# 3.3 Air Quality and Global Climate Change

This section provides an analysis of air quality and global climate change associated with the Bakersfield to Palmdale Project Section (B-P) of the California High-Speed Rail (HSR) System.

*Air Quality and Global Climate Change*

The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from stationary and mobile sources. This law authorizes the U.S. Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. California has also implemented state-specific clean air requirements in order to protect the health and welfare of California citizens.

### Summary of Results

Project construction for all B-P Build Alternatives (including the César E. Chávez National Monument Design Option [CCNM Design Option], the Refined CCNM Design Option, and the portion of the Fresno to Bakersfield Locally Generated Alternative [F-B LGA] alignment from the intersection of 34th Street and L Street to Oswell Street[1]) would result in emissions of ozone ($O_3$) precursors (volatile organic compounds [VOC] and nitrogen oxides [$NO_X$]). Once constructed, operation of all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would result in a net benefit to air quality because the HSR project would result in lower mobile-source air toxics (MSAT), greenhouse gas (GHG) emissions, VOC, $NO_X$, carbon monoxide (CO), particulate matter smaller than or equal to 2.5 microns in diameter ($PM_{2.5}$), and particulate matter smaller than or equal to 10 microns in diameter ($PM_{10}$) emissions compared with the No Project Alternative. Operation of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would reduce regional vehicle miles traveled (VMT) and consequently would reduce reactive organic gas (ROG), $NO_X$, $PM_{10}$, and $PM_{2.5}$ emissions compared with the No Project Alternative and existing conditions. Therefore, operation of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would have a beneficial impact under the National Environmental Policy Act (NEPA) and a less than cumulatively considerable contribution under the California Environmental Quality Act (CEQA). Because the B-P Build Alternatives (including the CCNM Design Option and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would result in a net reduction in carbon dioxide ($CO_2$) emissions, the project would result in a beneficial effect to statewide GHG emissions.

## 3.3.1 Introduction

This section describes the regulatory and environmental setting associated with the air quality and global climate change impacts that would result from implementation of the Bakersfield to Palmdale Project Section of the California HSR Project. This section also describes avoidance and minimization measures and mitigation measures applicable to the project section that would reduce these impacts. This section summarizes detailed information contained in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (California High-Speed Rail Authority [Authority] 2018b) and *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report Supplement* (Authority 2018c). This section also references data contained in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b) and *Bakersfield to Palmdale Project*

[1] The portion of the Fresno to Bakersfield Locally Generated Alternative (F-B LGA) alignment from the intersection of 34th Street and L Street to Oswell Street is analyzed and considered as part of the Bakersfield to Palmdale Project Section under all of the B-P Build Alternatives. The *Fresno to Bakersfield Section Final Supplemental EIR* (Authority 2018a) analyzed the F-B LGA alignment from the City of Shafter through the Bakersfield F Street Station; however, the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street has not been approved. As such, the approval of this portion of the alignment may occur through approval of the Bakersfield to Palmdale Project Section.

*Section Air Quality and Global Climate Change Technical Report Supplement* (Authority 2018c). For information on how to access and review technical reports, please refer to the Authority's website at www.hsr.ca.gov.

## 3.3.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders, or plans relevant to air quality and global climate change in the geographic area affected by the project are presented below. General NEPA and CEQA requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in this resource section.

### *3.3.2.1 Federal*

The U.S. Environmental Protection Agency (USEPA) is responsible for establishing the National Ambient Air Quality Standards (NAAQS), enforcing the Clean Air Act (CAA; U.S. Code Title 42, § 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 California Air Resources Board (CARB).

**Federal Railroad Administration Procedures for Considering Environmental Impacts (64 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 U.S. Department of Transportation Order 5610.4" (FRA 1999, p. 28555).

**Clean Air Act (42 U.S.C. § 7401) and Conformity Rule (40 C.F.R Parts 51 and 93)**

The CAA defines nonattainment areas as geographic regions designated as not meeting one or more of the NAAQS. It requires that a state implementation plan (SIP) be prepared for each nonattainment area and a maintenance plan be prepared 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 in, support, or provide financial assistance for licensing, permitting, or approving any project unless the project conforms to the applicable SIP. The state's and the USEPA's goals 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, the USEPA promulgated Code of Federal Regulations (C.F.R.) Title 40, Part 51, Subpart W, and 40 C.F.R. Part 93, Subpart B—Determining Conformity of General Federal Actions to State or Federal Implementation Plans (see *Federal Register* [Fed. Reg.] Volume 58, Page 63214 [November 30, 1993]) as amended, and 75 Fed. Reg. 17253 [April 5, 2010]). These regulations, commonly referred to as the General Conformity Rule, apply to all federal actions, including those by the FRA, except for those federal actions that are excluded from review (e.g., stationary source emissions) or related to transportation plans, programs, and projects under 23 U.S. Code or the Federal Transit Act, which are subject to Transportation Conformity.

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.

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 an NAAQS
- Increase the frequency or severity of any existing violation of an NAAQS
- Delay timely attainment of an NAAQS or interim emission 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
- 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
- The total direct and indirect emissions of a pollutant (or its precursors) are at or above the *de minimis* levels[2] established in the General Conformity regulations (75 Fed. Reg. 17255).

Conformity regulatory criteria are listed in 40 C.F.R. Part 93.158. An action will be determined to conform to the applicable SIP if, for each pollutant that exceeds the *de minimis* emissions level in 40 C.F.R. Part 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. Part 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 project is subject to review under the USEPA General Conformity Rule. However, there may be some smaller highway elements of the project that will be dealt with through the case-by-case modification of the Regional Transportation Plan (RTP) consistent with transportation conformity.

**National and State Ambient Air Quality Standards**

As required by the CAA, the USEPA has established NAAQS for seven major air pollutants known as criteria pollutants. The criteria pollutants are $O_3$, $PM_{2.5}$, $PM_{10}$, CO, nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), and lead. For comparison, the California Ambient Air Quality Standards (CAAQS) are also shown as they are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles.

Table 3.3-1 summarizes state and federal standards by pollutant as of May 2016. Table 3.3-1 also lists the standards for each pollutant by the averaging time and method of measurement. The primary standards are intended to protect public health. The secondary standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

**Mobile-Source Air Toxics**

In addition to the criteria pollutants for which there are NAAQS, the USEPA regulates 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. USEPA estimates that in 2030 this rule would reduce total emissions of MSATs by 330,000 tons and VOC emissions (precursors to $O_3$ and $PM_{2.5}$) by more than 1 million tons. The latest revision to this rule occurred in October 2008. This revision added specific benzene control technologies that the previous rule did not include. No NAAQS or CAAQS exist for MSATs. Specifically, the USEPA has not established NAAQS or provided standards for hazardous air pollutants.

[2] 40 C.F.R. 93 Part 153 defines *de minimis* levels as the minimum threshold for which a conformity determination must be performed for various criteria pollutants in various areas.

## 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 | 35 ppm (40 mg/m$^3$) | – | Non-Dispersive Infrared Photometry |
| | 8-Hour | 9.0 ppm (10 mg/m$^3$) | | 9 ppm (10 mg/m$^3$) | – | |
| | 8-Hour (Lake Tahoe) | 6 ppm (7 mg/m$^3$) | | – | – | |
| Nitrogen Dioxide ($NO_2$)[10] | 1-Hour | 0.18 ppm (339 µg/m$^3$) | Gas Phase Chemilumi-nescence | 100 ppb (188 µg/m$^3$) | – | Gas Phase Chemilumi-nescence |
| | Annual Arithmetic Mean | 0.030 ppm (57 µg/m$^3$) | | 0.053 ppm (100 µg/m$^3$) | Same as Primary Standard | |
| Sulfur Dioxide ($SO_2$)[11] | 1-Hour | 0.25 ppm (655 µg/m$^3$) | Ultraviolet Fluorescence | 75 ppb (196 µg/m$^3$) | – | Ultraviolet Fluorescence; Spectrophoto-metry (Pararosaniline Method) |
| | 3-Hour | – | | – | 0.5 ppm (1300 µg/m$^3$) | |
| | 24-Hour | 0.04 ppm (105 µg/m$^3$) | | 0.14 ppm (for certain areas)[11] | – | |
| | Annual Arithmetic Mean | – | | 0.030 ppm (for certain areas)[11] | – | |
| Lead[12, 13] | 30-Day Average | 1.5 µg/m$^3$ | Atomic Absorption | – | – | High-Volume Sampler and Atomic Absorption |
| | Calendar Quarter | – | | 1.5 µg/m$^3$ (for certain areas)[12] | Same as Primary Standard | |
| | Rolling 3-Month Average | – | | 0.15 µg/m$^3$ | | |

| Pollutant | Averaging Time | California Standards[1] | | Federal Standards[2] | | |
|---|---|---|---|---|---|---|
| | | Concentration[3] | Method[4] | Primary[3,5] | Secondary[3,6] | Method[7] |
| Visibility-Reducing Particles[14] | 8-Hour | See table note 14 | Beta Attenuation and Transmittance through Filter Tape | No Federal Standards | | |
| Sulfates | 24-Hour | 25 µg/m$^3$ | Ion Chromatography | No Federal Standards | | |
| Hydrogen Sulfide | 1-Hour | 0.03 ppm (42 µg/m$^3$) | Ultraviolet Fluorescence | No Federal Standards | | |
| Vinyl Chloride[12] | 24-Hour | 0.01 ppm (26 µg/m$^3$) | Gas Chromatography | No Federal Standards | | |

*Source: Ambient Air Quality Standards (California Air Resources Board, May 4, 2016,* www.arb.ca.gov/research/aaqs/aaqs2.pdf).

1 California standards for $O_3$, carbon monoxide (except 8-hour Lake Tahoe), $SO_2$ (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 per 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/m$^3$ 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 is expressed first in the units in which it was promulgated. Equivalent units given in parentheses are based on 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/m$^3$ to 12.0 µg/m$^3$. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m$^3$, as was the annual secondary standard of 15 µg/m$^3$. The existing 24-hour $PM_{10}$ standards (primary and secondary) of 150 µg/m$^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

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 1-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 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, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

°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

On February 3, 2006, the Federal Highway Administration (FHWA) released *Interim Guidance on Air Toxic Analysis in NEPA Documents* (FHWA 2006). This guidance was superseded on September 30, 2009, by the FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents* (FHWA 2009) and was updated on December 6, 2012 (FHWA 2012). The FHWA most recently updated the guidance on October 18, 2016 (FHWA 2016). The FHWA's guidance advises on when and how to analyze MSATs in the NEPA process for highway projects. This guidance is considered interim because MSAT science is still evolving. As the science progresses, the FHWA is expected to update the guidance. The Authority has chosen to follow the FHWA's MSAT guidance.

**Greenhouse Gas Regulations and Guidance**

GHG emissions are regulated at the federal and state levels. Laws and regulations, as well as plans and policies, have been adopted to address global climate change issues. Key federal regulations relevant to the HSR project are summarized below.

On September 22, 2009, the USEPA published the Final Rule that requires mandatory reporting of GHG emissions from large sources in the U.S. (USEPA 2010a). The gases covered by the Final Rule are $CO_2$, methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride ($SF_6$), 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.

On December 7, 2009, the *Final Endangerment and Cause or Contribute Findings for Greenhouse Gases* under Section 202(a) of the CAA was signed by the USEPA administrator. The endangerment finding states that current and projected concentrations of the six key well-mixed GHGs in the atmosphere—$CO_2$, $CH_4$, $N_2O$, hydrofluorocarbons, perfluorocarbons, and $SF_6$—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 2010b).

Based on the endangerment finding, the USEPA revised vehicle emission standards. The USEPA and the National Highway Traffic Safety Administration (NHTSA) updated the Corporate Average Fuel Economy fuel standards on October 15, 2012 (77 Fed. Reg. 62623), requiring substantial improvements in fuel economy for all vehicles sold in the U.S. The new standards apply to new passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2017 through 2025. The 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.

On September 15, 2011, the USEPA and the NHTSA issued a final rule of *Greenhouse Gas Emissions Standards 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 fuel efficiency and GHG standards in this rule would reduce $CO_2$ emissions by approximately 270 million metric tons (MMT) and save 530 million barrels of oil over the life of vehicles sold during the 2014 through 2018 model years. On August 16, 2016, the USEPA and the NHTSA determined that the Phase 2 standards will lower $CO_2$ emissions by approximately 1.1 billion metric tons and save up to 2 billion barrels of oil over the life of vehicles sold under the program.

On October 15, 2012, the USEPA and the NHTSA issued Corporate Average Fuel Economy standards for model years 2017 and beyond. These standards would reduce GHG emissions by increasing the fuel economy of light-duty vehicles to 48.7–49.7 miles per gallon by model year 2025. 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 on December 6, 2012, and the final rulemaking became effective December 31, 2012. In July 2016, the USEPA, the NHTSA, and CARB released a mid-term evaluation of the October 2012 final rule in a draft technical assessment report (USEPA, CARB, and NHTSA 2016). The draft technical assessment report concludes the following:

- A wider range of technologies exist for manufacturers to use to meet the model year 2022–2025 standards, and at costs that are similar to, or lower than, those projected in the 2012 rule.
- The automobile industry can meet the standards primarily with advanced gasoline vehicle technologies and with very low levels of strong hybridization and full electrification (plug-in vehicles).
- The updated 2025 projections for fuel prices, car/truck mix, and the fleet target illustrate that the footprint-based standards will continue to accommodate consumer choice and achieve significant GHG reductions and fuel savings across all vehicle types.

On August 24, 2018, the USEPA and NHTSA proposed the Safer Affordable Fuel-Efficient Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks. The Safer Affordable Fuel-Efficient Vehicles Rule, if finalized, would 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, 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 also requested comment on a range of other alternatives.

#### *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 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 emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB also establishes passenger vehicle fuel specifications.

**Asbestos Control Measures**

CARB has adopted two airborne toxic control measures for controlling naturally occurring asbestos—the *Asbestos Airborne Toxic Control Measure for Surfacing Applications* (California Code of Regulations, Title 17, Section 93106) and the *Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations* (California Code of Regulations Title 17, Section 93105). The USEPA is also responsible for enforcing regulations relating to asbestos 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 Federal National Emission Standards for Hazardous Air Pollutants regulations for asbestos.

**California Environmental Quality Act**

CEQA (California Public Resources Code § 21000 et seq.) and the CEQA Guidelines (California Code of Regulations § 15000 et seq.) require state and local agencies to identify the significant environmental impacts of their actions, including potential significant air quality and climate

change impacts, and to avoid or mitigate those impacts when feasible. The CEQA Amendments of December 30, 2009, specifically require lead agencies to address GHG emissions in determining the significance of environmental impacts caused by a project and to consider feasible means to mitigate the significant impacts of GHG emissions.

**Greenhouse Gas Guidance**

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

***Assembly Bill 1493***

In 2002, with the passage of Assembly Bill (AB) 1493 (Pavley), California launched an innovative and proactive approach to addressing GHG emissions and climate change at the state level. California 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 later granted (USEPA 2010c).

***Executive Order S-3-05***

On June 1, 2005, Governor Arnold Schwarzenegger signed California Executive Order (EO) S-3-05. EO S-3-05 establishes targets to reduce California's GHG emissions to year 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050. EO S-3-05 also calls for the California Environmental Protection Agency to prepare biennial science reports on the potential 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 *2009 Climate Adaptation Strategy* (California Natural Resources Agency 2009) was released following extensive interagency coordination and stakeholder input. The latest of these reports, *Climate Action Team Biennial Report*, was published in December 2010 (California Environmental Protection Agency 2010).

***Assembly Bill 32***

In 2006, the goal of EO S-3-05 was further reinforced with the passage of AB 32 (Pavley; 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 that includes market mechanisms and to implement 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:

- CARB will prepare and approve a scoping plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions from sources or categories of sources of GHGs by 2020 (California Health and Safety Code 38561). The scoping plan, approved by CARB on December 12, 2008, and updated in 2014, provides an outline for future actions to reduce GHG emissions in California via regulations, market mechanisms, and other measures.
- The scoping plan includes the implementation of the HSR project as a GHG reduction measure, estimating a 2020 reduction of 1 MMT of carbon dioxide equivalent ($CO_2e$) emissions.
- Identify the statewide level of GHG emissions in 1990 to serve as the emissions limit to be achieved by 2020 (California Health and Safety Code 38550). In December 2007, CARB approved the 2020 emission limit of 427 MMT $CO_2e$ of GHG.
- Adopt a regulation requiring the mandatory reporting of GHG emissions (California Health and Safety Code 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 to determine GHG emissions and track future changes in emission levels.

***Executive Order S-01-07***

With EO S-01-07, Governor Schwarzenegger set forth the Low Carbon Fuel Standard for California. This 2007 EO calls for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020.

***Sustainable Communities and Climate Protection Act of 2008 (Senate Bill 375)***

Senate Bill (SB) 375, the *Sustainable Communities and Climate Protection Act of 2008* (Chapter 728, Statutes of 2008), was signed into law by Governor Schwarzenegger on September 30, 2008, and became effective January 1, 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 (MPO). The 18 MPOs have been tasked with creating the regional land use and transportation plans called "sustainable community strategies" (SCS). The MPOs 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 RTP or an unconstrained alternative planning strategy. If regions develop integrated land use, housing, and transportation plans that meet the SB 375 targets, new projects in these regions can be relieved of certain review requirements of CEQA.

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

***Executive Order S-13-08***

In April 2015, Governor Jerry 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 emission reduction target of 40 percent below 1990 levels by 2030 is intended to make it possible to reach the state's ultimate 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 (California Office of the Governor 2015).

***Executive Order B-30-15***

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

***Senate Bill 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 statewide, California would need 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.

***Senate Bill 100***

On September 10, 2018, Governor Brown signed SB 100. SB 100 establishes a state goal to acquire 100 percent of California electricity from eligible renewable energy resources and zero-carbon resources 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.

### *3.3.2.3 Regional and Local*

Adopted local and regional plans, policies, and regulations related to air quality and GHG emissions are provided in the sections below.

**Local Air Quality Management District Regulations**

The Bakersfield to Palmdale Project Section passes through two air basins and three air quality management districts: the San Joaquin Valley Air Pollution Control District (SJVAPCD), the Eastern Kern Air Pollution Control District (EKAPCD), and the Antelope Valley Air Quality Management District (AVAQMD). The SJVAPCD and the San Joaquin Valley Air Basin (SJVAB) encompass the same area; the EKAPCD and the AVAQMD are both located within the Mojave Desert Air Basin (MDAB).

***San Joaquin Valley Air Pollution Control District***

The SJVAPCD has specific air quality-related planning documents, rules, and regulations. This section summarizes the local planning documents and regulations that may be applicable to the project as administered by the SJVAPCD with CARB oversight.

**San Joaquin Valley Air Pollution Control District Rule 2201—New and Modified Stationary Source Review**

Rule 2201 applies to new or modified stationary sources and requires that sources not increase emissions above the specified thresholds. If the post-project stationary source has the potential to emit equal emissions or exceed the offset threshold levels, offsets will be required (SJVAPCD 2006). Stationary sources at the station (such as natural gas heaters) would need to be permitted by the SJVAPCD and would have to comply with best available control technology requirements. Stationary sources such as exterior washing, welding, material storage, cleaning solvents, abrasive blasting, painting, oil/water separation, and wastewater treatment and combustion would require permits. Permits would need to be obtained for equipment associated with these activities from the SJVAPCD and would need to comply with best available control technology requirements.

**San Joaquin Valley Air Pollution Control District Rule 2280—Portable Equipment Registration**

Portable equipment used at project sites for less than 6 consecutive months must be registered with the SJVAPCD. The SJVAPCD will issue the registrations 30 days after receipt of the application (SJVAPCD 1996).

**San Joaquin Valley Air Pollution Control District Rule 2303—Mobile Source Emission Reduction Credits**

A project may qualify for SJVAPCD vehicle emission reduction credits if it meets the specific requirements of Rule 2303 for any of the following categories (SJVAPCD 1994):

- Low-Emission Transit Buses
- Zero-Emission Vehicles
- Retrofit Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles
- Retrofit Heavy-Duty Vehicles

**San Joaquin Valley Air Pollution Control District Rule 4201 and Rule 4204—Particulate Matter Concentration and Emission Rates**
Rule 4201 and Rule 4202 apply to operations that emit or may emit dust, fumes, or total suspended particulate matter. Particulate emissions from the project must be less than the specified emission limit (SJVAPCD 1992a, 1992b).

**San Joaquin Valley Air Pollution Control District Rule 4301—Fuel Burning Equipment**
Rule 4301 limits the emissions from fuel-burning equipment whose primary purpose is to produce heat or power by indirect heat transfer. The project will comply with the emission limits (SJVAPCD 1992c).

**San Joaquin Valley Air Pollution Control District Rule 8011—General Requirements: Fugitive Dust Emission Sources**
Fugitive dust regulations are applicable to outdoor fugitive dust sources. Operations, including construction operations, must control fugitive dust emissions in accordance with SJVAPCD Regulation VIII (SJVAPCD 2004a). According to Rule 8011, the SJVAPCD requires the implementation of control measures for fugitive dust emission sources. The project would also implement the mandatory control measures listed on pages 77 and 78 of the *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI) (SJVAPCD 2015a) to reduce fugitive dust emissions. These measures are not considered mitigation measures because they are required by the regulation.

Many of the control measures required by the SJVAPCD are the same as or similar to the control measures listed in the *Statewide Program Environmental Impact Report (EIR)/EIS* (Authority and FRA 2005). The SJVAPCD Rule 8011 requirements are listed below:

- All disturbed areas, including storage piles, that are not being actively used for construction purposes would be effectively stabilized for dust emissions using water or a chemical stabilizer/suppressant, or covered with a tarp or other suitable cover or vegetative ground cover.
- All on-site unpaved roads and off-site unpaved access roads would be effectively stabilized for dust emissions using water or a chemical stabilizer/suppressant.
- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities would be effectively controlled for fugitive dust emissions by utilizing an application of water or by pre-soaking.
- With the demolition of buildings up to six stories in height, all exterior surfaces of the building would be wetted during demolition.
- All materials transported off-site would be covered or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container would be maintained.
- All operations would limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.
- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, piles would be effectively stabilized for fugitive dust emissions by utilizing sufficient water or a chemical stabilizer/suppressant.
- Within urban areas, trackout would be immediately removed when it extends 50 or more feet from the site and at the end of each workday.
- Any site with 150 or more vehicle trips per day would prevent carryout and trackout.

For projects in which construction-related activities would disturb equal to or greater than 1 acre of surface area, the SJVAPCD recommends that demonstration of receipt of an SJVAPCD-approved Dust Control Plan or Construction Notification Form, before issuance of the first grading permit, be made a condition of approval.

**San Joaquin Valley Air Pollution Control District Rule 9510—Indirect Source Review**
In December 2005, the SJVAPCD adopted the Indirect Source Rule (Rule 9510) to meet its emission reduction commitments in the $PM_{10}$ and $O_3$ Attainment Plans (SJVAPCD 2005). Indirect Source Review regulation applies to any transportation project in which construction emissions equal or exceed 2 tons of $NO_X$ or $PM_{10}$ per year. Construction of the HSR alignment (specifically, on-site/off-road construction exhaust emissions) would be subject to Indirect Source Review. Accordingly, the Authority would need to submit an Air Impact Assessment application to the SJVAPCD with commitments to reduce construction exhaust $NO_X$ and $PM_{10}$ emissions by 20 percent and 45 percent, respectively. Operation of the HSR system would be exempt under Sections 4.1 and 4.2 of Rule 9510.

