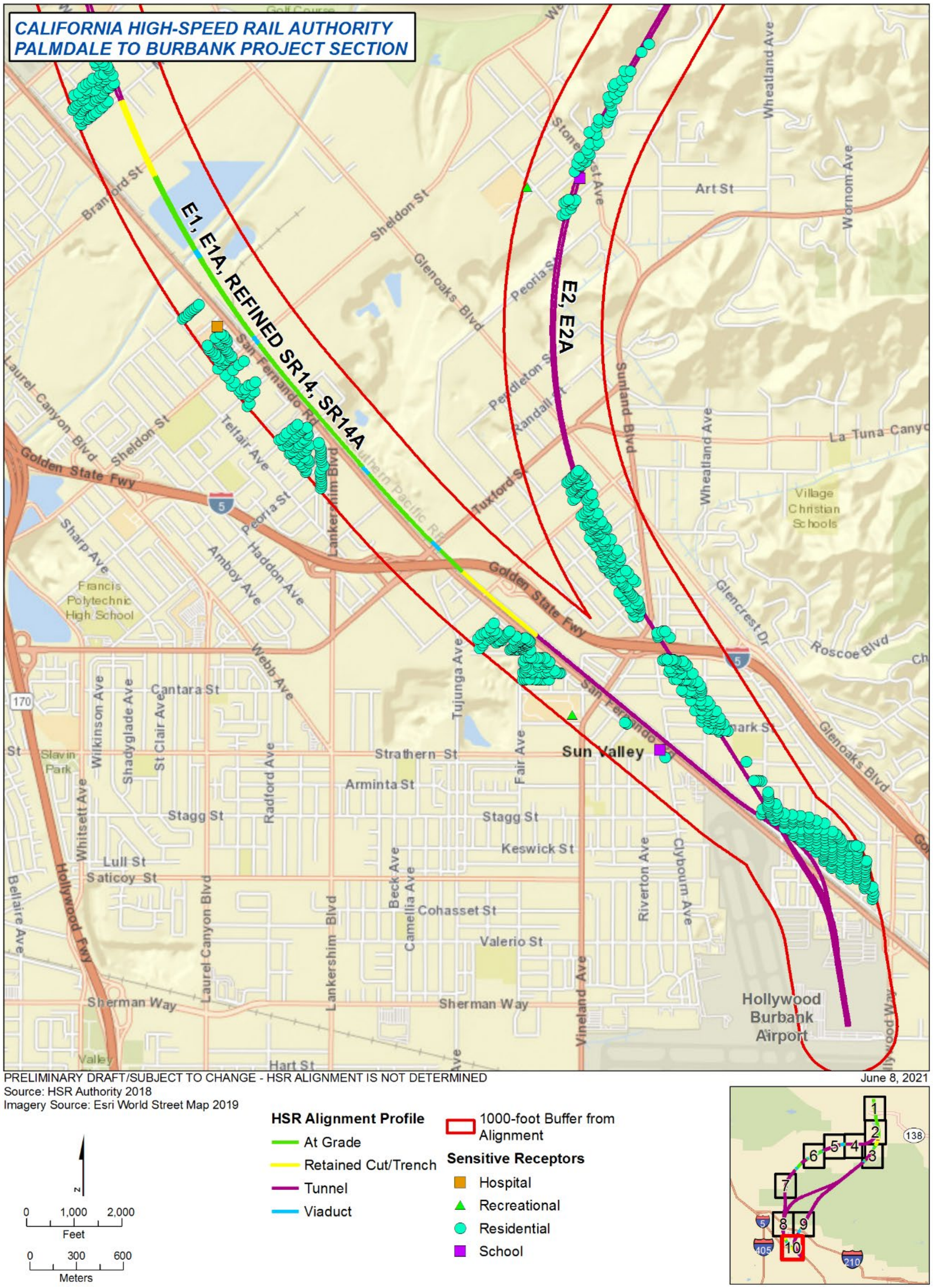


Figure 3.3-14 Sensitive Receptors in Resource Study Area (Map 10 of 10)

3.3.6 Environmental Consequences

3.3.6.1 Overview

Using the methods described in Section 3.3.4, this section evaluates air quality and GHG impacts that would result from construction and operation of the Palmdale to Burbank Project Section.[11] The impacts of the Build Alternatives are described and organized as follows.

Pollutants Referenced in this Section

CO = carbon monoxide

CO_2e = carbon dioxide equivalent

DPM = diesel particulate matter

GHG = greenhouse gas

O_3 = ozone

NO_2 = nitrogen dioxide

NO_X = nitrogen oxides

PM_{10} = respirable particulate matter (10 microns or less in diameter)

$PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter)

SO_2 = sulfur dioxide

TAC = toxic air contaminant

VOC = volatile organic compound

Air Quality Effects Analysis

- **Construction Impacts**
  - Impact AQ#1: Exposure to Asbestos- and Lead-Containing Materials during Construction.
  - Impact AQ#2: Regional Air Quality Impacts during Construction.
  - Impact AQ#3: Compliance with Air Quality Plans during Construction.
  - Impact AQ#4: Health Risks Assessment for Construction-Period Emissions.
  - Impact AQ#5: Localized Construction Effects.
- **Operations Impacts**
  - Impact AQ#6: Statewide and Regional Pollutant Emissions.
  - Impact AQ#7: Mobile Source Air Toxics Analysis.
  - Impact AQ#8: Fugitive Dust Emissions from Train Movement.
  - Impact AQ#9: Localized Increases in Carbon Monoxide Emissions Due to Project Operations.
  - Impact AQ#10: Generation of Other Emissions (Such as Those Leading to Odors) during Project Operations.
  - Impact AQ#11: Compliance with Air Quality Plans during Project Operations.

Global Climate Change Effect Analysis

- **Construction Impacts**
  - Impact AQ#12: Total Regional Construction Greenhouse Gas Emissions.
- **Operations Impacts**
  - Impact AQ#13: Statewide and Regional Operations Greenhouse Gas Emissions Analysis.

[11] The construction impacts analysis does not include the facilities within the Palmdale Station and Maintenance Facility subsections. The operations impacts analysis does include these facilities in order to provide regional context under project operation.

3.3.6.2 No Project Alternative

The No Project Alternative assumes that the Palmdale to Burbank Project Section would not be constructed.

In assessing future conditions, it was assumed that all currently known, programmed, and funded improvements to the intercity transportation system (highway, rail, and transit), and reasonably foreseeable local development projects (with funding sources already identified) would be developed as planned by 2040.

Table 3.3-13 summarizes estimated statewide emission burdens under No Project Alternative conditions in 2015 and 2040 under the two ridership scenarios described in Section 3.3.4. Although there would be no ridership under the No Project Alternative, the Authority still uses both scenarios for the No Project Alternative to appropriately compare the No Project Alternative with the Build Alternatives. The “high ridership” scenario differs from the “medium ridership” scenario because the scenarios assume different background conditions. These differences in the conditions include demographic forecasts, estimates of automobile operating costs, travel times, air travel times, and airfares. These differences in conditions, between the “high ridership” and “medium ridership” scenarios, would affect the emissions associated with on-road vehicles, aircrafts, and power plants. As shown in these tables, total emissions for VOCs, CO, and NO_X in 2040 would be lower than the levels in 2015. The decreases in emissions for these pollutants would occur because of the anticipated increased efficiencies and improvements in vehicle emission technology in future years, despite increases in aircraft and power plants emissions resulting from increased population and economic growth. In contrast, emissions of SO_2, PM_{10}, and $PM_{2.5}$ in 2040 would be higher than the levels in 2015, because emissions of these pollutants are dependent on factors other than vehicle emission technology. Improvements in vehicle emission technology would not influence PM_{10} and $PM_{2.5}$ emissions that result from noncombustion processes, such as brake wear or other sources of on-road dust. This is because vehicle emission technology improvements generally target tailpipe emissions, such as CO_2, methane, and nitrous oxide.

Emissions of SO_2, which are most commonly generated from power plants and other industrial facilities, are expected to increase as demand for energy and industrial products rise along with population and economic growth. These increases in emissions would lead to a degradation of regional air quality in air basins throughout the state. Additionally, implementation of the SCAG’s 2020–2045 RTP/SCS would reduce GHG emissions from passenger vehicles and light-duty trucks by 8 percent per capita by 2020 and 19 percent per capita by 2035 compared to 2005. Temporary and localized construction emissions would affect greater numbers of sensitive receptors in urban centers such as Palmdale and Burbank; however, air quality impacts are generally regional and not tied to a specific geographic location. Impacts on rural locations, such as the ANF, are discussed in Section 3.3.10.

Table 3.3-13 Estimated Statewide Emissions under No Project Conditions

Element	VOCs(tons/year)		CO (tons/year)		NO_X (tons/year)		SO_2(tons/year)		PM_{10}(tons/year)		$PM_{2.5}$(tons/year)	
	M	H	M	H	M	H	M	H	M	H	M	H
Year 2015												
On-Road Vehicles	7,839	7,800	324,144	322,534	33,370	33,204	767	763	22,981	22,867	6,242	6,211
Aircraft	338	315	2,888	2,692	2,779	2,589	299	279	84	78	84	78
Power Plants	1,893	1,893	25,767	25,767	13,476	13,476	1,609	1,609	3,189	3,189	2,880	2,880
Total Statewide Net Emissions[1]	*10,070*	*10,008*	*352,800*	*350,993*	*49,624*	*49,269*	*2,675*	*2,651*	*26,254*	*26,134*	*9,206*	*9,170*

Element	VOCs(tons/year)		CO (tons/year)		NO_X (tons/year)		SO_2(tons/year)		PM_{10}(tons/year)		$PM_{2.5}$(tons/year)	
	M	H	M	H	M	H	M	H	M	H	M	H
Year 2040												
On-Road Vehicles	1,059	1,093	91,121	94,097	6,688	6,907	534	552	28,262	29,185	7,383	7,625
Aircraft	474	520	3,968	4,348	3,908	4,282	423	464	118	129	118	129
Power Plants	2,579	2,579	39,173	39,173	16,080	16,080	2,104	2,104	4,082	4,082	3,686	3,686
Total Statewide Net Emissions[1]	*4,112*	*4,192*	*134,261*	*137,618*	*26,676*	*27,269*	*3,062*	*3,120*	*32,463*	*33,397*	*11,187*	*11,440*

Source: Authority 2020a
[1] Totals may not add up exactly due to rounding.
CO = carbon monoxide; H = high ridership scenario M = medium ridership scenario; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SO_2 = sulfur dioxide; VOC = volatile organic compound

The high ridership scenario differs from medium scenario in the No Project Alternative because the scenarios assume different background conditions. These are differences in the conditions surrounding the California HSR System and are more extensive than changes in service patterns (e.g., changes in demographics, willingness to travel, air fares, automobile operating costs). For example, an increase in the price of gasoline would lead to higher transit use and a decrease in automobile travel. The ridership data is based on the Authority's 2016 Business Plan (Authority 2016). For additional information about travel demand and ridership forecasts, see Section 2.6, Travel Demand and Ridership Forecasts, of the Final EIR/EIS.

3.3.6.3 Build Alternatives

Air Quality Effects Analysis

Construction Impacts

Construction of the Build Alternatives would involve demolition of existing structures, clearing, and grubbing, reduction of permeable surface area, handling, storing, hauling, excavating, and placing fill, possible pile driving, and construction of aerial structures, bridges, road modifications, utility upgrades and relocations, HSR electrical systems, and railbeds. These construction activities would generate criteria pollutant and GHG emissions during the projected 2020–2029-year construction period. This construction impacts analysis does not include facilities associated with the Palmdale Station and Lancaster Maintenance Facility. Construction activities are further described in Chapter 2, Alternatives.

Impact AQ#1: Exposure to Asbestos- and Lead-Containing Materials during Construction.

Asbestos is a naturally occurring mineral often used in building materials and construction. Because asbestos has been proven to cause serious and fatal diseases, it is strictly regulated in its use as a building material and where it occurs naturally. All six Build Alternatives would pass through Los Angeles County, which, according to the California Department of Conservation (CDMG 2020), is not likely to contain naturally occurring asbestos. Further information on Palmdale to Burbank Project Section–related risks associated with exposure to ACM is provided in Section 3.10, Hazardous Materials and Wastes.

Buildings in the local RSA might contain residual lead, which was used as a pigment and drying agent in oil-based paint until the Lead-Based Paint Poisoning Prevention Act of 1971 prohibited such use. As such, the exposure to asbestos and lead would be limited to the demolition of ACM found in existing buildings that would be displaced during construction of the Build Alternatives.

For more information on demolition and displacement associated in the Palmdale to Burbank Project Section, refer to Section 3.12, Socioeconomics and Communities.

As detailed in Section 3.12, Socioeconomics and Communities, the Refined SR14 Build Alternative would displace the most residences and businesses combined. Therefore, the Refined SR14 Build Alternative would have the greatest risk to release ACM and lead-containing materials in the air. Should ACM be encountered during demolition, demolition activities would be subject to the limitations of the National Emissions Standards for Hazardous Air Pollutants regulations and would require an asbestos inspection (USEPA 2019). HMW-IAMF#5, which incorporated as part of the project design, requires that, prior to construction, the contractor shall prepare demolition plans for the safe dismantling and removal of building components and debris. The demolition plans will include a plan for asbestos and lead paint abatement that complies with federal and State regulations, including the National Emissions Standards for Hazardous Air Pollutants. The plans shall be submitted to the Project Construction Manager on behalf of the Authority for verification that appropriate demolition practices will be followed. AVAQMD's and SCAQMD's Compliance Divisions would be consulted before demolition begins. Full details regarding HMW-IAMF#5 can be found in Section 3.3.4.2. See Section 3.10, Hazardous Materials and Wastes, for a detailed analysis of other hazardous materials that would be encountered during demolition.

CEQA Conclusion

Construction of the six Build Alternatives would entail demolition of properties that may contain ACM or lead; thus, construction of each of the Build Alternatives could result in releases of ACM or lead into the air. However, the Build Alternatives incorporate HMW-IAMF#5, which requires the construction contractor to prepare a safe asbestos and lead abatement plan for the removal of building components and debris that complies with federal and State regulations. Compliance with existing asbestos and lead-based paint regulations will avoid exposing sensitive receptors to substantial pollutant concentrations associated with asbestos or lead. The impact of localized effects on sensitive receptors to substantial pollutant concentrations from asbestos and lead-paint would be less than significant under CEQA for the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives. Therefore, CEQA does not require any mitigation.

Impact AQ#2: Regional Air Quality Impacts during Construction.

After circulation of the Draft EIR/EIS, supplemental analyses were conducted regarding emissions associated with haul trucks required to transport contaminated spoil material and emissions associated with the trucking of recycled water for the tunnel boring machines during construction.

Class I/Class II Hazardous/Designated Waste spoils would be transported to a landfill site near the city of Buttonwillow, California, approximately 127 miles away from the Refined SR14 and SR14A Build Alternatives. Class III Non-Hazardous, Contaminated Wastes and Class III Non-Hazardous, Uncontaminated Waste landfill facilities are located an average distance of 40 and 20 miles away, respectively. These hauling distances would be similar for all Build Alternatives.

As the SR14A Build Alternative has the highest volume of spoils and longest tunnels, the supplemental analyses were conducted only for the SR14A Build Alternative. As presented below for the SR14A Build Alternative, the supplemental analysis determined that the change in emissions would not result in any new significant impacts within the SCAB/SCAQMD area. In addition, the new emissions within the SJVAB/SJVAPCD area would not exceed the General Conformity *de minimis* levels or the CEQA thresholds. For the other build alternatives, the emissions from haul trucks and recycled water trucks would result in a decrease in NOx, CO, and ROG emissions and a small increase in PM_{10}, $PM_{2.5}$, and SO_2 emissions. However, as with Alternative SR14A, the change in emissions would not result in new or substantially more severe significant impacts for those alternatives.

Refined SR14 Build Alternative

Construction activities associated with the Refined SR14 Build Alternative would result in criteria pollutant emissions in both the SCAB, which is under the jurisdiction of the SCAQMD, and the portion of the MDAB that is under the jurisdiction of the AVAQMD. See Section 3.3.4 for a detailed discussion of the assumptions and tools used to calculate construction-period criteria pollutants.

Construction Schedule

As shown in Table 3.3-14, emissions vary from year to year according to the construction activities being performed. For a schedule of construction activities, refer to Table 3.3-4.

As described in Section 3.3.4.2, the Refined SR14 Build Alternative would incorporate the following IAMFs during construction to reduce construction-period pollutant emissions:

- AQ-IAMF#1—The contractor will employ measures to minimize and control fugitive dust emissions. The measures will be included in a fugitive dust control plan that will be prepared for approval by each air district prior to construction.
- AQ-IAMF#2—The contractor will use super-compliant or clean air paints that have a lower VOCs content than that required by the air districts.
- AQ-IAMF#3—The contractor will use renewable diesel fuel to minimize and control exhaust emissions from all heavy-duty diesel-fueled construction diesel equipment and on-road diesel trucks.
- AQ-IAMF#4—The Authority will require all heavy-duty equipment used during the construction phase to meet Tier 4 engine requirements.
- AQ-IAMF#5—The Authority will incorporate the material-hauling truck fleet mix requirements into the contract specifications including that all on-road trucks used for hauling during construction will be model year 2020 or newer.
- AQ-IAMF#6—Prior to construction of any concrete batch plant, the contractor will provide the Authority with a technical memorandum documenting consistency with the Authority's concrete batch plant siting criteria and utilization of typical control measures to reduce fugitive dust and emissions.

While AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emission results determined that exceedance of applicable *de minimis* levels in the SCAB will still occur. The calculated annual construction emissions for the Refined SR14 Build Alternative, including incorporation of the IAMFs, are presented in Table 3.3-14. This table shows applicable General Conformity *de minimis* levels in the SCAB and indicates whether the Refined SR14 Build Alternative would exceed these levels. As the SCAB is in maintenance for the NO_2 NAAQS, the emissions must be calculated and compared to the applicable General Conformity *de minimis* level. As NO_2 is a subset of NO_X, for the purposes of this analysis, the NO_2 emissions are assumed to be equal to the NO_X emissions. NOx are a mixture of gases that are composed of nitrogen and oxygen. These gases include nitric oxide (NO), nitrogen dioxide NO_2, nitrous oxide (N_2O), and nitrogen pentoxide (NO_5). Although NO_2 is the criteria pollutant, both NO and N_2O are emitted by cars, trucks, buses, power plants, and non-road engines and equipment. The emitted NO is rapidly oxidized into NO_2 in the atmosphere. Therefore, to capture both the emitted and oxidized NO_2, the project's NOx emissions are reported. The annual construction emissions results demonstrate that the Refined SR14 Build Alternative would result in the following exceedances of General Conformity *de minimis* levels applicable to the SCAB:

- NO_X: 2021–2025
- CO: 2023

Table 3.3-14 Annual Construction Emissions in the South Coast Air Basin – Refined SR14 Build Alternative

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis* levels[1]	10	10	100	100	100	100	70
Annual CEQA threshold	The SCAQMD does not have annual CEQA thresholds. The SCAQMD CEQA thresholds for daily emissions are presented in subsequent tables.						
Year 2020							
Emissions (tons/year)	1.1	9.8	9.8	36.0	0.1	3.9	1.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2021							
Emissions (tons/year)	2.9	40.3	40.3	69.0	0.3	8.8	2.3
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2022							
Emissions (tons/year)	4.4	44.0	44.0	98.2	0.3	10.3	2.8
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2023							
Emissions (tons/year)	4.7	46.9	46.9	105.1	0.3	11.6	3.2
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	Yes	No	No	No
Year 2024							
Emissions (tons/year)	2.3	23.5	23.5	58.9	0.2	5.7	1.6
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2025							
Emissions (tons/year)	0.9	10.4	10.4	30.5	0.1	3.0	1.0
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2026							
Emissions (tons/year)	0.4	5.3	5.3	13.5	<0.1	1.2	0.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2027							
Emissions (tons/year)	0.2	3.0	3.0	8.5	<0.1	0.4	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Year 2028							
Emissions (tons/year)	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2029							
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No

Source: Authority 2020a
[1] The General Conformity *de minimis* levels for criteria pollutants are based on the SCAB federal attainment status. The SCAB is considered an extreme nonattainment area for the O_3 NAAQS, a serious nonattainment area for the $PM_{2.5}$ NAAQS, a serious maintenance area for the PM_{10} NAAQS, and a maintenance area for the CO NAAQS. Although the SCAB is in attainment for SO_2, because SO_2 is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* levels are used.
[2] As the SCAB is in maintenance for the NO_2 NAAQS, the alternative's emissions must be compared to the NO_2 *de minimis* level. For the purposes of this analysis, the NO_2 emissions are assumed to be equal to the NO_X emissions
[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.
< = less than; Authority = California High-Speed Rail Authority; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAB = South Coast Air Basin; SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound

The SCAQMD and AVAQMD have also adopted CEQA thresholds of significance to determine a project's impact on air quality. Table 3.3-15 and Table 3.3-16 show applicable CEQA thresholds in the SCAQMD and AVAQMD and indicate whether the construction of the Refined SR14 Build Alternative would exceed these thresholds. Table 3.3-16 shows that there were no CEQA threshold exceedances in the AVAQMD. While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emissions results demonstrate that the Refined SR14 Build Alternative would result in the following exceedances of applicable SCAQMD CEQA thresholds:

- NO_X: 2020–2025
- CO: 2021–2023

Table 3.3-15 Daily Construction Emissions Relative to the CEQA Thresholds Applicable to the South Coast Air Quality Management District – Refined SR14 Build Alternative

Projected Construction Year	VOCs	NO_X	CO	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Daily CEQA threshold applicable to the SCAQMD (pounds/day)	75	100	550	150	150	55
Year 2020						
Emissions (pounds/day)	14	127	493	1	50	17
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2021						
Emissions (pounds/day)	25	350	638	2	78	21
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2022						
Emissions (pounds/day)	35	441	859	3	98	28

Projected Construction Year	VOCs	NO_X	CO	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2023						
Emissions (pounds/day)	34	401	928	3	109	32
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2024						
Emissions (pounds/day)	22	217	515	2	48	13
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2025						
Emissions (pounds/day)	15	153	502	2	33	10
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2026						
Emissions (pounds/day)	4	53	145	<1	15	5
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (pounds/day)	5	63	172	1	10	4
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028						
Emissions (pounds/day)	<1	3	1	<1	1	<1
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029						
Emissions (pounds/day Station)	0	0	0	0	0	0
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a

[1] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.

< = less than; Authority = California High-Speed Rail Authority; CEQA = California Environmental Quality Act; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound

Daily emissions are not presented in the AVAQMD because project construction activities that span multiple years in the district are subject to the annual thresholds only. As shown in Table 3.3-16 below, none of the pollutants generated by construction of the Refined SR14 Build Alternative would exceed the AVAQMD's CEQA thresholds or the General Conformity *de minimis* levels applicable to the MDAB.

Table 3.3-16 Annual Construction Emissions in the Antelope Valley Air Quality Management District/Mojave Desert Air Basin – Refined SR14 Build Alternative

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis* levels[1]	25	25	NA	NA	NA	NA
Annual CEQA threshold (tons/year)	25	25	100	25	15	15

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Year 2020						
Emissions (tons/year)	<0.1	0.3	0.5	<0.1	0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (tons/year)	0.3	9.3	5.6	0.1	1.7	0.5
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2022						
Emissions (tons/year)	0.3	4.9	5.8	<0.1	0.8	0.3
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2023						
Emissions (tons/year)	0.5	7.3	10.2	<0.1	1.5	0.5
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2024						
Emissions (tons/year)	0.5	6.0	10.0	<0.1	1.7	0.6
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2025						
Emissions (tons/year)	0.1	1.2	2.6	<0.1	0.4	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2026						
Emissions (tons/year)	<0.1	0.3	0.7	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (tons/year)	0.1	1.0	2.9	<0.1	0.1	<0.1

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028[4]						
Emissions (tons/year)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029[4]						
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a
[1] The General Conformity *de minimis* levels for criteria pollutants are based on the MDAB federal attainment status. The MDAB is considered a severe nonattainment area for the O_3 NAAQS. N/A indicates conformity is not applicable because the MDAB is designated attainment for the NAAQS for the pollutant.
[2] As the MDAB is in attainment for the NO_2 NAAQS, the annual NO_2 emissions are not quantified for this basin.
[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.
[4] Emissions associated with Maintenance Facility construction are included for years 2028 and 2029.
< = less than; Authority = California High-Speed Rail Authority; AVAQMD = Antelope Valley Air Quality Management District; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; MDAB = Mojave Desert Air Basin; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SO_2 = sulfur dioxide; VOC = volatile organic compound

The SCAQMD and AVAQMD CEQA thresholds were established to prevent emissions associated with new projects from contributing to CAAQS and NAAQS violations. CAAQS and NAAQS standards were developed to protect human health (i.e., standards that define the maximum amount of ambient pollution that can be present without harming public health). Thus, where a project exceeds an air district's regional thresholds, there is the potential for adverse health effects to occur. However, because adverse health effects resulting from regional criteria pollutants depend on many variables (e.g., concentrations, local atmospheric conditions, number of exposed individuals), and because some pollutants are transported over long distances before resulting in adverse health effects, the specific health effects resulting from regional pollutants generated by a single project are difficult to determine. This difficulty in correlating regional emissions generated by an individual project to specific health consequences has been confirmed by the air quality districts during legal review, including SCAQMD (*Sierra Club v. County of Fresno* 2015). Therefore, while regional emissions due to Build Alternative construction could lead to increased incidence of specific health consequences, the magnitude of these health consequences cannot be quantified with a high level of certainty. However, it is known that public health would continue to be affected in the SCAB and MDAB as long as these regions do not attain the CAAQS and NAAQS.

Each criteria pollutant threshold exceedance could result in different health effects on nearby receptors. At atmospheric concentrations, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2, chronic pulmonary fibrosis, and bronchitis. When outdoor CO levels are elevated, they can be of particular concern to people with some types of heart disease, especially while exercising or under increased stress. Prolonged exposure to high levels of CO may result in headaches, drowsiness, loss of equilibrium, heart disease, reduced oxygen to the heart, and chest pain. See Section 3.3.4.3 for more details of the potential health consequences of increased levels of each criteria pollutant.

Construction of the Refined SR14 Build Alternative would exceed the General Conformity *de minimis* levels and CEQA thresholds for NO_X and CO in the SCAB, while no General Conformity *de minimis* levels or CEQA thresholds would be exceeded in the MDAB.

A General Conformity Determination would be required for the Refined SR14 Build Alternative for NO_X and CO in the SCAB for the years during construction, when the emissions would exceed the applicable *de minimis* levels indicated above. The General Conformity Determination can be achieved for CO and NO_X, using one of the following methods:

- Demonstrating that the direct and indirect emissions are specifically identified in the relevant implementation plan
- Obtaining a written statement from the entity responsible for the implementation plan that the total indirect and direct emissions from the action, along with other emissions in the area, would not exceed the total implementation plan emission budget
- Fully offsetting the total direct and indirect emissions to net zero by reducing emissions of the same pollutant in the same nonattainment or maintenance area

For CO emissions, Section 93.158(a)(4) of the General Conformity Rule stipulates that emission offsets cannot be used to mitigate CO impacts. Instead, the SCAQMD must determine whether the construction-period CO emissions for the Refined SR14 Build Alternative would result in a level of CO emissions which, together with all other emissions in the nonattainment (or maintenance) area, would exceed the regional emissions budget specified in the applicable SIP. Pursuant to the General Conformity Rule, the SCAQMD may determine that additional air quality modeling is required to demonstrate that the allocation of the construction-period emissions for the Refined SR14 Build Alternative is within its emissions budget. As discussed below, construction-period CO emissions would not result in an exceedance of the NAAQS.

Compliance with the General Conformity Rule will occur prior to completion of the NEPA process for the Palmdale to Burbank Project Section. Demonstrating compliance with the General Conformity Rule will not change the results of the construction emissions analysis.

A General Conformity determination would be required only for construction of the Palmdale to Burbank Project Section, as operations are overall expected to decrease regional emissions of criteria pollutants. The Final General Conformity Determination demonstrates that construction emissions of NO_X caused by the implementation of the SR14A Build Alternative would not exceed the regional emissions budget specified in the SCAQMD SIP with the implementation of AQ-MM#1, which is further evaluated in Section 3.3.7. Localized CO modeling shows no exceedance of the NAAQS, and additional microscale modeling would satisfy the applicable General Conformity *de minimis* level for CO. The Final General Conformity Determination has been included in this Final EIR/EIS.[12]

AQ-MM#1 requires the purchase of emission offsets through the SCAQMD Emission Offsets programs to the extent feasible. Emission reduction credits will be obtained from SCAQMD to offset emissions associated with the construction of the Build Alternatives. Purchase of emission offsets through SCAQMD's RECLAIM Program or Air Quality Investment Program, emission reduction credits, or another mechanism, subject to discussion with and approval by SCAQMD (AQ-MM#1), would offset and/or decrease NO_X emissions.

As previously discussed, emissions offsets procured through AQ-MM#1 cannot be used to mitigate CO impacts. However, under the General Conformity Rule, CO emissions exceeding the

[12] FRA assigned its responsibilities for compliance with NEPA and other federal environmental laws to the Authority pursuant to an assignment memorandum of understanding, pursuant to 23 U.S.C. 327 (see Chapter 2, Alternatives) (FRA and State of California 2019). Under section 327, FRA could not assign responsibility for making air quality conformity determinations. Therefore, FRA retained responsibility for reviewing all comments on the Draft General Conformity determination and for issuing the Final General Conformity determination.

de minimis level can demonstrate conformity by conducting air quality modeling to show that CO concentrations would not cause or contribute to an increase in the severity or frequency of NAAQS violations. As CO is a local pollutant, it is anticipated that the air quality modeling would entail the same approach (i.e., dispersion modeling) used to evaluate localized criteria pollutant effects during construction (see Section 3.3.4.3). The Authority has confirmed with the SCAQMD that the air quality modeling conducted as part of the localized construction effects analysis for the Palmdale to Burbank Project Section would suffice in demonstrating CO conformity if the modeling shows that there are no exceedances of the applicable CO NAAQS (SCAQMD 2020b). As shown in Impact AQ#5, localized CO concentrations generated during construction at the six discrete worst-case case locations would not result in an exceedance of the NAAQS. Details of this analysis are included in the Air Quality Technical Report (Authority 2020a).

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 require reduced emissions, low-VOC coatings, and renewable diesel, construction of the Refined SR14 Build Alternative would still result in exceedances of General Conformity *de minimis* levels for NOx and CO in the SCAB as well as exceedances of SCAQMD's CEQA significance thresholds for CO and NOx. These exceedances represent a significant air quality impact. AQ-MM#1 requires the Authority to purchase emission offsets through an anticipated contractual agreement with the SCAQMD to the extent necessary to satisfy General Conformity requirements and to meet CEQA significance thresholds to the extent feasible. Emissions not above the General Conformity *de minimis* levels, but above local air district CEQA thresholds, would be reduced to quantities below the air district's CEQA thresholds to the extent feasible. This mitigation measure is further described in Section 3.3.7, including reference to the Authority's voluntary commitment per POLI-1007 (Sustainability Policy) to reduce criteria air pollutant emissions during construction to net zero to the extent possible, exceeding the CEQA/NEPA mitigation obligation.

AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. Where feasible, ZE technology may include the use of electric-powered construction equipment. The use of electric-powered equipment would reduce emissions of CO, NOx, SO_2, and diesel particulates.

CEQA Conclusion

Unlike the federal General Conformity regulations, obtaining offsets or emission reduction credits for CO exceedances of the CEQA thresholds is not prohibited. As such, offsets procured through AQ-MM#1 may also be used to mitigate CO exceedances (if such offsets are available), in addition to NO_X to below the SCAQMD CEQA thresholds.

AQ-MM#3, described in Section 3.3.7, requires the use of zero emission (ZE) or near-zero emission (NZE) technology for a minimum of 25 percent of all light-duty on-road, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. All remaining emissions after implementation of AQ-MM#3 will be offset with emission offset credits required under AQ-MM#1 to below the SCAQMD CEQA thresholds to the extent feasible. However, until the contractual agreement between the Authority and the SCAQMD is in place and the purchase of emission offsets is secured, this represents a significant and unavoidable impact for the Refined SR14 Build Alternative.

SR14A Build Alternative

Construction activities associated with the SR14A Build Alternative would result in criteria pollutant emissions. See Section 3.3.4 for a detailed discussion of the assumptions and tools used to calculate construction-period criteria pollutants and Section 3.3.4.2 for a description of the IAMFs incorporated to reduce construction-period criteria pollutants during construction.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, exceedance of air district *de minimis* levels would still occur. The calculated annual construction emissions for the SR14A Build Alternative, including incorporation of the IAMFs, are presented in Table 3.3-17.

This table shows applicable General Conformity *de minimis* levels in the SCAB and indicates whether the SR14A Build Alternative would exceed these levels. As the SCAB is in maintenance for the NO_2 NAAQS, the emissions must be calculated and compared to the applicable General Conformity *de minimis* level. As NO_2 is a subset of NO_X, for the purposes of this analysis the NO_2 emissions are assumed to be equal to the NO_X emissions. NOx are a mixture of gases that are composed of nitrogen and oxygen. These gases include nitric oxide (NO), nitrogen dioxide NO_2, nitrous oxide (N_2O), and nitrogen pentoxide (NO_5). Although NO_2 is the criteria pollutant, both NO and N_2O are emitted by cars, trucks, buses, power plants, and non-road engines and equipment. The emitted NO is rapidly oxidized into NO_2 in the atmosphere. Therefore, to capture both the emitted and oxidized NO_2, the project's NOx emissions are reported. The annual construction emissions results demonstrate the following exceedances of General Conformity *de minimis* levels applicable to the SCAB:

- NO_X: 2020–2026
- CO: 2022–2023

Table 3.3-17 Annual Construction Emissions in the South Coast Air Basin – SR14A Build Alternative

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis* levels[1]	10	10	100	100	100	100	70
Annual CEQA threshold	The SCAQMD does not have annual CEQA thresholds. The SCAQMD CEQA thresholds for daily emissions are presented in subsequent tables.						
Year 2020							
Emissions (tons/year)	1.2	13.5	13.5	38.5	0.1	4.7	1.3
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2021							
Emissions (tons/year)	3.0	34.0	34.0	71.6	0.5	14.7	4.0
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2022							
Emissions (tons/year)	4.3	49.0	49.0	100.7	0.4	12.6	3.4
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	Yes	No	No	No
Year 2023							
Emissions (tons/year)	4.9	55.2	55.2	112.8	0.4	13.2	3.8
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	Yes	No	No	No
Year 2024							
Emissions (tons/year)	2.4	31.7	31.7	69.6	0.3	7.1	2.1
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Year 2025							
Emissions (tons/year)	1.4	20.0	20.0	44.0	0.2	4.6	1.4
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2026							
Emissions (tons/year)	0.6	11.5	11.5	19.3	0.1	2.8	0.8
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2027							
Emissions (tons/year)	0.3	3.8	3.8	8.5	0.0	0.9	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2028							
Emissions (tons/year)	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2029							
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No

Source: Authority 2020a

[1] The General Conformity *de minimis* levels for criteria pollutants are based on the SCAB federal attainment status. The SCAB is considered an extreme nonattainment area for the O_3 NAAQS, a serious nonattainment area for the $PM_{2.5}$ NAAQS, a serious maintenance area for the PM_{10} NAAQS, and a maintenance area for the CO and NO_2 NAAQS. Although the SCAB is in attainment for SO_2, because SO_2 is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* levels are used.

[2] As the SCAB is in maintenance for the NO_2 NAAQS, the alternative's emissions must be compared to the NO_2 *de minimis* level. For the purposes of this analysis, the NO_2 emissions are assumed to be equal to the NOx emissions.

[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.

Authority = California High-Speed Rail Authority; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; < = less than; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAB = South Coast Air Basin; SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound

The SCAQMD and AVAQMD have also adopted CEQA thresholds of significance to determine a project's impact on air quality. Table 3.3-18 and Table 3.3-19 show applicable CEQA thresholds within the SCAQMD and AVAQMD and indicate whether the construction of the SR14A Build Alternative would exceed these thresholds. Table 3.3-19 shows that there were no CEQA threshold exceedances in the AVAQMD. While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emissions results demonstrate that the SR14A Build Alternative would result in exceedances of the following SCAQMD CEQA thresholds:

- NO_X: 2020–2027
- CO: 2020–2024

Table 3.3-18 Daily Construction Emissions Relative to the CEQA Thresholds Applicable to the South Coast Air Quality Management District – SR14A Build Alternative

Projected Construction Year	VOCs	NO_X	CO	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Daily CEQA threshold (pounds/day)	75	100	550	150	150	55
Year 2020						
Emissions (pounds/day)	17	197	594	2	60	20
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2021						
Emissions (pounds/day)	25	331	604	5	130	36
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2022						
Emissions (pounds/day)	35	492	852	3	123	35
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2023						
Emissions (pounds/day)	32	417	832	3	107	31
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2024						
Emissions (pounds/day)	23	316	591	2	69	20
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2025						
Emissions (pounds/day)	12	175	387	1	40	12
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2026						
Emissions (pounds/day)	7	114	209	1	23	6
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2027						
Emissions (pounds/day)	6	107	181	1	18	6
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2028						
Emissions (pounds/day)	<1	3	1	<1	1	<1
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029						
Emissions (pounds/day)	0	0	0	0	0	0
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a
[1] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.

< = less than; Authority = California High-Speed Rail Authority; CEQA = California Environmental Quality Act; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound

Daily emissions are not presented in the AVAQMD, because project construction activities that span multiple years in the district are subject to the annual thresholds only. As shown in Table 3.3-19 below, none of the pollutants generated by construction of the SR14A Build Alternative would exceed the AVAQMD's CEQA thresholds or the General Conformity *de minimis* levels applicable to the MDAB.

Table 3.3-19 Annual Construction Emissions in the Antelope Valley Air Quality Management District/Mojave Desert Air Basin – SR14A Build Alternative

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis* levels[1]	25	25	N/A	N/A	N/A	N/A
Annual CEQA threshold (tons/year)	25	25	100	25	15	15
Year 2020						
Emissions (tons/year)	0.2	3.2	4.2	<0.1	0.8	0.3
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (tons/year)	0.5	6.5	9.1	<0.1	1.4	0.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2022						
Emissions (tons/year)	0.2	4.0	4.4	<0.1	0.7	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2023						
Emissions (tons/year)	0.4	6.1	8.1	<0.1	1.7	0.6
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2024						
Emissions (tons/year)	0.3	5.2	6.7	<0.1	1.3	0.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2025						

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Emissions (tons/year)	0.1	3.4	2.8	<0.1	0.6	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2026						
Emissions (tons/year)	0.1	3.6	3.0	<0.1	0.7	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (tons/year)	0.1	3.4	3.5	<0.1	0.6	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028[4]						
Emissions (tons/year)	<0.1	2.4	0.5	<0.1	0.5	0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029[4]						
Emissions (tons/year)	<0.1	1.1	0.2	<0.1	0.2	0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a
[1] The General Conformity *de minimis* levels for criteria pollutants are based on the MDAB federal attainment status. The MDAB is considered a severe nonattainment area for the O_3 NAAQS. N/A indicates conformity is not applicable because the MDAB is designated attainment for the NAAQS for the pollutant.
[2] As the MDAB is in attainment for the NO_2 NAAQS, the annual NO_2 emissions are not quantified for this basin.
[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.
[4] Emissions associated with Maintenance Facility construction included for years 2028 and 2029.
< = less than; Authority = California High-Speed Rail Authority; AVAQMD = Antelope Valley Air Quality Management District; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; MDAB = Mojave Desert Air Basin; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SO_2 = sulfur dioxide; VOC = volatile organic compound

The SJVAPCD has established a 100 pound per day screening threshold for criteria pollutant emissions from on-site construction activities. However, as the emissions within the SJVAPCD area are from off-site on-road haul trucks, the project is only subject to the annual thresholds. As shown in Table 3.3-20 below, none of the pollutants generated by construction of the SR14A Build Alternative would exceed the SJVAPCD's CEQA thresholds or the General Conformity *de minimis* levels applicable to the SJVAB.

Table 3.3 20 Annual Construction Emissions in the San Joaquin Valley Air Pollution Control District/San Joaquin Valley Air Basin – SR14A Build Alternative

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}	$PM_{2.5}$
Annual General Conformity *de minimis* levels[1]	10	10	100	100	100	100
Annual CEQA threshold (tons/year)	10	10	100	27	15	15
Year 2020						
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (tons/year)	0.2	9.3	1.4	0.3	9.0	2.6
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2022						
Emissions (tons/year)	0.0	1.3	0.2	0.0	1.3	0.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2023						
Emissions (tons/year)	0.0	1.1	0.2	0.0	1.0	0.3
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2024						
Emissions (tons/year)	0.0	0.7	0.1	0.0	0.6	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2025						
Emissions (tons/year)	0.0	0.1	0.0	0.0	0.1	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2026						
Emissions (tons/year)	0.0	0.1	0.0	0.0	0.1	0.0

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}	$PM_{2.5}$
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028						
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029						
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a
[1] The General Conformity *de minimis* levels for criteria pollutants are based on the SJVAB federal attainment status. The SJVAB is considered an extreme nonattainment area for the O_3 NAAQS, a nonattainment area for the $PM_{2.5}$ NAAQS, a maintenance area for the PM_{10} NAAQS, and an attainment area for the CO and NO_2 NAAQS. Although the SJVAB is in attainment for SO_2, because SO_2 is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* levels are used.
[2] As the SJVAB is in attainment for the NO_2 NAAQS, the annual NO_2 emissions are not quantified for this basin.
Authority = California High-Speed Rail Authority; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SO_2 = sulfur dioxide; SJVAPCD = San Joaquin Valley Air Quality Management District; SJVAB = San Joaquin Valley Air Basin; VOC = volatile organic compound

The SCAQMD, AVAQMD, and SJVAPCD CEQA thresholds were established to prevent emissions associated with new projects from contributing to CAAQS and NAAQS violations. CAAQS and NAAQS standards were developed to protect human health (i.e., standards that define the maximum amount of ambient pollution that can be present without harming public health). Thus, where a project exceeds SCAQMD's regional thresholds, there is the potential for adverse health effects to occur. However, because adverse health effects resulting from regional criteria pollutants depend on many variables (e.g., concentrations, local atmospheric conditions, number of exposed individuals), and because some pollutants are transported over long distances before resulting in adverse health effects, the specific health effects resulting from regional pollutants generated by a single project are difficult to determine. This difficulty in correlating regional emissions generated by an individual project to specific health consequences has been discussed by the air quality districts during legal review, including SCAQMD (*Sierra Club v. County of Fresno* 2015). Therefore, while regional emissions due to Build Alternative construction could lead to increased incidence of specific health consequences, the magnitude of these health consequences cannot be quantified with a high level of certainty. However, it is known that public health would continue to be affected in the SCAB, MDAB, and SJVAB as long as these regions do not attain the CAAQS and NAAQS.

Each criteria pollutant threshold exceedance could result in different health effects on nearby receptors. At atmospheric concentrations, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2, chronic pulmonary fibrosis, and bronchitis. When outdoor CO levels are elevated, they can be of particular concern to people with some types of heart disease, especially while exercising or under increased stress. Prolonged exposure to high levels of CO may result in reduced oxygen to the heart, chest pain headaches, drowsiness, loss of equilibrium, and heart disease.

Construction of the SR14A Build Alternative would exceed the General Conformity *de minimis* levels and CEQA thresholds for NO_x and CO in the SCAB, while no General Conformity *de minimis* levels or CEQA thresholds would be exceeded in the AVAQMD/MDAB or SJVAPCD/SJVAB. A General Conformity Determination would be required for the SR14A Build Alternative for NO_x and CO in the SCAB for the years during construction when the emissions would exceed the applicable *de minimis* levels indicated above.

The steps to obtaining the General Conformity Determination are the same for the SR14A Build Alternative as previously described for the Refined SR14 Build Alternative. Compliance with the General Conformity Rule is required before construction, but may be completed concurrent with Final EIR/EIS certification. Currently, it is assumed that a General Conformity determination would be required only for construction of the Palmdale to Burbank Project Section, as operations are overall expected to decrease regional emissions of criteria pollutants.

The General Conformity Determination demonstrates that construction emissions of NO_x caused by the implementation of the SR14A Build Alternative would not exceed the regional emissions budget specified in the SCAQMD with the implementation of AQ-MM#1, which is further evaluated in Section 3.3.7. Localized CO modeling, which shows no exceedance of the NAAQS, and additional microscale modeling will satisfy the applicable *de minimis* General Conformity level for CO.

AQ-MM#1 requires the purchase of emission offsets through the SCAQMD Emission Offsets programs to the extent feasible. Emission reduction credits would be obtained from SCAQMD to offset emissions associated with the construction of the Build Alternative. Purchase of emission offsets through SCAQMD's RECLAIM Program or Air Quality Investment Program, emission reduction credits, or another mechanism, subject to discussion with and approval by SCAQMD (AQ-MM#1), would offset and/or decrease NO_x emissions.

As previously discussed, emissions offsets procured through AQ-MM#1 cannot be used to mitigate CO impacts. The Authority has confirmed with the SCAQMD that the air quality modeling conducted as part of the localized construction effects analysis for the Palmdale to Burbank Project Section is acceptable in demonstrating CO conformity if the modeling shows that there are no exceedances of the applicable CO NAAQS. As shown in Impact AQ#5, the localized CO concentrations generated during construction at the six discrete worst-case case locations are below the NAAQS.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will require reduced emissions, low-VOC coatings and renewable diesel, construction of the SR14A Build Alternative would still result in exceedances of General Conformity *de minimis* levels for NO_X and CO in the SCAB as well as exceedances of SCAQMD's CEQA significance thresholds for NO_X and CO. These exceedances represent a significant air quality impact. The Final General Conformity Determination demonstrates that, with implementation of AQ-MM#1, construction-related emissions of NO_X caused by implementation of the SR14A Build Alternative would not exceed the regional emissions budget specified in the SCAQMD SIP. AQ-MM#1 requires the Authority to purchase emission offsets through an anticipated contractual agreement with the SCAQMD to the extent necessary to satisfy General Conformity requirements and to meet SCAQMD CEQA significance thresholds. Emissions not above the General Conformity *de minimis* levels, but above local air district CEQA thresholds, would be reduced to quantities below the air district's CEQA thresholds. This mitigation measure is further evaluated in Section 3.3.7, including reference to the Authority's voluntary commitment per POLI-1007 (Sustainability Policy) to reduce criteria air pollutant emissions during construction to net zero to the extent possible, exceeding the CEQA/NEPA mitigation obligation.

AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. Where feasible, ZE technology may include the use of electric-powered construction equipment. The use of electric-powered equipment would reduce emissions of CO, NO_X, SO_2, and diesel particulates.

CEQA Conclusion

Unlike the federal General Conformity regulations, obtaining offsets or emission reduction credits for CO exceedances of the CEQA thresholds is not prohibited. As such, offsets procured through AQ-MM#1 may also be used to mitigate CO exceedances (if such offsets are available), in addition to NO_X to below the SCAQMD CEQA thresholds.

AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. All remaining emissions after implementation of AQ-MM#3 will be offset with emission offset credits required under AQ-MM#1 to below the SCAQMD CEQA thresholds. However, until the contractual agreement between the Authority and the SCAQMD is in place and the purchase of emission offsets is secured, this represents a significant and unavoidable impact for the SR14A Build Alternative.