**San Joaquin Valley Air Pollution Control District CEQA Guidelines**
The SJVAPCD prepared the GAMAQI to assist lead agencies and project applicants in evaluating the potential air quality impacts of projects in the SJVAB (SJVAPCD 2015a). The GAMAQI provides SJVAPCD-recommended procedures for evaluating potential air quality impacts during the CEQA environmental review process. The GAMAQI provides guidance on evaluating short-term (construction) and long-term (operational) air emissions. The most recent version of the GAMAQI, adopted March 19, 2015, was used in this evaluation. It contains guidance on the following:

- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts
- Methods to mitigate air quality impacts
- Information for use in air quality assessments and environmental documents, including air quality, regulatory setting, climate, and topography data

### *Eastern Kern Air Pollution Control District*

**Eastern Kern Air Pollution Control District CEQA Guidelines**
The EKAPCD adopted the *Guidelines for Implementation of the California Environmental Quality Act of 1970, As Amended*, in 1996 (EKAPCD 2012c). The guidelines include thresholds for criteria air pollutants and guidance on implementation of mitigation measures.

**Addendum to CEQA Guidelines Addressing Greenhouse Gas Emission Impacts for Stationary-Source Projects When Serving as Lead CEQA Agency**
This policy document establishes and details the process of evaluating new or modified stationary-source GHG emissions impacts on global climate change for purposes of CEQA. A project would be considered to have a less than significant or less than cumulatively considerable impact on GHG emissions if its GHG emissions are less than 25,000 tons per year; it can demonstrate consistency with a state GHG reduction plan; or it can reduce its emissions by at least 20 percent below business-as-usual emissions (EKAPCD 2012a).

**Eastern Kern Air Pollution Control District Rule 402—Fugitive Dust**
The purpose of Rule 402 is to prevent, reduce, and mitigate ambient concentrations of anthropogenic fugitive dust emissions to an amount sufficient to attain and maintain the NAAQS and CAAQS. Controlling fugitive dust when visible emissions are detected may not prevent all $PM_{10}$ emissions, but it will substantially reduce ambient concentrations (EKAPCD 2014).

### *Antelope Valley Air Quality Management District*

**CEQA and Federal Conformity Guidelines**
Under CEQA, the AVAQMD is a commenting agency on air quality and GHG emissions within its jurisdiction. The CEQA and Federal Conformity Guidelines, released in 2011, are intended to assist persons in preparing environmental analysis or reviewing documents for any project within the jurisdiction of the AVAQMD by providing background information and guidance on the preferred analysis approach. The guidelines include annual and daily GHG emission thresholds of significance for project-generated GHGs and criteria pollutants within the jurisdiction of the

AVAQMD (AVAQMD 2011). The significant emissions thresholds for GHGs are 100,000 tons per year and 548,000 pounds per day of $CO_2e$ emissions.

**Antelope Valley Air Quality Management District Rule 403—Fugitive Dust**
The provisions of this rule include actions to prevent, reduce, or mitigate fugitive dust particulate matter entrained in the ambient air as a result of built sources. The rule limits actions that would result in a source of dust that causes 20 percent opacity or greater during an observation of three minutes or more in any 1 hour. It also limits $PM_{10}$ concentrations to under 50 micrograms per cubic meter ($\mu g/m^3$).

**Antelope Valley Air Quality Management District Rule 109—Recordkeeping for Volatile Organic Compound Emissions**
The provisions of this rule shall apply to an owner or operator of a stationary source within the AVAQMD conducting operations that include the use of adhesives, coatings, solvents, and/or graphic arts materials. This rule shall apply when records are required to determine an AVAQMD rule's applicability or source's exemption from a rule, rule compliance, or specifically as a Permit to Operate or Permit to Construct condition (AVAQMD 2010).

### Associations of Governments

#### *Kern Council of Governments*

**2014 Regional Transportation Plan/Sustainable Communities Strategy**
The RTP/SCS establishes a set of regional transportation goals, policies, and actions intended to guide development of the planned multimodal transportation systems in Kern County. The RTP focuses on new efforts to achieve and maintain federal air quality standards, and in doing so will make significant progress toward achieving state climate change goals. The RTP also includes measures to reduce $PM_{2.5}$ emissions to achieve attainment plan goals. The SCS is intended to reduce GHG emissions from passenger vehicles and light-duty trucks by 5 percent per capita by 2020 and 10 percent per capita by 2035 compared to 2005. GHG emissions and vehicle trip reduction strategies include, but are not limited to, the construction of new transit lines, expanded passenger rail service, increased transit service, and a change in transit fares (Kern Council of Governments [COG] 2014a).

#### *Southern California Association of Governments*

**2012–2035 Regional Transportation Plan/Sustainable Communities Strategy: Towards a Sustainable Future**
In addition to meeting the USEPA's criteria air pollutant emission budgets, by sustainable planning and integrated transportation and land use decisions, the RTP/SCS contains projects, policies, and strategies to achieve a 9 percent reduction in GHG emissions from passenger vehicles and light-duty trucks by 2020 and a 16 percent reduction by 2035 (Southern California Association of Governments 2012).

### Local Agencies

#### *City of Bakersfield*

**City of Bakersfield General Plan Conservation Element**
The City of Bakersfield General Plan Conservation Element includes several goals, policies, and implementation programs intended to help Bakersfield be in attainment of state and federal air quality standards and balance economic growth with clean air. The air quality goals work to promote healthy air quality, minimize vehicular trips, reduce vehicular emissions, and reduce air pollution associated with agricultural activities (City of Bakersfield 2002).

#### *City of Palmdale*

**City of Palmdale General Plan Environmental Resources Element**
The City of Palmdale General Plan Environmental Resources Element includes Objective 5.4 and Policies 5.4.1 and 5.4.2, which are intended to reduce GHG emissions. Air quality emissions were addressed in the strategies included in Objective 2.1, Policy L2.1.8, and Goal C2, which includes

strategies for reducing the number of vehicle trips and VMT to meet regional transportation and air quality goals (City of Palmdale 1993).

**City of Palmdale Energy Action Plan**
The City of Palmdale Energy Action Plan includes goals, measures, and actions to reduce the city's GHG emissions by 15 percent below 2005 levels by 2020, consistent with AB 32 (City of Palmdale 2011).

### *City of Tehachapi*

**Tehachapi General Plan Town Form Element**
Objective 14 and Policies 55 through 59 identify strategies the City of Tehachapi can implement to reduce its GHG emissions and contribution to climate change, and adapt to the effects of climate change. Section 3.3.6 addresses air quality in the Greater Tehachapi Area and includes Policies 34 through 41, which identify strategies to reduce air quality and GHG emissions. The City of Tehachapi plans to meet NAAQS and CAAQS through cooperation with the EKAPCD (City of Tehachapi 2012).

## 3.3.3 Regional and Local Policy Analysis

State and regional policies supporting the California HSR System were described in Section 3.1.3 of this document. Because the HSR project is an undertaking of the Authority in its capacity as state agency and representative of a federal agency, the project is neither subject to the jurisdiction of local governments nor is it required to be consistent with local plans. Authority regulations nonetheless call for the discussion of any inconsistency or conflict of a proposed action with regional or local plans and laws. Where inconsistencies or conflicts exist, the Council on Environmental Quality and the Authority require a description of the extent of reconciliation and the reason for proceeding if full reconciliation is not feasible (C.F.R. Title 40, Part 1506.2[d], and 64 *Federal Register* 28545, 14[n][15]). The CEQA Guidelines also require that an EIR discuss the inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans (CEQA Guidelines § 15125[d]).

Table 3.3-2 lists the policies from the Bakersfield General Plan Conservation Element, the Palmdale General Plan Environmental Resources Element, and the Tehachapi General Plan Town Form Element that are applicable to the Bakersfield to Palmdale Project Section. As shown in Table 3.3-2, implementation of the Bakersfield to Palmdale Project Section would be consistent with local air quality and GHG reduction policies.

**Table 3.3-2 Policy Consistency Summary**

| Policy | Consistency |
|---|---|
| **City of Bakersfield General Plan Conservation Element** | |
| **Bakersfield AQ Policy 1:** Comply with and promote SJVAPCD control measures regarding ROGs. | Consistent |
| **Bakersfield AQ Policy 3:** Require dust abatement measures during significant grading and construction operations. | Consistent |
| **Bakersfield AQ Policy 5:** Consider the location of sensitive receptors such as schools, hospitals, and housing developments when locating industrial uses to minimize the impact of industrial source on air pollution. | Consistent |
| **Bakersfield AQ Policy 12:** Encourage the use of mass transit, carpooling, and other transportation options to reduce vehicle miles traveled. | Consistent |
| **Bakersfield AQ Policy 14:** Establish park and ride facilities to encourage carpooling and the use of mass transit. | Consistent |
| **Bakersfield AQ Policy 15:** Promote the use of bicycles by providing attractive bicycle paths and requiring provision of storage facilities in commercial and industrial projects. | Consistent |

| Policy | Consistency |
|---|---|
| **Bakersfield AQ Policy 25:** Require design of parking structures and ramps to provide adequate off-street storage for entering vehicles to minimize on-street congestion and avoid internal backup and idling of vehicles. | Consistent |
| **Bakersfield AQ Policy 26:** Consider restriction or elimination of on-street parking for the purpose of providing increased road or intersection capacity during peak traffic hours. | Consistent |
| **Bakersfield AQ Policy 27:** Local governments should work with local transit authorities to increase the attractiveness of passenger staging areas through the provision of waiting shelters, landscaping and drinking fountains. | Consistent |
| **City of Palmdale General Plan Environmental Resources Element** | |
| **Palmdale Policy ER5.1.1:** Reduce the number of work-related trips through such means as promoting alternate work schedules, telecommuting, teleconferencing, company-sponsored ride share and alternative fuel vehicle programs developed under the County's Congestion Management Program, the use of Metro Link trains and other alternative modes of transportation to the workplace and the creation of additional park and ride facilities. | Consistent |
| **Palmdale Policy ER5.1.2:** Reduce vehicle non-work trips through merchant transportation incentives, distance learning, and transit system improvements. | Consistent |
| **Palmdale Policy ER5.2.1:** Reduce dust from unpaved roads and parking lots by requiring paving or vegetative stabilization of the unpaved areas; require that measures be taken at construction sites to prevent deposition of soil onto public rights-of-way. | Consistent |
| **Palmdale Policy ER5.2.2:** Encourage developers to maintain natural contours to the greatest degree possible, to eliminate the need for extensive land clearing, blasting, ground excavation, grading and cut and fill operations. | Consistent |
| **Palmdale Policy ER5.2.3:** Require erosion control measures on new development, including covering soil with straw mats or use of chemical soil and dust binders, followed by seeding and watering as soon as possible after grading to prevent fugitive dust. | Consistent |
| **Palmdale Policy ER5.3.1:** Promote the AVAQMD's efforts to eliminate emissions from such sources as excessive car dealership cold starts, excessive curb idling, emissions from advertising vehicles, and emissions from leaf blowers, among others, through assisting with implementation and enforcement of district programs once they are adopted. | Consistent |
| **Palmdale Policy ER5.3.3:** Reduce reactive organic gas (ROG) and particulate emissions from building materials and construction methods, by promoting the use of nonsolvent-based, high-solid, or water-based coatings, and requiring compliance with all pertinent AVAQMD rules. | Consistent |
| **Tehachapi General Plan Town Form Element** | |
| **Tehachapi Policy NR3:** Reduce emissions for stationary point sources of air pollution (e.g., equipment at commercial and industrial facilities) and stationary area sources (e.g., wood-burning fireplaces & gas powered lawn mowers) which cumulatively, represent large quantities of emissions. | Consistent |
| **Tehachapi Policy NR4b:** Require that contractors include, in construction contracts, the following requirements, consistent with the East Kern District's Regulations:<br>• Maintain construction equipment engines in good condition and in proper tune per manufacturer's specification for the duration of construction;<br>• Minimize idling time of construction-related and/or, heavy-duty equipment, motor vehicles, and portable equipment;<br>• Use alternative fuel construction equipment (i.e., compressed natural gas, liquid petroleum gas and unleaded gasoline);<br>• Use add-on control devices such as diesel oxidation, catalysts or particulate filters;<br>• Use diesel equipment that meets the Air Quality Management District's certification standard for off-road heavy-duty diesel engines;<br>• Limit construction hours/hours of operation of heavy-duty equipment. | Consistent |

| Policy | Consistency |
|---|---|
| **Tehachapi Policy NR4c:** Locate new stationary sources of air pollutants, such as industrial facilities, at sufficient distances away from residential areas and facilities that serve sensitive receptors; | Consistent |
| **Tehachapi Policy CH11:** Maintain and improve Tehachapi's air quality through a variety of measures including greenhouse gas emissions reduction measures. | Consistent |
| **Tehachapi Policy TF55.** Pro-actively cooperate with the state to implement AB 32 to achieve the required greenhouse gas emissions reductions. | Consistent |
| **Tehachapi Policy TF56.** In cooperation with the state and Kern COG proactively promote implementation of SB 375. | Consistent |
| **Tehachapi Policy TF57.** Reduce greenhouse gas emissions and adapt to climate change with efforts in the following areas: energy; land use; transportation; buildings; waste; ecology; government operations; and communications and programs. | Consistent |

Source: City of Bakersfield 2002, City of Palmdale 1993, and City of Tehachapi 2012.
AB = Assembly Bill
AVAQMD = Antelope Valley Air Quality Management District
Kern COG = Kern Council of Governments
ROG = reactive organic gas
SB = Senate Bill
SJVAPCD = San Joaquin Valley Air Pollution Control District

## 3.3.4 Methods for Evaluating Impacts

The methods for evaluating impacts are intended to satisfy the federal and state requirements, including NEPA, CEQA, and General Conformity. These laws 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 in the project vicinity. 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]). In accordance with these requirements, the HSR project's air quality and global climate change impacts are evaluated against both existing conditions (as of the year 2015) and No Project Alternative conditions in the horizon year of 2040, with consideration of effects in the opening year of HSR operations. Details are presented in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b).

The analysis estimated the emission changes due to projected reductions of on-road VMT and intrastate air travel, and increases in electrical demand (required to power the HSR system). In the project analyses, the project is predicted to have a beneficial effect on (i.e., reduce) statewide emissions of all applicable pollutants as compared to existing and 2040 conditions.

### *3.3.4.1 Study Area for Analysis*

The resource study area (RSA) is the area in which all environmental investigations specific to air quality and global climate change are conducted to determine the affected environment and potential impacts of the Bakersfield to Palmdale Project Section. The boundaries of the RSA for air quality and global climate change extend beyond the project footprint. The local air quality impact analysis focuses on the effects of criteria pollutant and MSAT emissions from both the construction and operation of the project on nearby sensitive receptors, as shown in Table 3.3-17. Typical screening distances based on USEPA and CARB modeling guidance and project-specific factors of the HSR project, including the location of maintenance facilities and stations, were used to determine the RSA.

The regional air quality analysis and global climate change analysis evaluate the project's impact on criteria pollutants and the long-lived GHGs (i.e., $CO_2$, $CH_4$, $N_2O$, and fluorinated gases) 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 project's impact on statewide VMT, aircraft travel, and energy use, consistent with State of California planning.

**State**

The state component of the air quality RSA (for operations) was identified to evaluate potential changes in air quality from large-scale, nonlocalized impacts, such as HSR project electric power requirements, changes in air traffic, and HSR project conformance with the SIP. Similarly, the state component of the global climate change RSA (for construction and operations) captures the effects of these activities as they relate to GHGs. A statewide RSA provides a policy context for California-specific goals within which to view air quality and global climate change issues.

**Regional**

The Bakersfield to Palmdale Project Section of the HSR system would potentially affect regional air pollutant concentrations in the SJVAB and the MDAB. The project section is situated in Kern County, which is within both the SJVAB and MDAB, and Los Angeles County, which is within the MDAB. The SJVAB, which is approximately 250 miles long and 35 miles wide, is the second-largest air basin in the state. The SJVAB is defined by the mountain ranges of the Sierra Nevada to the east (8,000 to 14,491 feet in elevation), the Coast Ranges to the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains to the south (6,000 to 8,000 feet in elevation). To the north, the SJVAB opens to the sea at the Carquinez Strait, where the Sacramento–San Joaquin River Delta empties into San Francisco Bay.

The MDAB is defined by the Tehachapi Mountains to the north and the San Gabriel (6,000 to 10,000 feet in elevation) and San Bernardino (7,000 to 11,000 feet in elevation) Mountains to the west and south (CARB 2015).

During construction, the hauling of ballast material from quarries outside the SJVAB and MDAB to the project site could potentially affect regional air pollutant concentrations in other air basins. For the analysis of material-hauling emissions, these other air basins have been included in the study area.

**Local**

Local study areas are areas of potential major air emission activities along the project alignment, including areas near large construction activities and major traffic pattern changes. Local study areas are generally defined as areas along the alignment within 1,000 feet of the proposed stations, major intersections, and the heavy maintenance facility (HMF). Analyses performed by CARB indicate that providing a separation of 1,000 feet from diesel sources and high-traffic areas would substantially reduce diesel particulate matter (DPM) concentrations, public exposure, and asthma symptoms in children (California Environmental Protection Agency and CARB 2005). Potential impacts from changes in CO, $PM_{2.5}$, and $PM_{10}$ concentrations caused by changes in local traffic conditions were evaluated at sensitive land uses within 1,000 feet of intersections operating at level-of-service (LOS) E or F.

**Climate Change**

As described above, the RSA for GHG emission analysis is the State of California, based on the properties of GHG pollutants and the statewide nature of the HSR system's impact on VMT, aircraft, and energy use.

### *3.3.4.2 Impact Avoidance and Minimization Features*

The Authority has pledged to integrate programmatic impact avoidance and minimization features (IAMF) consistent with (1) the 2005 Statewide Program EIR/Environmental Impact Statement (EIS), (2) the 2008 Bay Area to Central Valley Program EIR/EIS, and (3) the 2012 Partially Revised Final Program EIR into the HSR project. The Authority will implement these features

during project design and construction, as relevant to the project section, to avoid or reduce impacts.

IAMFs are incorporated into the project design and construction that would avoid or minimize the environmental or community impacts. These IAMFs are listed below.

***AQ-IAMF#1: Fugitive Dust Emissions***

During construction, the Contractor shall employ the following measures to minimize and control fugitive dust emissions. The Contractor shall prepare a fugitive dust control plan for each distinct construction segment. At a minimum, the plan shall describe how each measure would be employed and identify an individual responsible for ensuring implementation. At a minimum, the plan shall address the following components unless alternative measures are approved by the applicable air quality management district.

- Cover all vehicle loads transported on public roads to limit visible dust emissions, and maintain at least 6 inches of freeboard space from the top of the container or truck bed.
- Clean all trucks and equipment before exiting the construction site using an appropriate cleaning station that does not allow runoff to leave the site or mud to be carried on tires off the site.
- Water exposed surfaces and unpaved roads at a minimum three times daily with adequate volume to result in wetting of the top 1 inch of soil but avoiding overland flow. Rain events may result in adequate wetting of top 1 inch of soil thereby alleviating the need to manually apply water.
- Limit vehicle travel speed on unpaved roads to 15 miles per hour (mph).
- Suspend any dust-generating activities when average wind speed exceeds 25 mph.
- Stabilize all disturbed areas, including storage piles that are not being used on a daily basis for construction purposes, by using water, a chemical stabilizer/suppressant, hydro mulch or by covering with a tarp or other suitable cover or vegetative ground cover, to control fugitive dust emissions effectively. In areas adjacent to organic farms, the Authority would use non-chemical means of dust suppression.
- Stabilize all on-site unpaved roads and off-site unpaved access roads, using water or a chemical stabilizer/suppressant, to effectively control fugitive dust emissions. In areas adjacent to organic farms, the Authority would use non-chemical means of dust suppression.
- Carry out watering or presoaking for all land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities.
- For buildings up to 6 stories in height, wet all exterior surfaces of buildings during demolition.
- Limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at a minimum of once daily, using a vacuum type sweeper.
- After the addition of materials to or the removal of materials from surface or outdoor storage piles, apply sufficient water or a chemical stabilizer/suppressant.

***AQ-IAMF#2: Selection of Coatings***

During construction, the Contractor shall use:

- Low-volatile organic compound (VOC) paint that contains less than 10 percent of VOC contents (VOC, 10%).
- Super-compliant or Clean Air paint that has a lower VOC content than that required by San Joaquin Valley Unified Air Pollution Control District Rule 4601, Eastern Kern Air Pollution Control District Rule 410, and Antelope Valley Air Quality Management District Rule 1113, when available. If not available, the Contractor shall document lack of availability,

recommend alternative measure(s) to comply with Rule 4601, 410, and 1113 or disclose absence of measure(s) for full compliance and obtain concurrence from the Authority.

***AQ-IAMF#3: Renewable Diesel***

During construction, the Contractor would use renewable diesel fuel to minimize and control exhaust emissions from all heavy-duty diesel-fueled construction diesel equipment and on-road diesel trucks. Renewable diesel must meet the most recent ASTM D975 specification for Ultra Low Sulfur Diesel and have a carbon intensity no greater than 50 percent of diesel with the lowest carbon intensity among petroleum fuels sold in California. The Contractor would provide the Authority with monthly and annual reports, through the Environmental Mitigation Management and Application (EMMA) system, of renewable diesel purchase records and equipment and vehicle fuel consumption. Exemptions to use traditional diesel can be made where renewable diesel is not available from suppliers within 200 miles of the project site. The construction contract must identify the quantity of traditional diesel purchased and fully document the availability and price of renewable diesel to meet project demand.

***AQ-IAMF#4: Reduce Criteria Exhaust Emissions from Construction Equipment***

Prior to issuance of construction contracts, the Authority would incorporate the following construction equipment exhaust emissions requirements into the contract specifications:

1. All heavy-duty off-road construction diesel equipment used during the construction phase would meet Tier 4 engine requirements.
2. A copy of each unit's certified tier specification and any required CARB or air pollution control district operating permit would be made available to the Authority at the time of mobilization of each piece of equipment.
3. The contractor would keep a written record (supported by equipment-hour meters where available) of equipment usage during project construction for each piece of equipment.
4. The contractor would provide the Authority with monthly reports of equipment operating hours (through the Environmental Mitigation Management and Assessment [EMMA] system) and annual reports documenting compliance.

***AQ-IAMF#5: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment***

Prior to issuance of construction contracts, the Authority would incorporate the following material-hauling truck fleet mix requirements into the contract specifications:

1. All on-road trucks used to haul construction materials, including fill, ballast, rail ties, and steel, would consist of an average fleet mix of equipment model year 2010 or newer, but no less than the average fleet mix for the current calendar year as set forth in the CARB's EMFAC 2014 database.
2. The contractor would provide documentation to the Authority of efforts to secure such a fleet mix.
3. The contractor would keep a written record of equipment usage during project construction for each piece of equipment and provide the Authority with monthly reports of VMT (through EMMA) and annual reports documenting compliance.