E1 Build Alternative

Construction activities associated with the E1 Build Alternative would result in criteria pollutant emissions. See Section 3.3.4 for a detailed discussion of the assumptions and tools used to calculate construction-period criteria pollutants.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, exceedance of air district *de minimis* levels would still occur. The calculated annual construction emissions for the E1 Build Alternative, including the IAMFs, are presented in Table 3.3-21. This table shows applicable General Conformity *de minimis* levels in the SCAB and indicates whether the E1 Build Alternative would exceed these thresholds. As the SCAB is in maintenance for the NO_2 NAAQS, the emissions must be calculated and compared to the applicable General Conformity *de minimis* level. As NO_2 is a subset of NO_X, for the purposes of this analysis the NO_2 emissions are assumed to be equal to the NO_X emissions. NOx are a mixture of gases that are composed of nitrogen and oxygen. These gases include nitric oxide (NO), nitrogen dioxide NO_2, nitrous oxide (N_2O), and nitrogen pentoxide (NO_5). Although NO_2 is the criteria pollutant, both NO and N_2O are emitted by cars, trucks, buses, power plants, and non-road engines and equipment. The emitted NO is rapidly oxidized into NO_2 in the atmosphere. Therefore, to capture both the emitted and oxidized NO_2, the project's NOx emissions are reported. The annual construction emissions results demonstrate the following exceedances of General Conformity *de minimis* levels applicable to the SCAB:

- NO_X: 2021–2026

Table 3.3-21 Annual Construction Emissions in the South Coast Air Basin – E1 Build Alternative

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis* levels applicable to the SCAQMD[1]	10	10	100	100	100	100	70
Annual CEQA threshold	The SCAQMD does not have annual CEQA thresholds. The SCAQMD CEQA thresholds for daily emissions are presented in subsequent tables.						
Year 2020							

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Emissions (tons/year)	<0.1	0.6	0.6	1.4	<0.1	0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2021							
Emissions (tons/year)	1.0	12.8	12.8	30.9	0.1	2.4	0.7
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2022							
Emissions (tons/year)	2.5	34.6	34.6	66.3	0.2	5.5	1.7
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2023							
Emissions (tons/year)	2.6	33.8	33.8	74.8	0.3	6.3	2.0
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2024							
Emissions (tons/year)	1.8	22.6	22.6	54.6	0.2	4.3	1.3
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2025							
Emissions (tons/year)	1.6	19.3	19.3	50.3	0.2	3.9	1.2
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2026							
Emissions (tons/year)	0.7	10.3	10.3	27.3	0.1	2.7	0.8
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2027							
Emissions (tons/year)	0.5	5.2	5.2	16.8	<0.1	0.7	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2028							
Emissions (tons/year)	<0.1	0.4	0.4	0.1	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Year 2029							
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	N/A	N/A	N/A	N/A

Source: Authority 2020a
[1] The General Conformity *de minimis* levels for criteria pollutants are based on the SCAB federal attainment status. The SCAB is considered an extreme nonattainment area for the O_3 NAAQS, a serious nonattainment area for the $PM_{2.5}$ NAAQS, a serious maintenance area for the PM_{10} NAAQS, and a maintenance area for the CO and NO_2 NAAQS. Although the SCAB is in attainment for SO_2, because SO_2 is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* levels are used.
[2] As the SCAB is in maintenance for the NO_2 NAAQS, the alternative's emissions must be compared to the NO_2 *de minimis* level. For the purposes of this analysis, the NO_2 emissions are assumed to be equal to the NOx emissions.
[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.
< = less than; Authority = California High-Speed Rail Authority; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAB = South Coast Air Basin; SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound

The SCAQMD and AVAQMD have also adopted CEQA thresholds of significance to determine a project's impact on air quality. Table 3.3-22 and Table 3.3-23 show applicable CEQA thresholds in the SCAQMD and AVAQMD and indicate whether the construction of the E1 Build Alternative would exceed these thresholds. Table 3.3-23 shows that there were no CEQA threshold exceedances in the AVAQMD. While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emissions results demonstrate that the E1 Build Alternative would result in exceedances of the following SCAQMD CEQA thresholds:

- NO_X: 2021–2025
- CO: 2023

Table 3.3-22 Daily Construction Emissions Relative to the CEQA Thresholds Applicable to the South Coast Air Quality Management District – E1 Build Alternative

Projected Construction Year	VOCs	NO_X	CO	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Daily CEQA threshold applicable to the SCAQMD (pounds/day)	75	100	550	150	150	55
Year 2020						
Emissions (pounds/day)	<1	5	14	<1	1	<1
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (pounds/day)	9	113	300	1	21	5
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2022						
Emissions (pounds/day)	18	248	483	2	41	13
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2023						
Emissions (pounds/day)	24	405	633	3	85	28
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2024						

Projected Construction Year	VOCs	NO_X	CO	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Emissions (pounds/day)	12	149	375	1	30	9
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2025						
Emissions (pounds/day)	12	157	366	1	35	12
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2026						
Emissions (pounds/day)	7	93	239	1	25	7
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (pounds/day)	7	70	247	1	8	3
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028						
Emissions (pounds/day)	<1	10	1	<1	2	1
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029						
Emissions (pounds/day)	0	0	0	0	0	0
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a
[1] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.
< = less than; Authority = California High-Speed Rail Authority; CEQA = California Environmental Quality Act; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound

Daily emissions are not presented in the AVAQMD, because project construction activities that span multiple years in the district are subject to the annual thresholds only. As shown in Table 3.3-23 below, none of the pollutants generated by construction of the E1 Build Alternative would exceed the AVAQMD's CEQA thresholds or the General Conformity *de minimis* levels applicable to the MDAB.

Table 3.3-23 Annual Construction Emissions in the Antelope Valley Air Quality Management District/Mojave Desert Air Basin – E1 Build Alternative

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis* levels applicable to the MDAB[1]	25	25	N/A	N/A	N/A	N/A
Annual CEQA threshold applicable to the AVAQMD (tons/year)	25	25	100	25	15	15
Year 2020						
Emissions (tons/year)	0.1	1.1	2.0	<0.1	0.3	0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (tons/year)	0.3	3.1	5.0	<0.1	1.0	0.3
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2022						
Emissions (tons/year)	0.4	9.5	9.9	0.1	1.7	0.5
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2023						
Emissions (tons/year)	0.9	13.3	30.9	0.1	2.3	0.7
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2024						
Emissions (tons/year)	0.6	11.5	13.6	0.1	2.9	1.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2025						
Emissions (tons/year)	0.8	8.7	26.3	0.1	1.8	0.6
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2026						
Emissions (tons/year)	0.8	7.3	24.5	0.1	1.1	0.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (tons/year)	0.1	1.8	4.4	<0.1	0.3	0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028[4]						

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Emissions (tons/year)	<0.1	0.2	<0.1	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029[4]						
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a

[1] The General Conformity *de minimis* levels for criteria pollutants are based on the MDAB federal attainment status. The MDAB is considered a severe nonattainment area for the O_3 NAAQS. N/A indicates conformity is not applicable because the MDAB is designated attainment for the NAAQS for the pollutant.

[2] As the MDAB is in attainment for the NO_2 NAAQS, the annual NO_2 emissions are not quantified for this basin.

[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.

[4] Emissions associated with Maintenance Facility construction included for years 2028 and 2029.

< = less than; Authority = California High-Speed Rail Authority; AVAQMD = Antelope Valley Air Quality Management District; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; MDAB = Mojave Desert Air Basin; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SO_2 = sulfur dioxide; VOC = volatile organic compound

The SCAQMD and AVAQMD thresholds were established to prevent emissions associated with new projects from contributing to CAAQS and NAAQS violations. CAAQS and NAAQS standards were developed to protect human health (i.e., standards that define the maximum amount of ambient pollution that can be present without harming public health). Thus, where a project exceeds SCAQMD's regional thresholds, there is the potential for adverse health effects to occur. However, because adverse health effects resulting from regional criteria pollutants depend on many variables (e.g., concentrations, local atmospheric conditions, number of exposed individuals), and because some pollutants are transported over long distances before resulting in adverse health effects, the specific health effects resulting from regional pollutants generated by a single project are difficult to determine. This difficulty in correlating regional emissions generated by an individual project to specific health consequences has been discussed by the air quality districts during legal review, including SCAQMD (*Sierra Club v. County of Fresno* 2015). Therefore, while regional emissions due to Build Alternative construction could lead to increased incidence of specific health consequences, the magnitude of these health consequences cannot be quantified with a high level of certainty. However, it is known that public health would continue to be affected in the SCAB and MDAB as long as these regions do not attain the CAAQS and NAAQS.

Each criteria pollutant threshold exceedance could result in different health effects on nearby receptors. At atmospheric concentrations, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2, chronic pulmonary fibrosis, and bronchitis. When outdoor CO levels are elevated, they can be of particular concern to people with some types of heart disease, especially while exercising or under increased stress. Prolonged exposure to high levels of CO may result in reduced oxygen to the heart, chest pain, headaches, drowsiness, loss of equilibrium, and heart disease. See Section 3.3.4.3 for more details of the potential health consequences of increased levels of each criteria pollutant.

Construction of the E1 Build Alternative would exceed the NOx General Conformity *de minimis* level and both NOx and CO CEQA thresholds, in the SCAB. No General Conformity *de minimis* levels or CEQA thresholds would be exceeded in the MDAB. A General Conformity Determination would be required for the E1 Build Alternative for NOx in the SCAB for the years during construction, when the emissions would exceed the applicable *de minimis* levels indicated above.

The steps to obtaining the General Conformity Determination are the same for the E1 Build Alternative as previously described for the Refined SR14 Build Alternative. Compliance with the General Conformity Rule is required before construction but may be completed concurrent with Final EIR/EIS certification. A General Conformity determination would be required only for construction of the Palmdale to Burbank Project Section, as operations are overall expected to decrease regional emissions of criteria pollutants.

The General Conformity Determination would demonstrate that construction emissions of NO_x caused by the implementation of the E1 Build Alternative would not exceed the regional emissions budget specified in the applicable SIP with the implementation of AQ-MM#1, which is further evaluated in Section 3.3.7.

AQ-MM#1 requires the purchase of emission offsets through the SCAQMD Emission Offsets programs. Emission reduction credits will be obtained from SCAQMD to offset emissions associated with the construction of the Build Alternative. Purchase of emission offsets through SCAQMD's RECLAIM Program or Air Quality Investment Program, emission reduction credits, or another mechanism, subject to discussion with and approval by SCAQMD (AQ-MM#1), would offset and/or decrease NOx emissions.

Unlike the federal General Conformity regulations, the obtainment of offsets or emission reduction credits for CO exceedances of the CEQA thresholds is not prohibited. As such, offsets procured through AQ-MM#1 will also be used to mitigate CO exceedances below the SCAQMD CEQA thresholds.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will require reduced emissions, low-VOC coatings, and renewable diesel, construction of the E1 Build Alternative would still result in exceedances of General Conformity *de minimis* levels for NO_X in the SCAB as well as exceedances of SCAQMD's CEQA significance thresholds for NO_X. These exceedances represent a significant air quality impact. AQ-MM#1 requires the Authority to purchase emission offsets through an anticipated contractual agreement with the SCAQMD to the extent necessary to satisfy General Conformity requirements and to meet SCAQMD CEQA significance thresholds. Emissions not above the General Conformity *de minimis* levels, but above local air district CEQA thresholds, would be reduced to quantities below the air district's CEQA thresholds. This mitigation measure is further evaluated in Section 3.3.7, including reference to the Authority's voluntary commitment per POLI-1007 (Sustainability Policy) to reduce criteria air pollutant emissions during construction to net zero to the extent possible, exceeding the CEQA/NEPA mitigation obligation.

AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. Where feasible, ZE technology may include the use of electric-powered construction equipment. The use of electric-powered equipment would reduce emissions of CO, NO_X, SO_2, and diesel particulates.

CEQA Conclusion

Unlike the federal General Conformity regulations, obtaining offsets or emission reduction credits for CO exceedances of the CEQA thresholds is not prohibited. As such, offsets procured through AQ-MM#1 may also be used to mitigate CO exceedances (if such offsets are available), in addition to NO_X to below the SCAQMD CEQA thresholds.

AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. All remaining emissions after implementation of this AQ-MM#3 will be offset with emission offset credits required under AQ-MM#1 to below the SCAQMD CEQA thresholds. However, until the contractual agreement between the Authority and the SCAQMD is in place and the purchase of emission offsets is secured, this represents a significant and unavoidable impact for the E1 Build Alternative.

E1A Build Alternative

Construction activities associated with the E1A Build Alternative would result in criteria pollutant emissions. See Section 3.3.4 for a detailed discussion of the assumptions and tools used to calculate construction-period criteria pollutants and Section 3.3.4.2 for a description of the IAMFs incorporated to reduce construction-period criteria pollutants during construction.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emission results determined that exceedance of the applicable *de minimis* levels in the SCAB would still occur. The calculated annual construction emissions for the E1A Build Alternative, including the IAMFs, are presented in Table 3.3-24. This table shows applicable General Conformity *de minimis* levels in the SCAB and indicates whether the E1A Build Alternative would exceed these thresholds. As the SCAB is in maintenance for the NO_2 NAAQS, the emissions must be calculated and compared to the applicable General Conformity *de minimis* level. As NO_2 is a subset of NO_X, for the purposes of this analysis the NO_2 emissions are assumed to be equal to the NO_X emissions. NOx are a mixture of gases that are composed of nitrogen and oxygen. These gases include nitric oxide (NO), nitrogen dioxide NO_2, nitrous oxide (N_2O), and nitrogen pentoxide (NO_5). Although NO_2 is the criteria pollutant, both NO and N_2O are emitted by cars, trucks, buses, power plants, and non-road engines and equipment. The emitted NO is rapidly oxidized into NO_2 in the atmosphere. Therefore, to capture both the emitted and oxidized NO_2, the project's NOx emissions are reported. The annual construction emissions results demonstrate the following exceedances of General Conformity *de minimis* levels applicable to the SCAB:

- NO_X: 2021–2026

Table 3.3-24 Annual Construction Emissions in the South Coast Air Basin – E1A Build Alternative

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis*[1]	10	10	100	100	100	100	70
Annual CEQA threshold	The SCAQMD does not have annual CEQA thresholds. The SCAQMD CEQA thresholds for daily emissions are presented in subsequent tables.						
Year 2020							
Emissions (tons/year)	0.3	2.8	2.8	10.2	0.0	0.6	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2021							
Emissions (tons/year)	1.1	14.7	14.7	35.0	0.1	2.7	0.8
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2022							
Emissions (tons/year)	2.4	33.1	33.1	62.7	0.2	5.4	1.6
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2023							
Emissions (tons/year)	2.6	33.7	33.7	73.6	0.3	6.4	2.0
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Year 2024							
Emissions (tons/year)	1.7	21.3	21.3	51.2	0.2	4.2	1.3
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2025							
Emissions (tons/year)	1.5	17.9	17.9	44.8	0.1	3.5	1.0
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2026							
Emissions (tons/year)	0.7	10.8	10.8	28.1	0.1	2.9	0.8
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2027							
Emissions (tons/year)	0.5	5.3	5.3	16.6	0.0	0.7	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2028							
Emissions (tons/year)	<0.1	0.6	0.6	0.1	<0.1	0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2029							
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No

Source: Authority 2020a
[1] The General Conformity *de minimis* levels for criteria pollutants are based on the SCAB federal attainment status. The SCAB is considered an extreme nonattainment area for the O_3 NAAQS, a serious nonattainment area for the $PM_{2.5}$ NAAQS, a serious maintenance area for the PM_{10} NAAQS, and a maintenance area for the CO and NO_2 NAAQS. Although the SCAB is in attainment for SO_2, because SO_2 is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* levels are used.
[2] As the SCAB is in maintenance for the NO_2 NAAQS, the alternative's emissions must be compared to the NO_2 *de minimis* level. For the purposes of this analysis, the NO_2 emissions are assumed to be equal to the NOx emissions.
[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.
Authority = California High-Speed Rail Authority; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; < = less than; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAB = South Coast Air Basin; SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound

The SCAQMD and AVAQMD have also adopted CEQA thresholds of significance to determine a project's impact on air quality. Table 3.3-25 and Table 3.3-26 show applicable thresholds in the SCAQMD and AVAQMD and indicate whether the construction of the E1A Build Alternative would exceed these thresholds. Table 3.3-26 shows that there were no CEQA threshold exceedances in the AVAQMD. While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emissions results demonstrate that the E1A Build Alternative would result in exceedances of the following SCAQMD CEQA thresholds:

- NO_X: 2021–2025

- CO: 2023

Table 3.3-25 Daily Construction Emissions Relative to the CEQA Thresholds Applicable to the South Coast Air Quality Management District – E1A Build Alternative

Projected Construction Year	VOCs	NO_X	CO	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Daily CEQA threshold applicable to the SCAQMD (pounds/day)	75	100	550	150	150	55
Year 2020						
Emissions (pounds/day)	4	39	152	0	6	2
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (pounds/day)	8	103	235	1	22	6
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2022						
Emissions (pounds/day)	17	244	459	2	40	13
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2023						
Emissions (pounds/day)	21	272	580	2	48	15
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2024						
Emissions (pounds/day)	9	123	257	1	27	8
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2025						
Emissions (pounds/day)	11	134	278	1	32	10
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2026						
Emissions (pounds/day)	3	70	100	1	22	6
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (pounds/day)	5	55	162	0	11	3
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028						
Emissions (pounds/day)	<1	6	1	<1	1	<1
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029						
Emissions (pounds/day)	0	0	0	0	0	0
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a
[1] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.
< = less than; Authority = California High-Speed Rail Authority; CEQA = California Environmental Quality Act; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound

Daily emissions are not presented in the AVAQMD, because project construction activities that span multiple years in the district are subject to the annual thresholds only. As shown in Table 3.3-26, none of the pollutants generated by construction of the E1A Build Alternative would exceed the AVAQMD's CEQA thresholds or the General Conformity *de minimis* levels applicable to the MDAB.

Table 3.3-26 Annual Construction Emissions in the Antelope Valley Air Quality Management District/Mojave Desert Air Basin – E1A Build Alternative

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis* levels applicable to the MDAB[1]	25	25	N/A	N/A	N/A	N/A
Annual CEQA threshold applicable to the AVAQMD (tons/year)	25	25	100	25	15	15
Year 2020						
Emissions (tons/year)	0.3	2.5	6.6	<0.1	0.7	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (tons/year)	0.8	10.2	14.7	0.1	2.6	0.8
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2022						
Emissions (tons/year)	0.5	15.1	11.9	0.1	2.9	0.8
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2023						
Emissions (tons/year)	1.4	22.0	49.6	0.2	4.3	1.3
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Year 2024						
Emissions (tons/year)	0.9	15.6	25.5	0.1	3.2	1.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2025						
Emissions (tons/year)	0.5	6.0	18.1	0.1	0.9	0.3
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2026						
Emissions (tons/year)	0.5	5.2	19.9	0.1	0.7	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (tons/year)	0.1	1.9	4.4	<0.1	0.3	0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028[4]						
Emissions (tons/year)	<0.1	0.2	<0.1	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029[4]						
Emissions (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a

[1] The General Conformity *de minimis* levels for criteria pollutants are based on the MDAB federal attainment status. The MDAB is considered a severe nonattainment area for the O_3 NAAQS. N/A indicates conformity is not applicable because the MDAB is designated attainment for the NAAQS for the pollutant.

[2] As the MDAB is in attainment for the NO_2 NAAQS, the annual NO_2 emissions are not quantified for this basin.

[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.

[4] Emissions associated with Maintenance Facility construction included for years 2028 and 2029.

< = less than; Authority = California High-Speed Rail Authority; AVAQMD = Antelope Valley Air Quality Management District; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; MDAB = Mojave Desert Air Basin; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SO_2 = sulfur dioxide; VOC = volatile organic compound

The SCAQMD and AVAQMD thresholds were established to prevent emissions associated with new projects from contributing to CAAQS and NAAQS violations. CAAQS and NAAQS standards were developed to protect human health (i.e., standards that define the maximum amount of ambient pollution that can be present without harming public health). Thus, where a project exceeds SCAQMD's regional thresholds, there is the potential for adverse health effects to occur. However, because adverse health effects resulting from regional criteria pollutants depend on many variables (e.g., concentrations, local atmospheric conditions, number of exposed individuals), and because some pollutants are transported over long distances before resulting in adverse health effects, the specific health effects resulting from regional pollutants generated by a single project are difficult to determine. This difficulty in correlating regional emissions generated by an individual project to specific health consequences has been discussed by the air quality districts during legal review, including SCAQMD (*Sierra Club v. County of Fresno* 2015). Therefore, while regional emissions due to Build Alternative construction could lead to increased incidence of specific health consequences, the magnitude of these health consequences cannot be quantified with a high level of certainty. However, it is known that public health would continue to be affected in the SCAB and MDAB as long as these regions do not attain the CAAQS and NAAQS.

Each criteria pollutant threshold exceedance could result in different health effects on nearby receptors. At atmospheric concentrations, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2, chronic pulmonary fibrosis, and bronchitis. Prolonged exposure to high levels of CO can cause headaches, drowsiness, loss of equilibrium, and heart disease, while airborne particulate matter can damage lung tissue when inhaled. See Section 3.3.4.3 for more details of the potential health consequences of increased levels of each criteria pollutant.

Construction of the E1A Build Alternative would exceed the General Conformity *de minimis* levels for NO_x in the SCAB. A General Conformity Determination would be required for the E1A Build Alternative for NO_x in the SCAB for the years during construction, when the emissions would exceed the applicable *de minimis* levels indicated above.

The steps to obtaining the General Conformity Determination are the same for the E1A Build Alternative, as previously described for the Refined SR14 Build Alternative. Consistency with the General Conformity Rule is required before construction but may be completed concurrent with Final EIR/EIS certification. A General Conformity determination would be required only for construction of the Palmdale to Burbank Project Section, as operations are overall expected to decrease regional emissions of criteria pollutants.

The General Conformity Determination would demonstrate that construction emissions of NO_x caused by the implementation of the E1A Build Alternative would not exceed the regional emissions budget specified in the applicable SIP with the implementation of AQ-MM#1, which is further evaluated in Section 3.3.7. AQ-MM#1 requires the Authority to purchase emission offsets through an anticipated contractual agreement with the SCAQMD until the General Conformity *de minimis* level is met. Emission reduction credits will be obtained from SCAQMD to offset emissions associated with the construction of the Build Alternative. Purchase of emission offsets through SCAQMD's RECLAIM Program or Air Quality Investment Program, emission reduction credits, or another mechanism, subject to discussion with and approval by SCAQMD (AQ-MM#1), would offset and/or decrease NOx emissions.

Unlike the federal General Conformity regulations, the obtainment of offsets or emission reduction credits for CO exceedances of the CEQA thresholds is not prohibited. As such, offsets procured through AQ-MM#1 may also be used to mitigate CO exceedances (if such offsets are available) below the SCAQMD CEQA thresholds.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will require reduced emissions and renewable diesel, construction of the E1A Build Alternative would still result in exceedances of General Conformity *de minimis* levels for NOx in the SCAB as well as exceedances of SCAQMD's CEQA significance thresholds for CO and NO_x. These exceedances represent a significant air quality impact. AQ-MM#1 requires the Authority to purchase emission offsets from the SCAQMD to the extent necessary to satisfy General Conformity requirements and to meet SCAQMD CEQA significance thresholds. Emissions not above the General Conformity *de minimis* levels, but above local air district CEQA thresholds, would be reduced to quantities below the air district's CEQA thresholds. This mitigation measure is further evaluated in Section 3.3.7, including reference to the Authority's voluntary commitment per POLI-1007 (Sustainability Policy) to reduce criteria air pollutant emissions during construction to net zero to the extent possible, exceeding the CEQA/NEPA mitigation obligation.

AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. Where feasible, ZE technology may include the use of electric-powered construction equipment. The use of electric-power equipment would reduce emissions of CO, NO_X, SO_2, and diesel particulates.

CEQA Conclusion

Unlike the federal General Conformity regulations, obtaining offsets or emission reduction credits for CO exceedances of the CEQA thresholds is not prohibited. As such, offsets procured through AQ-MM#1 may also be used to mitigate CO exceedances (if such offsets are available), in addition to $NO_{X,}$ to below the SCAQMD CEQA thresholds.

AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. All remaining emissions after implementation of this AQ-MM#3 will be offset with emission offset credits required under AQ-MM#1 to below the SCAQMD CEQA thresholds. However, until the contractual agreement between the Authority and the SCAQMD is in place and the purchase of emission offsets is secured, this represents a significant and unavoidable impact for the E1A Build Alternative.

E2 Build Alternative

Construction activities associated with the E2 Build Alternative would result in criteria pollutant emissions. See Section 3.3.4 for a detailed discussion of the assumptions and tools used to calculate construction-period criteria pollutants.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emission results determined that exceedance of *de minimis* levels in the SCAB would still occur. The calculated annual construction emissions for the E2 Build Alternative, including the IAMFs, are presented in Table 3.3-27. This table shows applicable General Conformity *de minimis* levels in the SCAB and indicates whether the E2 Build Alternative would exceed these thresholds. As the SCAB is in maintenance for the NO_2 NAAQS, the emissions must be calculated and compared to the applicable General Conformity *de minimis* level. As NO_2 is a subset of NO_X, for the purposes of this analysis the NO_2 emissions are assumed to be equal to the NO_X emissions. NOx are a mixture of gases that are composed of nitrogen and oxygen. These gases include nitric oxide (NO), nitrogen dioxide NO_2, nitrous oxide (N_2O), and nitrogen pentoxide (NO_5). Although NO_2 is the criteria pollutant, both NO and N_2O are emitted by cars, trucks, buses, power plants, and non-road engines and equipment. The emitted NO is rapidly oxidized into NO_2 in the atmosphere. Therefore, to capture both the emitted and oxidized NO_2, the project's NOx emissions are reported. The annual construction emissions results demonstrate that the E2 Build Alternative would result in the following exceedances of General Conformity *de minimis* levels applicable to the SCAB:

- NO_X: 2021–2026

Table 3.3-27 Annual Construction Emissions in the South Coast Air Quality Basin – E2 Build Alternative

Projected Construction Year	VOCs	NO_X	NO_2 [2]	CO	SO_2	PM_{10} [3]	$PM_{2.5}$ [3]
Annual General Conformity *de minimis* levels [1]	10	10	100	100	100	100	70
Annual CEQA threshold	The SCAQMD does not have annual CEQA thresholds. The SCAQMD CEQA thresholds for daily emissions are presented in subsequent tables.						
Year 2020							
Emissions (tons/year)	0.3	3.1	3.1	11.2	<0.1	0.7	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2021							
Emissions (tons/year)	1.4	20.7	20.7	45.9	0.2	3.4	1.0
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2022							
Emissions (tons/year)	3.1	35.5	35.5	99.1	0.3	4.8	1.5
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2023							
Emissions (tons/year)	2.9	30.4	30.4	92.3	0.3	4.8	1.5
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2024							
Emissions (tons/year)	2.6	27.5	27.5	76.3	0.2	5.0	1.5
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2025							
Emissions (tons/year)	2.6	23.3	23.3	74.7	0.4	4.9	1.6
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2026							
Emissions (tons/year)	1.8	16.3	16.3	44.4	0.2	3.2	0.9
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2027							
Emissions (tons/year)	0.3	5.9	5.9	7.0	<0.1	1.4	0.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Year 2028							
Emissions (tons/year)	0.2	3.4	3.4	4.8	<0.1	0.7	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2029							
Emissions (tons/year)	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No

Source: Authority 2020a

[1] The General Conformity *de minimis* levels for criteria pollutants are based on the SCAB federal attainment status. The SCAB is considered an extreme nonattainment area for the O_3 NAAQS, a serious nonattainment area for the $PM_{2.5}$ NAAQS, a serious maintenance area for the PM_{10} NAAQS, and a maintenance area for the CO and NO_2 NAAQS. Although the SCAB is in attainment for SO_2, because SO_2 is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* levels are used.

[2] As the SCAB is in maintenance for the NO_2 NAAQS, the alternative's emissions must be compared to the NO_2 de minimis level. For the purposes of this analysis, the NO_2 emissions are assumed to be equal to the NOx emissions.

[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.

< = less than; Authority = California High-Speed Rail Authority; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAB = South Coast Air Basin; SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The AVAQMD and SCAQMD have adopted CEQA thresholds of significance to determine a project's impact on air quality. Table 3.3-28 and Table 3.3-29 show applicable CEQA thresholds within the SCAQMD and AVAQMD and indicate whether the construction of the E2 Build Alternative would exceed these thresholds. Table 3.3-29 shows that there were no CEQA threshold exceedances in the AVAQMD. While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emissions results demonstrate that the E2 Build Alternative would result in the following exceedances of applicable SCAQMD CEQA thresholds:

- NO_X: 2021–2026, and 2028
- CO: 2021–2025

Table 3.3-28 Daily Construction Emissions Relative to the CEQA Thresholds Applicable to the South Coast Air Quality Management District – E2 Build Alternative

Projected Construction Year	VOCs	NO_X	CO	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Daily CEQA threshold applicable to the SCAQMD (pounds/day)	75	100	550	150	150	55
Year 2020						
Emissions (pounds/day)	2	22	86	<1	5	1
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (pounds/day)	17	257	562	2	34	10
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No

Projected Construction Year	VOCs	NO_X	CO	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Year 2022						
Emissions (pounds/day)	21	256	668	2	34	10
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2023						
Emissions (pounds/day)	20	210	648	2	31	10
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2024						
Emissions (pounds/day)	19	196	558	2	35	11
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2025						
Emissions (pounds/day)	25	225	809	3	57	21
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2026						
Emissions (pounds/day)	13	133	299	2	28	8
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2027						
Emissions (pounds/day)	4	100[2]	115	1	22	7
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028						
Emissions (pounds/day)	5	105	142	1	22	7
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2029						
Emissions (pounds/day)	<1	2	<1	<1	1	<1
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a
[1] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.
[2] The emissions value is presented as "100" due to rounding but does not exceed the SCAQMD's 100 pounds per day CEQA threshold.
< = less than; Authority = California High-Speed Rail Authority; CEQA = California Environmental Quality Act; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound.

Daily emissions are not presented in the AVAQMD, because project construction activities that span multiple years in the district are subject to the annual thresholds only. As shown in Table 3.3-29 below, none of the pollutants generated by construction of the E2 Build Alternative would exceed the AVAQMD's CEQA thresholds or the General Conformity *de minimis* levels applicable to the MDAB.

Table 3.3-29 Annual Construction Emissions in the Antelope Valley Air Quality Management District/Mojave Desert Air Basin – E2 Build Alternative

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis* levels [1]	25	25	N/A	N/A	N/A	N/A
Annual CEQA threshold (tons/year)	25	25	100	25	15	15
Year 2020						
Emissions (tons/year)	0.1	1.1	2.0	<0.1	0.4	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (tons/year)	0.3	3.3	5.9	0.1	1.0	0.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2022						
Emissions (tons/year)	0.5	11.2	14.4	0.1	2.0	0.6
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2023						
Emissions (tons/year)	1.0	15.2	31.5	0.1	2.8	0.8
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2024						
Emissions (tons/year)	0.9	15.0	25.6	0.1	3.8	1.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2025						
Emissions (tons/year)	1.1	11.0	31.8	0.1	2.2	0.8
Equals or Exceeds General Conformity *de minimis* level?	No	No	N/A	N/A	N/A	N/A
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2026						
Emissions (tons/year)	0.7	6.6	18.0	0.1	1.1	0.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (tons/year)	0.1	1.0	2.1	<0.1	0.2	0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028[4]						
Emissions (tons/year)	0.1	1.0	2.4	<0.1	0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029[4]						
Emissions (tons/year)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a
[1] The General Conformity *de minimis* levels for criteria pollutants are based on the MDAB federal attainment status. The MDAB is considered a severe nonattainment area for the O_3 NAAQS. N/A indicates conformity is not applicable because the MDAB is designated attainment for the NAAQS for the pollutant.
[2] As the MDAB is in attainment for the NO_2 NAAQS, the annual NO_2 emissions are not quantified for this basin.
[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.
[4] Emissions associated with Maintenance Facility construction included for years 2028 and 2029.
< = less than; Authority = California High-Speed Rail Authority; AVAQMD = Antelope Valley Air Quality Management District; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; MDAB = Mojave Desert Air Basin; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SO_2 = sulfur dioxide; VOC = volatile organic compound

The SCAQMD and AVAQMD thresholds were established to prevent emissions associated with new projects from contributing to CAAQS and NAAQS violations. CAAQS and NAAQS standards were developed to protect human health (i.e., standards that define the maximum amount of ambient pollution that can be present without harming public health). Thus, where a project exceeds SCAQMD's regional thresholds, there is the potential for adverse health effects to occur. However, because adverse health effects resulting from regional criteria pollutants depend on many variables (e.g., concentrations, local atmospheric conditions, number of exposed individuals), and because some pollutants are transported over long distances before resulting in adverse health effects, the specific health effects resulting from regional pollutants generated by a single project are difficult to determine. This difficulty in correlating regional emissions generated by an individual project to specific health consequences has been confirmed by the air quality districts during legal review, including SCAQMD (*Sierra Club v. County of Fresno* 2015). Therefore, while regional emissions due to Build Alternative construction could lead to increased incidence of specific health consequences, the magnitude of these health consequences cannot be quantified with a high level of certainty. However, it is known that public health would continue to be affected in the SCAB and MDAB as long as these regions do not attain the CAAQS and NAAQS.

Each criteria pollutant threshold exceedance could result in different health effects on nearby receptors. At atmospheric concentrations, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2, chronic pulmonary fibrosis, and bronchitis. When outdoor CO levels are elevated, they can be of particular concern to people with some types of heart disease, especially while exercising or under increased stress. Prolonged exposure to high levels of CO may result in reduced oxygen to the heart, chest pain headaches, drowsiness, loss of equilibrium, and heart disease. See Section 3.3.4.3 for more details of the potential health consequences of increased levels of each criteria pollutant.

A General Conformity Determination would be required for the E2 Build Alternative for NO_X in the SCAB for the years during construction when the emissions would exceed the applicable *de minimis* levels indicated above.

The steps to obtaining the General Conformity Determination are the same for the E2 Build Alternative as previously described for the Refined SR14 and E1 Build Alternatives. Compliance with the General Conformity Rule is required before construction but may be completed concurrent with Final EIR/EIS certification. Currently, it is assumed that a General Conformity determination would be required only for construction of the Palmdale to Burbank Project Section, as operations are overall expected to decrease regional emissions of criteria pollutants.

The General Conformity Determination would demonstrate that construction emissions of NO_X caused by the implementation of the E2 Build Alternative would not exceed the regional emissions budget specified in the applicable SIP with the implementation of AQ-MM#1, which is further evaluated in Section 3.3.7.

AQ-MM#1 requires the Authority to purchase emission offsets through an anticipated contractual agreement with the SCAQMD until the General Conformity *de minimis* levels and CEQA thresholds are met. Emission reduction credits will be obtained from SCAQMD to offset emissions associated with the construction of the Build Alternative. Purchase of emission offsets through SCAQMD's RECLAIM Program or Air Quality Investment Program, emission reduction credits, or another mechanism, subject to discussion with and approval by SCAQMD (AQ-MM#1), would offset and/or decrease NO_X emissions.

Unlike the federal General Conformity regulations, the obtainment of offsets or emission reduction credits for CO exceedances of the CEQA thresholds is not prohibited. As such, offsets procured through AQ-MM#1 may also be used to mitigate CO exceedances (if such offsets are available) below the SCAQMD CEQA thresholds.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will require reduced emissions and renewable diesel, construction of the E2 Build Alternative would still result in exceedances of General Conformity *de minimis* thresholds for NOx in the SCAB as well as exceedances of SCAQMD's CEQA significance thresholds for CO and NOx. These exceedances represent a significant air quality impact. AQ-MM#1 requires the Authority to purchase emission offsets from the SCAQMD to the extent necessary to satisfy General Conformity requirements and to meet SCAQMD CEQA significance thresholds. Emissions not above the General Conformity *de minimis* levels, but above local air district CEQA thresholds, would be reduced to quantities below the air district's CEQA thresholds This mitigation measure is further evaluated in Section 3.3.7, including reference to the Authority's voluntary commitment per POLI-1007 (Sustainability Policy) to reduce criteria air pollutant emissions during construction to net zero to the extent possible, exceeding the CEQA/NEPA mitigation obligation.

AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. Where feasible, ZE technology may include the use of electric-powered construction equipment. The use of electric-powered equipment would reduce emissions of CO, NO_X, SO_2, and diesel particulates.

CEQA Conclusion

Unlike the federal General Conformity regulations, obtaining offsets or emission reduction credits for CO exceedances of the CEQA thresholds is not prohibited. As such, offsets procured through AQ-MM#1 may also be used to mitigate CO exceedances (if such offsets are available), in addition to NO_X to below the SCAQMD CEQA thresholds.

AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. All remaining emissions after implementation of this AQ-MM#3 will be offset with emission offset credits required under AQ-MM#1 to below the SCAQMD CEQA thresholds. However, until the contractual agreement between the Authority and the SCAQMD is in place and the purchase of emission offsets is secured, this represents a significant and unavoidable impact for the E2 Build Alternative.

E2A Build Alternative

Construction activities associated with the E2A Build Alternative would result in criteria pollutant emissions. See Section 3.3.4 for a detailed discussion of the assumptions and tools used to calculate construction-period criteria pollutants and Section 3.3.4.2 for a description of the IAMFs incorporated to reduce construction-period criteria pollutants during construction.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emission results determined that exceedance of applicable *de minimis* levels in both the SCAB and MDAB would still occur. The calculated annual construction emissions for the E2A Build Alternative, including the IAMFs, are presented in Table 3.3-30. This table shows applicable General Conformity *de minimis* levels in the SCAB and indicates whether the E2A Build Alternative would exceed these thresholds. As the SCAB is in maintenance for the NO_2 NAAQS, the emissions must be calculated and compared to the applicable General Conformity *de minimis* level. As NO_2 is a subset of NO_X, for the purposes of this analysis the NO_2 emissions are assumed to be equal to the NO_X emissions. NOx are a mixture of gases that are composed of nitrogen and oxygen. These gases include nitric oxide (NO), nitrogen dioxide NO_2, nitrous oxide (N_2O), and nitrogen pentoxide (NO_5). Although NO_2 is the criteria pollutant, both NO and N_2O are emitted by cars, trucks, buses, power plants, and non-road engines and equipment. The emitted NO is rapidly oxidized into NO_2 in the atmosphere. Therefore, to capture both the emitted and oxidized NO_2, the project's NOx emissions are reported. The annual construction emissions results demonstrate the following exceedances of General Conformity *de minimis* levels applicable to the SCAB:

- NO_X: 2021–2026
- CO: 2022, 2024–2025

Table 3.3-30 Annual Construction Emissions in the South Coast Air Basin – E2A Build Alternative

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis* levels [1]	10	10	100	100	100	100	70
Annual CEQA threshold	The SCAQMD does not have annual CEQA thresholds. The SCAQMD CEQA thresholds for daily emissions are presented in subsequent tables.						
Year 2020							
Emissions (tons/year)	0.3	3.1	3.1	11.2	0.0	0.7	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2021							
Emissions (tons/year)	1.5	20.7	20.7	48.0	0.2	3.4	1.0
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2022							
Emissions (tons/year)	4.0	35.4	34.4	113.5	0.3	4.5	1.4
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	Yes	No	No	No
Year 2023							
Emissions (tons/year)	2.7	27.7	27.7	84.0	0.2	4.3	1.3

Projected Construction Year	VOCs	NO_X	NO_2[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2024							
Emissions (tons/year)	3.9	29.2	29.2	102.4	0.3	4.9	1.6
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	Yes	No	No	No
Year 2025							
Emissions (tons/year)	4.4	25.9	25.9	100.6	0.4	4.8	1.5
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	Yes	No	No	No
Year 2026							
Emissions (tons/year)	4.5	19.9	19.9	86.0	0.2	3.0	1.0
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	No	No	No	No	No
Year 2027							
Emissions (tons/year)	1.3	7.8	7.8	23.7	0.0	1.4	0.5
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2028							
Emissions (tons/year)	0.2	3.4	3.4	4.7	<0.1	0.7	0.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No
Year 2029							
Emissions (tons/year)	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No	No

Source: Authority 2020a

[1] The General Conformity *de minimis* levels for criteria pollutants are based on the SCAB federal attainment status. The SCAB is considered an extreme nonattainment area for the O_3 NAAQS, a serious nonattainment area for the $PM_{2.5}$ NAAQS, a serious maintenance area for the PM_{10} NAAQS, and a maintenance area for the CO and NO_2 NAAQS. Although the SCAB is in attainment for SO_2, because SO_2 is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* levels are used.

[2] As the SCAB is in maintenance for the NO_2 NAAQS, the alternative's emissions must be compared to the NO_2 de minimis level. For the purposes of this analysis, the NO_2 emissions are assumed to be equal to the NOx emissions.

[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.

Authority = California High-Speed Rail Authority; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; < = less than; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAB = South Coast Air Basin; SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound

The AVAQMD and SCAQMD have adopted CEQA thresholds of significance to determine a project's impact on air quality. Table 3.3-31 and Table 3.3-32 show applicable CEQA thresholds within the SCAQMD and AVAQMD and indicate whether the construction of the E2A Build Alternative would exceed these thresholds. Table 3.3-32 shows one CEQA threshold exceedance in the AVAQMD: NO_X in 2023. While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emissions results demonstrate that the E2A Build Alternative would result in exceedances of the following SCAQMD CEQA thresholds:

- NOX: 2021–2025
- CO: 2023

Table 3.3-31 Daily Construction Emissions Relative to the CEQA Thresholds Applicable to the South Coast Air Quality Management District – E2A Build Alternative

Projected Construction Year	VOCs	NO_X	CO	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Daily CEQA threshold applicable to the SCAQMD (pounds/day)	75	100	550	150	150	55
Year 2020						
Emissions (pounds/day)	4	39	152	0	6	2
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (pounds/day)	8	103	235	1	22	6
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2022						
Emissions (pounds/day)	17	244	459	2	40	13
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2023						
Emissions (pounds/day)	21	272	580	2	48	15
Exceeds CEQA threshold?	No	Yes	Yes	No	No	No
Year 2024						
Emissions (pounds/day)	9	123	257	1	27	8
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2025						
Emissions (pounds/day)	11	134	278	1	32	10
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2026						
Emissions (pounds/day)	3	70	100	1	22	6
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (pounds/day)	5	55	162	0	11	3
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028						
Emissions (pounds/day)	<1	6	1	<1	1	<1
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2029						

Projected Construction Year	VOCs	NO_X	CO	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Emissions (pounds/day)	0	0	0	0	0	0
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a
[1] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.
< = less than; Authority = California High-Speed Rail Authority; CEQA = California Environmental Quality Act; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAQMD = South Coast Air Quality Management District; SO_2 = sulfur dioxide; VOC = volatile organic compound

Daily emissions are not presented in the AVAQMD because project construction activities that span multiple years in the district are subject to the annual thresholds only. As shown in Table 3.3-32, while incorporation of AQ-IAMF#1 through AQ-IAMF#6 will reduce emissions, the construction emissions results demonstrate that the E2A Build Alternative would result in exceedance of the following AVAQMD CEQA threshold and General Conformity *de minimis* level applicable to the MDAB:

- NOx: 2023

Table 3.3-32 Annual Construction Emissions in the Antelope Valley Air Quality Management District/Mojave Desert Air Basin – E2A Build Alternative

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Annual General Conformity *de minimis* levels [1]	25	25	N/A	N/A	N/A	N/A
Annual CEQA threshold (tons/year)	25	25	100	25	15	15
Year 2020						
Emissions (tons/year)	0.4	4.4	12.9	0.1	1.2	0.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	NA	NA	NA	NA
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2021						
Emissions (tons/year)	1.1	13.2	23.0	0.2	2.9	0.9
Equals or Exceeds General Conformity *de minimis* level?	No	No	NA	NA	NA	NA
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2022						
Emissions (tons/year)	0.8	18.5	21.0	0.1	3.4	1.0
Equals or Exceeds General Conformity *de minimis* level?	No	No	NA	NA	NA	NA
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2023						
Emissions (tons/year)	1.7	25.1	51.5	0.2	5.0	1.5
Equals or Exceeds General Conformity *de minimis* level?	No	Yes	NA	NA	NA	NA

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Exceeds CEQA threshold?	No	Yes	No	No	No	No
Year 2024						
Emissions (tons/year)	1.2	19.0	33.7	0.2	3.8	1.2
Equals or Exceeds General Conformity *de minimis* level?	No	No	NA	NA	NA	NA
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2025						
Emissions (tons/year)	0.6	7.6	20.9	0.1	1.2	0.4
Equals or Exceeds General Conformity *de minimis* level?	No	No	NA	NA	NA	NA
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2026						
Emissions (tons/year)	0.6	7.0	20.7	0.1	1.1	0.3
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2027						
Emissions (tons/year)	0.1	1.3	2.5	<0.1	0.2	0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No
Year 2028[4]						
Emissions (tons/year)	0.1	1.0	2.5	<0.1	0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No

Projected Construction Year	VOCs	NO_X[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[3]
Year 2029[4]						
Emissions (tons/year)	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Equals or Exceeds General Conformity *de minimis* level?	No	No	No	No	No	No
Exceeds CEQA threshold?	No	No	No	No	No	No

Source: Authority 2020a

[1] The General Conformity *de minimis* levels for criteria pollutants are based on the MDAB federal attainment status. The MDAB is considered a severe nonattainment area for the O_3 NAAQS. N/A indicates conformity is not applicable because the MDAB is designated attainment for the NAAQS for the pollutant.

[2] As the MDAB is in attainment for the NO_2 NAAQS, the annual NO_2 emissions are not quantified for this basin.

[3] PM_{10} and $PM_{2.5}$ emissions have incorporated the SCAQMD Rule 403 requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.

[4] Emissions associated with Maintenance Facility construction are included for years 2028 and 2029.

< = less than; Authority = California High-Speed Rail Authority; AVAQMD = Antelope Valley Air Quality Management District; CO = carbon monoxide; EIR = environmental impact report; EIS = environmental impact statement; MDAB = Mojave Desert Air Basin; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SO_2 = sulfur dioxide; VOC = volatile organic compound

The SCAQMD and AVAQMD thresholds were established to prevent emissions associated with new projects from contributing to CAAQS and NAAQS violations. CAAQS and NAAQS standards were developed to protect human health (i.e., standards that define the maximum amount of ambient pollution that can be present without harming public health). Thus, where a project exceeds SCAQMD's regional thresholds, there is the potential for adverse health effects to occur. However, because adverse health effects resulting from regional criteria pollutants depend on many variables (e.g., concentrations, local atmospheric conditions, number of exposed individuals), and because some pollutants are transported over long distances before resulting in adverse health effects, the specific health effects resulting from regional pollutants generated by a single project are difficult to determine. This difficulty in correlating regional emissions generated by an individual project to specific health consequences has been discussed by the air quality districts during legal review, including SCAQMD (*Sierra Club v. County of Fresno* 2015). Therefore, while regional emissions due to Build Alternative construction could lead to increased incidence of specific health consequences, the magnitude of these health consequences cannot be quantified with a high level of certainty. However, it is known that public health would continue to be affected in the SCAB and MDAB as long as these regions do not attain the CAAQS and NAAQS.