***AQ-IAMF#6: Reduce the Potential Impact of Concrete Batch Plants***

Prior to construction of any concrete batch plant, the contractor would provide the Authority with a technical memorandum documenting consistency with the Authority's concrete batch plant siting criteria and utilization of typical control measures. Concrete batch plants would be sited at least 1,000 feet from sensitive receptors, including places such as daycare centers, hospitals, senior care facilities, residences, parks, and other areas where people may congregate. The concrete batch plant would implement typical control measures to reduce fugitive dust such as water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central dust collection systems, and other suitable technology, to reduce emissions to be equivalent to the

USEPA AP-42 controlled emission factors for concrete batch plants. The contractor would provide to the Authority documentation that each batch plant meets this standard during operation.

### 3.3.4.3 Pollutants for Analysis

Three general classes of pollutants are of concern for this project—criteria pollutants, toxic air contaminants (TAC), and GHGs. Criteria pollutants are those for which the USEPA and the state have set ambient air quality standards or that are chemical precursors to compounds for which ambient standards have been set. TACs of concern for the proposed project are seven MSATs identified by the USEPA as having significant contributions from mobile sources—acrolein, benzene,1,3-butadiene, DPM and diesel exhaust organic gases, 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. GHGs include $CO_2$, $CH_4$, $N_2O$, hydrofluorocarbons, perfluorocarbons, $SF_6$, and other fluorinated gases, including nitrogen trifluoride and hydrofluorinated ethers.

**Criteria Pollutants**

Both NAAQS and CAAQS have been established to protect public health and welfare for criteria pollutants. The following sections briefly describe each of the criteria pollutants.

***Ozone***

CARB inventories two classes of hydrocarbons—TOGs and ROGs. ROGs have relatively high photochemical reactivity. The principal nonreactive hydrocarbon is $CH_4$, which is also a GHG. The major source of ROGs 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 ROGs for air quality analysis, and ROG has the same definition as the federal term VOC. For the air quality and global climate change analysis, ROG is assumed to be equivalent to VOC.

*Definition of $O_3$*

$O_3$ is a colorless, toxic gas found in the earth's upper and lower atmospheric levels. In the upper atmosphere, $O_3$ is naturally occurring and helps to prevent the sun's harmful ultraviolet rays from reaching the earth. In the lower atmosphere, $O_3$ is generated by human activity. Although $O_3$ is not directly emitted, it forms in the lower atmosphere through a chemical reaction between hydrocarbons and nitrogen oxides (also referred to as VOC and $NO_X$), which are emitted from industrial sources and from automobiles.

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 proposed project on a regional and statewide level.

***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 $PM_{10}$ 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 VOC. 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 project are examined on a localized—or microscale—basis, a regional basis, and a statewide basis.

*Definitions of $PM_{10}$ and $PM_{2.5}$*

$PM_{10}$ refers to particulate matter less than or equal to 10 microns in diameter, or about 1/7th 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.

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

### *Carbon Monoxide*

In most cities, 85 to 95 percent of all CO emissions 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.

*Definition of CO*

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

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.

### *Nitrogen Dioxide*

Nitrogen oxides, also known as nitric oxide and $NO_2$, and collectively referred to as $NO_X$, 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 brownish-red 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 to 3 years old has been observed at concentrations below 0.3 parts per million (ppm).

### *Lead*

Lead is a metal that can be suspended in the atmosphere. 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 decrease continually. 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, an analysis of the impacts of $SO_2$ emissions was conducted for this project.

### 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." 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 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 would 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 HSR project would not emit TACs, MSATs would be associated with the project chiefly through motor vehicle traffic to and from the HSR stations.

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 has identified 93 compounds emitted from mobile sources that are listed in its Integrated Risk Information System. The USEPA identified seven 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 seven compounds are acrolein, benzene, 1,3-butadiene, DPM plus diesel exhaust organic gases, formaldehyde, naphthalene, and polycyclic organic matter. This list, however, is subject to change and may be adjusted in consideration of future USEPA rules.

### 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 to 1.4 degrees Fahrenheit (°F) in the last 100 years. Eight of the top 10 warmest years on record have occurred since 1998. Average global temperatures show a similar trend, and all of the top 10 warmest years on record worldwide have occurred since 1998 (USEPA 2016). 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*

GHGs include any gases that absorb infrared radiation in the atmosphere. GHGs include, but are not limited to, water vapor, carbon dioxide, methane, nitrous oxide, hydrochlorofluorocarbons, ozone, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. GHGs contribute to the global warming trend, a regional and, ultimately, 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 $CH_4$ emissions. To compare emissions of different GHGs, inventory compilers use a weighting factor called global warming potential (GWP). To use a GWP, the heat-trapping ability of 1 metric ton (1,000 kilograms) of $CO_2$ is taken as the standard. Emissions are expressed in terms of $CO_2e$ but can also be expressed in terms of carbon equivalents. Therefore, the GWP of $CO_2$ is 1. The GWP of $CH_4$ is 21, whereas the GWP of $N_2O$ is 310.

The principal GHGs that enter the atmosphere because of human activities are described below.

- **$CO_2$**—$CO_2$ enters the atmosphere via the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., cement manufacturing). $CO_2$ is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.

- **$CH_4$**—$CH_4$ is emitted during the production and transport of coal, natural gas, and oil. $CH_4$ emissions also result from livestock and other agricultural practices, and from the decay of organic waste in municipal solid waste landfills.
- **$N_2O$**—$N_2O$ is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- **Fluorinated Gases**—Hydrofluorocarbons, perfluorocarbons, and $SF_6$ are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for $O_3$-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as high-GWP gases.

Due to the global nature of GHG emissions and the nature of the electrical grid system, GHGs will be examined on a statewide level.

#### *3.3.4.4 Methods for NEPA and CEQA Impact Analysis*

This section describes the sources and methods used to analyze potential impacts from implementing the B-P Build Alternatives on air quality and global climate change. These methods apply to both NEPA and CEQA unless otherwise indicated. Refer to Section 3.1.3.4, Methods for Evaluating Impacts, for a description of the general framework for evaluating impacts under NEPA and CEQA.

**Statewide and Regional Emission Calculations**

The emission burden analysis of a project determines a project's overall impact on air quality levels. The Bakersfield to Palmdale Project Section would affect long-distance, city-to-city travel along freeways and highways throughout the state, as well as long-distance, city-to-city aircraft takeoffs and landings. The HSR system would also affect electrical demand throughout the state. Analysts calculated criteria pollutant and GHG operational emissions based on a medium ridership forecast scenario (46.8 million) and a high ridership forecast scenario (56.8 million) for existing (2015) and Phase 1 of Statewide HSR Project build out (2040) years. The tables in the effects analysis, therefore, present two values for operational emissions for each pollutant, corresponding to the two ridership forecast scenarios. For additional discussion of ridership forecasts, see Sections 2.5 and 3.1.3.6.[3]

The ridership forecasts were presented for two scenarios based on probability of occurrence. The "medium" scenario is the forecast with a 50 percent probability of occurring; the "high" scenario is the forecast with a 75 percent probability of occurring. For the year 2040, which corresponds to the horizon year used in the impacts analysis in this document, the forecasts projected 42.8 million passengers under the medium scenario and 56.8 million passengers under the high scenario.

This range of ridership forecasts reflects the development of certain aspects of the HSR system's design and certain portions of the environmental analysis, as described in more detail below. Because the ultimate ridership of the HSR system will depend on many uncertain factors, such as the price of gasoline or population growth, the HSR system described in this document has been designed to accommodate the broad range of ridership assumptions expected over the coming decades.

Since the 2016 Business Plan forecasts were developed, the Authority has adopted its 2018 Business Plan, which was accompanied by updated forecasts (Authority 2016, 2018d). The 2016 and 2018 Business Plan ridership forecasts were developed using the same travel forecasting model; the forecasts differ due to changes in the model's inputs, including the HSR service plan, demographic forecasts, estimates of automobile operating costs and travel times, and airfares.

[3] The *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b) includes additional data and information about anticipated emissions for a 2029 Phase 1 opening year.

The "medium" ridership forecast for 2040 decreased by 6.5 percent, from 42.8 to 40 million, and the "high" ridership forecast decreased by 10.1 percent, from 56.8 to 51.6 million. In addition, the 2018 Business Plan assumes an opening year of 2033 rather than 2029 for the full Phase 1 system (Authority 2016, 2018d).

To the extent the lower ridership levels projected in the 2018 Business Plan result in fewer trains operating in 2040, the impacts associated with the train operations in 2040 would be somewhat less than the impacts presented in this EIR/EIS, and the benefits accruing to the project (e.g., reduced VMT, GHG emissions, and energy consumption) also would be less than the benefits presented in this EIR/EIS. As with the impacts, the benefits would continue to build and accrue over time and would eventually reach the levels discussed in this EIR/EIS for the Phase 1 system.

### *On-Road Vehicles*

Analysts evaluated on-road vehicle emissions using average daily VMT estimates and associated average daily speed estimates for each affected county. Analysts estimated emission factors using the CARB emission factor program, EMission FACtors 2014 (EMFAC2014), which accounts for the Pavley Clean Car Standards. Parameters were set in the program for each individual county to reflect conditions within each county and statewide parameters to reflect travel through each county. The analysis was conducted for the following modeling years:

- Existing (Year 2015)
- Horizon Year (Year 2040)

To determine overall pollutant burdens generated by on-road vehicles, analysts multiplied the estimated VMT by the applicable pollutant's emission factors, which are based on speed, vehicle mix, and analysis year. Additional data and information about anticipated emissions for the opening year are included in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b).

### *Airport Emissions*

Analysts used the Federal Aviation Administration's Aviation Environmental Design Tool to estimate aircraft emissions. 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. Analysts calculated average aircraft emissions based on the profile of aircraft currently servicing the San Francisco to Los Angeles corridor. Analysts estimated the number of air trips removed attributable to the HSR project using the results of the travel demand modeling analyses conducted for the project section, based on the ridership estimates presented in the Authority's 2016 Business Plan (Authority 2016).

### *Power Plant Emissions*

Analysts conservatively estimated the electrical demands caused by propulsion of the trains, and of the trains at terminal stations and in storage depots and maintenance facilities as part of the project section design. Analysts derived average emission factors for each kilowatt-hour required from CARB statewide emission inventories of electrical and cogeneration facilities data along with USEPA eGRID2012 (released October 20, 2015) electrical generation data. The energy estimates used in this analysis for the propulsion of the HSR system include the use of regenerative braking power.

The HSR system is currently analyzed as if it would be powered by the state's current electric grid. This is a conservative assumption because of the state requirement that an increasing fraction of electricity (50 percent by 2030) generated for the state's power portfolio come from renewable energy sources. As such, the emissions generated for the HSR system are expected to be lower in the future than the emissions estimated for this analysis. Furthermore, under the 2013 Policy Directive POLI-PLAN-03, the Authority has adopted a goal to purchase 100 percent of the HSR system's power from renewable energy sources.

### Analysis of Local Operation Emission Sources

Operation of the Bakersfield to Palmdale Project Section HSR stations and the HMF and co-located maintenance-of-way facility (MOWF) would affect emissions of criteria pollutants and GHGs. The operation of the 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, emissions from these stations were not quantified. The methodology used to estimate operational air emissions from the train stations, the maintenance facilities, and local mobile sources is discussed below. Project information used for the operation emission estimates is presented in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b). Detailed emission calculations are also provided in the technical report.

#### *Station Sites*

Emissions associated with the operation of the Bakersfield and Palmdale Project Section HSR stations would primarily result from space heating and facility landscaping, energy consumption for facility lighting, indirect emissions associated with water use and solid waste disposal, emergency generator testing, CO emissions from vehicle activity at the parking structure, and employee and passenger traffic. The evaluation of the Bakersfield Station was included in the *Fresno to Bakersfield Section Final EIR/EIS* (Authority and FRA 2014) and technical studies and the *Fresno to Bakersfield Section Final Supplemental EIR* (Authority 2018a) and *Fresno to Bakersfield Section Locally Generated Alternative Final Supplemental EIS* (Authority 2019a). The methodology used for evaluating the emissions associated with the Palmdale Station is described in this section below.

##### Area and Stationary Sources

Emissions from area and stationary sources, including natural gas consumption for space heating and landscaping equipment, were calculated using the California Emissions Estimator Model v.2013.3.2 (CalEEMod) (South Coast Air Quality Management District 2015). Emissions were based on the land use data, entered as the size of the station buildings (square feet). The CalEEMod output files, the emissions estimated for each operational activity, and the activity data details used to perform the estimations are summarized in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b).

##### Indirect Electricity

The Palmdale Station would generate indirect emissions from purchased electricity consumed for facility lighting. It is expected that the power used by the Palmdale Station would be much less than the power used by train operations. However, the indirect emissions from power consumption have been included in the overall emission estimates.

Indirect emissions from purchased electricity consumed by the HSR stations were calculated based on the building square footage using the default electricity consumption rates provided in CalEEMod.

##### Indirect Water

The Palmdale Station 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 HSR stations were calculated using CalEEMod based on each station's estimated water usage and electricity associated with sourcing, treatment, and distribution of water. A water consumption rate of 5.8 million gallons per year was used for the Palmdale Station. Wastewater was estimated at 5.2 million gallons per year for the Palmdale Station.

##### Indirect Solid Waste

The Palmdale Station would generate indirect GHG emissions from solid waste disposal. Indirect emissions from solid waste disposed by the Palmdale Station were calculated based on a rate of 1.3 tons per day. To estimate the amount of degradable organic carbon content in the waste, the solid waste was assumed to have the characteristics of general municipal solid waste. The

emissions associated with decomposition of the solid waste in a landfill were estimated using CalEEMod.

**Emergency Generators**

The Palmdale Station would have emergency generators that would be used in the event of a power outage. It was assumed that the emergency generators would be Tier 4, 800-kilowatt generators and that they would operate up to 200 hours for testing per year. Using the Tier 4 emission standards, the criteria pollutants and GHG emissions are quantified. Since emergency generators are subject to SJVAPCD, AVAQMD, and EKAPCD permitting requirements, a health risk assessment was not conducted because this will be done at the time of permitting, with permit conditions provided to ensure that sensitive receptors are not exposed to excess concentrations of TACs. This is consistent with the SJVAPCD CEQA guidance regarding permitted sources.

### *Maintenance Facilities*

The Bakersfield to Palmdale Project Section would include a Light Maintenance Facility (LMF) and an MOWF in the Antelope Valley. The LMF would be used for servicing trains as well as for storage of maintenance equipment and supplies. In addition to the LMF, the project section would include an MOWF, which would provide equipment and supplies for maintaining the HSR infrastructure, such as track, traction power, and signal systems. The facility would include heavy-duty equipment (e.g., cranes, backhoes, loaders, and emergency generators) and heavy-duty delivery trucks. Measures would be incorporated to minimize atmospheric emissions from these sources, such as the use of electric yard trains to move train cars and electric locomotives around the site and the use of diesel-retrofits on heavy-duty diesel engines. Regional emissions associated with the LMF and MOWF were calculated using CalEEMod.

### *Local Operational Mobile Sources*

Local emissions associated with mobile sources would occur from employee commutes, truck deliveries, and passenger travel to and from the station. Vehicular exhaust emissions were estimated using CalEEMod, which uses emission factors from EMFAC2014. Emission factors were estimated using CalEEMod for light-duty automobiles and light-duty trucks.

**Employee Traffic**

Emissions from employee traffic were calculated using CalEEMod. The projected 2040 employee counts for each facility are listed in Table 3.3-3.

**Table 3.3-3 Employee Counts**

| Facility | 2040 Employee Count |
|---|---|
| Bakersfield Station | 48 |
| Palmdale Station | 38 |
| Maintenance Facilities | 92 |

*Source: California High-Speed Rail Authority, 2014*

**Truck Deliveries**

Truck deliveries for the HSR stations would be minimal. For purposes of this analysis, it was assumed that there would be an average of 20 deliveries to the Palmdale Station site per day. The MOWF analysis assumed that approximately 50 percent of trips would be by truck. Truck deliveries would include supplies of materials and chemicals, as well as the removal of refuse from the site.

**Passenger Traffic**

There would be no passenger traffic at the maintenance facilities, but passengers would be expected to arrive at the Bakersfield and Palmdale stations by car, by shuttle/bus, or by biking or walking. It was assumed that each passenger would make one round trip per day. The numbers of passengers visiting the Bakersfield and Palmdale stations daily are listed in Table 3.3-4 by their mode of transportation, based on a high level of ridership. All methodology and approach for

all ridership-related data was provided in the *Ridership and Revenue Forecasting—2016 Business Plan: Technical Supporting Document* (Authority 2016).

**Table 3.3-4 Daily Passenger Trips**

| Mode of Transportation | 2040 Bakersfield Station Passenger Trips | 2040 Palmdale Station Passenger Trips |
|---|---|---|
| Shuttle/bus | 900 | 400 |
| Car | 5,900 | 3,900 |
| Biking/walking | 500 | 300 |
| **Total** | **7,300** | **5,600** |

*Source: California High-Speed Rail Authority, 2010, 2016*

### Microscale Carbon Monoxide Analysis

CO hot-spot analyses were conducted to evaluate the potential air quality impacts of HSR-related changes in traffic conditions along heavily traveled roadways, congested intersections, and areas near the Palmdale train station parking facilities using the high ridership scenario. CO modeling was performed using the California LINE Source Dispersion Model, Version 4 (CALINE4) (California Department of Transportation [Caltrans] 1997) air quality dispersion model to estimate existing (2016), existing plus project (2016), future (2040) No Project Alternative, and future with project (2040) CO concentrations at selected locations. The CO modeling results for 2016 and 2040 are presented in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b). Bakersfield Station data are included in the *Fresno to Bakersfield Section Final EIR/EIS* (Authority and FRA 2014) and technical reports.

#### *Intersection Microscale Analysis*

The site selection and receptor locations, emissions model, dispersion model, meteorological conditions, persistence factor, background conditions, traffic information, and analysis years for the intersection microscale analysis are presented in the paragraphs below.

**Site Selection and Receptor Locations**

Traffic conditions at affected intersections were evaluated to identify which intersections in the study area would have the potential to cause CO hot spots. Intersections within the study area were screened based on changes in intersection volume, delay, and LOS between the existing condition, the No Project Alternative, and the B-P Build Alternatives. Intersections were considered to have the potential to cause CO hot spots if the LOS decreased from D or better to D or worse (LOS E or LOS F) under any of the B-P Build Alternatives. Intersections that were already below LOS D were considered to have the potential to cause CO hot spots if their LOS, delays, and/or volumes would increase over the existing condition and the No Project Alternative with any of the B-P Build Alternatives. Using this criterion, intersections were ranked according to LOS, increased delay, and total traffic volumes of the B-P Build Alternatives relative to these factors for the existing condition and the No Project Alternative. The three intersections with the worst LOS, delay, and/or traffic volumes were included in the CO hot-spot modeling.

Receptors for the intersection analyses were located in accordance with the University of California, Davis, CO Protocol (Caltrans 1997). All receptors used were located at a height of 1.8 meters. Receptors for the intersection analysis were located 3 meters from the roadway so they were not within the mixing zone of the travel lanes and were spaced at 0, 25, and 50 meters from the intersection for both the 1-hour and 8-hour analyses (Caltrans 1997). Although sidewalks do not exist around all the intersections, it was assumed that the public could access these locations.

**Emission Model**

Vehicular emissions were estimated using EMFAC2014, which is a mobile-source emission estimate program that provides current and future estimates of emissions from highway motor vehicles. EMFAC2014 was designed by CARB to address a wide variety of air pollution modeling

needs. It incorporates updated information on basic emission rates, more realistic driving patterns, separation of start and running emissions, improved correction factors, and changing fleet composition. The EMFAC2014 output files are provided in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b).

**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 study for estimating pollutant concentrations near roadway intersections is the CALINE4 dispersion model developed by Caltrans.

CALINE4 is a Gaussian model recommended in the Caltrans CO Protocol. Gaussian models assume that the dispersion of pollutants downwind of a pollution source follow a normal distribution around the center of the pollution source. The model is described in *CALINE4 – A Dispersion Model for Predicting Air Pollutant Concentration near Roadways* (Caltrans 1989). The analysis of roadway CO impacts followed the CO Protocol (Caltrans 1997). It is also consistent with procedures identified in the SJVAPCD CEQA guidance (SJVAPCD 2015a).

**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 values for these parameters were chosen to maximize pollutant concentrations at each prediction site (i.e., to establish a conservative worst-case situation).

- **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 will 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° were considered.
- **Wind Speed**—CO concentrations are greatest at low wind speeds. A conservative wind speed of 2.2 miles 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 recommendation for the study area and a mixing height (the height in the atmosphere to which pollutants rise) of 3,280.8 feet. Neutral atmospheric stability (stability class G) conditions will be used in estimating microscale CO concentrations. The ambient temperatures were determined to be 5°F above the lowest January average minimum temperature over a representative 3-year period (based on Table B.7 of the CO Protocol [Caltrans 1997]). The stability class G was chosen as recommended in Table B.11 of the CO Protocol.

The selection of these meteorological parameters was based on recommendations from the South Coast Air Quality Management District's *CEQA Air Quality Handbook* (South Coast Air Quality Management District 1993), Caltrans' CO Protocol (Caltrans 1997), and the USEPA's Transportation Conformity Guidance (40 C.F.R. Part 93.123). These data were found to be the most representative of the conditions existing in the project vicinity.

**Persistence Factor**

Peak 8-hour concentrations of CO were obtained 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, as recommended in the CO Protocol (Caltrans 1997).

**Background Conditions**
Microscale modeling is used to predict CO concentrations resulting from emissions from motor vehicles using roadways immediately adjacent to the locations at which predictions are being made. A CO background level must be added to this value to account for CO entering the area from other sources upwind of the receptors. CO background levels were obtained from data collected at a monitoring station located away from the influence of local traffic congestion. For this study area, background data collected at the Lancaster Division Street monitoring station for the Palmdale Station and the Bakersfield S Union Avenue monitoring station for the Bakersfield Station were used.

The use of these monitoring stations is conservative because, while they are the closest monitors to the general study area and have a neighborhood spatial scale, they are influenced by traffic-related emissions. The second-highest monitored value was used as a background concentration. In addition, future CO background levels are anticipated to be lower than existing levels because of mandated emission-source reductions.

The second-highest monitored values were used as background concentrations. The second-highest monitored 1-hour CO concentration based on the years 2012 to 2014 was 1.9 ppm for the S Union Avenue monitoring station. The second-highest 8-hour average was 0.7 ppm at the S Union Avenue monitoring station.

**Traffic Information**
Traffic data for the air quality analysis were derived from traffic counts and other information developed as part of an overall traffic analysis for the HSR project (refer to Section 3.2, Transportation, of this document). The microscale CO analysis was performed based on data from this analysis for the a.m. and p.m. peak traffic periods. These are the periods when maximum traffic volumes occur on local streets and when the greatest traffic and air quality impacts of the proposed project are expected.

**Analysis Years**
CO concentrations were predicted for the existing conditions (2016) and the HSR project's horizon year (2040).

### *Parking Facility Microscale Carbon Monoxide Analysis*

The Bakersfield Station and Palmdale Station parking facilities were also modeled for potential CO hot spots because of the potential increase in the number of idling cars in one location. The microscale CO analysis for the station parking facilities used the same methodology as was used in the intersection CO modeling, including the use of the high ridership scenario traffic data. Bakersfield Station data are included in the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014) and technical reports. The emission factors were based on the assumed travel speed of 10 mph. As a conservative estimate, emissions were estimated based on the total capacity of the parking facilities.

### Particulate Matter ($PM_{10}$/$PM_{2.5}$) Hot-Spot Analysis

While the HSR portion of the project is subject to the General Conformity guidelines and not the Transportation Conformity guidelines, the SJVAB (in which portions of the project are located) is classified as a nonattainment area for $PM_{2.5}$ and a federal maintenance area for $PM_{10}$. Therefore, a $PM_{2.5}$/$PM_{10}$ hot-spot analysis was conducted to inform the impacts analysis under NEPA and to support the local air quality modeling analysis under the General Conformity regulations, regardless of medium or high ridership scenario. In the absence of specific guidance under the General Conformity regulations, the hot-spot analysis was conducted in accordance with the USEPA's *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas* (USEPA 2015b).

The analysis focused on potential air quality concerns under NEPA from project effects on roads and followed the recommended practice in the USEPA's Transportation Conformity regulations regarding the localized analysis of $PM_{2.5}$ and $PM_{10}$ (40 C.F.R. Part 93).

The USEPA specifies in the Transportation Conformity regulations, 40 C.F.R. Part 93.123(b)(1), that only projects of air quality concern are required to undergo a $PM_{2.5}$ and $PM_{10}$ hot-spot analysis. The USEPA defines projects of air quality concern as certain highway and transit projects that involve significant levels of diesel traffic or any other project identified by the $PM_{2.5}$ SIP as a localized air quality concern. Projects of air quality concern, as defined by 40 C.F.R. Part 93.123(b)(1), are the following:

- New or expanded highway projects that have a significant number of or significant increase in diesel vehicles
- Projects affecting intersections that operate at LOS D, E, or F with a significant number of diesel vehicles or those that would degrade to LOS D, E, or F because of increased traffic volumes from the significant number of diesel vehicles related to the project
- New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location
- 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

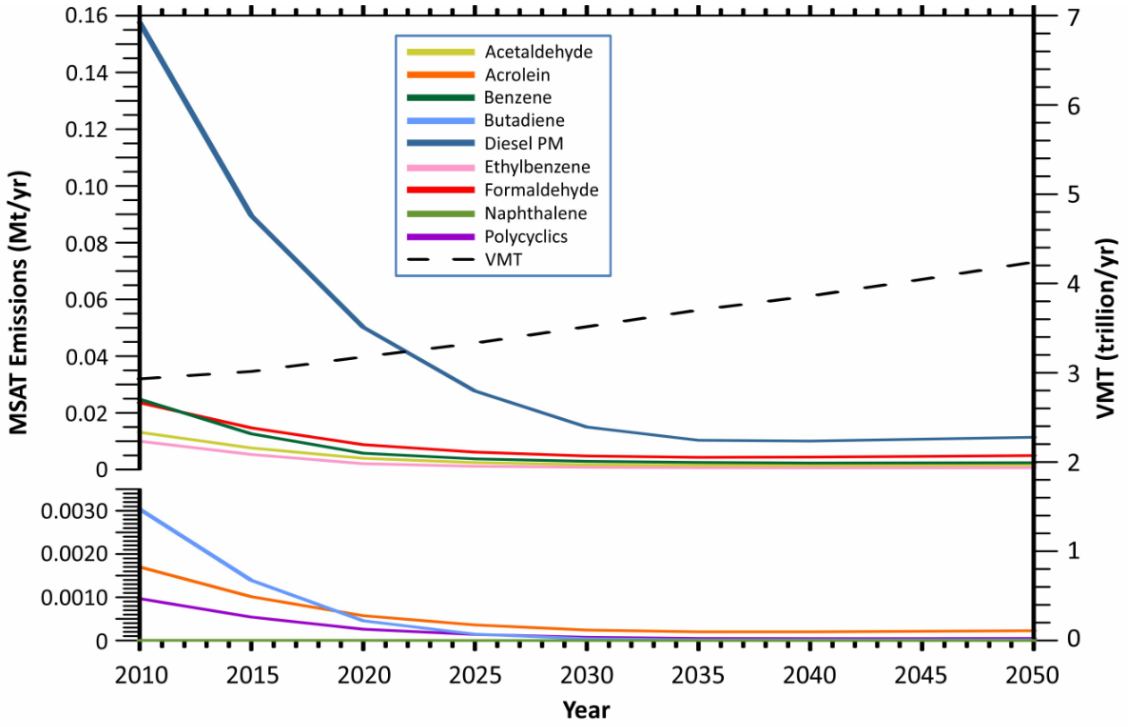
**Mobile-Source Air Toxics Analysis**

Under the 2007 rule on the Control of Hazardous Air Pollutants from Mobile Sources (72 Fed. Reg., 37:8430), the USEPA sets standards on fuel composition, vehicle exhaust emissions, and evaporative losses from portable containers. According to the FHWA analysis using the USEPA's MOtor Vehicle Emissions Simulator (MOVES) 2010b model, even if VMT increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSATs is projected for the same time period, as shown on Figure 3.3-1.

On February 3, 2006, the FHWA released the *Interim Guidance on Air Toxic Analysis in NEPA Documents* (FHWA 2006). The FHWA most recently updated the guidance on October 18, 2016 (FHWA 2016), prompted by recent changes in the emissions model required for conducting emissions analysis. The 2016 Updated Interim Guidance incorporates new analysis conducted using MOVES2014a (the most recent version of MOVES released by the USEPA).

The FHWA's guidance advises on when and how to analyze MSATs in the NEPA process for highway projects. This guidance is interim because MSAT science is still evolving. As the science progresses, the FHWA is expected to update the guidance. A qualitative analysis provides a basis for identifying and comparing the potential differences in MSAT emissions, if any, among the B-P Build Alternatives. The FHWA's interim guidance groups projects into the following tier categories:

- No analysis for projects without any potential for meaningful MSAT effects
- Qualitative analysis for projects with low potential MSAT effects
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.
- The HSR project has a low potential for MSAT impacts. Accordingly, a qualitative analysis was used to provide a basis for identifying and comparing the potential differences in MSAT emissions, if any, among the B-P Build Alternatives, regardless of ridership scenario. The qualitative assessment is derived, in part, from a study conducted by the FHWA titled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (FHWA 2010).




*Source: Federal Highway Administration, 2016*
Trends for specific locations may be different, depending on locally derived information representing vehicle miles traveled, vehicle speeds, vehicle mix, fuels, emission-control programs, meteorology, and other factors.

**Figure 3.3-1 Projected National Mobile-Source Air Toxics Emission Trends (2010–2050) for Vehicles Operating on Roadways Using the U.S. Environmental Protection Agency's MOVES2010b Model**

### Asbestos

Asbestos minerals occur in rocks and soil as the result of natural geologic processes, often in veins near earthquake faults in the coastal ranges and the foothills of the Sierra Nevada and in other areas of California. Naturally occurring asbestos (NOA) takes the form of long, thin, flexible, separable fibers. Natural weathering or human disturbance can break NOA down to microscopic fibers, which are easily suspended in air. When inhaled, these thin fibers irritate tissues and resist the body's natural defenses. In addition, asbestos-containing materials may have been used in constructing buildings that would be demolished.

Asbestos is a known human carcinogen. It 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 NOA in a number of areas in California.

The California Geological Survey identified ultramafic rocks in California to be the source of NOA. In August 2000, the California Department of Conservation, Division of Mines and Geology, published a report entitled *A General Location Guide for Ultramafic Rocks in California Areas More Likely to Contain Naturally Occurring Asbestos* (California Department of Conservation, Division of Mines and Geology 2000). This study was used to determine whether NOA is present in the project vicinity.

### Greenhouse Gas Analysis

As discussed in Section 3.3.4.1, Study Area for Analysis, the project section would reduce long-distance, city-to-city travel along freeways and highways throughout the state, as well as long-distance, city-to-city aircraft takeoffs and landings. The project section would also affect electricity

demand throughout the state. These elements would affect GHG emissions in both the statewide and regional study areas. The methodology for estimating GHG emissions associated with construction and operations of the project section is discussed below. Operational emissions are presented for both the medium and high ridership forecasts.

### *On-Road Vehicle Emissions*

Analysts conducted the on-road vehicle GHG emission analysis using the same methods and RSAs as described for air quality emission calculations in the on-road vehicles discussion in Section 3.3.4.4.

### *Airport Emissions*

Analysts calculated aircraft emissions by using the fuel consumption factors and emission factors from CARB's 2000–2014 *Greenhouse Gas Emissions Inventory Technical Support Document* and the accompanying technical support document. The emission factor includes both landing and take-off and cruise operations (formula: aircraft emissions per flight = fuel consumption × emission factor; aircraft emissions = flights removed × aircraft emissions per flight). Analysts calculated average aircraft GHG emissions based on the profile of intrastate aircraft currently servicing the San Francisco to Los Angeles corridor. Analysts estimated the number of air trips removed attributable to the project section through the travel demand modeling analysis conducted for the project section, based on the ridership estimates presented in the Authority's *2016 Business Plan* (Authority 2016).

### *Power Plant Emissions*

The electrical demands due to propulsion of the trains, stations, storage depots, and maintenance facilities were calculated as part of the project design. Average GHG emission factors for each kilowatt-hour required were derived from USEPA eGRID2012 electrical generation data. The energy estimates used in this analysis for the propulsion of the HSR system include the use of regenerative braking power.

In addition, because of the state requirement that an increasing fraction (50 percent by 2030) of electricity generated for the state's power portfolio come from renewable energy sources, the emissions generated for the HSR system are expected to be lower in the future when compared to emissions estimated for this analysis.

### Construction Phase

Construction phase emissions were quantitatively estimated for the earthwork and major civil construction activity during construction of the following components of the HSR project:

- At-grade rail segments
- Elevated rail segments
- Retained-fill rail segments
- Electrical substations
- Train stations
- LMF/MOWF
- Roadways and roadway overpasses

These major construction activities would account for the vast majority of earthwork, the largest amount of diesel-powered off-road construction equipment, and the majority of material to be hauled along public streets compared with the other minor construction activities of the project. Therefore, the regional emissions and localized emissions from these major activities would account for the vast majority of construction emissions that would be generated by construction of the proposed project. Regional and localized emissions from minor construction activities, such as mobilization and demobilization, were quantified and would contribute to fewer emissions than the major construction activities listed above. The estimated construction emissions from these major as well as minor activities were used to evaluate the regional and localized air quality impacts during the construction phase. Project-specific information was analyzed when available. Default emission rates for activities, such as architectural coating, were used if project-specific

information was not available. Project information used for the construction emission estimates and details of the construction emission calculations are provided in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b) and *Air Quality and Global Climate Change Technical Report Supplement* (Authority 2018c).

### *Models Used for Construction Emissions*

Criteria pollutant and GHG emissions from regional building demolition and construction of the at-grade rail segments, elevated rail segments, retained-fill rail segments, traction power substations, and industrial buildings at the LMF/MOWF and HSR stations, including parking facilities, were calculated using CalEEMod. CalEEMod uses emission factors from the OFFROAD 2011 model. The OFFROAD 2011 model provides the latest emission factors for off-road construction equipment and accounts for lower fleet population and growth factors as a result of the economic recession and updated load factors based on feedback from engine manufacturers. The use of emission rates from the OFFROAD models reflects the recommendation of CARB to capture the latest off-road construction assumptions. OFFROAD 2011 default load factors (the ratio of average equipment horsepower utilized to maximum equipment horsepower) and useful life parameters were used for emission estimates. Mobile-source emission burdens from worker vehicle trips and truck trips were also calculated using CalEEMod.

Construction exhaust emissions from equipment, fugitive dust emissions from earthmoving activities, and emissions from worker vehicle trips, deliveries, and material hauling were calculated and compiled in CalEEMod for each year of construction.

Project-specific data, including construction equipment lists and the construction schedule, were used for construction associated with the alignment/guideway. Project-specific data were not available for the nonlinear construction associated with the stations and LMF/MOWF buildings. Therefore, the CalEEMod default settings were used in these instances only.

Mobile-source emission burdens from worker trips and truck trips were estimated using CalEEMod.

### *General Assumptions for Methodologies*

#### Assumptions and Methodologies

Project-specific data, including construction equipment lists and the construction schedule, were used for construction associated with the alignment/guideway. Calculations were performed for each year of construction.

Major construction activities were grouped into the following categories:

- Mobilization
- Site preparation, including demolition, land clearing, and grubbing
- Earthmoving
- Roadway crossings
- Elevated structures
- Track laying (elevated, at-grade, and retained fill)
- Traction power substation
- Switching station
- Paralleling station
- LMF/MOWF
- Bakersfield Station
- Palmdale Station
- Hauling emissions, including truck and rail
- Demobilization

#### Statewide EIR/EIS Programmatic Impact Avoidance and Minimization Measures

The Authority has pledged to integrate programmatic IAMFs consistent with (1) the 2005 Statewide Program EIR/EIS, (2) the 2008 Bay Area to Central Valley Program EIR/EIS, and (3) the 2012 Partially Revised Final Program EIR into the HSR project. The Authority would implement these features during project design and construction, as relevant to the project section, to avoid or reduce impacts.

IAMFs are incorporated into the project design and construction to avoid or minimize the environmental or community impacts. The IAMFs were included in the unmitigated emission estimates. These IAMFs are listed in Section 3.3.4.2 and described in full in Appendix 2-E.

**Regulatory Control Measures**

Many of the control measures SJVAPCD Regulation VIII require are the same as or similar to the control measures listed in AQ-IAMF#1. The emission reductions associated with SJVAPCD Regulation VIII are the same as the emission reductions associated with the AQ-IAMF#1. The AVAQMD's Rule Book also includes control measures outlined in Rule 403.

Air pollutant control measures for construction sites for the EKAPCD include measures similar to those listed in AQ-IAMF#1. The EKAPCD, however, includes measures indicating all clearing, grading, earthmoving, and excavation activities should cease during periods of winds greater than 20 mph (averaged over 1 hour), if disturbed material is easily windblown, or when dust plumes of 20 percent or greater opacity impact public roads, occupied structures, or neighboring property.

### *Construction Activities*

The following discussion identifies the methods and assumptions used for evaluating construction-phase emissions and impacts on air quality and global climate change from implementation of the HSR alignment. The *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018c) provides additional information on the assumptions for the construction quantities, construction equipment fleets for each unit operation, and emission factors, as well as detailed model parameters and other assumptions. The analysis assumed that project construction would occur from 2018 to 2026. See Section 2.8 in Chapter 2, Alternatives, for additional details on the construction schedule.

**Site Preparation**

***Demolition***

This analysis assumed that demolition of existing structures along the HSR alignment and near HSR stations would take place from December 2020 through August 2021. Demolition emissions were calculated with CalEEMod using the project-specific equipment list. In addition to the fugitive dust emissions resulting from the destruction of existing buildings, emissions were estimated for worker trips, construction equipment exhaust, and truck-hauling exhaust.

***Land Grubbing***

Land grubbing refers to the site preparation activities for HSR alignment construction. Emissions from land grubbing were estimated using the OFFROAD 2011 emission factors as well as a site-specific equipment list. This analysis assumed that land grubbing would take place at four staging areas from December 2020 to August 2021. Fugitive dust from land-grubbing activities includes that from worker trips, construction equipment exhaust, and truck-hauling exhaust.

**Earthmoving**

The earthmoving activities include grading, trenching, and cut/fill activities for the HSR alignment construction. This analysis assumed that earthmoving would occur at four locations from March 2018 to October 2020. The emissions associated with the earthmoving activities were estimated using CalEEMod with OFFROAD 2011 emission factors, in conjunction with the site-specific equipment list. Fugitive dust from land-grubbing activities includes that from worker trips, construction equipment exhaust, and truck-hauling exhaust.

The construction area used in CalEEMod was the total area to be cleared based on the length of the alignment. Although the track widths vary along the alignment, it was conservatively assumed that a width of 120 feet would be graded along the entire length of the alignment. This width accounts for the widest portion of the alignment (four tracks wide) plus a buffer on each side.

Earthwork is the disturbance of soil or earth by any means, including excavation (including subsurface), tunneling, drilling, infilling, stockpiling, dumping of soil or sand, and construction/ reconstruction of any track, embankment, or drainage channel. Earthwork would be performed in such a manner as to achieve a balanced condition where the quantity of soil or earthen materials removed through excavation would be roughly equal to the quantity of material being placed in

embankments. The adjustment of the ratio of excavation to embankment to achieve this balance would be performed by variations in cut-slope ratios, embankment widths, and embankment slope ratios during construction as existing ground conditions are revealed. It is intended that cut material and tunnel spoils would be stored and processed on-site and used as fill materials if deemed suitable by the site geotechnical engineer. It is not anticipated that any excavated materials would need to be exported to off-site locations for the B-P Build Alternatives.

**High-Speed Rail Alignment Construction**

This analysis assumed that the HSR alignment construction would take place from 2020 to 2026, and includes the following construction phases and operation of a concrete batch plant:

- Constructing structures for the elevated rail
- Laying elevated rail and at-grade rail
- Constructing the retaining wall for the retained-fill rail
- Laying retained-fill rail

***Rail Type and Alignment Alternatives***

The four B-P Build Alternatives differ in total length, location, width, and percent at-grade/ elevated/retained fill. Table 3.3-5 summarizes the total length of at-grade rail, elevated rail, and retained-fill rail for each B-P Build Alternative. The CCNM Design Option would add 124 feet to the length of each B-P Build Alternative and the Refined CCNM Design Option would add 2,006 feet to the length of each B-P Build Alternative. Due to rounding, the total length in miles would not change with the CCNM Design Option.

**Table 3.3-5 Bakersfield to Palmdale Project Section Build Alternative Alignment Lengths**

| Alternative | Total Length (miles) | At-Grade Length (miles) | Underground Length | Elevated Length (miles) |
|---|---|---|---|---|
| Alternative 1 | 81.7 | 56.4 | 8.9 | 16.4 |
| Alternative 2 | 81.7 | 55.7 | 8.9 | 17.1 |
| Alternative 3 | 81.6 | 55.9 | 9.7 | 16.0 |
| Alternative 5 | 81.7 | 56.4 | 8.9 | 16.4 |

Emissions from construction of the track were modeled using CalEEMod. Equipment counts, horsepower, hours of operation, and load factors used in CalEEMod are included in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018c).

***Concrete Batch Plants***

Concrete would be required for the construction of bridges used to support the elevated sections of the HSR alignment, for construction of the station platform, and for construction of the retaining wall used to support the retained-fill sections of the alignment. To provide enough concrete on-site, it is estimated that batch plants would operate in the project vicinity (i.e., within 0.5 mile) during construction of the project. Because the locations of the concrete batch plants are unknown, fugitive dust emissions associated with the plants were estimated based on the total amount of concrete required and on emission factors from Chapter 11.12 of AP-42 (USEPA 2006). Emissions from on-road truck trips associated with transporting material to and from the concrete batch plants were included in materials-hauling emissions calculations.

***Material Hauling***

Emissions from the exhaust of trucks used to haul materials (including concrete slabs) to the construction site were calculated using heavy-duty truck emission factors from EMFAC2011 and anticipated travel distances of haul trucks within the SJVAB and MDAB. Ballast materials could potentially be hauled by rail within the air basins. Locomotive emission factors from *Emission Factors for Locomotives* (USEPA 2009b) and the travel distance by rail to the project site were used to estimate rail emissions.

Based on active permitted quarry locations, ballast materials are expected to be available within the SJVAB and MDAB (California Department of Conservation 2016). Therefore, for the regional emission analysis, emissions from ballast materials-hauling were calculated using the distance traveled within the project air districts. Emissions from ballast materials hauling by trucks and locomotives outside the project air districts were estimated based on the travel distances and transportation method (by rail or by truck) from the locations where ballast materials would be available. Rail emission factors using the USEPA guidance (USEPA 2009b) were used to estimate the locomotive emissions. Construction materials would likely be delivered from supply facilities within the SJVAB and the MDAB.

**Train Station**

Emissions from HSR station construction would be the result of mass site grading, building construction, and architectural coatings. Where applicable, emissions resulting from worker trips, vendor trips, and construction equipment exhaust were included. Paving activities associated with surface parking lots were included. This analysis assumed that construction of the Palmdale Station would begin in 2018 and be completed by 2021. CalEEMod was used to estimate emissions from construction phases of the Palmdale Station.

**Maintenance Facilities Construction**

Emissions associated with construction of the LMF and the MOWF are expected as a result of mass site grading, asphalt paving, building construction, and architectural coatings. These activities would occur during maintenance activities.

Fugitive dust from construction of the maintenance-of-way facility includes that from worker trips, construction equipment exhaust, and truck-hauling exhaust. Emissions from track construction were estimated using CalEEMod.

**Roadway Crossing Construction**

The B-P Build Alternatives would include the relocation and expansion of freeway segments, local roads, and overpasses, as well as reconstruction of several intersections. Fugitive dust and exhaust emissions from these construction activities were estimated using the Sacramento Metropolitan Air Quality Management District's Road Construction Emissions Model. Roadway demolition emissions are included in the CalEEMod analysis using the project-specific equipment list.

For purposes of this analysis, it was assumed that roadway project construction would begin in January 2020 and be completed by June 2022 (a total of 28 months), and that each type of roadway project would be constructed independently at staggered intervals during the 28-month period.

Based on project-specific data, a simplified construction schedule was used to estimate construction emissions. The representative project roadway length for each scenario was estimated by averaging all anticipated project roadway lengths within that designated scenario. Table 3.3-6 lists the 49 roadway project locations and 26 intersection locations.