Each criteria pollutant threshold exceedance could result in different health effects on nearby receptors. At atmospheric concentrations, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2, chronic pulmonary fibrosis, and bronchitis. When outdoor CO levels are elevated, they can be of particular concern to people with some types of heart disease, especially while exercising or under increased stress. Prolonged exposure to high levels of CO may result in reduced oxygen to the heart, chest pain, headaches, drowsiness, loss of equilibrium, and heart disease, while airborne particulate matter can damage lung tissue when inhaled. See Section 3.3.4.3 for more details of the potential health consequences of increased levels of each criteria pollutant.

Construction of the E2A Build Alternative would exceed the General Conformity *de minimis* levels for NOx and CO in the SCAB and NOx the MDAB. A General Conformity Determination would be required for the E2A Build Alternative for NO_x and CO in the SCAB and NO_x in the MDAB for the years during construction, when the emissions would exceed the applicable *de minimis* levels indicated above.

The steps to obtaining the General Conformity Determination are the same for the E2A Build Alternative as previously described for the Refined SR14 Build Alternative. Compliance with the General Conformity Rule is required before construction but may be completed concurrent with Final EIR/EIS certification. A General Conformity determination would be required only for construction of the Palmdale to Burbank Project Section, as operations are overall expected to decrease regional emissions of criteria pollutants.

The General Conformity Determination would demonstrate that construction emissions of NOx caused by the implementation of the E2A Build Alternative would not exceed the regional emissions budget specified in the applicable SIP with the implementation of AQ-MM#1, which is further evaluated in Section 3.3.7. Localized CO modeling, which shows no exceedance of the NAAQS, and additional microscale modeling would satisfy the applicable General Conformity *de minimis* level for CO.

AQ-MM#1 requires the Authority to purchase emission offsets through an anticipated contractual agreement with the SCAQMD until the General Conformity *de minimis* level and CEQA thresholds are met. Emission reduction credits will be obtained from SCAQMD to offset emissions associated with the construction of the Build Alternative. Purchase of emission offsets through SCAQMD's RECLAIM Program or Air Quality Investment Program, emission reduction credits, or another mechanism, subject to discussion with and approval by SCAQMD (AQ-MM#1), would offset and/or decrease NO_x emissions. Unlike the federal General Conformity regulations, the obtainment of offsets or emission reduction credits for CO exceedances of the CEQA thresholds is not prohibited. As such, offsets procured through AQ-MM#1 may also be used to mitigate CO exceedances (if such offsets are available) below the SCAQMD CEQA thresholds.

As previously discussed, emissions offsets procured through AQ-MM#1 cannot be used to mitigate CO impacts. The Authority has confirmed with the SCAQMD that the air quality modeling conducted as part of the localized construction effects analysis for the Palmdale to Burbank Project Section is acceptable in demonstrating CO conformity if the modeling shows that there are no exceedances of the applicable CO NAAQS. As shown in Impact AQ#5, the localized CO concentrations generated during construction are below the NAAQS.

While incorporation of AQ-IAMF#1 through AQ-IAMF#6 will require reduced emissions and renewable diesel, construction of the E2A Build Alternative would still result in exceedances of General Conformity *de minimis* levels for CO and NO_X in the SCAB, the General Conformity *de minimis* levels for NO_X, as well as exceedances of SCAQMD's CEQA significance thresholds for CO and NO_X. These exceedances represent a significant air quality impact. AQ-MM#1 and AQ-MM#2 require the Authority to purchase emission offsets through an anticipated contractual agreement from the SCAQMD and the AVAQMD, respectively, to the extent necessary to satisfy General Conformity requirements and to meet SCAQMD CEQA significance thresholds. Emissions not above the General Conformity *de minimis* levels, but above local air district CEQA thresholds, would be reduced to quantities below the air district's CEQA thresholds. These mitigation measures are further evaluated in Section 3.3.7, including reference to the Authority's voluntary commitment per POLI-1007 (Sustainability Policy) to reduce criteria air pollutant emissions during construction to net zero to the extent possible, exceeding the CEQA/NEPA mitigation obligation.

While AQ-MM#1 (Offset Project Construction Emissions through SCAQMD Emissions Offsets Programs) and AQ-MM#2 (Offset Project Construction Emissions through AVAQMD Emissions Offsets Programs) only require offsets to below local air district thresholds to mitigate regional air quality impacts under CEQA to less-than-significant, the Authority's Sustainability Policy commits the Authority to "achieve net-zero…criteria air pollutant emissions in construction" (Authority 2020b). Thus, the Authority's voluntary commitment per POLI-1007 exceeds the CEQA/NEPA mitigation obligation outlined in project-level Mitigation Monitoring and Reporting Programs.

AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. Where feasible, ZE technology may include the use of electric-powered construction equipment. The use of electric-powered equipment would reduce emissions of CO, NO_X, SO_2, and diesel particulates.

CEQA Conclusion

Unlike the federal General Conformity regulations, obtaining offsets or emission reduction credits for CO exceedances of the CEQA thresholds is not prohibited. As such, offsets procured through AQ-MM#1 may be used to mitigate CO exceedances (if such offsets are available) to below the SCAQMD CEQA thresholds. Additionally, offsets procured through AQ-MM#2 will be used to mitigation NO_X to below the AVAQMD CEQA thresholds.

AQ-MM#3, described in Section 3.3.7 requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. All remaining emissions after implementation of this AQ-MM#3 will be offset with emission offset credits required under AQ-MM#1 and AQ-MM#2 to below the applicable CEQA thresholds. However, until the contractual agreements between the Authority and the SCAQMD and the AVAQMD are in place, respectively, and the purchase of emission offsets is secured, this represents a significant and unavoidable impact for the E2A Build Alternative.

Impact AQ#3: Compliance with Air Quality Plans during Construction.

Planning documents for criteria pollutants for which the RSA is classified as a federal nonattainment or maintenance area are developed by the SCAQMD, the AVAQMD, and CARB and are approved by the USEPA. The RSA air districts are guided by California's SIPs and other planning documents.

The applicable air quality plan for the SCAQMD is the 2016 SCAQMD AQMP, approved by the USEPA in October 2019 (SCAQMD 2017). The applicable air quality plans for the AVAQMD include the 2017 Western Mojave Desert Ozone Attainment Plan and the 2004 Antelope Valley Ozone Attainment Plan (AVAQMD 2017 and AVAQMD 2004). The applicable air quality plans for the SJVAPCD include the 2022 Ozone Plan for the San Joaquin Valley (SJVAPCD 2022) , the 2016 Plan for the 2008 8-Hour Ozone Standard (SJVAPCD 2016), the 2004 Extreme Ozone Attainment Demonstration Plan (SJVAPCD 2004), the 2015 $PM_{2.5}$ Plan (SJVAPCD 2015), the 2004 Revision to the California State Implementation Plan for Carbon Monoxide (CARB 2004), and the 2007 PM_{10} Maintenance Plan and Request for Redesignation (SJVAPCD 2007).

Emissions from construction of the Palmdale to Burbank Project Section would be temporary. However, based on the amount of construction to be completed, construction activities would involve heavy-duty construction equipment and cause air quality impacts that would conflict with or obstruct implementation of the applicable air quality plan, which serve to attain federal and state ambient air quality standards. These will be avoided or minimized through incorporation of AQ-IAMF#1, AQ-IAMF#2, AQ-IAMF#4, AQ-IAMF#5, and AQ-IAMF#6. These IAMFs, which are part of the design of the six Build Alternatives, will reduce potential adverse effects resulting from factors related to criteria pollutants during construction.

As discussed above, NO_x emissions within the SCAB and MDAB and CO emissions in the SCAB would exceed the General Conformity *de minimis* levels, while VOC, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ emissions would be below the General Conformity *de minimis* levels. The emission thresholds set by the air districts also serve to prevent new projects from contributing to CAAQS and NAAQS violations, which supports implementation of regional air quality plans to attain federal and state ambient air quality standards. As such, emissions above these air district thresholds would have the potential to conflict with or obstruct implementation of the air quality plans. Construction NO_x and CO emissions would exceed the SCAQMD and AVAQMD thresholds and could impede the implementation of the respective air quality plans. With incorporation of on-site IAMFs (AQ-IAMF#1, AQ-IAMF#2, AQ-IAMF#4, AQ-IAMF#5, and AQ-IAMF#6), NO_x and CO effects will be reduced. With implementation of AQ-MM#1 and AQ-MM#2, construction emissions of NO_x and CO will be offset until the General Conformity *de minimis* level and the CEQA threshold is met, to the extent feasible.

CEQA Conclusion

As discussed above, construction emissions of NO_x within the SCAQMD and AVAQMD and construction CO emissions in the SCAQMD would be greater than applicable General Conformity *de minimis* levels and exceed their respective CEQA significance thresholds, which would impede or obstruct implementation of the applicable air district AQMPs. Therefore, NO_x and CO emissions would have a significant impact under CEQA.

Incorporation of the applicable IAMFs (AQ-IAMF#1, AQ-IAMF#2, AQ-IAMF#4, AQ-IAMF#5, and AQ-IAMF#6) will reduce criteria pollutant emissions. Additionally, AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. All remaining emissions after implementation of AQ-MM#3 will be offset with emission offset credits required under AQ-MM#1 and AQ-MM#2, to the extent feasible. However, until the contractual agreements between the Authority and the SCAQMD and the AVAQMD are in place, respectively, and the purchase of emission offsets is secured, this represents a significant and unavoidable impact for the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives.

As discussed in Impact AQ#2, localized CO modeling shows no exceedance of the NAAQS for construction-period emissions, which meets the federal General Conformity regulations requirements. Offsets procured through AQ-MM#1 may also be used to mitigate CO exceedances (if such offsets are available) below the SCAQMD CEQA thresholds. However, until the contractual agreement between the Authority and the SCAQMD is in place and the purchase of emission offsets is secured, this represents a significant and unavoidable impact for the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives.

Impact AQ#4: Health Risks Assessment for Construction-Period Emissions.

Construction activities associated with the Build Alternatives would increase TAC concentrations at certain receptor locations due to the operation of diesel--fueled off-road construction equipment and heavy-duty trucks. DPM is the primary TAC released from construction activities. Because DPM emissions from diesel-fueled machinery can present increased cancer risk and other health hazards, an HRA was performed (see Appendix C of the Air Quality Technical Report [Authority 2020a] for the detailed HRA). The HRA analysis considers both acute (short-term) and chronic (long-term) noncancer health hazards and increased cancer risk resulting from exposure of sensitive receptors (e.g., schools, residences, hospitals) to DPM concentrations associated with the construction activities. These analyses were evaluated following the OEHHA and SCAQMD modeling guidance, as discussed in Section 3.3.4.

Because the Build Alternative alignments are approximately 31 to 38 miles long, it would not be feasible to analyze the entire construction phase as a whole. Therefore, six discrete areas (or “cases”) were chosen to represent the worst-case scenarios for construction-related air quality and health risk impacts on the maximum number of sensitive receptors along the Build Alternative alignments. These cases were designed to represent the worst-case scenarios in terms of construction-related air quality and health risk impacts. The worst-case scenarios are those that have a large amount of construction activity with emissions near the most concentrated sensitive receptors along the Build Alternatives. The six cases are located in southern Palmdale, Acton, the city of San Fernando, near Hanson Dam Open Space, and along the approach to the Burbank Airport Station. The locations of the six cases are presented on Figure 3.3-3.

Table 3.3-33 shows the values of the health risks associated with construction emissions at the maximally exposed individual location at each individual case location. The modeled DPM concentrations were used to determine the exposure doses and associated health effects following OEHHA guidance for health risk assessments. Specific details of the air dispersion modeling, and health risk assessment are found in Appendix C of the Air Quality Technical Report (Authority 2020a).

Table 3.3-33 indicates that none of the cases would result in exceedances of applicable thresholds for cancer risk and for chronic and acute noncancer health impacts. The California Public Resources Code, Section 21151.4, sets requirements for construction of any facility within 0.25 mile (1,320 feet) of a school that emits TACs in quantities that pose a health or safety hazard to humans at the school. Table 3.3-33 shows that predicted health risks at the maximally exposed receptor location (within 1,000 feet of the project footprint) near any school would be zero or less than one for cancer risk and for chronic and acute noncancer health impacts.

Table 3.3-33 Cancer and Noncancer Maximum Health Risk Associated with Construction Emissions

Highest Risk[1] – by Risk Type and Receptor Type[2]	Sensitive Receptor Type			
	Residential[3]	Recreational	School	Daycare
Case 2				
Cancer Risk (per million)	6	0	0	NA
Noncancer Chronic (HI)	0.0	0.0	0.0	NA
Noncancer Acute (HI)	0.2	0.0	0.0	NA
Case 4[4]				
Cancer Risk (per million)[3]	7	N/A	N/A	N/A
Noncancer Chronic (HI)	0.0	N/A	N/A	N/A
Noncancer Acute (HI)	0.2	N/A	N/A	N/A
Case 5				
Cancer Risk (per million)	7	N/A	N/A	N/A
Noncancer Chronic (HI)	0.0	N/A	N/A	N/A
Noncancer Acute (HI)	0.1	N/A	N/A	N/A
Case 6				
Cancer Risk (per million)	7	N/A	N/A	N/A
Noncancer Chronic (HI)	0.0	N/A	N/A	N/A
Noncancer Acute (HI)	0.1	N/A	N/A	N/A
Case 7				
Cancer Risk (per million)	9	0	0	2
Noncancer Chronic (HI)	0.0	0.0	0.0	0.0
Noncancer Acute (HI)	0.1	0.0	0.0	0.0
Case 8[4]				
Cancer Risk (per million)	6	0	0	N/A
Noncancer Chronic (HI)	0.0	0.0	0.0	N/A
Noncancer Acute (HI)	0.1	0.0	0.1	N/A

Source: Authority 2020a

[1] In all cases other than Case 2 and 4, conservative screening-level residential cancer risk were initially conducted and then refined to reflect the integration of IAMFs and other reasonable assumptions. For Cases 2 and 4, screening-level cancer risks are reported, as applicable IAMFs and other refinements did not apply to these cases.

[2] The SCAQMD has established thresholds for cancer risk and non-cancer health impacts (SCAQMD 2019). The cancer risk threshold is 10 per million. For chronic and acute risk, the hazard index threshold is 1.0.

[3] Maximum includes the highest of AERMOD runs modeled with flat or complex terrain.
[4] All noncancer risks, and cancer risks for Cases 4 and 8 are based on screening-level exposure. This represents risks based on a conservative estimate of exposure throughout the construction period to the highest reasonably foreseeable annual emissions from each source during that period.
HI = calculated Hazard Index; N/A = not applicable (receptor type does not appear for that case)

CEQA Conclusion

Construction activities associated with the Build Alternatives would increase TAC concentrations at certain receptor locations along each of the Build Alternative alignments. AQ-IAMF#1, AQ-IAMF#2, AQ-IAMF#4, and AQ-IAMF#6 implement the lowest-emitting construction equipment technology and adopt best management practices to minimize construction-period emissions. All feasible DPM control measures (i.e., renewable diesel, Tier 4-compliant construction equipment, and 2020 or newer truck fleet) will be implemented as IAMFs and no additional DPM control measures exist.

Project construction would not exceed applicable thresholds for cancer risk and for chronic and acute noncancer health impacts. As such this impact would be less than significant under CEQA. Therefore, CEQA does not require any mitigation. Details of the health risk analysis and results are provided in the Air Quality Technical Report (Authority 2020a).

Impact AQ#5: Localized Construction Effects.

Emissions from construction of the Build Alternatives would cause localized elevated criteria pollutant concentrations. These elevated concentrations may cause or contribute to exceedances of the NAAQS and CAAQS. This impact analyzes the criteria air pollutant concentrations from the emissions generated by construction at the six case locations analyzed under the HRA and applies to all six Build Alternatives, with the exception of Case 2.[13]

The following criteria pollutants were considered in this analysis of potential localized impacts:

- CO
- NO_2
- PM_{10}
- $PM_{2.5}$
- SO_2

To assess the potential localized impacts from CO, SO_2, and NO_2, the incremental increase in concentrations of these pollutants generated from construction is added to their respective background concentrations and evaluated against the NAAQS and CAAQS. Table 3.3-34 and Table 3.3-35 show that the estimated maximum criteria pollutant ambient air concentrations for CO and SO_2, respectively, at each of the case areas, are below the NAAQS and CAAQS. The Authority has confirmed with the SCAQMD that the air quality modeling conducted as part of the localized construction effects analysis for the Palmdale to Burbank Project Section would suffice in demonstrating CO conformity if the modeling shows that there are no exceedances of the applicable CO NAAQS.

Table 3.3-36 shows that concentrations of NO_2 would exceed the 1-hour average NAAQS in the Case 7 area and would be below the CAAQS at all of the case areas.

[13] The SR14A, E1A, and E2A Build Alternatives would traverse these case locations with the same alignment profiles as the Refined SR14, E1, and E2 Build Alternatives. While the Case 2 location would not traverse the SR14A Build Alternative alignment due to its diversion from the Refined SR14 Build Alternative south of Avenue R in Palmdale, this portion of the SR14A Build Alternative alignment would be farther from sensitive receptors and would consist entirely of a single tunnel profile rather than multiple alignment profiles (i.e., tunnel, at-grade, and elevated/aerial structure), which would require less overall construction activities and generate less emissions in that area.

Table 3.3-34 Carbon Monoxide Concentrations from Construction Emissions[1]

CO Concentration (µg/m³)[2]	1-hour Average		8-hour Average	
	CAAQS	NAAQS	CAAQS	NAAQS
Case 2				
Maximum Incremental Off-Site	964		259	
Background	1,489	1,489	1,260	1,260
Total Off-Site	2,453	2,453	1,519	1,519
Standard (µg/m³ equivalent)	23,000	40,000	10,000	10,000
Case 4				
Maximum Incremental Off-Site	1,935		340	
Background	1,489	1,489	1,260	1,260
Total Off-Site	3,424	3,424	1,600	1,600
Standard (µg/m³ equivalent)	23,000	40,000	10,000	10,000
Case 5				
Maximum Incremental Off-Site	326		127	
Background	3,437	3,437	2,864	2,864
Total Off-Site	3,763	3,763	2,991	2,991
Standard (µg/m³ equivalent)	23,000	40,000	10,000	10,000
Case 6				
Maximum Incremental Off-Site	423		225	
Background	3,437	3,437	2,864	2,864
Total Off-Site	3,860	3,860	3,089	3,089
Standard (µg/m³ equivalent)	23,000	40,000	10,000	10,000
Case 7				
Maximum Incremental Off-Site	572		304	
Background	3,437	3,437	2,864	2,864
Total Off-Site	4,009	4,009	3,168	3,168
Standard (µg/m³ equivalent)	23,000	40,000	10,000	10,000
Case 8				
Maximum Incremental Off-Site	53		24	
Background	3,437	3,437	2,864	2,864
Total Off-Site	3,490	3,490	2,888	2,888
Standard (µg/m³ equivalent)	23,000	40,000	10,000	10,000

Source: Authority 2020a

[1] Maximum criteria pollutant concentrations for NO_2, PM_{10}, $PM_{2.5}$ and SO_2 for each of the case areas can be found in the *Palmdale to Burbank Project Section: Air Quality and Global Climate Change Technical Report* (Authority 2020a).

[2] Maximum includes the highest of AERMOD runs modeled with flat or complex terrain.

μg/m[3] = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standards; CO = carbon monoxide; NAAQS = National Ambient Air Quality Standards, NO_2 = nitrogen dioxide, PM_{10} = respirable particulate matter (10 microns or less in diameter), $PM_{2.5}$ = respirable particulate matter (2.5 microns or less in diameter), SO_2 = sulfur dioxide

Table 3.3-35 Sulfur Dioxide Concentrations from Construction Emissions

SO_2 Concentration (μg/m³) [1]	1-hour Average[2]		24-hour Average[2]
	CAAQS	NAAQS	CAAQS
Case 2			
Maximum Incremental Off-site	0.6		0.1
Background	35.1	10.0	3.9
Total Off-site	36	11	4
Standard (μg/m³ equivalent)	655	196	105
Case 4			
Maximum Incremental Off-site	4.2		0.3
Background	35.1	10.0	3.9
Total Off-site	39	14	4
Standard (μg/m³ equivalent)	655	196	105
Case 5			
Maximum Incremental Off-site	8.4		1.1
Background	35.1	10.0	3.9
Total Off-site	43	18	5
Standard (μg/m³ equivalent)	655	196	105
Case 6			
Maximum Incremental Off-site	6.8		1.3
Background	35.1	10.0	3.9
Total Off-site	42	17	5
Standard (μg/m³ equivalent)	655	196	105
Case 7			
Maximum Incremental Off-site	1.2		0.3
Background	35.1	10.0	3.9
Total Off-site	36	11	4
Standard (μg/m³ equivalent)	655	196	105
Case 8			
Maximum Incremental Off-site	0.1		0.0
Background	35.1	10.0	3.9
Total Off-site	35	10	4
Standard (μg/m³ equivalent)	655	196	105

Source: Authority 2020a

1 Maximum includes the highest of AERMOD runs modeled with flat or complex terrain.
2 The maximum incremental off-site values shown for the 1-hour and 24-hour averages are the highest modeled values, which is more stringent than the NAAQS form for SO2.
µg/m3 = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standards; NAAQS = National Ambient Air Quality Standards

Table 3.3-36 Nitrogen Dioxide Concentrations from Construction Emissions

NO_2 Concentration (µg/m^3) [1]	1-hour Average		Annual Average	
	CAAQS	NAAQS[2]	CAAQS	NAAQS[2]
Case 2				
Maximum Incremental Off-site	60.7		0.6	
Background	121.4	75.8	22.2	20.3
Total Off-site	182	136	23	21
Standard (µg/m^3 equivalent)	339	188	57	100
Case 4				
Maximum Incremental Off-site	51.2		2.6	
Background	121.4	75.8	22.2	20.3
Total Off-site	173	127	25	23
Standard (µg/m^3 equivalent)	339	188	57	100
Case 5				
Maximum Incremental Off-site	46.7		5.1	
Background	136.3	95.3	25.4	24.6
Total Off-site	183	142	30	30
Standard (µg/m^3 equivalent)	339	188	57	100
Case 6				
Maximum Incremental Off-site	83.4		8.3	
Background	136.3	95.3	25.4	24.6
Total Off-site	220	179	34	33
Standard (µg/m^3 equivalent)	339	188	57	100
Case 7				
Maximum Incremental Off-site	108.6		12.3	
Background	136.3	95.3	25.4	24.6
Total Off-site	245	204*	38	37
Standard (µg/m^3 equivalent)	339	188	57	100
Case 8				
Maximum Incremental Off-site	5.3		0.2	
Background	136.3	95.3	25.4	24.6

NO_2 Concentration (µg/m³) [1]	1-hour Average		Annual Average	
	CAAQS	NAAQS[2]	CAAQS	NAAQS[2]
Total Off-site	142	101	26	25
Standard (µg/m³ equivalent)	339	188	57	100

Source: Authority 2020a
* Indicates an exceedance.
[1] Maximum includes the highest of AERMOD runs modeled with flat or complex terrain.
[2] The maximum incremental off-site value shown for the 1-hour average is the highest 5-year average of the annual 8th-highest maximum daily 1-hour value (the form of the NAAQS).
µg/m³ = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standards; NAAQS = National Ambient Air Quality Standards; NO_2 = nitrogen dioxide

Ambient PM_{10} concentrations in the SCAB and the Antelope Valley portion of the MDAB exceed the CAAQS, and ambient $PM_{2.5}$ concentrations in the SCAB exceed both the NAAQS and CAAQS; therefore, the construction emissions of these two pollutants are evaluated without the addition of their respective background concentrations. Instead, the modeled maximum concentrations of these two pollutants are evaluated in accordance with the SCAQMD and AVAQMD applicable ambient air quality thresholds.

If a Build Alternative's incremental increase in PM_{10} and $PM_{2.5}$ concentrations is below the applicable thresholds, then it would not cause or contribute significantly to exceedances of the ambient air quality standards.