**Table 3.3-6 High-Speed Rail Roadway Project Locations**

| Roadway | Location | | Crossing Type |
|---|---|---|---|
| | From | To | |
| W Avenue B | 40th Street | 35th Street | Bridge |
| W Avenue C | 32nd Street | 30th Street W | Bridge |
| W Avenue G | 10th Street W | Sierra Highway | Bridge |
| Holiday Avenue | 57th Street W | 55th Street W | Bridge |
| Gaskell Road | 50th Street W | 40th Street W | Bridge |
| Dawn Road | Tehachapi Willow Springs Road | 85th Street W | Bridge |
| Favorito Avenue | 85th Street W | 80th Street W | Bridge |

| Roadway | Location | | Crossing Type |
|---|---|---|---|
| | From | To | |
| 67th Street W | Irone Avenue | Felsite Avenue | Bridge |
| Robert Ranch Road | 115 Street W | 110th Street W | Bridge |
| 110th Street W | Robert Ranch Road | Trotter Avenue | Modified/Bridge |
| Backus Road | 105th Street W | General Petroleum Road | Bridge |
| 100th Street W | Montiverde Road | Toy Road | Bridge |
| Highgate Road | Acosta Road | Brazos Road | Bridge |
| Edison Highway | Oswell-Edison Connector | Sterling Road | Modified |
| Edison Highway | Sterling Road | Fairfax Road | Modified |
| SR 184/Weedpatch Highway | Edison Highway | E Brundage Lane | Bridge |
| S Vineland Road | Edison Highway | SR 58 | Bridge |
| S Edison Road | School Street | SR 58 | Bridge |
| Malaga Road | Edison Highway | SR 58 | Bridge |
| Comanche Drive | Edison Highway | SR 58 | Bridge |
| Tejon Highway | Edison Highway | Muller Road | Bridge |
| Towerline Road | Edison Highway/Bena Road | SR 58 | Bridge |
| Newmarket Road | South of Muller Road | – | Bridge |
| Caliente Bodfish Road | Bena Road | Bealville Road | Bridge |
| SR 58 | Broom Road | SR 202/Tucker Road | Bridge |
| Burnett Road | Challenger Drive | Arabian Drive | Modified |
| Goodrick Drive | E Tehachapi Boulevard | Dennison Road | Bridge |
| W Avenue G | 10th Street W | Sierra Highway | Bridge |
| W Avenue H | 7th Street W | Sierra Highway | Modified/Bridge |
| W Avenue H | Sierra Highway | Trevor Avenue | Modified/Bridge |
| W Avenue I | Beech Avenue | Sierra Highway | Modified |
| W Avenue I | Sierra Highway | Yucca Avenue | Bridge |
| W Avenue I | Yucca Avenue | Spearman Avenue | Modified |
| W Milling Street | Cedar Avenue | Sierra Highway | Modified/Bridge |
| W Avenue J | Cedar Avenue | Beech Avenue | Modified |
| W Avenue J | Beech Avenue | Sierra Highway | Modified |
| W Avenue J | Sierra Highway | Trevor Avenue | Modified/Bridge |
| Sierra Highway | W Avenue J | Avenue K | Modified |
| W Avenue K | Sierra Highway | Division Street | Modified/Bridge |
| Sierra Highway | W Avenue K | W Avenue L | Modified |
| W Avenue L | 11th Street W | Sierra Highway | Modified/Bridge |
| Sierra Highway | Avenue L | Columbia Way | Modified |
| Columbia Way/E Avenue M | Division Street | Sierra Highway | Modified/Bridge |
| Columbia Way/E Avenue M | Sierra Highway | 3rd Street E | Modified |
| Columbia Way/E Avenue M | 3rd Street E | 5th Street E | Modified |
| Sierra Highway | Columbia Way | Avenue N | Modified |
| W Avenue N | Division Street | Sierra Highway | Modified |
| Sierra Highway | Avenue N | Avenue O | Modified |

| Roadway | Location | | Crossing Type |
|---|---|---|---|
| | From | To | |
| E Avenue O | Division Street | Sierra Highway | Modified |
| **Roadway** | **Intersection** | | **Crossing Type** |
| Edison Highway | Oswell-Edison Connector | | Modified |
| Edison Highway | Sterling Road | | Modified |
| Edison Road | SR 158 Westbound Ramps | | Modified |
| Edison Road | SR 158 Eastbound Ramps | | Modified |
| Comanche Drive | SR 158 Eastbound Ramps | | Modified |
| Comanche Drive | SR 158 Westbound Ramps | | Modified |
| Towerline Road | SR 158 Eastbound Ramps | | Modified |
| Sierra Highway | W Avenue G | | Modified |
| Sierra Highway | W Avenue G 12 | | Modified |
| W Avenue I | Beech Avenue | | Modified |
| Sierra Highway | Beech Avenue | | Created |
| W Avenue I | Yucca Avenue | | Modified |
| W Avenue I | Trevor Avenue | | Modified |
| W Avenue I | Spearman Avenue | | Modified |
| W Milling Street | Spearman Avenue | | Modified |
| W Avenue J | Cedar Avenue | | Modified |
| W Avenue J | Beech Avenue | | Modified |
| Beech Avenue | Sierra Highway | | Created |
| W Avenue J | Sierra Highway | | Modified |
| W Avenue K | Sierra Highway | | Modified |
| W Avenue K | Division Street | | Modified |
| Sierra Highway | Avenue L | | Created |
| Sierra Highway | Columbia Way | | Modified |
| Columbia Way | 3rd Street E | | Modified |
| Columbia Way | 5th Street E | | Modified |
| Sierra Highway | E Avenue N | | Modified |

SR = State Route

**Localized Modeling for Construction Health Risks and Localized Impacts**

According to the Office of Environmental Health Hazard Assessment (OEHHA) guidance, cancer risk is defined as the predicted risk of cancer (unitless) over a lifetime based on a long-term (70-year) continuous exposure, and is usually expressed as chances per million persons exposed (OEHHA 2015). The construction of the Bakersfield to Palmdale Project Section of the HSR system has the potential to exceed or contribute to exceedances of the ambient air quality standards and to cause health impacts on nearby sensitive receptors. Construction of the HSR guideway/alignment and HSR stations would take place over several years, and sensitive receptors at schools, child care centers, health care facilities, and residences could potentially be exposed to cancer risks. A detailed air dispersion modeling analysis and health risk assessment was conducted to determine if these impacts would be significant.

An air dispersion modeling analysis using the USEPA's AERMOD (Version 15181) was conducted to simulate physical conditions and predict pollutant concentrations at locations near the fence line of construction sites. Construction sites for the guideway/alignment, HSR stations,

HMF/maintenance-of-way facility, and concrete batch plants were each evaluated for potential localized air quality impacts. For these construction sites, representative construction work areas were modeled, as it is not practical to model the entire length of the alignment or all possible construction alternatives, configurations, and locations for these project components. Pollutant concentrations were estimated near the site boundary and surrounding area. Regulatory default options and the rural dispersion algorithm of AERMOD were used in the analysis. The modeled concentrations were compared with the applicable NAAQS, CAAQS, and health-related guidelines to determine the level of impacts.

Local meteorological data were used in the air dispersion modeling analysis. For the analysis of HSR station construction, the nearest available meteorological data set was used. The Bakersfield Station analysis used the Bakersfield Airport meteorological data set, and the Palmdale Station analysis used the Palmdale Regional Airport meteorological data set. The analysis of the guideway/alignment construction used the Arvin meteorological data as a proxy to determine the potential localized impacts of construction emissions. Five years of meteorological data (2005 through 2009), or the largest number of complete years available from Bakersfield Airport and Palmdale Regional Airport, as compiled by the SJVAPCD, were used.

TAC concentrations at the maximally exposed individual sensitive receptor location were used to estimate cancer risks and the overall noncancer chronic and acute hazard index associated with construction emissions, using procedures developed by OEHHA (OEHHA 2015). Details of the risk analysis are in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018c). The analysis of these localized impacts from construction activities includes both qualitative and quantitative information on potential localized impacts from construction emissions to provide the public with additional information about the potential project effects.

#### *3.3.4.5 Method for Determining Impacts under NEPA*

For criteria pollutants, project emissions are compared to the General Conformity *de minimis* applicability thresholds (General Conformity thresholds) on a calendar-year basis for both construction and operational emissions. If annual project-related emissions generated in a nonattainment or maintenance area exceed the General Conformity thresholds, a General Conformity determination is required. In addition, for a General Conformity determination to be made, the project emissions may not cause new violations or exacerbate an existing violation of NAAQS.

Table 3.3-7 presents an example of General Conformity thresholds. Pursuant to NEPA, impacts on air quality would occur if the project criteria pollutant emissions would exceed the General Conformity *de minimis* thresholds (dependent on the 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. It is assumed that a General Conformity determination would be required only for construction of the HSR project, as operation of the project is overall expected to decrease regional emissions of criteria pollutants.

**Table 3.3-7 General Conformity *de minimis* Thresholds**

| Pollutant | Federal Attainment Status | Threshold Values (tons per year) |
|---|---|---|
| Ozone (VOC or $NO_X$) | Serious nonattainment | 50 |
| | Severe nonattainment | 25 |
| | Extreme nonattainment | 10 |
| | Other areas outside an ozone transport region | 100 |
| Ozone ($NO_X$) | Marginal and moderate nonattainment inside an ozone transport region | 100 |
| | Maintenance | 100 |
| Ozone (VOC) | Marginal and moderate nonattainment inside an ozone transport region | 50 |
| | Maintenance within an ozone transport region | 50 |
| | Maintenance outside and ozone transport region | 100 |
| CO, $SO_2$, and $NO_2$ | All nonattainment and maintenance | 100 |
| $PM_{2.5}$ direct emissions, $SO_2$. $NO_X$ (unless determined not to be a significant precursor), VOC or ammonia (if determined to be significant precursors | All nonattainment and maintenance | 100 |
| $PM_{10}$ | Serious nonattainment | 70 |
| | Moderate nonattainment and maintenance | 100 |
| Lead | All nonattainment and maintenance | 25 |

*Source: U.S. Environmental Protection Agency, 2018c*
Thresholds from Code of Federal Regulations Title 40, Parts 51 and 93.
CO = carbon monoxide
N/A = not applicable
$NO_2$ = nitrogen dioxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxide
VOC = volatile organic compound(s)

Impacts related to GHG emissions are evaluated based on consistency with established statewide GHG reduction goals, including the goals set forth in AB 32 and SB 32.

In cases where there are no defined thresholds, such as MSATs, professional judgment is used when considering the resource context, the intensity and duration of the potential effect, and implementation of mitigation measures to determine whether the project would result in no effect, a beneficial effect, or an impact on air quality.

While this EIR/EIS was being prepared, the FRA adopted new NEPA compliance regulations (23 C.F.R. Part 771). Those regulations only apply to actions initiated after November 28, 2018 (23 CFR 771.109(a)(4)). Because this EIR/EIS was initiated prior to that date, it remains subject to the FRA's environmental procedures rather than the Part 771 regulations.

### *3.3.4.6 Method for Determining Significance under CEQA*

CEQA requires that an EIR identify the significant environmental impacts of a project (CEQA Guidelines § 15126). One of the primary differences between NEPA and CEQA is that CEQA requires a significance determination for each impact using a threshold-based analysis (see 3.1.3.3, Methods for Evaluating Impacts, for further information). By contrast, under NEPA, significance is used to determine whether an EIS will be required. NEPA requires that an EIS be prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment." Accordingly, Section 3.3.10, CEQA Significance Conclusions, summarizes the significance of the environmental impacts on air quality and global

climate change for the B-P Build Alternatives. 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 B-P Build Alternatives. A significant impact is one that would:

- Conflict with or obstruct implementation of the applicable air quality plan (Threshold #1)
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (Threshold #2)
- Expose sensitive receptors to substantial pollutant concentrations (Threshold #3)
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people (Threshold #4)
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment (Threshold #5)
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs (Threshold #6)

As discussed throughout this section, the significance of air quality impacts is based largely on compliance with state and federal air quality standards, as well as standards and plans developed by local air districts. The primary federal and state standards are the NAAQS and the CAAQS, respectively. Both the NAAQS and the CAAQS have been established to protect public health and welfare. Local air districts are required to develop plans and control programs for attaining the state standards, which are generally more stringent than the corresponding federal standards and incorporate standards for additional pollutants. The air districts have also developed health-based guidance for assessing the significance of other pollutants, including asbestos. Therefore, the NAAQS and the CAAQS, as well as the standards and plans developed by the air districts, provide appropriate thresholds for determining whether project-related emissions would result in a significant impact. The quantitative emissions thresholds developed by regional air districts to evaluate the significance level of impacts are discussed below.

The analysis of localized impacts and health risks also relies on standards developed by OEHHA. OEHHA is the lead state agency for the assessment of health risks posed by environmental contaminants, including toxic air contaminants and other pollutants. The agency's mission is to protect human health and the environment through scientific evaluation of risks posed by hazardous substances. The standards developed by OEHHA are based on extensive scientific evidence and are specifically intended for the protection of human health and the environment.

Impacts related to GHG emissions are evaluated based on consistency with established statewide GHG reduction goals, including the goals set forth in AB 32 and SB 32. AB 32 required California to reduce GHG emissions to 1990 levels by 2020, and SB 32 continues that timeline and requires greater reduction in GHG emissions. The GHG reduction goals are based on scientific consensus on the GHG emissions reduction needed to avert the worst effects of climate change. The CEQA Guidelines provide that a lead agency may consider a project's consistency with the state's long-term climate goals or strategies in determining the significance of impacts. (CEQA Guidelines, section 15064.4.)

**San Joaquin Valley Air Pollution Control District**

The GAMAQI (SJVAPCD 2015) contains the emissions thresholds used to evaluate the significance of a project's emissions with regard to air quality standards. If a project's emissions are below the significance thresholds listed in Table 3.3-8, the impact would be considered less than significant and would not lead to a violation of an ambient air quality standard or conflict with an air quality plan. If either the construction- or operational-phase emissions are greater than these values, impacts for that phase would be considered potentially significant unless localized air-dispersion modeling can demonstrate that the emissions would not cause or contribute substantially to an existing or projected air quality violation of an ambient air quality standard.

**Table 3.3-8 San Joaquin Valley Air Pollution Control District CEQA Construction and Operational Thresholds of Significance**

| Pollutant | Emission Thresholds (tons per year) |
|---|---|
| CO | 100 |
| $NO_X$ | 10 |
| ROG | 10 |
| $SO_X$ | 27 |
| $PM_{10}$ | 15 |
| $PM_{2.5}$ | 15 |

*Source: San Joaquin Valley Air Pollution Control District, 2015*
CO = carbon monoxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
ROG = reactive organic gas
$SO_X$ = sulfur oxides

For CO, $NO_2$, and $SO_2$, the threshold is the ambient air quality standard for each respective pollutant. The increase in pollutant concentration associated with the project emissions is added to the background concentration to estimate the ambient air pollutant concentration for comparison with the threshold.

Pre-project concentrations of $PM_{10}$ and $PM_{2.5}$ in the SJVAB exceed their respective ambient air quality standards. Therefore, the SJVAPCD recommends comparing the incremental increase in $PM_{10}$ and $PM_{2.5}$ concentrations to the applicable significant impact level (SIL) for $PM_{10}$ and $PM_{2.5}$. For construction, the SJVAPCD recommended SILs of 10.4 $\mu g/m^3$ for the 24-hour average concentration and 2.08 $\mu g/m^3$ for the annual average concentration. The SJVAPCD recommends that these SILs be used to evaluate construction $PM_{10}$ and $PM_{2.5}$ emissions (SJVAPCD 2015). For operations, the SJVAPCD-recommended SILs are 5 $\mu g/m^3$ for the 24-hour average concentration and 1 $\mu g/m^3$ for the annual average concentration. These operational SILs are used to evaluate operational $PM_{10}$ and $PM_{2.5}$ emissions. Therefore, an incremental increase that does not exceed these SILs would not be considered to substantially contribute to further exceedances of the ambient air quality standards.

Additionally, as per the SJVAPCD GAMAQI, if a project is individually significant, it is also considered cumulatively significant. Therefore, the thresholds listed in Table 3.3-8 are also the cumulative significance thresholds for the project.

The significance of the impacts of the emissions from construction, operational nonpermitted equipment and activities, and operational permitted equipment and activities are evaluated separately. The thresholds of significance are made on a calendar-year basis. For construction emissions, the annual emissions are evaluated on a rolling 12-month period.

### Eastern Kern Air Pollution Control District

The EKAPCD's *Guidelines for Implementation of the California Environmental Quality Act (CEQA) of 1970, As Amended* (EKAPCD 2012c) set forth definitions, procedures, and forms used by the EKAPCD in the implementation of CEQA. In addition the EKAPCD provides *Suggested Air Pollutant Mitigation Measures for Construction Sites for Eastern Kern APCD* (EKAPCD 2012c), which include measures addressing land preparation, excavation, demolition, building construction, vehicular activities, and tailpipe emissions. Table 3.3-9 shows the thresholds of significance for EKAPCD.

**Table 3.3-9 Eastern Kern Air Pollution Control District CEQA Construction Thresholds of Significance**

| Pollutant | Construction Emission Thresholds (tons per year) |
|---|---|
| $NO_X$ | 25 |
| VOC | 25 |
| $SO_X$ | 27 |
| $PM_{10}$ | 15 |

*Source: Eastern Kern Air Pollution Control District, 2012c*
$NO_X$ = nitrogen oxides
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
$SO_X$ = sulfur oxides
VOC = volatile organic compound

### Antelope Valley Air Quality Management District

The *Antelope Valley AQMD CEQA and Federal Conformity Guidelines (AVAQMD Guidelines)* (AVAQMD 2016) contains the emissions thresholds used to evaluate the significance of a project's emissions with regard to air quality standards. If a project's emissions are below the significance thresholds listed in Table 3.3-10, the impact would be considered less than significant and would not lead to a violation of an ambient air quality standard or conflict with an air quality plan. If either the construction- or operational-phase emissions are greater than these values, impacts for that phase would be considered potentially significant unless localized air-dispersion modeling can demonstrate that the emissions would not cause or contribute substantially to an existing or projected air quality violation of an ambient air quality standard.

**Table 3.3-10 Antelope Valley Air Pollution Control District CEQA Construction and Operational Thresholds of Significance**

| Pollutant | Annual Thresholds (tons per year) | Daily Thresholds (pounds per day) |
|---|---|---|
| CO | 100 | 548 |
| $NO_X$ | 25 | 137 |
| VOC | 25 | 137 |
| $SO_X$ | 25 | 137 |
| $PM_{10}$ | 15 | 82 |
| $PM_{2.5}$ | 12 | 65 |

*Source: Antelope Valley Air Pollution Control District, 2011*
CO = carbon monoxide
$NO_X$ = nitrogen oxides
$PM_{10}$ = 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
$SO_X$ = sulfur oxides
VOC = volatile organic compound

For CO, $NO_2$, and $SO_X$, the threshold is the ambient air quality standard for each respective pollutant. The increase in pollutant concentration associated with the project emissions is added to the background concentration to estimate the ambient air pollutant concentration for comparison with the threshold.

## 3.3.5 Affected Environment

Air pollutant emissions have the potential to affect the environment on a local, regional, state, and global scale. From a local and regional perspective, meteorology and climate affect the dispersion of air pollutants within local communities as well as within an air basin. The ambient air quality is monitored by stations distributed within the air basin. These ambient air quality concentrations are evaluated against the state and federal ambient air quality standards to determine whether the air basin is in a state of attainment status for these standards. Air quality plans have been developed to guide air pollution control efforts to meet or maintain attainment of the ambient air quality standards.

This section provides a discussion of the physical environment and air quality conditions of the air basins in which the project is located. These include local meteorological conditions, ambient air quality, attainment status in the study area, air quality plans and programs, emissions inventory, and sensitive receptors.

The air quality affected environment for the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street is included in Section 3.3.4 of the *Fresno to Bakersfield Section Supplemental EIR/EIS* (Authority 2018a). However, the affected environment discussions included in Sections 3.3.5.1 through 3.3.5.6 also reflect this portion of the F-B LGA alignment between the intersection of 34th Street and L Street and Oswell Street.

### *3.3.5.1 Local Meteorological Conditions*

Air quality is affected by both the rate and location of pollutant emissions, and by meteorological conditions that influence movement and dispersal of pollutants in the atmosphere. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients, along with local topography, provide the link between air pollutant emissions and local air quality levels. Elevation and topography can affect localized air quality.

The project traverses two air basins. The northern section of the project is located in the SJVAB, which encompasses the southern third of California's Central Valley. The southern section of the project is located on the western edge of the MDAB. The meteorological conditions in these basins are described below.

**San Joaquin Valley Air Basin**

The SJVAB is approximately 250 miles long and is shaped like a narrow bowl. The sides and southern boundary of the bowl are bordered by mountain ranges. The valley's weather conditions include frequent temperature inversions; long, hot summers; and stagnant, foggy winters, all of which are conducive to the formation and retention of air pollutants (SJVAPCD 2011).

The SJVAB is typically arid in the summer months, 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 months is in the mid-90s °F and the average low in the winter is in the high 40s °F. January is typically the wettest month of the year, with an average of approximately 2 inches of rain. Wind direction is typically from the northwest, with mean wind speeds of about 5 to 8 mph (Western Regional Climate Center 2009).

**Mojave Desert Air Basin**

The MDAB is separated from the populated valleys and coastal areas to the west by several mountain ranges. These valleys and coastal areas are the major source of $O_3$ precursor emissions affecting $O_3$ exceedances within the Kern County part of the MDAB. Surrounding mountain ranges contain a limited number of passes serving as "transportation corridors." Air quality in Kern County is primarily influenced by the Tehachapi Pass corridor, with some influence through Soledad Canyon (EKAPCD 2003).

During the summer, the MDAB is generally influenced by a Pacific Subtropical High cell that sits off the coast, inhibiting cloud formation and encouraging daytime solar heating. Most desert moisture arrives from infrequent warm, moist, and unstable air masses from the south. The

MDAB averages between 3 and 7 inches of precipitation per year (from 16 to 30 days with at least 0.01 inch of precipitation). The MDAB is classified as a dry-hot desert climate, with portions classified as dry-very hot desert, to indicate at least 3 months have maximum average temperatures over 100.4 ºF (AVAQMD 2011). Predominant surface wind flow patterns are southerly and westerly, transporting air pollution from the SJVAB through the Tehachapi Mountains and over the San Gabriel and San Bernardino Mountains (CARB 2015).

### *3.3.5.2 Ambient Air Quality*

CARB maintains ambient air monitoring stations for criteria pollutants throughout California. The stations closest to the B-P Build Alternative alignments are the 43301 Division Street station in the City of Lancaster; the 923 Poole Street station in Mojave; and the 5558 California Avenue station in Bakersfield. These stations monitor $NO_2$, $O_3$, $PM_{10}$, $PM_{2.5}$, and CO. The land uses in the region range from urban and residential to rural and agricultural, and these stations represent these land use types. Air quality standards, primarily for $O_3$ and particulate matter, have been exceeded in the SJVAPCD, the EKAPCD, and the AVAQMD because of existing industrial, mobile, and agricultural sources. The four monitoring station locations are shown on Figure 3.3-2. A brief summary of the monitoring data includes the following:

- Monitored data from 2014 through 2016 do not exceed either the state or federal standards for CO. The Mojave and Bakersfield stations were not monitored for CO during 2014 through 2016; therefore, CO data from the 2000 S Union Avenue, Bakersfield, monitoring site is included.
- $O_3$ values for the region exceed the state and national 8-hour $O_3$ standards for all three stations for years 2014 through 2016. $O_3$ values for the region also exceed the state 1-hour $O_3$ standard for all stations for every year from 2014 through 2016 except in 2016 at the 5558 California Avenue station in Bakersfield.
- The $PM_{10}$ values for the region exceed the national 24-hour $PM_{10}$ standard for the Mojave and Bakersfield stations for year 2014. The state 24-hour $PM_{10}$ concentrations were exceeded at all stations, for all years. However, the number of days over the state standard was not monitored at the Lancaster monitoring station.
- The $PM_{2.5}$ values for the region exceed the national 24-hour $PM_{2.5}$ standard for the Mojave station for 2014 and 2015 and the Bakersfield station for 2014 through 2016. The Lancaster station exceeded the $PM_{2.5}$ national 24-hour standard in 2014 and 2016.
- $SO_2$ values were not monitored at any of the three stations or the additional station at 2000 S Union Avenue in Bakersfield between 2014 and 2016.

Table 3.3-11 lists the three monitoring stations nearest to the HSR project alignment and ambient criteria pollutant concentrations for 2014, 2015, and 2016.

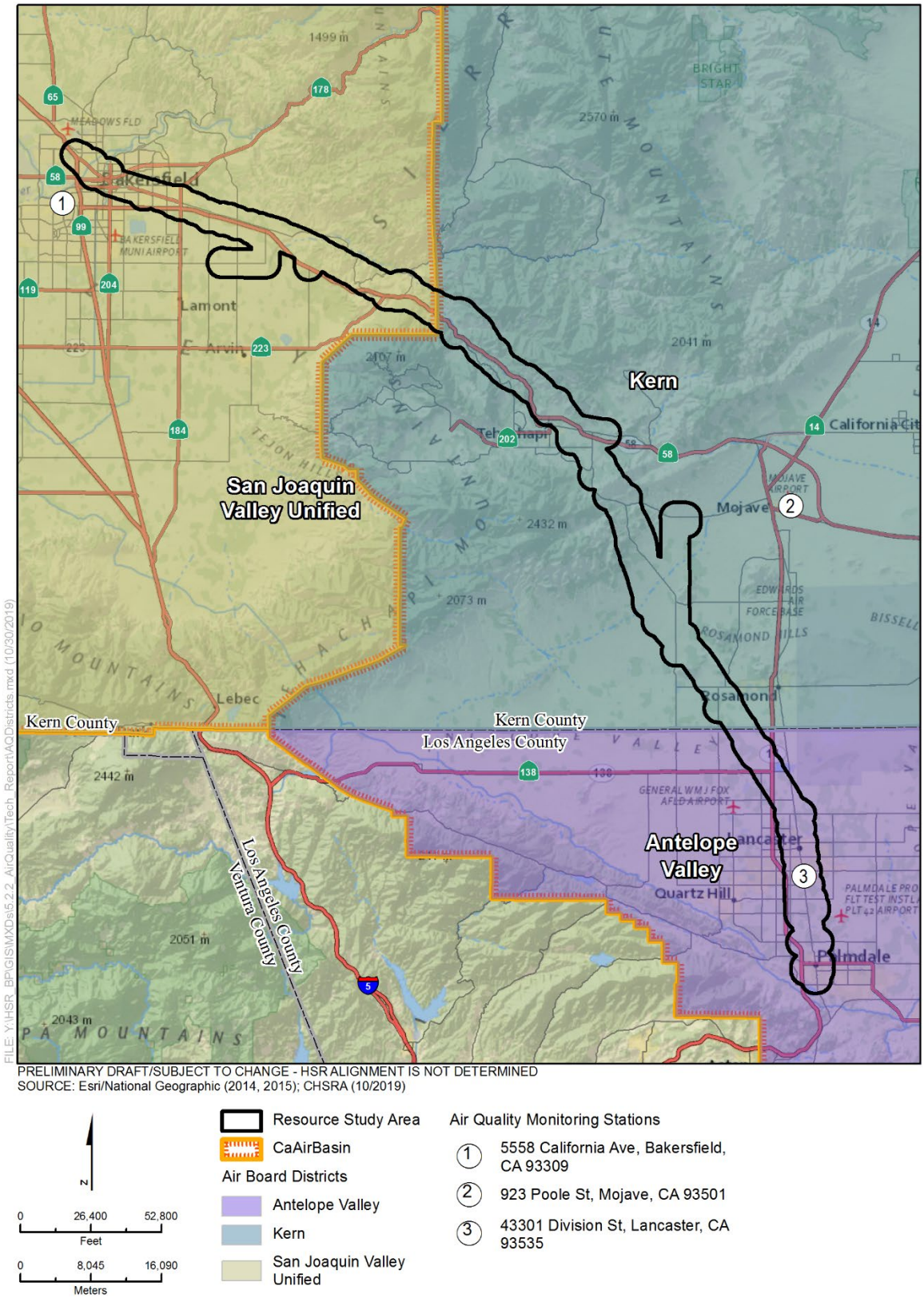



**Figure 3.3-2 Air Quality Monitoring Stations Closest to the California High-Speed Rail Project**

**Table 3.3-11 Ambient Criteria Pollutant Concentration Data at Air Quality Monitoring Stations Closest to the High-Speed Rail Project**

| Air Pollutant | Standard/Exceedance | 43301 Division Street, Lancaster | | | 923 Poole Street, Mojave | | | 5558 California Avenue, Bakersfield | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2014 | 2015 | 2016 | 2014 | 2015 | 2016 | 2014 | 2015 | 2016 |
| Carbon Monoxide (CO)[1] | Year Coverage | NM | NM | NM | NM | NM | NM | NM | NM | NM |
| | Max. 1-hour Concentration (ppm) | 1.5 | 1.5 | 2.6 | 1.9 | 1.7 | 1.4 | 1.9 | 1.7 | 1.4 |
| | Max. 8-hour Concentration (ppm) | 1.1 | 1.3 | 1.5 | 1.2 | 1.0 | 1.1 | 1.2 | 1.0 | 1.1 |
| | # Days>Federal 1-hour Std of >35 ppm | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | # Days>Federal 8-hour Std of >9 ppm | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | # Days>California 8-hour Std of >9 ppm | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ozone ($O_3$) | Year Coverage[2] | 100% | 99% | 98% | 90% | 97% | 96% | 81% | 99% | 98% |
| | Max. 1-hour Concentration (ppm) | 0.101 | 0.132 | 0.108 | 0.104 | 0.104 | 0.104 | 0.102 | 0.104 | 0.092 |
| | Max. 8-hour Concentration (ppm) | 0.087 | 0.103 | 0.090 | 0.096 | 0.085 | 0.093 | 0.093 | 0.097 | 0.086 |
| | # Days>Federal 8-hour Std of >0.070 ppm | 35 | 80 | 60 | 88 | 31 | 52 | 36 | 52 | 60 |
| | # Days>California 1-hour Std of >0.09 ppm | 3 | 26 | 3 | 9 | 1 | 2 | 3 | 6 | 0 |
| | # Days>California 8-hour Std of >0.07 ppm | 36 | 82 | 65 | 95 | 33 | 60 | 39 | 54 | 63 |
| Nitrogen Dioxide ($NO_2$) | Year Coverage | 79 | 56 | 95 | NM | NM | NM | 42% | 97% | 93% |
| | Max. 1-hour Concentration (ppm) | 51.9 | 41.8 | 48.8 | NM | NM | NM | 60.9 | 54.5 | 58.1 |
| | Annual Average (ppm) | 8 | NM | 8 | NM | NM | NM | NM | 11 | 12 |
| | # Days>Federal 1-hour Std of >100 ppm | 0 | 0 | 0 | NM | NM | NM | 0 | 0 | 0 |
| Sulfur Dioxide ($SO_2$) | Year Coverage | NM | NM | NM | NM | NM | NM | NM | NM | NM |
| | Max. 24-hour Concentration (ppm) | NM | NM | NM | NM | NM | NM | NM | NM | NM |
| | Annual Average (ppm) | NM | NM | NM | NM | NM | NM | NM | NM | NM |
| | # Days>California 24-hour Std of >0.04 ppm | NM | NM | NM | NM | NM | NM | NM | NM | NM |
| Respirable Particulate Matter ($PM_{10}$) | Year Coverage | NM | NM | NM | NM | NM | NM | 58% | 99% | 97% |
| | Max. 24-hour Concentration ($\mu g/m^3$)[3] | 131.5 | 123.8 | 145.0 | 184.2 | 80.4 | 139.2 | 430.1 | 104.7 | 92.2 |
| | # Days>Federal 24-hour Std of >150 $\mu g/m^3$ | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| | # Days>California 24-hour Std of >50 $\mu g/m^3$ | NM | NM | NM | 12 | 5 | 18 | 69 | 20 | 21 |
| | Annual Average[3] ($\mu g/m^3$) | 24.3 | 19.3 | 25.7 | 26.1 | 21.3 | 26.2 | 55.9 | 44.5 | 41.2 |

| Air Pollutant | Standard/Exceedance | 43301 Division Street, Lancaster | | | 923 Poole Street, Mojave | | | 5558 California Avenue, Bakersfield | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2014 | 2015 | 2016 | 2014 | 2015 | 2016 | 2014 | 2015 | 2016 |
| Fine Particulate Matter ($PM_{2.5}$) | Year Coverage | 93% | 86% | 93% | 97% | 99% | 96% | 95% | 91% | 90% |
| | Max. 24-hour Concentration (µg/m$^3$) | 42.0 | 10.4 | 64.8 | 36.5 | 42.2 | 25.7 | 101.9 | 107.8 | 66.4 |
| | State Annual Average (µg/m$^3$) | NM | NM | NM | 6.1 | NM | NM | 18.6 | 16.6 | 14.5 |
| | # Days>Federal 24-hour Std of >35 µg/m$^3$ | 1 | 0 | 2 | 1 | 2 | 0 | 37 | 29 | 23 |
| | Annual Average[3] (µg/m$^3$) | 7.2 | NM | 7.7 | 5.9 | 5.1 | 07.5 | 18.5 | 16.2 | 14.7 |

*Sources: California Air Resources Board and U.S. Environmental Protection Agency, 2016*

[1] CO data for the 923 Poole Street, Mojave, and 5558 California Avenue, Bakersfield, monitoring sites are from the 2000 S Union Avenue, Bakersfield, monitoring site.

[2] Coverage is for the 8-hour standard.

[3] Coverage is for the national standard.

> = greater than

µg/m$^3$ = micrograms per cubic meter

N/A = not available

NM = not monitored

$PM_{10}$ = 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

ppm = parts per million

Std = standard

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

### 3.3.5.3 Attainment Status of Resource Study Area

The USEPA and CARB designate each air basin (or portions of air basins) within California as attainment, maintenance, nonattainment, or unclassified based on the area's ability to meet ambient air quality standards. The four designations are defined as follows:

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

Table 3.3-12 summarizes the federal (under NAAQS) and state (under CAAQS) attainment status for each of the three air basins in which the project would be located. The following sections describe the attainment status of each air basin.

**Table 3.3-12 Federal and State Attainment Status**

| Pollutant | Federal Classification | State Classification |
|---|---|---|
| **San Joaquin Valley Air Pollution Control District** | | |
| $O_3$: 1-Hour | No Federal Standard | Nonattainment (Severe) |
| $O_3$: 8-Hour | Nonattainment (Extreme) | Nonattainment |
| $PM_{10}$ | Attainment/Maintenance | Nonattainment |
| $PM_{2.5}$ | Nonattainment | Nonattainment |
| CO | Urban portion of Fresno County and Kern County: Maintenance<br>Remaining basin: Attainment | Attainment/Unclassified |
| $NO_2$ | Attainment/Unclassified | Attainment |
| $SO_2$ | Attainment/Unclassified | Attainment |
| Lead | No Designation/Classification | Attainment |
| **Antelope Valley Air Quality Management District** | | |
| $O_3$: 1-Hour | No Federal Standard | Nonattainment (Extreme) |
| $O_3$: 8-Hour | Nonattainment (Severe) | Nonattainment (Extreme) |
| $PM_{10}$ | Attainment/Unclassified | Nonattainment |
| $PM_{2.5}$ | Attainment/Unclassified | Unclassified |
| CO | Attainment | Attainment |
| $NO_2$ | Attainment/Unclassified | Attainment/Unclassified |
| $SO_2$ | Attainment/Unclassified | Attainment/Unclassified |
| Lead | Attainment | Attainment |
| **Eastern Kern Air Pollution Control District** | | |
| $O_3$: 1-Hour | No Federal Standard | Moderate Nonattainment |
| $O_3$: 8-Hour | Nonattainment | Nonattainment |
| $PM_{10}$ | Attainment/Unclassified (EKAPCD) Nonattainment (Kern River/ Cummings Valleys), Attainment Maintenance (Indian Wells Valley) | Nonattainment |

| Pollutant | Federal Classification | State Classification |
|---|---|---|
| $PM_{2.5}$ | Attainment/Unclassified | Unclassified |
| CO | Attainment/Unclassified | Unclassified |
| $NO_2$ | Unclassified | Attainment |
| $SO_2$ | Unclassified | Attainment |
| Lead | Attainment/Unclassified | Attainment |

*Sources: U.S. Environmental Protection Agency, 2013; San Joaquin Valley Air Pollution Control District, 2013a; Antelope Valley Air Quality Management District, 2016; Eastern Kern Air Pollution Control District, 2012c*

CO = carbon monoxide
EKAPCD = Eastern Kern Air Pollution Control District
$NO_X$ = nitrogen oxides
$O_3$ = ozone
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
$SO_2$ = sulfur dioxide

**Attainment Status: San Joaquin Valley Air Basin**

Under the federal criteria, the SJVAB is currently designated as nonattainment for 8-hour $O_3$, the 1997 annual $PM_{2.5}$ standard (annual standard of 15 micrograms per cubic meter [µg/m$^3$]) and 24-hour standard (65 µg/m$^3$), and the 2006 24-hour $PM_{2.5}$ standard (35 µg/m$^3$). The SJVAB is a maintenance area for $PM_{10}$, and the Bakersfield urbanized area is a maintenance area for CO. The SJVAB is in attainment for the $NO_2$ and $SO_2$ NAAQS. The SJVAB is unclassified for the lead NAAQS.

Under the state criteria, the SJVAB is currently designated as nonattainment for 1-hour $O_3$, 8-hour $O_3$, $PM_{10}$, and $PM_{2.5}$. The SJVAB is an attainment/unclassified area for the state CO standard and an attainment area for the state $NO_2$, $SO_2$, and lead standards. The SJVAB is an unclassified area for the state hydrogen sulfide standard and visibility-reducing particle standard, and is classified as an attainment area for sulfates and vinyl chloride (SJVAPCD 2013a).

**Attainment Status: Antelope Valley Air Quality Management District**

Under the federal criteria, the AVAQMD is currently designated as nonattainment for 8-hour $O_3$. The AVAQMD is an attainment/unclassified area under the NAAQS for CO, $NO_2$, $SO_2$, and lead. The AVAQMD is unclassified for the $PM_{10}$ and $PM_{2.5}$ NAAQS.

Under the state criteria, the AVAQMD is currently designated as nonattainment for $O_3$ (classified as extreme nonattainment) and $PM_{10}$. The AVAQMD is an attainment/unclassified area for state $PM_{2.5}$, CO, $NO_2$, $SO_2$, and lead standards. The AVAQMD is an unclassified area for the state hydrogen sulfide standard, visibility-reducing particle standard, and particulate sulfate standard (AVAQMD 2014).

**Attainment Status: Eastern Kern Air Pollution Control District**

The EKAPCD is currently designated nonattainment for federal 8-hour $O_3$. The western portion of the district is currently designated nonattainment for $PM_{10}$. The EKAPCD is an attainment/ unclassifiable area for the $PM_{2.5}$, CO, and lead NAAQS. The EKAPCD is unclassified for the federal $NO_2$ and $SO_2$ standards.

Under the state criteria, the EKAPCD is currently designated as nonattainment for 1-hour $O_3$, 8-hour $O_3$, and $PM_{10}$. The EKAPCD is in attainment for the state $NO_2$, $SO_2$, and lead standards, and is an unclassified area for the $PM_{2.5}$ and CO state standards (EKAPCD 2012).

### *3.3.5.4 Air Quality Plans and Programs*

Planning documents for pollutants for which the study area is classified as a federal nonattainment or maintenance area are developed by the study area air districts for approval by the USEPA. The study area air districts are presently guided by the California SIP (CARB 2012) and other planning documents. The applicable planning documents for each of the three air quality management districts are described below.

### San Joaquin Valley Air Pollution Control District State Implementation Plan

The following lists the relevant SIP documents for the SJVAB:

- 2016 Plan for the 2008 8-Hour Ozone Standard (SJVAPCD 2016)
- 2004 Extreme Ozone Attainment Demonstration Plan (SJVAPCD 2004b)
- 2015 $PM_{2.5}$ Plan (SJVAPCD 2015b)
- 2004 Revision to the California State Implementation Plan for Carbon Monoxide (CARB 2004)
- 2007 $PM_{10}$ Maintenance Plan and Request for Redesignation (SJVAPCD 2007b)

#### *2016 Ozone Plan*

On May 5, 2010, the USEPA reclassified the 8-hour $O_3$ nonattainment of the San Joaquin Valley from serious to extreme. The reclassification requires the State of California to incorporate more stringent requirements, such as lower permitting thresholds and implementing reasonably available control technologies at more sources (USEPA 2012).

The 2016 Plan for the 2008 8-Hour Ozone Standard contained a comprehensive list of regulatory and incentive-based measures to reduce emissions of $O_3$ and $NO_X$ throughout the San Joaquin Valley. On June 16, 2016, the SJVAPCD Governing Board adopted the plan. On July 8, 2016, the USEPA approved the motor vehicle budgets for the 1997 8-hour $O_3$ standard and conditionally approved the revised budgets for the $PM_{10}$ standard (USEPA 2016).

#### *2004 Extreme Ozone Attainment Plan*

Although the USEPA subsequently revoked the 1-hour $O_3$ standard effective June 15, 2005, the requirement for the SJVAPCD to submit a plan for that standard remains in effect for the San Joaquin Valley (USEPA 2008). On March 8, 2010, the USEPA approved the SJVAPCD's 2004 Extreme Ozone Attainment Demonstration Plan for 1-hour $O_3$. However, effective June 15, 2005, the USEPA revoked the federal 1-hour $O_3$ standard for certain areas, including the SJVAB (SJVAPCD 2013b). Due to subsequent litigation, the USEPA withdrew its plan approval in November 2012, and the SJVAPCD and CARB withdrew this plan from consideration. While the 2004 plan is not a federally approved plan, it is described here for reference.

#### *2015 $PM_{2.5}$ Plan*

The 2015 Plan for the 1997 $PM_{2.5}$ standard, approved by the SJVAPCD Governing Board on April 16, 2015, will bring the San Joaquin Valley into attainment of the USEPA's 1997 $PM_{2.5}$ standard as expeditiously as practicable, but no later than December 31, 2020 (SJVAPCD 2015b).

#### *2004 Revision to California State Implementation Plan for Carbon Monoxide*

On July 22, 2004, CARB approved an update to the SIP that shows how 10 areas, including the SJVAB, will maintain the CO standard through 2018; revise emission estimates; and establish new on-road motor vehicle emission budgets for Transportation Conformity purposes (CARB 2004). On November 30, 2005, the USEPA approved and promulgated the Implementation Plans and Designation of Areas for Air Quality Purposes (USEPA 2005). This revision provides a 10-year update to the CO maintenance plan and establishes new CO motor vehicle emissions budgets for the purposes of determining transportation conformity.

#### *2007 $PM_{10}$ Maintenance Plan and Request for Redesignation*

CARB approved the SJVAPCD's 2007 $PM_{10}$ Maintenance Plan and Request for Redesignation with modifications to the Transportation Conformity budgets. On September 25, 2008, the USEPA redesignated the San Joaquin Valley as an attainment area for the $PM_{10}$ NAAQS and approved the $PM_{10}$ Maintenance Plan (SJVAPCD 2007b).

### Eastern Kern County Air Pollution Control District State Implementation Plan

#### *2003 Eastern Kern County Ozone Attainment Demonstration, Maintenance Plan, and Redesignation Request*

On January 9, 2003, the EKAPCD adopted the Eastern Kern Ozone Attainment Demonstration, Maintenance Plan and Redesignation Request for the Eastern Kern County nonattainment area.

The plan demonstrates that the air quality improvement was achieved due to successful implementation of $O_3$ control strategies contained in the region's SIP. It also demonstrates that significant $O_3$ precursor emission reductions that have been impacted in the region are permanent and enforceable. A maintenance plan is also included to ensure that the region would not experience exceedance. The plan requests a redesignation in accordance with the CAA (EKAPCD 2003).

**Antelope Valley Air Quality Management District State Implementation Plan**

The following lists the relevant SIP documents for the AVAQMD:

- 2007 Western Mojave Desert Ozone Attainment Plan (AVAQMD 2008)
- 2004 Antelope Valley Ozone Attainment Plan (AVAQMD 2004)

***2007 Western Mojave Desert Ozone Attainment Plan***

The Western Mojave Desert nonattainment area, which includes the AVAQMD, was designated nonattainment for the NAAQS for $O_3$ by the USEPA on April 15, 2004. The USEPA designated the Western Mojave Desert area as a nonattainment area for the 8-hour $O_3$ NAAQS. The AVAQMD is included in the Western Mojave Desert nonattainment area and has adopted state and federal attainment plans for the region within its jurisdiction. The 2007 Western Mojave Desert Ozone Attainment Plan includes the latest planning assumptions regarding population, vehicle activity, and industrial activity and addresses all existing and forecasted $O_3$ precursor-producing activities within the Antelope Valley through the year 2020. The document includes updates to the necessary information to allow General and Transportation Conformity findings to be made within the Antelope Valley (AVAQMD 2008).

***2004 Antelope Valley Ozone Attainment Plan***

The 2004 Antelope Valley Ozone Attainment Plan includes the AVAQMD's review and update of all elements of the Air Quality Management Plan that had been previously prepared by the South Coast Air Quality Management District when that district had jurisdiction over the Antelope Valley. The plan indicates that the Antelope Valley will also show significant progress toward attainment of the CAAQS for the $O_3$ standard. The document also includes the latest planning assumptions regarding population, vehicle activity, and industrial activity, and addresses all existing and forecasted $O_3$ precursor-producing activities within the Antelope Valley through the year 2007. The plan includes all necessary information to allow General and Transportation Conformity findings to be made within the Antelope Valley (AVAQMD 2004).

**Transportation Plans and Programs**

Regional Transportation Planning Agencies and MPOs within the SJVAB, the MDAB, and the study area (i.e., the Antelope Valley Transit Authority, the Southern California Association of Governments, and the Kern COG) are responsible for preparing RTPs. The RTP addresses a region's transportation goals, objectives, and policies for the next 20 to 25 years, and identifies the actions necessary to achieve those goals. MPOs prepare Federal Transportation Improvement Programs, which are 5-year programs of proposed projects that incrementally develop the RTP and contain a listing of proposed transportation projects for which funding has been committed. Transportation projects are analyzed for air quality conformity with the SIP as components of RTPs and Federal Transportation Improvement Programs.

The Kern COG adopted the 2014 RTP and the 2015 Federal Transportation Improvement Program in June 2014, and adopted the air conformity determination in July 2010. The Palmdale to Bakersfield Project Section of the HSR project and the HMF are included in the constrained program of projects in the Kern COG 2014 RTP (Kern COG 2014a, 2014b). However, neither the HSR project nor the HMF are listed in the mass transportation list of projects in the Kern COG 2015 Federal Transportation Improvement Program or in the projects listed in the air conformity determination, Appendix B (Kern COG 2010, 2014b).