Table 3.3-37 and Table 3.3-38 show the incremental increase in PM_{10} and $PM_{2.5}$ concentrations, respectively, for each of the case areas analyzed. As shown in Table 3.3-37 and Table 3.3-38, PM_{10} concentrations would not exceed the applicable 24-hour threshold at any case areas, while $PM_{2.5}$ concentrations would not exceed the applicable 24-hour or annual thresholds at any case areas. PM_{10} concentrations would exceed the CAAQS annual threshold at the following case areas:

- Case 5
- Case 6
- Case 7

Table 3.3-37 Particulate Matter-10 Concentrations from Construction Emissions

PM_{10} Concentration (µg/m³)[1]	24-hour Average[2]		Annual Average
	CAAQS[3]	NAAQS	CAAQS[3]
Case 2			
Maximum Incremental Off-site	1.0		0.1
Background	NA	67.7	NA
Total Off-site	1.0	69	0.1
Standard (µg/m³ equivalent)	10.4	150	1
Case 4			
Maximum Incremental Off-site	0.8	0.5	0.1
Background	NA	67.7	NA
Total Off-site	0.8	68	0.1
Standard (µg/m³ equivalent)	50	150	50

PM_{10} Concentration (µg/m³)[1]	24-hour Average[2]		Annual Average
	CAAQS[3]	NAAQS	CAAQS[3]
Case 5			
Maximum Incremental Off-site	4.2		1.4
Background	NA	67.7	NA
Total Off-site	4.2	72	1.4*
Standard (µg/m³ equivalent)	10.4	150	1
Case 6			
Maximum Incremental Off-site	9.3		2.8
Background	NA	67.7	NA
Total Off-site	9.3	77	2.8*
Standard (µg/m³ equivalent)	10.4	150	1
Case 7			
Maximum Incremental Off-site	7.9		1.2
Background	NA	67.7	NA
Total Off-site	7.9	76	1.2*
Standard (µg/m³ equivalent)	10.4	150	1
Case 8			
Maximum Incremental Off-site	0.1		0.0
Background	NA	67.7	NA
Total Off-site	0.1	68	0.0
Standard (µg/m³ equivalent)	10.4	150	1

Source: Authority 2020a
* Indicates an exceedance.
[1] Maximum includes the highest of AERMOD runs modeled with flat or complex terrain.
[2] The maximum incremental off-site values shown for the 24-hour averages are the highest 24-hour value used for comparison to both the CAAQS (SCAQMD) and the NAAQS. This is more conservative than the form of the NAAQS (the highest 6th-highest maximum 24-hour value). Even with this conservative estimate, the 24-hour NAAQS are not exceeded at any case location. For Case 4, two values are shown for the maximum incremental off-site concentration. These represent the actual form of the CAAQS (highest maximum 24-hour average) and NAAQS (highest 6th-highest maximum value) for comparison to the respective standards.
[3] Both Antelope Valley (AVAQMD) and South Coast (SCAQMD) are in nonattainment for the PM_{10} CAAQS. In both cases, no background is added for the assessments. Instead, for CAAQS compliance the maximum incremental off-site modeled values are compared directly to the applicable air district's thresholds shown in the "Standard" row. Because the thresholds for AVAQMD are different than that for SCAQMD, the standards applied to Case 4 are different than the other Cases.
µg/m³ = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standards; CO = carbon monoxide; NAAQS = National Ambient Air Quality Standards; PM_{10} = respirable particulate matter (10 microns or less in diameter)

Table 3.3-38 Particulate Matter-2.5 Concentrations from Construction Emissions

$PM_{2.5}$ Concentration (µg/m³)[1]	24-hour Average	Annual Average
	SCAQMD[2]	SCAQMD[2]
Case 2		
Maximum Incremental Off-site	0.37	0.0
Background	NA	NA

$PM_{2.5}$ Concentration (µg/m³)[1]	24-hour Average	Annual Average	
	SCAQMD[2]	SCAQMD[2]	
Total Off-site	0.4	0.0	
Standard (µg/m³ equivalent)	10.4	1	
Case 4			
Maximum Incremental Off-site	0.2	0.1	0.1
Background	24.6	9.7	9.6
Total Off-site	24.8	9.7	9.7
Standard (µg/m³ equivalent)	35	12	12
Case 5			
Maximum Incremental Off-site	1.1	0.4	
Background	NA	NA	
Total Off-site	1.1	0.4	
Standard (µg/m³ equivalent)	10.4	1	
Case 6			
Maximum Incremental Off-site	2.7	0.9	
Background	NA	NA	
Total Off-site	2.7	0.9	
Standard (µg/m³ equivalent)	10.4	1	
Case 7			
Maximum Incremental Off-site	3.1	0.6	
Background	NA	NA	
Total Off-site	3.1	0.6	
Standard (µg/m³ equivalent)	10.4	1	
Case 8			
Maximum Incremental Off-site	0.0	0.0	
Background	NA	NA	
Total Off-site	0.0	0.0	
Standard (µg/m³ equivalent)	10.4	1	

Source: Authority 2020a
[1] Maximum includes the highest of AERMOD runs modeled with flat or complex terrain.
[2] The maximum incremental off-site values shown for the 24-hour averages are the highest 24-hour value used for comparison to both the CAAQS (SCAQMD) and the NAAQS. This is more conservative than the form of the NAAQS (the highest 6th-highest maximum 24-hour value). Even with this conservative estimate, the 24-hour NAAQS are not exceeded at any case location. For Case 4, two values are shown for the maximum incremental off-site concentration. These represent the actual form of the CAAQS (highest maximum 24-hour average) and NAAQS (highest 6th-highest maximum value) for comparison to the respective standards.
µg/m³ = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standards; CO = carbon monoxide; NAAQS = National Ambient Air Quality Standards; dioxide; $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter)

CEQA Conclusion

While incorporation of AQ-IAMF#3 through AQ-IAMF#6 will reduce diesel emissions by addressing equipment and vehicle exhaust emissions and requiring the use of renewable diesel, NO_2 and PM_{10} emissions would exceed applicable thresholds in Case 7 (NO_2 for NAAQS) and Cases 5, 6, and 7 (PM_{10} for CAAQS) and would result in a significant impact under CEQA. Details of the health risk analysis and results are provided in the Air Quality Technical Report (Authority 2020a). AQ-IAMF#1, AQ-IAMF#2, AQ-IAMF#4, and AQ-IAMF#5 implement the lowest-emitting construction equipment technology and adopt best management practices to minimize construction-period emissions. No additional emissions control/mitigation measures exist. Given that all feasible DPM control measures (i.e., renewable diesel, Tier 4–compliant construction equipment, and 2020 or newer truck fleet) will already be implemented as IAMFs, no additional DPM control measures exist. Therefore, this impact would be significant under CEQA.

As shown in Table 3.3-34, Table 3.3-35, and Table 3.3-38, localized CO, SO_2, and $PM_{2.5}$ modeling shows no exceedance of NAAQS and CAAQS for construction-period emissions. Table 3.3-36 and Table 3.3-37 show the following exceedances:

- NO_2 in the Case 7 area (NAAQS)
- PM_{10} in the Case 5 area (CAAQS)
- PM_{10} in the Case 6 area (CAAQS)
- PM_{10} in the Case 7 area (CAAQS)

AQ-MM#3 addresses impacts related to construction activities near sensitive receptors. AQ-MM#3 requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. Until the final construction-period emissions calculations can be incorporated, it is determined that the six Build Alternatives would expose sensitive receptors to substantial pollutant concentrations that would exceed the applicable NAAQS and CAAQS within certain construction areas. This represents a significant and unavoidable impact for the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives.

Operations Impacts

There would be no difference in operations emissions between the Build Alternatives because the regional change in vehicle and airplane emissions and indirect energy use would be the same for all six Build Alternatives. Therefore, this operations analysis compares the operation of the six Build Alternatives to the 2015 baseline and 2040 No Project baseline. This operations impacts analysis includes the Palmdale Station and Lancaster Maintenance Facility subsections in order to provide regional context for project operations. Common benefits to regional air quality during operations would come from a reduction of VMT and airplane emissions, which would reduce criteria pollutants, MSATs, and GHG emissions.

Impact AQ#6: Statewide and Regional Pollutant Emissions.

Table 3.3-39 and Table 3.3-40 summarize the net change in statewide and regional emissions with and without the operation of the Palmdale to Burbank Project Section for existing conditions and a horizon year (2040) under the medium and high ridership scenarios. As shown in these tables, the operation of the Build Alternatives would have a beneficial effect on (i.e., reduce) statewide and regional emissions of all pollutants when compared to existing and future No Project baselines. Refer to Section 3.3.4.3 for a detailed discussion of the tools and assumptions used to estimate emission factors for on-road vehicles VMT, train movement, aircraft emissions, and indirect power plant emissions. For more information on the relative level of pollution reduction in the HSR opening year, see the Air Quality Technical Report (Authority 2020a).

Over the long term, statewide on-road vehicle and aircraft emissions could decrease, because it is anticipated that people would shift from using on-road vehicles and aircraft to the California HSR System, which is less emissions intensive than other transportation modes.

On-Road Vehicle Emissions

Operation of the six Build Alternatives would not change the regional traffic mix (i.e., trucks to personal vehicle ratios on freeways would not change). As such, the pollutant concentrations emitted from regional traffic would be proportional to VMT reductions and would decrease when compared to future No Project baselines. Table 3.3-39 and Table 3.3-40 summarize the statewide and regional reductions in criteria pollutant emissions associated with on-road vehicles for the horizon year (2040), based on travel-mode projections of VMT developed for the California HSR System in the HSR 2016 Business Plan for medium- and high-ridership scenarios (Authority 2016). Table 3.3-41 provides the anticipated VMT reductions as a result of the Palmdale to Burbank Project Section.

Aircraft Emissions

As indicated in Table 3.3-39 and Table 3.3-40, the operation of the six Build Alternatives would be expected to reduce aircraft emissions when compared to the existing and future No Project baselines (Table 3.3-13). The decrease in aircraft emissions would occur as intrastate travelers are expected to shift away from flying toward more use of the California HSR System. The reduction in aircraft travel as a result of the California HSR System is the largest contributor to the reduction in statewide and regional emissions.

Table 3.3-39 Net Changes in Statewide Pollutant Emissions Due to Operation of the Palmdale to Burbank Project Section

Element	VOCs (tons/year)		CO (tons/year)		NO_X (tons/year)		SO_2 (tons/year)		PM_{10} (tons/year)		$PM_{2.5}$ (tons/year)	
	M	H	M	H	M	H	M	H	M	H	M	H
2015 Project Emissions Relative to the 2015 Existing Baseline (No Project)												
On-Road Vehicles	-131	-180	-5,425	-7,458	-558	-768	-13	-18	-385	-529	-104	-144
Aircraft	-101	-97	-862	-829	-829	-798	-89	-86	-25	-24	-25	-24
Power Plants	15	17	215	237	108	118	13	14	26	29	23	26
Total Statewide Net Emissions	-217	-260	-6,071	-8,051	-1,280	-1,447	-89	-89	-384	-524	-106	-142
2040 Project Emissions Relative to the 2040 Future No Project Baseline												
On-Road Vehicles	-7	-27	-603	-2,287	-115	-168	-10	-13	-513	-709	-132	-185
Aircraft	-139	-134	-1,162	-1,118	-1,145	-1,101	-124	-119	-35	-33	-35	-33
Power Plants	15	17	215	237	108	118	13	14	26	29	23	26
Total Statewide Net Emissions	-131	-143	-1,550	-3,168	-1,152	-1,151	-121	-118	-522	-714	-143	-193

Source: Authority 2020a

Totals may not add up exactly due to rounding.

CO = carbon monoxide; CO_2 = carbon dioxide; H = high-ridership scenario; HSR = high-speed rail; M = medium-ridership scenario; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SO_2 = sulfur dioxide; VOC = volatile organic compound

Table 3.3-40 Net Changes in Regional Pollutant Emissions Due to Operation of the Palmdale to Burbank Project Section

Element	VOCs (tons/year)		CO (tons/year)		NO_X (tons/year)		SO_2 (tons/year)		PM_{10} (tons/year)		$PM_{2.5}$ (tons/year)	
	M	H	M	H	M	H	M	H	M	H	M	H
2015 Project Emissions Relative to the 2015 Existing Baseline (No Project)												
On-Road Vehicles	-54	-74	-2,073	-2,861	-230	-317	-5	-7	-157	-217	-43	-59
Aircraft	-43	-41	-371	-350	-357	-337	-38	-36	-11	-10	-11	-10
Power Plants	0.6	0.7	8.6	9.5	4.3	4.7	0.5	0.6	1.0	1.1	0.9	1.0
Total Regional Net Emissions	-97	-114	-2,436	-3,202	-583	-649	-43	-43	-167	-226	-53	-68
2040 Project Emissions Relative to the 2040 Future No Project Baseline												
On-Road Vehicles	-8	-10	-624	-831	-49	-67	-4	-5	-212	-292	-55	-76
Aircraft	-60	-56	-501	-472	-493	-465	-53	-50	-15	-14	-15	-14
Power Plants	0.6	0.7	8.6	9.5	4.3	4.7	0.5	0.6	1.0	1.1	0.9	1.0
Total Regional Net Emissions	-67	-66	-1,116	-1,293	-538	-528	-57	-55	-226	-305	-69	-89

Source: Authority 2020a
Totals may not add up exactly due to rounding.
CO = carbon monoxide; CO_2 = carbon dioxide; H = high-ridership scenario; HSR = high-speed rail; M = medium-ridership scenario; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SO_2 = sulfur dioxide; VOC = volatile organic compound

Table 3.3-41 On-Road Vehicle Miles Traveled for Operation of the Palmdale to Burbank Project Section and the No Project Alternative (under the Medium and High Ridership Scenarios)

Area	No Project Vehicle Miles Traveled Total Annual Traffic		Palmdale to Burbank Project Section Vehicle Miles Traveled Total Annual Traffic	
	Medium	High	Medium	High
Year 2015				
Los Angeles	73,394,193,078	73,236,845,700	72,724,087,184	72,310,888,632
Ventura	5,892,874,243	5,871,995,391	5,859,075,240	5,823,357,866
Kern	4,152,310,619	4,094,480,903	3,547,122,300	3,267,281,332
Santa Barbara	864,545,016	849,400,023	840,246,898	814,378,660
San Bernardino	12,725,201,965	12,686,260,346	12,665,228,642	12,601,481,161
Regional Total	**97,029,124,921**	**96,738,982,363**	**95,635,760,264**	**94,817,387,651**
Year 2040				
Los Angeles	86,055,909,405	87,075,870,799	85,124,593,011	85,788,971,213
Ventura	7,085,588,919	7,181,701,297	7,038,614,902	7,114,104,631
Kern	5,789,706,865	6,659,048,685	4,948,613,229	5,509,402,743
Santa Barbara	1,038,912,666	1,117,778,105	1,005,143,024	1,069,105,246
San Bernardino	18,495,252,023	18,770,247,920	18,411,900,811	18,652,421,401
Regional Total	**118,465,369,878**	**120,804,646,808**	**116,528,864,976**	**118,134,005,234**

Source: Authority 2020a
Totals may not add up exactly due to rounding.
Note: For analysis on VMT reduction in the 2029 opening year for medium and high scenarios, see the *Palmdale to Burbank Project Section: Air Quality and Global Climate Change Technical Report* (Authority 2020a).

Electrical Emissions

The operation of the six Build Alternatives would increase electrical requirements compared to the existing and future No Project baselines, because the trains would be powered by electricity. The proposed California HSR System would obtain electricity from the statewide grid. This is a conservative assumption because of the State requirement that an increasing fraction of electricity (50 percent by 2030 and 100 percent by 2045) generated for the State's power portfolio comes from renewable energy sources. As such, the emissions generated for the California HSR System are expected to be lower in the future than the emissions estimated for this analysis. However, the Authority has adopted a policy goal of utilizing renewable energy for all traction power that includes the procurement and production of energy on site, where feasible, to feed into the California grid and offset the energy required for HSR traction power (Authority 2008). An industry survey in April 2013 indicated that there is sufficient renewable energy capacity to meet the system demand. Under the 2013 Policy Directive POLI-PLAN-03, the Authority has adopted a goal to purchase 100 percent of the California HSR System's power from renewable energy sources (Authority 2016). Accordingly, the emissions generated for powering the California HSR System are expected to be lower in the future compared to emission estimates shown above in Table 3.3-39.

The electrically powered HSR trains would not generate direct combustion emissions along the six Build Alternative alignments. However, HSR trains traveling at high velocities would create sideways turbulence and rear wake, which would re-suspend particulates from the surface surrounding the track, resulting in fugitive dust emissions. A detailed analysis of wind-induced fugitive dust emissions from California HSR System travel is discussed under Impact AQ#8.

Station Sites Emissions

The Palmdale to Burbank Project Section would include a station in the Burbank Subsection, the Burbank Airport Station. The six Build Alternative alignments would be identical in the Burbank Subsection. Table 3.3-42 summarizes emissions associated with operations of the Burbank Airport Station.

Table 3.3-42 Burbank Airport Station Operations Emissions (2040)

Project Component	Emissions (tons/year)						
	VOCs	CO	NO_X	SO_2[1]	PM_{10}	$PM_{2.5}$	CO_2e
Burbank Airport Station	5.3	52.4	13.1	0.2	20.1	5.4	16,656.9

Source: Authority 2020a

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = nitrogen oxide; PM_{10} = particulate matter smaller than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter; SO_2 = sulfur dioxide; tons/year = tons per year; VOC = volatile organic compound

CEQA Conclusion

As shown in Table 3.3-42, the Burbank Airport Station would result in emissions during operations. However, Table 3.3-39 and Table 3.3-40 show that operations of the Build Alternatives as a whole would result in a reduction of statewide and regional criteria pollutants compared to existing and future No Project baselines, under both the medium- and high-ridership scenarios. In the opening year of HSR operations, statewide emissions would be reduced, although at a lesser extent compared to projected 2040 emissions reductions. Therefore, operation of the six Build Alternatives and the rest of the California HSR System would result in a net benefit to statewide air quality and would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. The impact on statewide emissions from operation of the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives would be less than significant. Therefore, CEQA does not require any mitigation.

Impact AQ#7: Mobile Source Air Toxics Analysis.

Pursuant to the FHWA's *Updated Interim Guidance on Air Toxic Analysis in NEPA Documents* (FHWA 2016), the qualitative assessment presented below is derived, in part, from a study conducted by FHWA titled *A Methodology for Evaluating Mobile Source Air Toxic Emissions among Transportation Project Alternatives* (FHWA 2011). It is provided as a basis for identifying and comparing the potential differences in MSAT emissions, if any, among the Build Alternatives.

There would be no difference in MSAT emissions among the Build Alternatives, because the regional change in vehicle emissions would be the same for all six Build Alternatives. Therefore, this analysis compares the Build Alternatives to the 2015 existing baseline and 2040 future no project baselines.

The Build Alternatives' trains would be powered by electricity, with the power distributed to each train car via the overhead contact system. Operation of the trains would not generate combustion emissions; therefore, no toxic emissions would occur from the operation of the Palmdale to Burbank Project Section trains.

As previously discussed (Impact AQ#6), the six Build Alternatives would decrease regional VMT emissions relative to the existing and future No Project baselines, under both the medium and high-ridership scenarios (see Table 3.3-41). Because the six Build Alternatives would not change the regional traffic mix, the amount of MSATs emitted from highways and other roadways would decrease proportional to the VMT reductions.

The Build Alternatives would also result in reduced traffic congestion and increased vehicle speed when compared to the existing and future No Project baselines. According to the USEPA's Motor Vehicle Emission Simulator 2014 model, emissions of all priority MSATs, except DPM, decrease as speed increases. Therefore, the six Build Alternatives would result in decreases in MSAT emissions as traffic congestion declines. Regionally, the project would be considered a project with "no meaningful MSAT effects" (Tier 1), per FHWA's (2016) MSAT guidance.

The potential MSAT emission sources directly related to operation of the Build Alternatives would be passenger vehicles traveling to and from the Burbank Airport Station. Localized increases in MSAT emissions could occur near the station because of passenger commutes. Consistent with FHWA's MSAT guidance, the magnitude and the duration of potential changes in localized MSATs cannot be reliably quantified because of incomplete or unavailable information in forecasting project-specific health effects. Nonetheless, USEPA's vehicle and fuel regulations, coupled with fleet turnover, will cause substantial MSAT reductions over time, thereby offsetting the increase in localized traffic associated with the Build Alternatives.

CEQA Conclusion

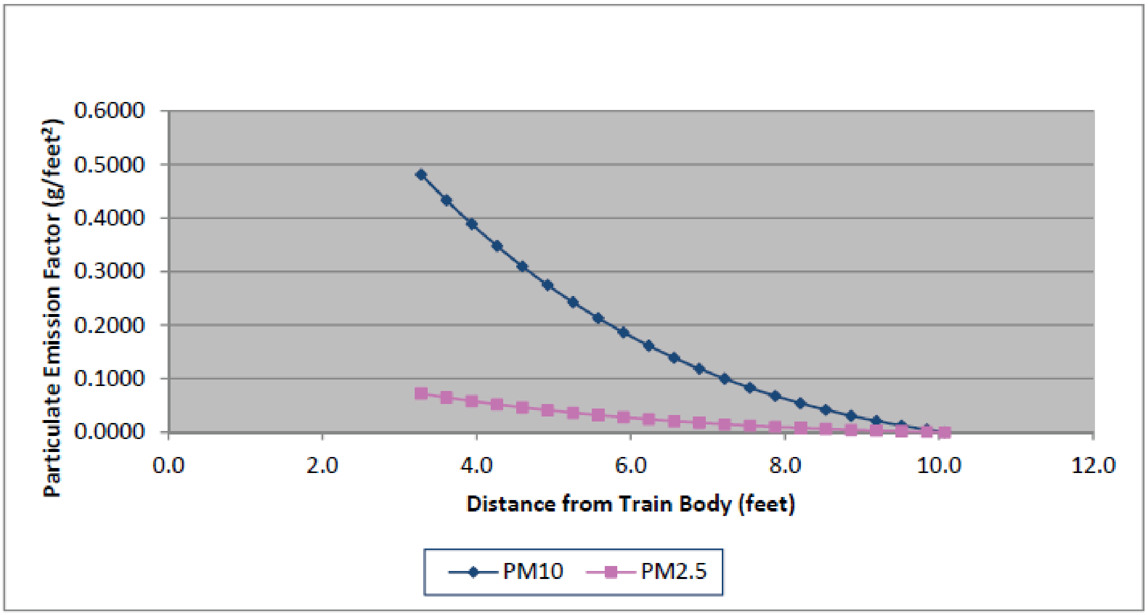
Because the project would not change the regional traffic mix, and because the HSR trains would not generate combustion emissions, the amount of MSATs emitted from highways and other roadways would decrease proportional to the VMT reductions (see Impact AQ#6). There would be no difference in operations emissions between the six Build Alternatives because the regional change in travel-related emissions and indirect energy use would be the same. Because the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives would not expose sensitive receptors to substantial pollutant concentrations, this impact would be less than significant. Therefore, CEQA does not require any mitigation.

Impact AQ#8: Fugitive Dust Emissions from Train Movement.

Because the California HSR System trains would be electrically powered, the operation of the six Build Alternatives would not generate direct combustion emissions along the railways that would cause substantial health concerns, such as asthma or other respiratory diseases. However, the operation of California HSR System trains creates an aerodynamic wake behind the train that results in airflow in the general direction of the moving train. A detailed analysis of existing credible scientific evidence related to evaluating impacts from induced winds from California HSR System trains is included in Appendix F of the Air Quality Technical Report (Authority 2020a).

Specifically, the analysis evaluates the potential for generating fugitive dust emissions from HSR-induced winds.

As can be seen on Figure 3.3-15 and in Table 3.3-43, the amount of fugitive dust suspended beyond 10 feet would be negligible (USEPA 2006). This threshold assumes a friction velocity of 0.62 foot per second to resuspend soils, and that a train passing at 220 mph could resuspend soil particles out to approximately 10 feet from the train. Therefore, even though the California HSR System trains would travel at speeds of up to 220 mph, the train movement would not suspend in the air herbicides, fungicides, or other harmful residues from the soil outside of the immediate HSR right-of-way. Based on this analysis, fugitive dust emissions from train movement would not result in sufficient amounts of dust to cause health concerns.



Source: Authority 2020a
g/feet^2 = grams per square foot; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter)

Figure 3.3-15 Particulate Emission Factor from Passing Train

Table 3.3-43 Emission Factor from Passing Train

Distance from Train Body (feet)	Emission Factor (grams per square foot)	
	PM_{10}	$PM_{2.5}$
3.3	0.48	0.07
3.6	0.43	0.07
3.9	0.39	0.06
4.3	0.35	0.05
4.6	0.31	0.05
4.9	0.28	0.04

Distance from Train Body (feet)	Emission Factor (grams per square foot)	
	PM_{10}	$PM_{2.5}$
5.2	0.24	0.04
5.6	0.21	0.03
5.9	0.19	0.03
6.2	0.16	0.02
6.6	0.14	0.02
6.9	0.12	0.02
7.2	0.10	0.02
7.5	0.08	0.01
7.9	0.07	0.01
8.2	0.05	0.01
8.5	0.04	0.01
8.9	0.03	0.00
9.2	0.02	0.00
9.5	0.01	0.00
9.8	0.01	0.00
10.1	0.00	0.00

Source: Authority 2020a
PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter)

CEQA Conclusion

Operation of the six Build Alternatives would not generate fugitive dust emissions that would result in health concerns or expose sensitive receptors to substantial pollutant concentrations. This impact would be less than significant under CEQA for the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives. Therefore, CEQA does not require any mitigation.

Impact AQ#9: Localized Increases in Carbon Monoxide Emissions Due to Project Operations.

A CO hot-spot analysis was performed for five roadway intersections that would experience localized increases in vehicle emissions because of shifts in traffic patterns due to the Build Alternatives. The 10 intersections selected for the CO hot-spot analysis were identified in the *Palmdale to Burbank Project Section: Transportation Technical Report* (Authority 2019) as the intersections that would experience the greatest traffic impacts under a high ridership forecast (i.e., highest traffic volumes) under 2040 Project conditions. Five of the 10 intersections are outside the Palmdale to Burbank Project Section area in the Palmdale Station area, which is analyzed in the Bakersfield to Palmdale Project Section EIR/EIS. The remaining five intersections are located near the proposed Burbank Airport Station, where a large number of people would travel to park and ride on the Palmdale to Burbank Project Section HSR trains.

Refer to Section 3.3.4.3 for a detailed discussion of the tools and assumptions used to prepare the CO hot-spot analysis.

Table 3.3-44 summarizes the CO hot-spot analysis for the and Burbank Airport Station. The traffic parameters associated with CO emissions at the five evaluated intersections would be the same, regardless of the Build Alternative selected, because the changes are associated with a singular design for the Burbank Airport Station. As such, the CO hot-spot analysis results are presented for all six Build Alternatives. In most cases, the Build Alternatives would not affect CO emissions at the study intersections. Where changes would occur, the increases would be minimal, on the magnitude of 0.1 part per million. As such, implementation of the Palmdale to Burbank Project Section would increase localized CO concentrations when compared to the existing and future No Project baselines but would not exceed the 1- or 8-hour NAAQS and CAAQS.

Table 3.3-44 Localized CO Modeling Concentration Results – Burbank Airport Station Intersections

Intersection	Receptor[1]	1-hour Carbon Monoxide (ppm)[2, 3]				8-hour Carbon Monoxide (ppm)[4, 5]			
		2015		2040		2015		2040	
		Existing Baseline	Existing Plus Project	2040 Baseline	2040 Plus Project	Existing	Existing Plus Project	2040 Baseline	2040 Plus Project
Burbank Boulevard/Victory Boulevard	1	4.2	4.2	3.2	3.2	2.9	2.9	2.2	2.2
	2	4.5	4.5	3.4	3.4	3.1	3.1	2.4	2.4
	3	4.6	4.6	3.4	3.4	3.2	3.2	2.4	2.4
	4	4.1	4.1	3.2	3.2	2.9	2.9	2.2	2.2
CA-170/Victory Boulevard	1	4.5	4.5	3.4	3.4	3.1	3.1	2.4	2.4
	2	4.6	4.6	3.4	3.4	3.2	3.2	2.4	2.4
	3	4.5	4.5	3.4	3.4	3.1	3.1	2.4	2.4
	4	4.5	4.5	3.4	3.4	3.1	3.1	2.4	2.4
Laurel Canyon/Victory Boulevard	1	4.1	4.1	3.2	3.2	2.9	2.9	2.2	2.2
	2	4.1	4.1	3.2	3.2	2.9	2.9	2.2	2.2
	3	4.0	4.0	3.2	3.2	2.8	2.8	2.2	2.2
	4	4.1	4.1	3.2	3.2	2.9	2.9	2.2	2.2
Laurel Canyon/Sherman Way	1	4.1	4.1	3.2	3.2	2.9	2.9	2.2	2.2
	2	4.0	4.0	3.2	3.2	2.8	2.8	2.2	2.2
	3	4.0	4.0	3.2	3.2	2.8	2.8	2.2	2.2
	4	4.3	4.3	3.3	3.3	3.0	3.0	2.3	2.3

Intersection	Receptor[1]	1-hour Carbon Monoxide (ppm)[2, 3]				8-hour Carbon Monoxide (ppm)[4, 5]			
		2015		2040		2015		2040	
		Existing Baseline	Existing Plus Project	2040 Baseline	2040 Plus Project	Existing	Existing Plus Project	2040 Baseline	2040 Plus Project
Hollywood Way/Victory Boulevard	1	4.0	4.0	3.2	3.2	2.8	2.8	2.2	2.2
	2	4.0	4.0	3.2	3.2	2.8	2.8	2.2	2.2
	3	4.1	4.1	3.2	3.3	2.9	2.9	2.2	2.3
	4	4.0	4.0	3.2	3.2	2.8	2.8	2.2	2.2

Source: Authority 2020a

[1] Receptors are located at 3 meters from the intersection, at each of the four corners. All intersections modeled have two intersecting roadways.
[2] Average 1-hour background concentration between 2015 and 2017 was 2.4 ppm (USEPA 2018).
[3] CAAQS = 20 ppm; NAAQS = 35 ppm.
[4] Average 8-hour background concentration between 2015 and 2017 was 1.7 ppm (USEPA 2018).
[5] CAAQS = 9.0 ppm; NAAQS = 9.0 ppm.
CAAQS = California Ambient Air Quality Standards; NAAQS = National Ambient Air Quality Standards; ppm = parts per million

CEQA Conclusion

The operation of the six Build Alternatives would result in minor localized increases in vehicle emissions because of shifts in traffic patterns near the Burbank Airport Station. However, the localized emissions would not result in CO concentrations above NAAQS or CAAQS. Therefore, the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives would not expose sensitive receptors to substantial pollutant concentrations, resulting in a less-than-significant impact. Therefore, CEQA does not require any mitigation.

Impact AQ#10: Generation of Other Emissions (Such as Those Leading to Odors) during Project Operations.

Operation of the Palmdale to Burbank Project Section would not result in emissions other than those discussed in Impact AQ#6 through Impact AQ#9. Because the California HSR System would be electrically powered, it would not generate direct combustion emissions along its route; train operations would not generate other emissions, including those that would result in odors. There would be some area-source emissions associated with operations of the Palmdale and Burbank Stations, such as natural gas combustion for space and water heating, landscaping equipment emissions, and minor solvent and paint use. The solvent and paint use would have the potential to be odorous sources to sensitive receptors; however, odors related to paint and solvent use would be limited to the immediate area where the products are being used and would not be expected to result in substantial odors to residential or other areas containing sensitive receptors. Regardless of the Build Alternative selected, no other emissions are anticipated to occur, and there would be odorous emissions.

CEQA Conclusion

Operation of the six Build Alternatives would not generate odors beyond existing levels along the Palmdale to Burbank Project Section. Impacts from other emissions, including odors, would be less than significant. Therefore, CEQA does not require any mitigation.

Impact AQ#11: Compliance with Air Quality Plans during Project Operations.

During operations, the Palmdale to Burbank Project Section would reduce VMT in the region, which would reduce regional O_3 precursor pollutant emissions. The Palmdale to Burbank Project Section would also decrease emissions from other modes of travel (buses, diesel trains, and airports). This reduction in VMT would be consistent with the applicable air quality plans for SCAQMD and AVAQMD. Therefore, operations of the Build Alternatives would not conflict with or obstruct implementation of applicable air quality plans.

CEQA Conclusion

Operations of the Build Alternatives would not conflict with or obstruct implementation of applicable air quality plans. The impact of compliance with air quality plans during operations would be a less-than-significant impact for the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives. Therefore, CEQA does not require any mitigation.

Global Climate Change Effect Analysis

Construction Impacts

Impact AQ#12: Total Regional Construction Greenhouse Gas Emissions.

GHG emissions generated from construction of the Build Alternatives would be short-term (i.e., during the 10-year construction period). However, because the time that CO_2 remains in the atmosphere cannot be definitively quantified due to the wide range of time scales in which carbon reservoirs exchange CO_2 with the atmosphere, there is no single value for the half-life of CO_2 in the atmosphere (Intergovernmental Panel on Climate Change 1997). Therefore, the duration that CO_2 emissions from a short-term project would remain in the atmosphere is unknown.

Table 3.3-45 shows construction activity emissions that would be generated by the six Build Alternatives. The emissions for this impact assume implementation of AQ-IAMF#1 through AQ-IAMF#6. The GHG emissions reductions achieved by IAMFs were incorporated into the analysis by adjusting the GHG emission rates for all construction emission sources. To conservatively estimate the amortized GHG emissions, the Palmdale to Burbank Project Section life is conservatively assumed to be 25 years (although the actual Palmdale to Burbank Project Section life would be much longer). The total GHG construction emissions of the Refined SR14 Build Alternative would be less than 0.03 percent of the total annual statewide GHG emissions. Furthermore, the increase in GHG emissions generated during construction would be offset in less than a year by the net GHG reductions from HSR Phase 1 operations of the Palmdale to Burbank Project Section (see Impact AQ#13).

CEQA Conclusion

The AVAQMD CEQA thresholds of significance for construction GHG emissions (quantified in CO_2e) are reflected in Table 3.3-45, which shows that the six Build Alternatives would not result in an exceedance of AVAQMD significance thresholds for construction-period GHG emissions. The SCAQMD has not established CEQA threshold(s) for transportation projects.

Table 3.3-46 shows that the total increase in construction GHG emissions listed for each Build Alternative would be offset in less than a year by the net GHG reductions from Palmdale to Burbank Project Section operations. Emission reductions during operations from reduced auto and aircraft trips would offset the short-term construction-related contribution to increased GHG emissions. The Build Alternatives construction would generate GHG emissions between 2020 and 2029. However, these emissions would be almost fully offset after 4 to 6 months of operations (depending on the ridership scenario and Build Alternative). After a maximum of 6 months, the Build Alternatives would result in net annual emissions reductions and a GHG benefit.

Emissions reductions during operations would offset the short-term construction-related increases in GHG emissions. Additionally, the California HSR System is identified in CARB's AB 32 Scoping Plan and 2017 Scoping Plan as a component of a sustainable transportation system and is consistent with the state's plan to achieve GHG emissions reductions in the long term. The project would result in a net reduction in GHG emissions for each year that the California HSR System is operational after the initial 4 to 6 months of operations. These long-term reductions are consistent with the statewide goal specified in SB 32. Consequently, the short-term increases in GHG emissions from construction does not impede the state from meeting the statewide GHG emissions targets. Based on the discussion above, temporary increases in regional GHG emissions during construction are considered a less-than-significant impact for the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives. Therefore, CEQA does not require any mitigation.

Table 3.3-45 Palmdale to Burbank Project Section Construction Greenhouse Gas Emissions

Emissions	SCAQMD	AVAQMD
Refined SR14 Build Alternative		
Total Construction GHG (CO_2e) Emissions (MT)	105,709	28,589
	134,297	
Amortized GHG Emissions (averaged over 25 years)[1]		
GHG (CO_2e) Emissions (MT/year)	4,228	1,144
Applicable CEQA Thresholds	*N/A*[2]	*100,000*
Total GHG Emissions	**5,372**	

Emissions	SCAQMD	AVAQMD
SR14A Build Alternative		
Total Construction GHG (CO_2e) Emissions (MT)	142,163	28,823
	170,986	
Amortized GHG Emissions (averaged over 25 years)[1]		
GHG Emissions (MT/year)	5,687	1,153
Applicable CEQA Thresholds	*N/A*[2]	*100,000*
Total GHG Emissions	**6,839**	
E1 Build Alternative		
Total Construction GHG (CO_2e) Emissions (MT)	117,020	24,721
	141,741	
Amortized GHG Emissions (averaged over 25 years)[1]		
GHG Emissions (MT/year)	4,681	989
Applicable CEQA Thresholds	*N/A*[2]	*100,000*
Total GHG Emissions	**5,670**	
E1A Build Alternative		
Total Construction GHG (CO_2e) Emissions (MT)	117,651	36,565
	154,217	
Amortized GHG Emissions (averaged over 25 years)[1]		
GHG Emissions (MT/year)	4,706	1,463
Applicable CEQA Thresholds	*N/A*[2]	*100,000*
Total GHG Emissions	**6,169**	
E2 Build Alternative		
Total Construction GHG (CO_2e) Emissions (MT)	111,567	28,362
	139,929	
Amortized GHG Emissions (averaged over 25 years)[1]		
GHG Emissions (MT/year)	4,463	1,134
Applicable CEQA Thresholds	N/A[2]	100,000
Total GHG Emissions	**5,597**	

Emissions	SCAQMD	AVAQMD
E2A Build Alternative		
Total Construction GHG (CO_2e) Emissions (MT)	135,207	43,9576
	179,164	
Amortized GHG Emissions (averaged over 25 years)[1]		
GHG Emissions (MT/year)	5,408	1,758
Applicable CEQA Thresholds	*N/A*[2]	*100,000*
Total GHG Emissions	**7,167**	

Source: Authority 2020a
[1] Palmdale to Burbank Project Section life assumed to be 25 years.
[2] The SCAQMD does not currently establish CEQA threshold(s) for transportation projects.
AVAQMD = Antelope Valley Air Quality Management District; CEQA = California Environmental Quality Act; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; MT = metric tons; N/A = not applicable; SCAQMD = South Coast Air Quality Management District

Table 3.3-46 Payback of Greenhouse Gas Emissions (months)

Build Alternative	Ridership Scenario[2]	
	Medium	High
Refined SR14	5	4
SR14A	6	5
E1	5	4
E1A	5	4
E2	5	4
E2A	6	5

Source: Authority 2020a
[1] Payback periods were estimated by dividing the total GHG emissions during construction by the annual GHG emission reduction during operations.
[2] The range in payback days represents the range of emissions changes based on the medium and high ridership scenarios.
Emission factors for CO_2 do not account for improvements in technology.
CO_2e = carbon dioxide equivalent; GHG = greenhouse gas

Operations Impacts

Impact AQ#13: Statewide and Regional Operations Greenhouse Gas Emissions Analysis.

There would be no difference in operations GHG emissions among the six Build Alternatives because they all assume the same level of ridership and thus the same diversion of trips from air and auto travel. Therefore, this operations analysis compares the operation of the Build Alternatives to the existing conditions (2015) and 2040 future No Project baselines. The analysis considers project-related emission reductions from reduced on-road VMT, reduced aircraft travel, and the California HSR System's electricity demands (see Impact AQ#1).

As shown in Table 3.3-47, operations under both the medium- and high-ridership scenarios would increase indirect GHG emissions due to additional electricity required to power the California HSR System, as well as direct GHG emissions from operation of the Burbank Airport Station, relative to the existing conditions (2015) and 2040 future No Project baselines.

Table 3.3-47 Power Plant Greenhouse Gas Emission Changes

Affected Area	Change in CO_2e Emissions under the Build Alternatives (MMT/year)	
	M	H
2015 Emissions Relative to the 2015 Existing Baseline		
Regional	<0.1	<0.1
Statewide	0.4	0.4
2040 Emissions Relative to the 2040 Future No Project Baseline		
Regional	<0.1	<0.1
Statewide	0.4	0.4

< = less than; CO_2e = carbon dioxide equivalent; H = high-ridership scenario; HSR = high-speed rail; M = medium-ridership scenario; MMT = million metric tons

While the Build Alternatives operations would indirectly increase GHGs due to drawing electricity from power plants, Table 3.3-48 summarizes the net statewide GHG emission changes (quantified in CO_2e) resulting from the medium- and high-ridership scenarios for the project. Reductions in single-occupancy vehicles trips and aircraft activity achieve these emissions benefits; with a greater number of people traveling on the California HSR System, VMT and airplane miles would be reduced. As Table 3.3-48 shows, the project is predicted to have a beneficial effect on (i.e., reduce) statewide GHG emissions, when compared with the existing and 2040 future No Project baselines. These emissions benefits would begin accumulating after construction emissions are offset, which as noted above, would occur within 4 to 6 months of Palmdale to Burbank Project Section operations (Table 3.3-46).

Operation of any of the Build Alternatives would help the State reach the goal established in AB 1279 (85 percent reduction in statewide anthropogenic [human-made] GHG emissions [from 1990 levels] by 2045). The California HSR System is also identified in CARB's AB 32 Scoping Plan and 2017 Scoping Plan Update as a component of a sustainable transportation system and would be consistent with the State's plan to achieve GHG emission reductions in the long run. Such GHG reductions would be consistent with statewide goals. Consequently, the Palmdale to Burbank Project Section would not impede the State from meeting the statewide GHG emissions reductions target.

Based on the 1990 emissions level of 431 MMT CO_2e, emissions in California would need to be reduced by 172 MMT CO_2e to achieve the SB 32 goal. Operation of the Palmdale to Burbank Project Section would reduce statewide GHG emissions by 1.1 to 1.7 MMT CO_2e in 2040, depending on the ridership scenario (medium and high). These annual reductions would represent 0.6 to 1.0 percent of the 172 MMT CO_2e needed to achieve the SB 32 goal.

CEQA Conclusion

Operation of each of the six Build Alternatives would have a beneficial impact on (i.e., reduce) statewide GHG emissions when compared to existing and future 2040 No Project baselines, under both the medium and high ridership scenarios and would result in a less-than-significant impact under CEQA. The GHG emissions reductions would be less under the medium-ridership scenario than under the high-ridership scenario; the medium-ridership scenario presents the more conservative assessment of GHG reduction benefits, but both scenarios result in GHG reduction benefits. Additionally, the California HSR System is discussed in CARB's 2017 Scoping Plan Update and would help the State attain its long-term GHG reductions goals as identified in AB 32, SB 32, and EO B-55-18 (CARB 2017c). Consequently, the Palmdale to Burbank Project Section would not impede the State from meeting the statewide GHG emissions reductions targets. This impact would be beneficial for the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives. Therefore, CEQA does not require mitigation.

Table 3.3-48 Estimated Statewide Greenhouse Gas Emission Changes – By Year and Ridership Scenario

Element	Change in CO_2e Emissions That Would Result from HSR (MMT/year)	
	M	H
2015 Project Emissions Relative to the 2015 Existing Baseline		
On-Road Vehicles	-1.1	-1.5
Aircraft	-0.7	-0.7
Power Plants	0.4	0.4
Total Statewide Net Emissions	*-1.4*	*-1.8*
2040 Project Emissions Relative to the 2040 Future No Project Baseline		
On-Road Vehicles	-0.5	-1.1
Aircraft	-1.0	-0.9
Power Plants	0.4	0.4
Total Statewide Net Emissions	*-1.1*	*-1.7*

Source: Authority 2020a
Totals may not add up exactly due to rounding.
Opening year (2029) GHG emissions reductions can be found in the *Palmdale to Burbank Project Section: Air Quality and Global Climate Change Technical Report* (Authority 2020a).
CO_2e = carbon dioxide equivalent; GHC = greenhouse gas; HSR = high-speed rail; MMT = million metric tons; M = medium-ridership scenario; H = high-ridership scenario

3.3.7 Mitigation Measures

Based on the discussions above, the Build Alternatives would have significant construction-period impacts on air quality even with incorporation of IAMFs (see Impacts AQ#2 and #4). The following mitigation measures are proposed to avoid, minimize, rectify, reduce, eliminate, or compensate for air quality impacts. These mitigation measures would not result in secondary or off-site environmental impacts.

AQ-MM#1: Offset Project Construction Emissions through SCAQMD Emissions Offsets Programs

The Palmdale to Burbank Project Section's construction emissions that cannot be reduced by IAMFs and any other mitigation measures will, to the extent feasible, be offset through a SCAQMD rule or contractual agreement by funding equivalent emissions reductions that achieve reductions in the same years as construction emissions occur, thus offsetting project-related air quality impacts in real time. The project will implement measures and best practices to minimize emissions from project construction. After implementation of these measures, emission levels that still exceed thresholds will be offset to the extent necessary to satisfy General Conformity *de minimis* levels and to meet CEQA thresholds to the extent feasible. The Authority's Sustainability Policy has a goal to achieve net zero emissions from construction. As the Palmdale to Burbank Project Section advances towards construction, the Authority will work with SCAQMD to assess the estimated emissions, availability of offsets, and cost for achieving the Authority's Sustainability Policy goal to the extent possible.

AQ-MM#2: Offset Project Construction Emissions through AVAQMD Emissions Offsets Programs

The Authority shall enter into an agreement with AVAQMD to mitigate (by offsetting to the extent that offsets are available) the project's actual emissions from construction equipment and vehicl exhaust emissions of VOC, NO_X, PM_{10} and $PM_{2.5}$. to achieve General Conformity *de minimis* levels and to meet CEQA thresholds. The Authority's Sustainability Policy has a goal to achieve net zero emissions from construction. In the AVAQMD, the Authority shall participate in the Air Quality Investment Program, which funds stationary- and mobile-source emission reduction strategies.

AQ-MM#3: Construction Emissions Reductions – Requirements for use of Zero Emission (ZE) and/or Near Zero Emission (NZE) Vehicles and off-road equipment

This mitigation measure would reduce the impact of construction emissions from project-related on-road vehicles and off-road equipment. All remaining emissions after implementation of this measure will be offset, to the extent feasible, with emission offset credits required under AQ-MM#1 and AQ-MM#2.

The Authority and all project construction contractors shall require that a minimum of 25 percent, with a goal of 100 percent, of all light-duty on-road vehicles (e.g., passenger cars, light-duty trucks) associated with the project (e.g., on-site vehicles, contractor vehicles) use ZE or NZE technology.

The Authority and all project construction contractors shall have the goal that a minimum of 25 percent of all heavy-duty on-road vehicles (e.g., for hauling, material delivery, and soil import/export) associated with the project use ZE or NZE technology.

The Authority and all project construction contractors shall have the goal that a minimum of 10 percent of off-road construction equipment use ZE or NZE vehicles.

If local or state regulations mandate a faster transition to using ZE and/or NZE vehicles at the time of construction, the more stringent regulations will be applied. For example, EO N-79-20, issued by California Governor Newsom September 23, 2020, currently states the following:

- Light-duty and passenger car sales be 100 percent ZEV by 2035
- Full transition to ZEV short haul/drayage trucks by 2035
- Full transition to ZEV heavy-duty long-haul trucks, where feasible, by 2045
- Full transition to ZE off-road equipment by 2035, where feasible

The project will have a goal of surpassing the requirements of these or other future regulations as a mitigation measure.