In addition, the Kern COG adopted the 2018 RTP/SCS, 2019 Federal Transportation Improvement Program, and corresponding air conformity analysis in August 2018. The 2018

RTP/SCS includes a conservative ridership scenario for the HSR project in the 2035 and 2042 conformity determinations (Kern COG 2018a, 2018b). Implications of the HSR project on meeting attainment goals are evaluated in the Kern COG Conformity Analysis (Kern COG 2018c) for the 2018 RTP/SCS and 2019 Federal Transportation Improvement Program.

The Southern California Association of Governments 2016 RTP and conformity assessment included the HSR project as one of the regional transit projects. The Antelope Valley Transit Authority adopted the 2010 Long Range Transit Plan, which introduced the HSR project. The 2010 Long Range Transit Plan discussed the purpose and status of the HSR project plans at that time.

### *3.3.5.5 Emission Inventory*

#### Criteria Pollutants

##### *San Joaquin Valley Air Pollution Control District*

CARB maintains an annual emission inventory for select counties and air basins in the state. The inventory for the SJVAB consists of data submitted to CARB by the SJVAPCD plus estimates for certain source categories, which are provided by CARB staff. The 2012 inventory data for the SJVAB are summarized in Table 3.3-13.

**Table 3.3-13 Estimated Annual Average Emissions for the San Joaquin Valley Air Pollution Control District (tons per day)**

| Source Category | TOG | ROG | CO | $NO_X$ | $SO_X$ | Particulate Matter | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|---|---|
| **Stationary Sources** | | | | | | | | |
| Fuel Combustion | 18.82 | 3.60 | 23.76 | 29.17 | 4.30 | 6.0 | 5.53 | 5.31 |
| Waste Disposal | 457.38 | 20.98 | 0.5 | 0.29 | 0.12 | 0.56 | 0.15 | 0.11 |
| Cleaning and Surface Coatings | 23.34 | 20.31 | 0.01 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 |
| Petroleum Production and Marketing | 130.88 | 33.59 | 0.61 | 0.27 | 0.14 | 0.23 | 0.16 | 0.15 |
| Total Industrial Processes | 16.72 | 15.68 | 0.83 | 6.71 | 3.36 | 16.54 | 8.03 | 3.16 |
| Total Stationary Sources | 647.15 | 94.16 | 25.70 | 36.44 | 7.92 | 23.44 | 13.97 | 8.82 |
| Stationary Sources Percentage of Total | 36.7 | 26.3 | 2.8 | 11.2 | 76.2 | 4.4 | 5.0 | 11.7 |
| **Areawide Sources** | | | | | | | | |
| Solvent Evaporation | 53.11 | 47.59 | -- | -- | -- | -- | -- | -- |
| Miscellaneous Processes | 969.01 | 128.58 | 186.76 | 13.25 | 1.27 | 488.35 | 250.24 | 59.99 |
| Total Areawide Sources | 1,022.12 | 176.16 | 186.76 | 13.25 | 1.27 | 488.35 | 250.24 | 59.99 |
| Areawide Sources Percentage of Total | 57.9 | 49.2 | 20.6 | 4.0 | 12.2 | 92.4 | 88.9 | 71.4 |
| **Mobile Sources** | | | | | | | | |
| On-Road Motor Vehicles | 53.22 | 48.51 | 437.65 | 177.87 | 0.67 | 10.78 | 10.77 | 6.73 |
| Other Mobile Sources | 41.62 | 39.02 | 252.45 | 97.60 | 0.53 | 5.89 | 6.61 | 6.09 |
| Total Mobile Sources | 94.84 | 87.53 | 690.10 | 275.47 | 1.20 | 16.66 | 17.38 | 12.81 |
| Mobile Sources Percentage of Total | 5.4 | 24.4 | 76.5 | 84.7 | 11.5 | 3.2 | 6.2 | 16.9 |
| **Grand Total** | **1,764.1** | **357.9** | **902.6** | **325.2** | **10.4** | **528.5** | **281.6** | **75.6** |

*Source: California Air Resources Board, 2015*

CO = carbon monoxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
ROG = reactive organic gas
$SO_X$ = sulfur oxides
TOG = total organic gas

In the SJVAPCD, mobile-source emissions account for over 65 percent of the basin's ROG and $NO_X$ emission inventory. Area sources account for over 90 percent and over 50 percent of the basin's particulate matter and total VOC emissions, respectively, and stationary sources account for over 75 percent of the basin's sulfur oxides ($SO_X$) emissions.

### *Eastern Kern Air Pollution Control District*

Emission inventory data for the EKAPCD for 2012 are summarized in Table 3.3-14. In the EKAPCD, mobile-source emissions account for over 74 percent of the ROG and 56 percent of the $NO_X$ emission inventory. Area sources made up over 64 percent of the particulate emissions, while stationary sources made up 88 percent of $SO_X$ emissions.

**Table 3.3-14 Estimated Annual Average Emissions for the Eastern Kern Air Pollution Control District (tons per day)**

| Source Category | TOG | ROG | CO | $NO_X$ | $SO_X$ | Particulate Matter | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|---|---|
| **Stationary Sources** | | | | | | | | |
| Fuel Combustion | 0.52 | 0.12 | 0.56 | 2.46 | 0.23 | 0.40 | 0.37 | 0.36 |
| Waste Disposal | 7.30 | 0.05 | -- | -- | 0.00 | 0.00 | 0.00 | 0.00 |
| Cleaning and Surface Coatings | 0.85 | 0.77 | -- | -- | -- | 0.00 | 0.00 | 0.00 |
| Petroleum Production and Marketing | 0.20 | 0.20 | -- | -- | -- | -- | -- | -- |
| Industrial Processes | 0.11 | 0.09 | 6.79 | 15.43 | 2.25 | 5.69 | 3.67 | 1.55 |
| Total Stationary Sources | 8.98 | 1.22 | 7.35 | 17.89 | 2.48 | 6.09 | 4.04 | 1.91 |
| Stationary Sources Percentage of Total | 44 | 12 | 13 | 50 | 88 | 23 | 25 | 29 |
| **Areawide Sources** | | | | | | | | |
| Solvent Evaporation | 1.14 | 1.21 | -- | -- | -- | -- | -- | -- |
| Miscellaneous Processes | 1.85 | 0.30 | 1.37 | 0.26 | 0.01 | 17.09 | 8.26 | 1.40 |
| Total Areawide Sources | 3.26 | 1.51 | 1.37 | 0.26 | 0.01 | 17.09 | 8.26 | 1.40 |
| Areawide Sources Percentage of Total | 16 | 14 | 2 | 1 | 0 | 64 | 52 | 21 |
| **Mobile Sources** | | | | | | | | |
| On-Road Motor Vehicles | 2.59 | 2.37 | 23.53 | 9.70 | 0.03 | 0.54 | 0.54 | 0.35 |
| Other Mobile Sources | 5.71 | 5.48 | 24.90 | 7.85 | 0.31 | 3.13 | 3.06 | 3.02 |
| Total Mobile Sources | 8.30 | 7.85 | 48.44 | 17.55 | 0.34 | 3.67 | 3.06 | 3.37 |
| Mobile Sources Percentage of Total | 40 | 74 | 85 | 49 | 12 | 14 | 19 | 50 |
| **Grand Total** | **20.54** | **10.59** | **57.15** | **35.70** | **2.83** | **26.85** | **15.90** | **6.68** |

*Source: California Air Resources Board, 2015*
CO = carbon dioxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
ROG = reactive organic gas
$SO_X$ = sulfur oxides
TOG = total organic gas

### *Antelope Valley Air Quality Management District*

Emission inventory data for the AVAQMD for 2012 are summarized in Table 3.3-15. In the AVAQMD, mobile-source emissions account for over 91 percent and 69 percent of the CO and $NO_X$ emissions inventory, respectively. Area sources made up over 55 percent of the particulate emissions, whereas stationary sources made up 45 percent of particulate emissions. Mobile sources were 64 percent of the $SO_X$ emissions. Stationary sources made up 43 percent of the areawide ROG emissions.

**Table 3.3-15 Estimated Annual Average Emissions for the Antelope Valley Air Quality Management District (tons per day)**

| Source Category | TOG | ROG | CO | $NO_X$ | $SO_X$ | Particulate Matter | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|---|---|
| **Stationary Sources** | | | | | | | | |
| Fuel Combustion | 0.36 | 0.17 | 1.35 | 5.09 | 0.02 | 3.24 | 1.36 | 0.57 |
| Waste Disposal | 2.88 | 0.06 | 0.00 | 0.00 | 0.00 | 0.54 | 0.16 | 0.02 |
| Cleaning and Surface Coatings | 5.21 | 3.36 | -- | -- | -- | 0.21 | 0.20 | 0.19 |
| Petroleum Production and Marketing | 13.82 | 3.11 | -- | -- | -- | -- | -- | -- |
| Industrial Processes | 0.19 | 0.11 | 0.00 | 0.01 | 0.00 | 17.57 | 8.46 | 2.00 |
| Total Stationary Sources | 22.46 | 6.82 | 1.36 | 5.09 | 0.03 | 21.56 | 10.81 | 2.79 |
| Stationary Sources Percentage of Total | 63 | 43 | 2 | 28 | 21 | 45 | 43 | 49 |
| **Areawide Sources** | | | | | | | | |
| Solvent Evaporation | 3.89 | 3.39 | -- | -- | -- | -- | -- | -- |
| Miscellaneous Processes | 3.78 | 0.74 | 3.67 | 0.50 | 0.02 | 26.43 | 13.52 | 2.28 |
| Total Areawide Sources | 7.67 | 4.13 | 3.67 | 0.50 | 0.02 | 26.43 | 13.52 | 2.28 |
| Areawide Sources Percentage of Total | 21 | 26 | 6 | 3 | 14 | 55 | 53 | 40 |
| **Mobile Sources** | | | | | | | | |
| On-Road Motor Vehicles | 3.19 | 2.84 | 41.25 | 9.54 | 0.05 | -- | 0.65 | 0.33 |
| Other Mobile Sources | 2.36 | 2.22 | 11.57 | 2.84 | 0.04 | 0.32 | 0.31 | 0.30 |
| Total Mobile Sources | 5.54 | 5.06 | 52.81 | 12.37 | 0.09 | 0.32 | 0.97 | 0.63 |
| Mobile Sources Percentage of Total | 16 | 32 | 91 | 69 | 64 | 1 | 4 | 11 |
| **Grand Total** | **35.68** | **16.01** | **57.84** | **17.97** | **0.14** | **48.31** | **24.66** | **5.70** |

*Source: California Air Resources Board, 2015*
CO = carbon dioxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
ROG = reactive organic gas
$SO_X$ = sulfur oxides
TOG = total organic gas

### Statewide Greenhouse Gas

As a requirement of AB 32, CARB constructed a GHG emissions inventory to determine the 1990 emission level and 2020 limit of 431 MMT $CO_2e$, using the Intergovernmental Panel on Climate Change Fourth Assessment Report GWPs (CARB 2015). GHGs are inventoried on a statewide basis because their impacts are not localized or regional; this is due to their rapid dispersion into the global atmosphere. Because climate change is a global rather than regional issue, specific inventories have not been prepared for the individual air basins. The original statewide 2020 limit of 427 MMT $CO_2e$ was approved on December 6, 2007, and was not sector-specific. A revised statewide 2020 limit of 431 MMT $CO_2e$ was approved on May 22, 2014, and also is not sector-specific. Since development of the 1990 emissions inventory, CARB has prepared a statewide inventory for the years 2000 through 2014. A summary of the 2014 statewide GHG emissions inventory, which was current at the time of the analysis, is included in Table 3.3-16.

**Table 3.3-16 2014 California Statewide Greenhouse Gas Emissions Inventory**

| GHG Emission Category | 2014 (MMT $CO_2e$) | Percentage of Total[1] |
|---|---|---|
| Transportation | 159.53 | 36 |
| Electric power | 88.24 | 20 |
| Commercial and residential | 38.34 | 8 |
| Industrial | 93.32 | 21 |
| Recycling and waste | 8.85 | 2 |
| High GWP | 17.15 | 4 |
| Agriculture | 36.11 | 8 |
| **Total California Emissions** | **441.54** | **100** |

*Source: California Air Resources Board, 2015*

[1] Rounded to the nearest percentage. Category percentages do not sum to 100 percent due to rounding.

GHG = greenhouse gas

GWP = global warming potential

MMT $CO_2e$ = million metric tons of carbon dioxide equivalent

### *3.3.5.6 Sensitive Receptors*

Some locations are considered more sensitive to adverse effects from air pollution than others. These locations are termed “sensitive receptors” and include residences, schools, day-care facilities, elderly care establishments, medical facilities, and other areas that are populated with people considered more vulnerable to the effects of poor air quality. Analyses performed by CARB indicate that providing a separation of at least 1,000 feet from diesel sources and high-traffic areas would substantially reduce exposure to air contaminants and decrease asthma symptoms in children (CARB 2005a).

Many residential developments are within 1,000 feet of the B-P Build Alternatives. Table 3.3-17 shows the other nonresidential sensitive receptors from north to south on the alignment, within 1,000 feet of the B-P Build Alternatives. Figure 3.3-3 shows the locations of these sensitive receptors.

**Table 3.3-17 Sensitive Receptors within 1,000 Feet of the Bakersfield to Palmdale Project Section Build Alternatives**

| Sensitive Receptors | Distance (feet) | | | |
|---|---|---|---|---|
| | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 5 |
| Sam Lynn Ballpark[1] | 900 | 900 | 900 | 900 |
| Valley Oaks Charter School[1] | 400 | 400 | 400 | 400 |
| Weill Park[1] | 100 | 100 | 100 | 100 |
| Bakersfield Play Center[1] | 600 | 600 | 600 | 600 |
| Sierra Junior High School[1] | 700 | 700 | 700 | 700 |
| Ramon Garza Elementary School[1] | 500 | 500 | 500 | 500 |
| Miller Creek Linear Park[1] | 900 | 900 | 900 | 900 |
| CLC Tech[1] | 400 | 400 | 400 | 400 |
| Blanton Center[1] | 220 | 220 | 220 | 220 |
| Owens Intermediate School[1] | 500 | 500 | 500 | 500 |
| Bakersfield Homeless Center[4] | 200 | 200 | 200 | 200 |
| Bethel Christian School[1] | 600 | 600 | 600 | 600 |
| Edison Middle School[1] | 600 | 600 | 650 | 600 |
| Edison School District[1] | 700 | 700 | 750 | 700 |
| Whit Carter Park[1] | 100 | 100 | 100 | 50 |
| Grace Resource Center[4] | 100 | 100 | 100 | 150 |
| St. Vincent De Paul Emergency[3] | 1,000 | 1,000 | 1,000 | – |
| Mental Health America[4] | 200 | 200 | 200 | 150 |
| Antelope Valley High School District[1] | 300 | 300 | 300 | 250 |
| Sacred Heart School[1] | 900 | 900 | 900 | 850 |
| AV Pulmonary Care[2] | 600 | 600 | 600 | 550 |
| Lancaster School District[1] | 900 | 900 | 900 | 850 |
| Lancaster Community Shelter[1] | 200 | 200 | 200 | 250 |
| Life Source International Charter School[1] | 600 | 600 | 600 | 550 |
| University of Antelope Valley[1] | 100 | 100 | 100 | 50 |
| Penny Lane Family Center Clinic[2] | 1,000 | 1,000 | 1,000 | – |
| Penny Lane Centers[2] | 1,000 | 1,000 | 1,000 | – |
| Sierra Retirement Village[1] | 100 | 100 | 100 | 50 |
| Charter College[1] | 500 | 500 | 500 | 450 |
| R. Rex Parris High School[1] | 600 | 600 | 600 | 600 |
| Doctor Robert C. St. Clair Parkway[1] | 200 | 200 | 200 | 200 |

[1] Receptor type: youth, cultural, and educational facility
[2] Receptor type: health-care facility
[3] Receptor type: hospital
[4] Receptor type: miscellaneous

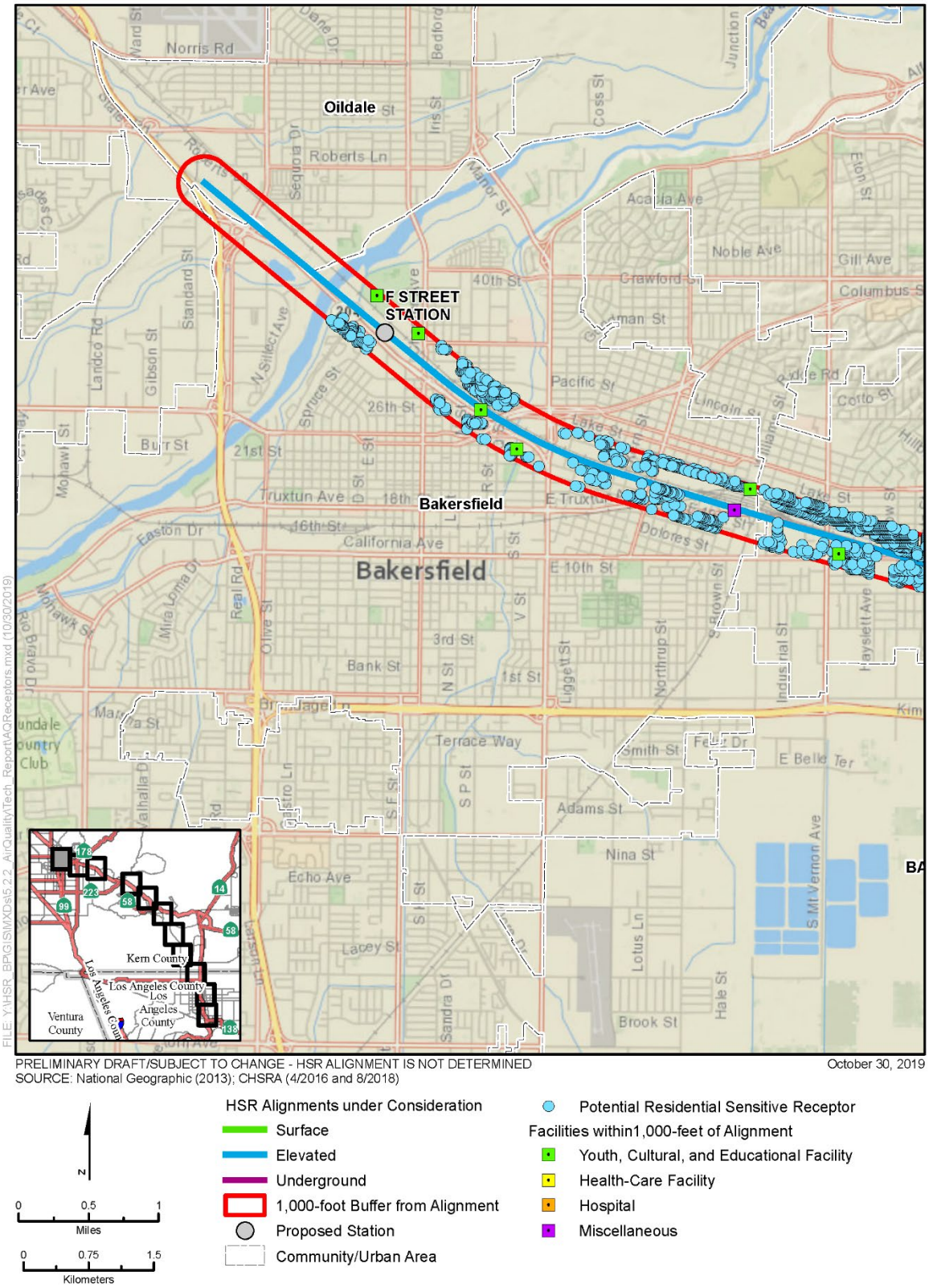



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 1 of 11)

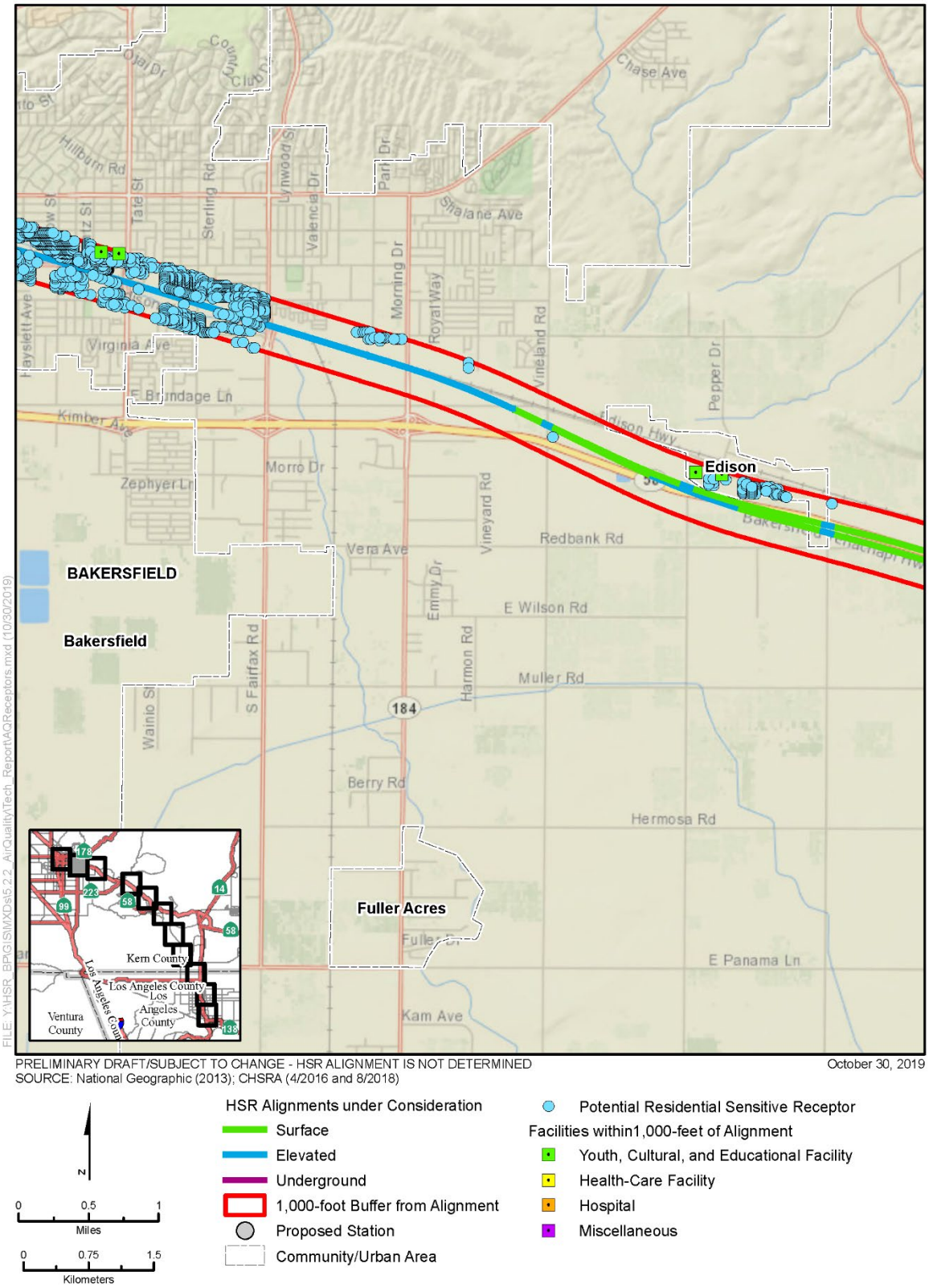



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 2 of 11)