3.3.8 NEPA Impacts Summary

All six Build Alternatives would result in two general types of effects on air quality and global climate change: operations and construction related. Table 3.3-49 provides a comparison of impacts by Build Alternative. The following discussion provides a summary comparison of the impacts by Build Alternative against the No Project Alternative (Section 3.3.6.2). Please refer to the detailed impact analysis in Section 3.3.6 for additional information that substantiates the conclusions summarized below.

Table 3.3-49 Comparison of High-Speed Rail Build Alternative Impacts for Air Quality and Global Climate Change

Impacts	Build Alternative						NEPA Conclusion before Mitigation (All Build Alternatives)	Mitigation	NEPA Conclusion post Mitigation (All Build Alternatives)
	Refined SR14	SR14A	E1	E1A	E2	E2A			
Air Quality									
Construction Impacts									
Impact AQ#1: Exposure to Asbestos- and Lead-Containing Materials during Construction. Implementation of the Build Alternatives could cause a release of ACM or lead-containing materials into the air during demolition activities. The Refined SR14 Build Alternative would displace the most residences and businesses combined and therefore would have the greatest risk related to release of ACM and lead-containing materials in the air. For each of the Build Alternatives, impacts related to ACM or lead during project construction would be avoided. With the incorporation of policies outlined in Section 3.10, Hazardous Materials and Wastes, no adverse air quality effects related to asbestos or lead would occur. Further information on Build Alternative-related risks associated with exposure to ACM is provided in Section 3.10, Hazardous Materials and Wastes.							No Adverse Effect	No mitigation needed	N/A See Section 3.3.8.1
Impact AQ#2: Regional Air Quality Impacts during Construction. All six Build Alternatives would result in construction-period emissions that exceed the annual applicable SCAB *de minimis* General Conformity level(s) and applicable SCAQMD threshold(s) during construction. Within the AVAQMD/MDAB, only construction of the E2A Build Alternative would result in exceedance of the MDAB *de minimis* General Conformity level and AVAQMD CEQA threshold for NO_X. While the specific construction year and pollutant-type exceedances vary between the Build Alternatives, the magnitude of effects would be similar. The Authority would reduce construction-period emissions of NOx and CO through offsets, if such offsets are available, until the General Conformity *de minimis* levels and CEQA threshold(s) are met. Microscale modeling of CO emissions would further satisfy applicable *de minimis* General Conformity level(s).									
Exceeds SCAB *de minimis* General Conformity levels (pollutant: construction year exceedance would occur)	NO_X: 2021–2025 CO: 2023	NO_X: 2020–2026 CO: 2022–2023	NO_X: 2021–2026	NO_X: 2021–2026	NO_X: 2021–2026	NO_X: 2021–2026 CO: 2022, 2024–2025	Adverse Effect	AQ-MM#1 AQ-MM#3	Adverse Effect See Section 3.3.8.1
Exceeds MDAB *de minimis*	No exceedances	No exceedances	No exceedances	No exceedances	No exceedances	NO_X: 2023	Adverse Effect	AQ-MM#2 AQ-MM#3	Adverse Effect

Impacts	Build Alternative						NEPA Conclusion before Mitigation (All Build Alternatives)	Mitigation	NEPA Conclusion post Mitigation (All Build Alternatives)
	Refined SR14	SR14A	E1	E1A	E2	E2A			
General Conformity levels (pollutant: construction year exceedance would occur)									See Section 3.3.8.1
Exceeds SJVAB *de minimis* General Conformity levels (pollutant: construction year exceedance would occur)	No exceedances	No exceedances	No exceedances	No exceedances	No exceedances	No exceedances	No Adverse Effect	No mitigation needed	N/A See Section 3.3.8.1
Exceeds SCAQMD CEQA thresholds (pollutant: construction year exceedance would occur)	NO_X: 2020–2025 CO: 2021–2023	NO_X: 2020–2027 CO: 2020–2024	NO_X: 2021–2025 CO: 2023	NO_X: 2021–2025 CO: 2023	NO_X: 2021–2026, 2028 CO: 2021–2025	NO_X: 2021–2025 CO: 2023	Adverse Effect	AQ-MM#1 AQ-MM#3	Adverse Effect See Section 3.3.8.1
Exceeds AVAQMD CEQA thresholds	No exceedances	No exceedances	No exceedances	No exceedances	No exceedances	NO_X: 2023	Adverse Effect	AQ-MM#2 AQ-MM#3	Adverse Effect See Section 3.3.8.1

Impacts	Build Alternative: Refined SR14	SR14A	E1	E1A	E2	E2A	NEPA Conclusion before Mitigation (All Build Alternatives)	Mitigation	NEPA Conclusion post Mitigation (All Build Alternatives)
(pollutant: construction year exceedance would occur)									
Exceeds SJVAPCD CEQA thresholds (pollutant: construction year exceedance would occur)	No exceedances	No exceedances	No exceedances	No exceedances	No exceedances	No exceedances	No Adverse Effect	No mitigation needed	N/A See Section 3.3.8.1
Impact AQ#3: Compliance with Air Quality Plans during Construction. All six Build Alternatives would result in the exceedance of General Conformity *de minimis* levels during construction. Within the SCAQMD, construction of the Refined SR14, SR14A, and E2A Build Alternatives would result in exceedance of NO_x and CO thresholds, while construction of the E1, E1A, and E2 Build Alternatives would result in exceedance of the NO_x threshold. Within the AVAQMD, only construction of the E2A Build Alternative would result in exceedance of the NO_x threshold. These exceedances could conflict with or obstruct implementation of the air quality plans, which have been prepared to attain NAAQS and CAAQS. The Authority would reduce construction-period emissions of NO_x and CO through offsets, if such offsets are available, until the *de minimis* General Conformity levels and CEQA threshold(s) are met.							Adverse Effect	AQ-MM#1 AQ-MM#2 AQ-MM#3	Adverse Effect See Section 3.3.8.1
Impact AQ#4: Health Risks Assessment for Construction-Period Emissions. While construction activities associated with the Build Alternatives would increase TAC concentrations at certain receptor locations along each of the Build Alternative alignments, none of the six Build Alternatives would result in exceedance of applicable thresholds for cancer risk or for chronic and acute noncancer health impacts.							No Adverse Effect	No mitigation needed	N/A See Section 3.3.8.1
Impact AQ#5: Localized Construction Effects. While emissions would be reduced to the extent feasible, the Build Alternatives would exceed applicable thresholds for NO_2 in the Case 7 area, and PM_{10} in the Case 5, 6, and 7 areas. The Authority would reduce construction emissions of on-road vehicles through the use of ZE or NZE technology; however, this would likely not reduce on-road vehicle emissions enough to achieve CAAQS or NAAQS standards. All six Build Alternatives have communities that would experience localized construction emission exceedances from construction activities.							Adverse Effect	AQ-MM#3	Adverse Effect See Section 3.3.8.1

Impacts	Build Alternative Refined SR14	SR14A	E1	E1A	E2	E2A	NEPA Conclusion before Mitigation (All Build Alternatives)	Mitigation	NEPA Conclusion post Mitigation (All Build Alternatives)
Operations Impacts									
Impact AQ#6: Statewide and Regional Pollutant Emissions. Effects would be identical for all six Build Alternatives. Operation of any of the six Build Alternatives would reduce statewide emissions of all pollutants when compared to existing and future No Project baselines, under all ridership scenarios.							No Adverse Effect	No mitigation needed	N/A See Section 3.3.8.2
Impact AQ#7: Mobile Source Air Toxics Analysis. Because the Palmdale to Burbank Project Section would not change the regional traffic mix, the amount of MSATs emitted from highways and other roadways would decrease proportionally to the VMT reductions (see Impact AQ#1). Effects would be identical under all six Build Alternatives because the regional change in travel-related emissions and indirect energy use would be the same.							No Adverse Effect	No mitigation needed	N/A See Section 3.3.8.2
Impact AQ#8: Fugitive Dust Emissions from Train Movement. Fugitive dust generated from train movement would not pose health risks to sensitive receptors along any of the six proposed Build Alternative alignments.							No Adverse Effect	No mitigation needed	N/A. See Section 3.3.8.2
Impact AQ#9: Localized Increases in Carbon Monoxide Emissions Due to Project Operations. Effects from localized CO emissions at intersections near the Palmdale and Burbank Stations would be the same for all six Build Alternatives. The Build Alternatives would increase localized CO concentrations at certain intersections near the Burbank Airport Station but would not exceed the 1-hour or 8-hour NAAQS and CAAQS. The traffic parameters associated with CO emissions at the five evaluated intersections would be the same, regardless of the Build Alternative selected. Effects from localized CO emissions at intersections near the Burbank Airport Station would be the same for all six Build Alternatives.							No Adverse Effect	No mitigation needed	N/A See Section 3.3.8.2
Impact AQ#10: Generation of Other Emissions (Such as Those Leading to Odors) during Project Operations. For each of the Build Alternatives, the HSR trains would be powered by electricity, with the power distributed to each train car via the overhead contact system. Operation of the trains would not generate other emissions (such as those leading to odors) for any of the six Build Alternatives.							No Adverse Effect	No mitigation needed	N/A See Section 3.3.8.2
Impact AQ#11: Compliance with Air Quality Plans during Project Operations. For each of the Build Alternatives, impacts related to compliance with applicable air quality plans during project operation would be avoided, and would result in an anticipated net reduction in criteria pollutant and GHG emissions within the SCAQMD and AVAQMD.							No Adverse Effect	No mitigation needed	N/A See Section 3.3.8.2
Global Climate Change									
Construction Impacts									

Impacts	Build Alternative						NEPA Conclusion before Mitigation (All Build Alternatives)	Mitigation	NEPA Conclusion post Mitigation (All Build Alternatives)
	Refined SR14	SR14A	E1	E1A	E2	E2A			
Impact AQ#12: Total Regional Construction Greenhouse Gas Emissions. Regardless of the Build Alternative selected, total GHG construction emissions generated during construction of the Palmdale to Burbank Project Section would be less than 0.02 percent of the total annual statewide GHG emissions. The increase in GHG emissions generated during construction would be offset in less than a year by the net GHG reductions from California HSR System operations (see Impact AQ#13). The California HSR System would help the state attain its long-term GHG reductions goals as identified in AB 32, SB 32, and EO B-55-18 and the state Scoping Plan (CARB 2017c) and, therefore, would not conflict with applicable state plans and policies adopted to reduce GHGs.							No Adverse Effect	No mitigation needed	N/A See Section 3.3.8.1
Impact AQ#13: Statewide and Regional Operations Greenhouse Gas Emissions Analysis. For each of the Build Alternatives, the Palmdale to Burbank Project Section is anticipated to have a beneficial effect on (i.e., reduce) statewide GHG emissions when compared with the existing and future No Project baselines. There would be no difference in operations GHG emissions between the Build Alternatives because the regional change in vehicle emissions and indirect energy use would be the same. Annual reductions would range from 1.1 million metric tons CO_2e to 1.7 million metric tons CO_2e in 2040, depending on the ridership scenario.							Beneficial Effect	No mitigation needed	N/A See Section 3.3.8.2

ACM = asbestos-containing material; AVAQMD = Antelope Valley Air Quality Management District; CAAQS = California Ambient Air Quality Standards; CEQA = California Environmental Quality Act; CO = carbon monoxide; GHG = greenhouse gas; HSR = high-speed rail; MSAT = mobile source air toxics; N/A = Not applicable; NAAQS = National Ambient Air Quality Standards; NO_X = nitrogen oxides; PM_{10} = respirable particulate matter (10 microns or less in diameter); $PM_{2.5}$ = fine particulate matter (2.5 microns or less in diameter); SCAB = South Coast Air Basin; SCAQMD = South Coast Air Quality Management District; VMT = vehicle miles traveled; VOC = volatile organic compound.

3.3.8.1 Construction Impacts

Construction of the six Build Alternatives would entail demolition of properties that may contain ACM or lead; thus, construction of each of the Build Alternatives could result in releases of ACM or lead into the air. However, the Build Alternatives incorporate HMW-IAMF#5, which requires the contractor to prepare a safe asbestos and lead abatement plan for the removal of building components and debris that complies with federal and State regulations. Compliance with existing asbestos and lead-based paint regulations will avoid exposing sensitive receptors to substantial pollutant concentrations associated with asbestos or lead.

All six Build Alternatives would result in construction-period emissions that exceed the annual applicable *de minimis* General Conformity level(s) for criteria pollutants (see Impact AQ#2). Table 3.3-49 provides a comparison of exceedances by Build Alternative. While the specific construction year and pollutant-type exceedances vary between the Build Alternatives, there are no deviations large enough that would make one Build Alternative substantially less impactful than another. Inclusion of the applicable IAMFs and the implementation of mitigation measure AQ-MM#1 would reduce or offset construction-period emissions.

Construction emissions of NOx within the SCAB and MDAB and construction CO emissions in the MDAB would be greater than applicable General Conformity *de minimis* levels which would impede or obstruct implementation of the applicable air district AQMPs. Incorporation of the applicable IAMFs will reduce criteria pollutant emissions. Additionally, AQ-MM#3, described in Section 3.3.7, requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction. All remaining emissions after implementation of AQ-MM#3 will be offset with emission offset credits required under AQ-MM#1 and AQ-MM#2. Purchase of offset emissions (AQ-MM#1 and AQ-MM#2) for these pollutants would reduce NOx emissions to below applicable thresholds. As discussed in Impact AQ#2, localized CO modeling shows no exceedance of the NAAQS for construction-period emissions, which meets the federal General Conformity regulations requirements. Mitigation measure AQ-MM#1 would require the purchase of emission offsets through an anticipated contractual agreement between the Authority and the SCAQMD. Emission reduction credits are anticipated to be obtained from the SCAQMD to offset emissions associated with the construction of the HSR Build Alternative. Purchase of emission offsets through the anticipated agreement (mitigation measure AQ-MM#1), would offset and/or decrease CO emissions. The Authority will participate in the SCAQMD emission offset program to the maximum extent that offsets are available to reduce construction period CO emissions. However, until such agreement is in place and offsets are purchased, effects related to regional air quality during construction would remain adverse after mitigation. Mitigation measure AQ-MM#2 would require the purchase of emission offsets through an anticipated contractual agreement between the Authority and the AVAQMD. Emission reduction credits are anticipated to be obtained from the AVAQMD to offset emissions associated with the construction of the HSR Build Alternative. Purchase of emission offsets through the anticipated agreement (mitigation measure AQ-MM#2), would offset and/or decrease NO_X emissions. The Authority will participate in the AVAQMD Air Quality Investment Program to the maximum extent that offsets are available to reduce construction period NO_X emissions. However, until such agreement is in place and offsets are purchased, effects related to regional air quality during construction would remain adverse after mitigation.

The HRA analysis, which considers both acute (short-term) and chronic (long-term) noncancer health hazards and increased cancer risk resulting from exposure of sensitive receptors to DPM concentrations associated with the construction activities, was evaluated for six discrete areas (or "cases") that represent the worst-case in terms of construction-related air quality and health risk impacts (see Impact AQ#4). These "cases" represent those areas that have a large amount of construction activity with emissions near the most concentrated sensitive receptors along the Palmdale to Burbank Project Section. However, the selection of case locations was independent of Build Alternative. In cases where multiple Build Alternatives pass through a case, the case was defined using the highest possible emissions. The HRA analysis found that project construction would not exceed applicable thresholds for cancer and noncancer health risks.

The localized construction emissions analysis uses the same general approach as the HRA analysis described above. Localized criteria pollutant analysis considers both short-term (less than 24 hours) and long-term (24 hours or longer) emissions effects, and assesses the localized effects based on the NAAQS and CAAQS. The criteria pollutants considered in the analysis of potential localized air quality effects consist of CO, NO_2, PM_{10}, $PM_{2.5}$, and SO_2. Impact AQ#5 shows that NO_2 would exceed applicable thresholds in the Case 7 area and PM_{10} would exceed applicable thresholds in the Case 5, 6, and 7 areas. AQ-MM#3 requires the use of ZE or NZE technology for 25 percent of all light-duty on-road vehicles, with a goal to use ZE or NZE technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction, but would not lower effects below applicable thresholds.

As discussed in Impact AQ#12, the construction of the Build Alternatives would result in GHG emissions. Regardless of the Build Alternative selected, the total GHG construction emissions of the Palmdale to Burbank Project Section would be less than 0.02 percent of the total annual statewide GHG emissions. The increase in GHG emissions generated during construction would be offset in less than a year by the net GHG reductions from California HSR System operations (see Impact AQ#13). None of the Build Alternatives would result in an exceedance of AVAQMD CEQA thresholds of significance for construction GHG emissions.

3.3.8.2 Operations Impacts

Operation of all six Build Alternatives would have a beneficial effect on (i.e., reduce) statewide emissions of all pollutants when compared to existing and future No Project baselines, under all ridership scenarios. Statewide and regional criteria pollutant and GHG emissions associated with on-road vehicles and aircrafts would be reduced because travelers would use HSR rather than drive or fly (see Impact AQ#6 and Impact AQ#13). There would be no difference in operations emissions between the Build Alternatives because the regional change in travel-related emissions and indirect energy use would be the same for all six Build Alternatives. Because the Palmdale to Burbank Project Section would not change the regional traffic mix, the amount of MSATs emitted from highways and other roadways would decrease proportional to the VMT reductions (see Impact AQ#2).

The California HSR System trains would be powered by electricity, with the power distributed to each train car via the overhead contact system. Operation of the trains would not generate combustion emissions; therefore, no toxic or odorous emissions would occur from the operation of the Palmdale to Burbank Project Section (see Impact AQ#10). Fugitive dust generated from train movement would not pose health risks to sensitive receptors along the proposed Build Alternatives (see Impact AQ#8). When compared to the existing and future No Project baselines, implementation of the Palmdale to Burbank Project Section would increase localized CO concentrations at certain intersections near the Burbank Airport Station but would not exceed the 1- or 8-hour NAAQS and CAAQS (see Impact AQ#9). The traffic parameters associated with CO emissions at the five evaluated intersections would be the same, regardless of the Build Alternative selected. As such, the localized CO emissions at intersections near the Burbank Station would be the same for all Build Alternatives. Operations of the Build Alternatives would not conflict with or obstruct implementation of applicable air quality plans.

Given the conclusions of operations-related impact analysis, there are no deviations that would make one Build Alternative more beneficial than the other.

3.3.9 CEQA Significance Conclusions

Table 3.3-50 summarizes impacts, the level of significance before mitigation, mitigation measures, and the level of CEQA significance after mitigation for all six Build Alternatives. As shown in Table 3.3-50, construction-period emissions would exceed localized construction emissions thresholds even with the implementation of mitigation measures. Additionally, respective contractual agreements between the Authority and the SCAQMD and the AVAQMD and the purchase of emission offsets are anticipated but not yet secured. Therefore, Impacts AQ#2, AQ#3, and AQ#5 would be significant and unavoidable.

Table 3.3-50 Summary of CEQA Significance Conclusions and Mitigation Measures for Air Quality and Global Climate Change

Impact	Level of CEQA Significance before Mitigation	Mitigation Measure	Level of CEQA Significance after Mitigation
Air Quality			
Construction Impacts			
Impact AQ#1: Exposure to Asbestos- and Lead-Containing Materials during Construction	Less than Significant	No mitigation measures are required	N/A
Impact AQ#2: Regional Air Quality Impacts during Construction.	Significant	AQ-MM#1 AQ-MM#2 (E2A Build Alternative only) AQ-MM#3	Significant and Unavoidable
Impact AQ#3: Compliance with Air Quality Plans during Construction.	Significant	AQ-MM#1 AQ-MM#2 (E2A Build Alternative only) AQ-MM#3	Significant and Unavoidable
Impact AQ#4: Health Risks Assessment for Construction-Period Emissions.	Less than Significant	No mitigation measures are required	N/A
Impact AQ#5: Localized Construction Effects.	Significant	AQ-MM#3	Significant and Unavoidable
Operations Impacts			
Impact AQ#6: Statewide and Regional Pollutant Emissions.	No Impact/Beneficial	No mitigation measures are required	N/A
Impact AQ#7: Mobile Source Air Toxics Analysis.	Less than Significant	No mitigation measures are required	N/A
Impact AQ#8: Fugitive Dust Emissions from Train Movement.	Less than Significant	No mitigation measures are required	N/A
Impact AQ#9: Localized Increases in Carbon Monoxide Emissions Due to Project Operations.	Less than Significant	No mitigation measures are required	N/A
Impact AQ#10: Generation of Other Emissions (Such as Those Leading to Odors) during Project Operations.	No Impact	No mitigation measures are required	N/A
Impact AQ#11: Compliance with Air Quality Plans during Project Operations.	Less than Significant	No mitigation measures are required	N/A

Impact	Level of CEQA Significance before Mitigation	Mitigation Measure	Level of CEQA Significance after Mitigation
Global Climate Change			
Construction Impacts			
Impact AQ#12: Total Regional Construction Greenhouse Gas Emissions.	Less than Significant	No mitigation measures are required	N/A
Operations Impacts			
Impact AQ#13: Statewide and Regional Operations Greenhouse Gas Emissions Analysis.	No Impact/Beneficial	No mitigation measures are required	N/A

CEQA = California Environmental Quality Act; CO = carbon monoxide; HSR = high-speed rail; N/A = not applicable; NO_X = nitrogen oxides; SCAB = South Coast Air Basin

3.3.10 United States Forest Service Impact Analysis

This section summarizes potential air quality and global climate change effects associated with each of the six Build Alternatives on the ANF, including lands within the SGMNM that are part of the SGMNM.

3.3.10.1 Consistency with Applicable United States Forest Service Policies

Appendix 3.1-B, USFS Policy Consistency Analysis, contains a comprehensive evaluation of relevant laws, regulations, plans, and policies relative to portions areas within the ANF including SGMNM, affected by the six Build Alternatives. Policies in the Angeles National Forest Management Plan regarding air quality are related to controlling and reducing smoke and fugitive dust to protect human health, improve safety, and/or reduce or eliminate environmental impacts. The Build Alternatives include AQ-IAMF#1, which requires the contractor to prepare a fugitive dust control plan for each distinct construction segment that, when implemented, would address human health and safety and environmental impact. The majority of the project facilities would be below ground in the ANF including SGMNM, thereby reducing and avoiding potential for wildland fires from project operation. As such, all six Build Alternatives are considered consistent with these policies related to air quality. The following USFS policies pertain to air quality:

- **Air 1**—Minimize Smoke and Dust: Control and reduce smoke and fugitive dust to protect human health, improve safety and/or reduce or eliminate environmental impacts.
- **Air 2**—Forest Air Quality Emissions: Maintain and update the inventory for wildland fire emissions and other forest resource management emissions within the State Implementation Plan. The State Implementation Plan inventories and establishes levels of air pollution that meet the long-term federal air quality goals for bringing the nonattainment areas to attainment of the National Ambient Air Quality Standards.

3.3.10.2 United States Forest Service Resource Analysis

Construction Impacts

Construction impacts consist of impacts directly related to Build Alternative construction. Because most of the infrastructure associated with the proposed Build Alternatives in USFS lands would consist of underground tunnels, construction-related emissions in the ANF including SGMNM would be concentrated around portals and adit locations. Construction activities could generate fugitive dust in surrounding areas in the ANF including SGMNM. However, these effects would be reduced through implementation of AQ-IAMF#1, which requires the preparation of fugitive dust control plans.

See Section 3.3.6.3 for a more detailed discussion of Impacts AQ#1 and AQ#2.

Operations Impacts

Operations impacts would be limited to air quality effects associated with train operation. As discussed in Impacts AQ#6 and AQ#12, operation of the Build Alternatives would reduce statewide and regional pollution and GHG emissions when compared to the No Project baselines, because travelers would use HSR in place of vehicles or flying. Additionally, fugitive dust and emissions leading to odors would not be distributed by the trains during operation (Impacts AQ#8 and AQ#10). Overall, operation of the Palmdale to Burbank Project Section would have a beneficial impact on regional air quality. See Section 3.3.6.3 for a more detailed discussion of operations impacts.