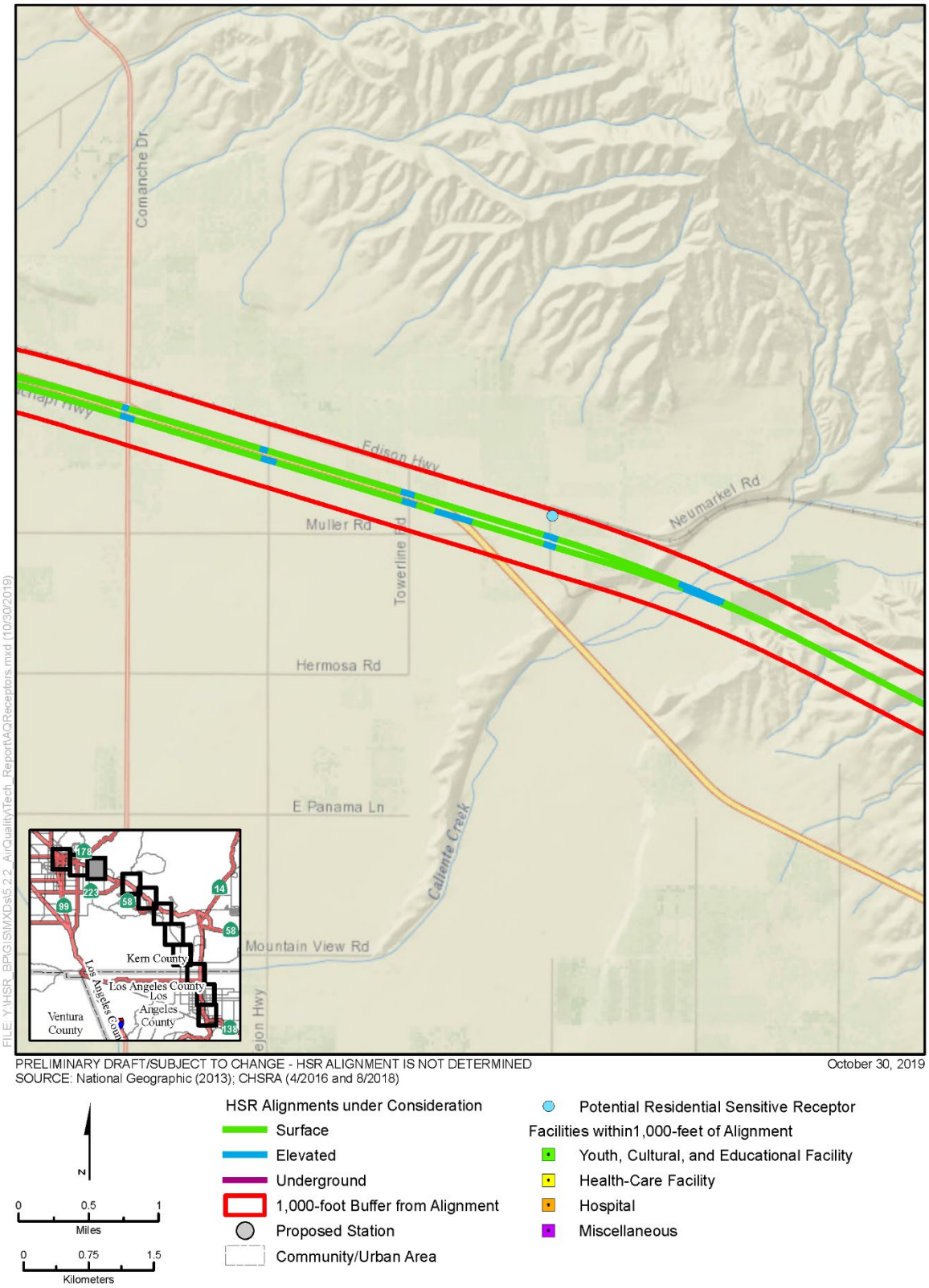



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 3 of 11)

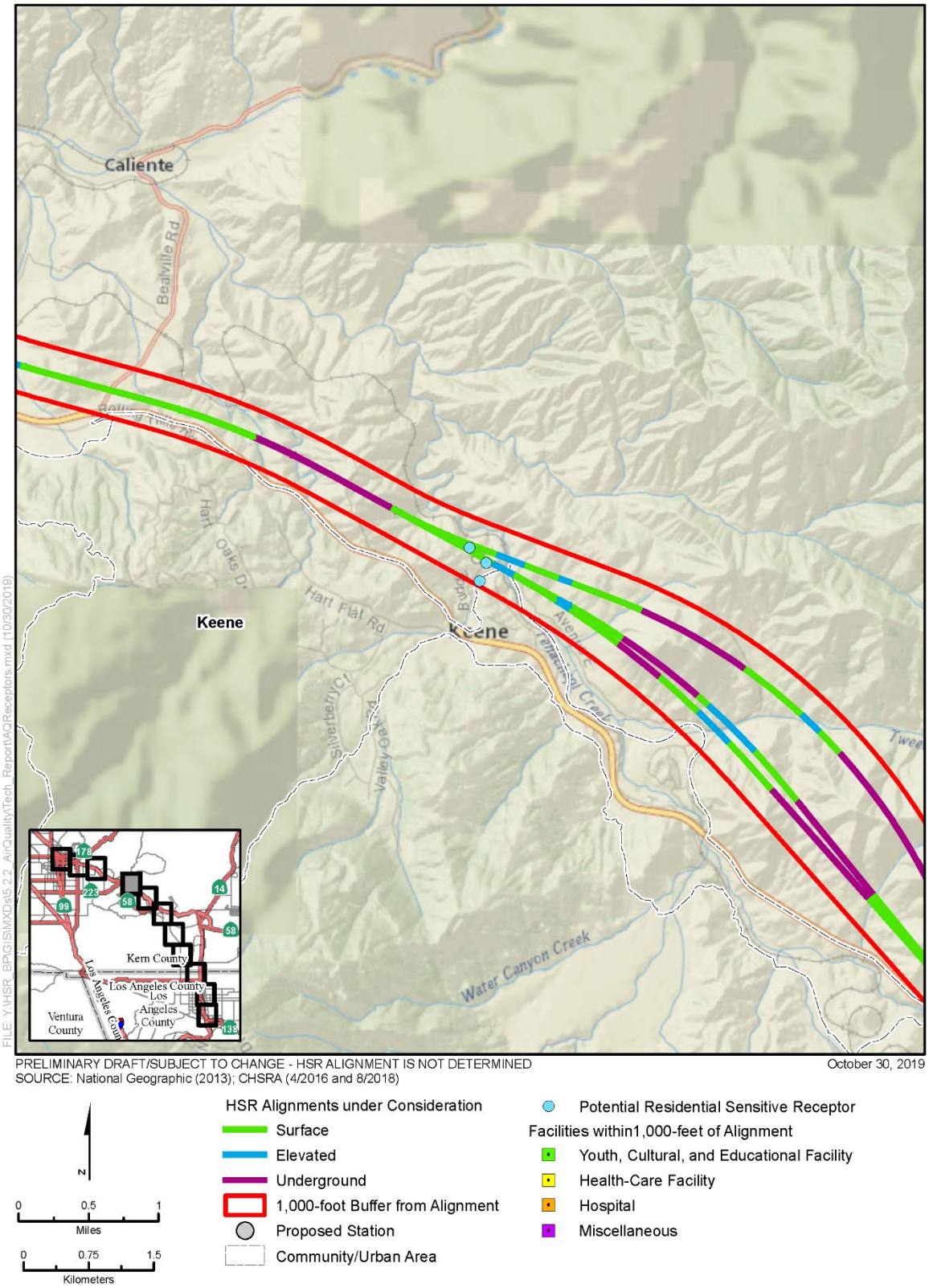



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 4 of 11)

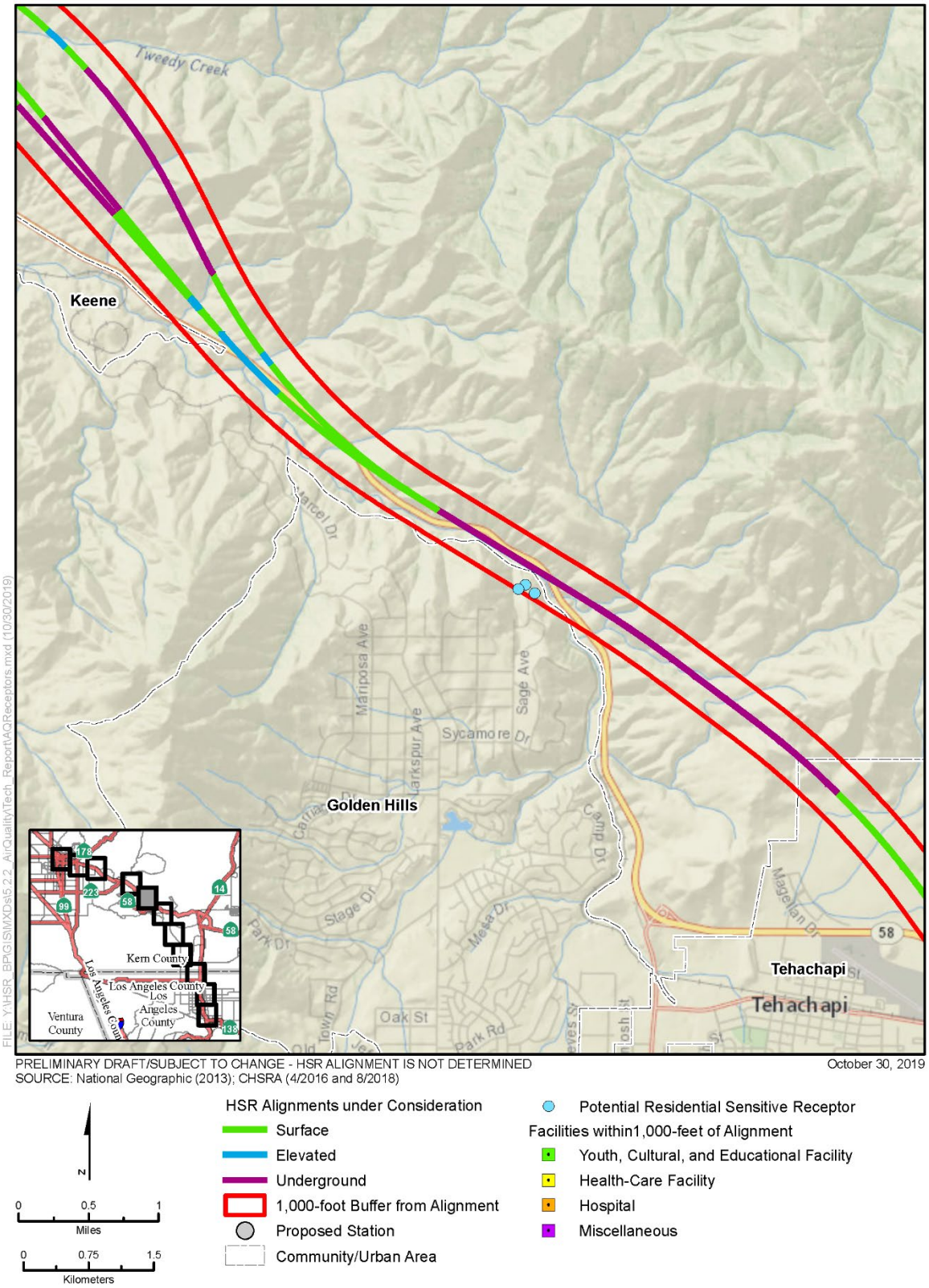



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 5 of 11)

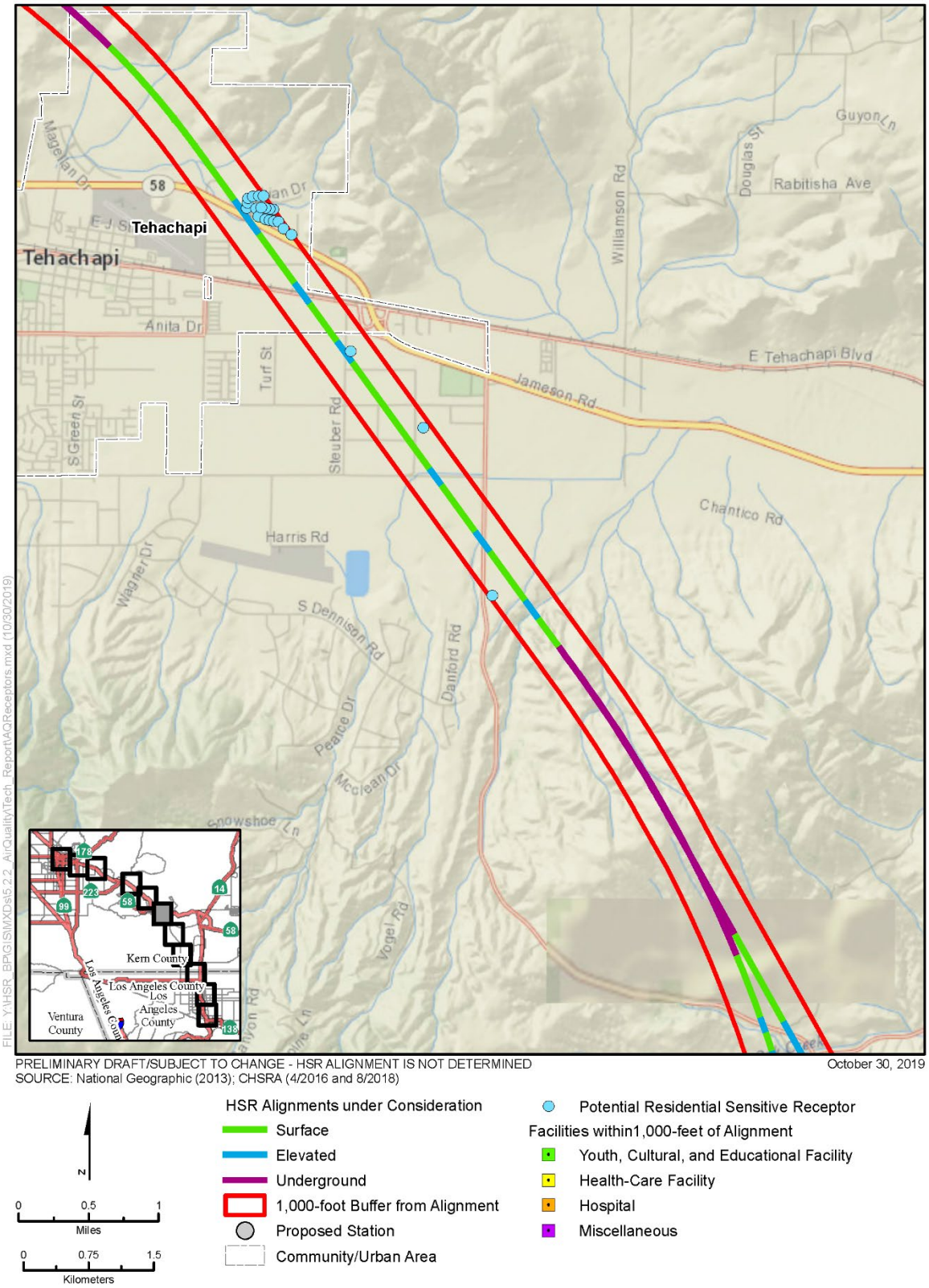



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 6 of 11)

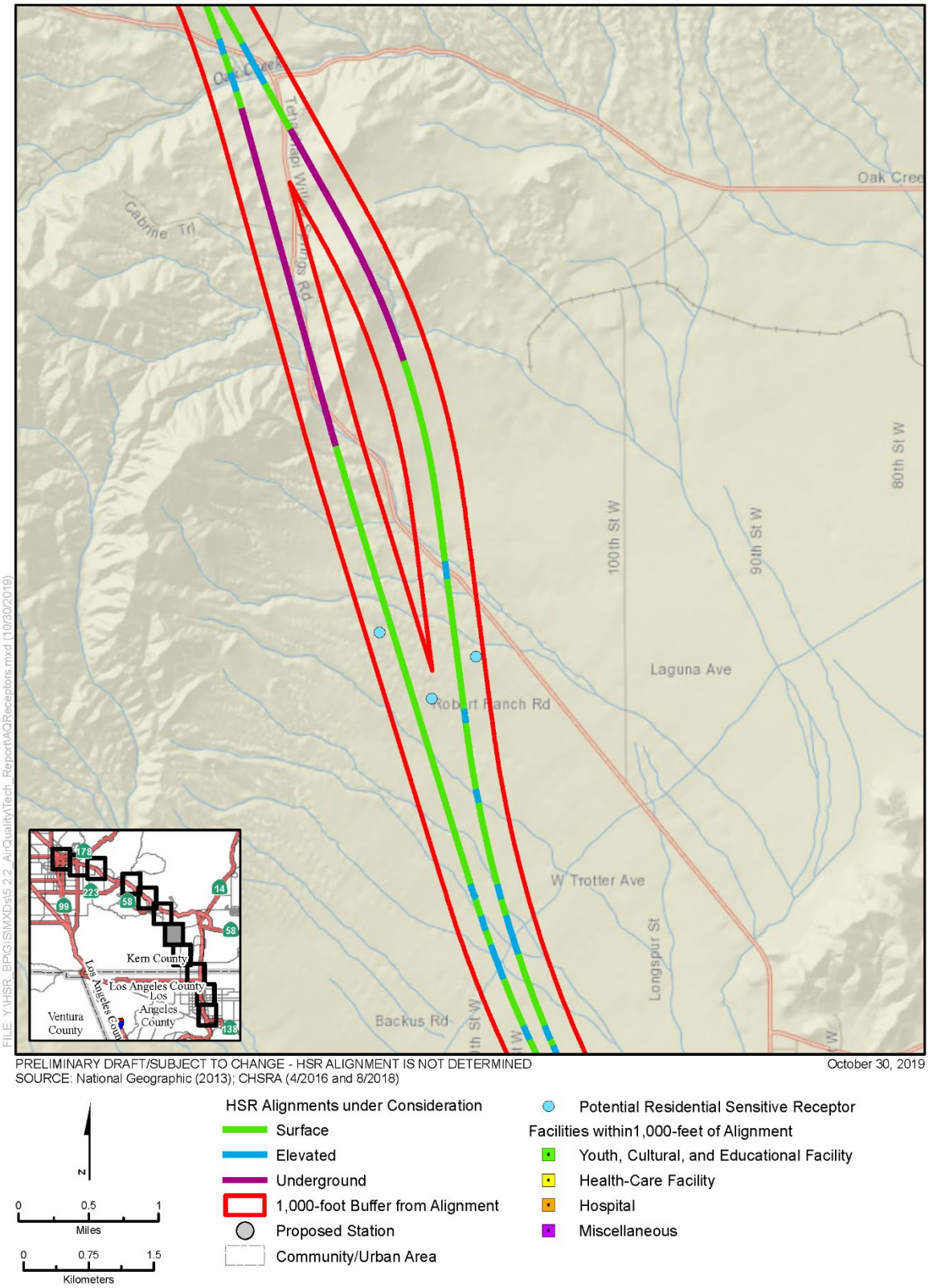



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 7 of 11)

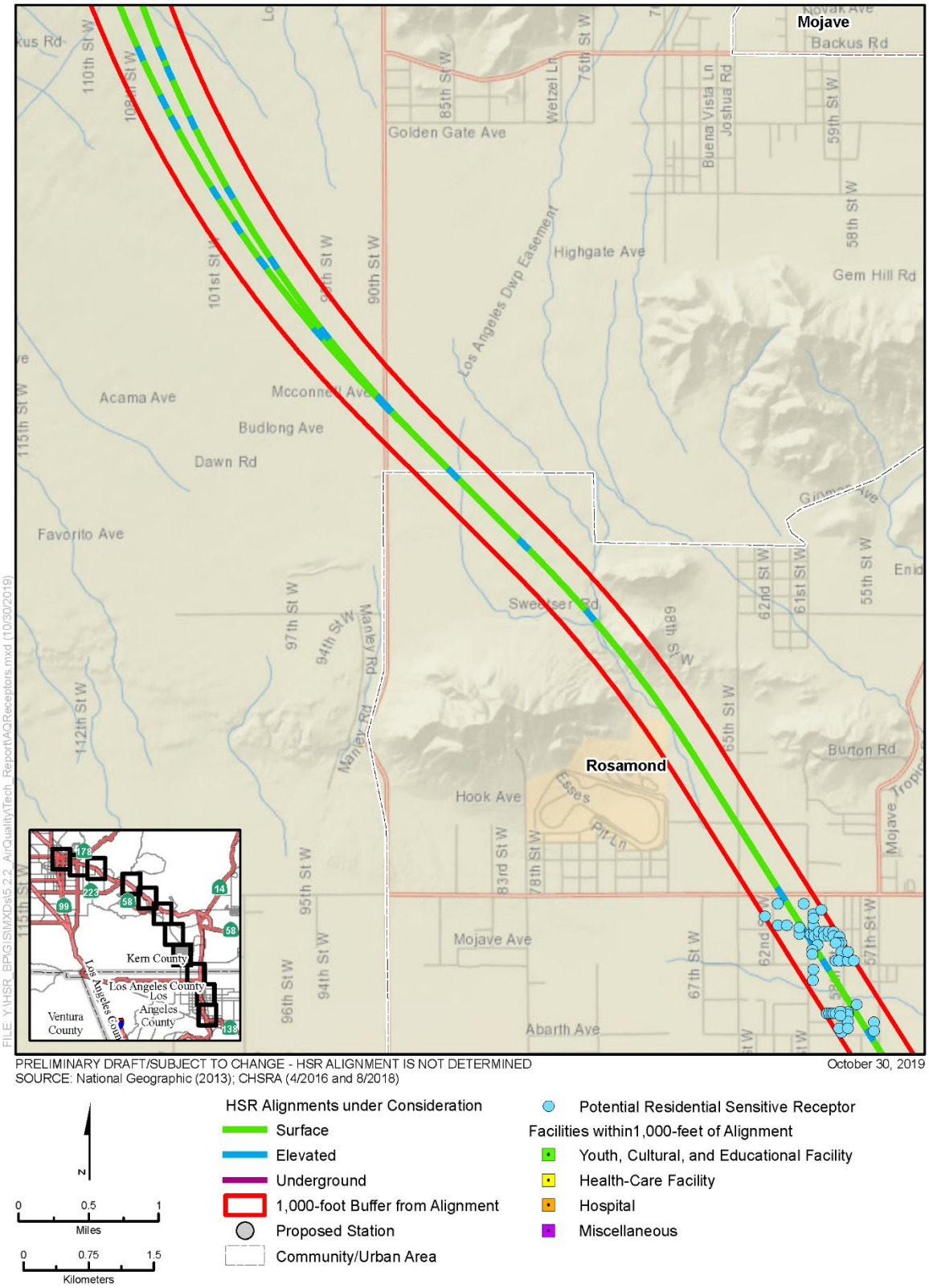



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 8 of 11)

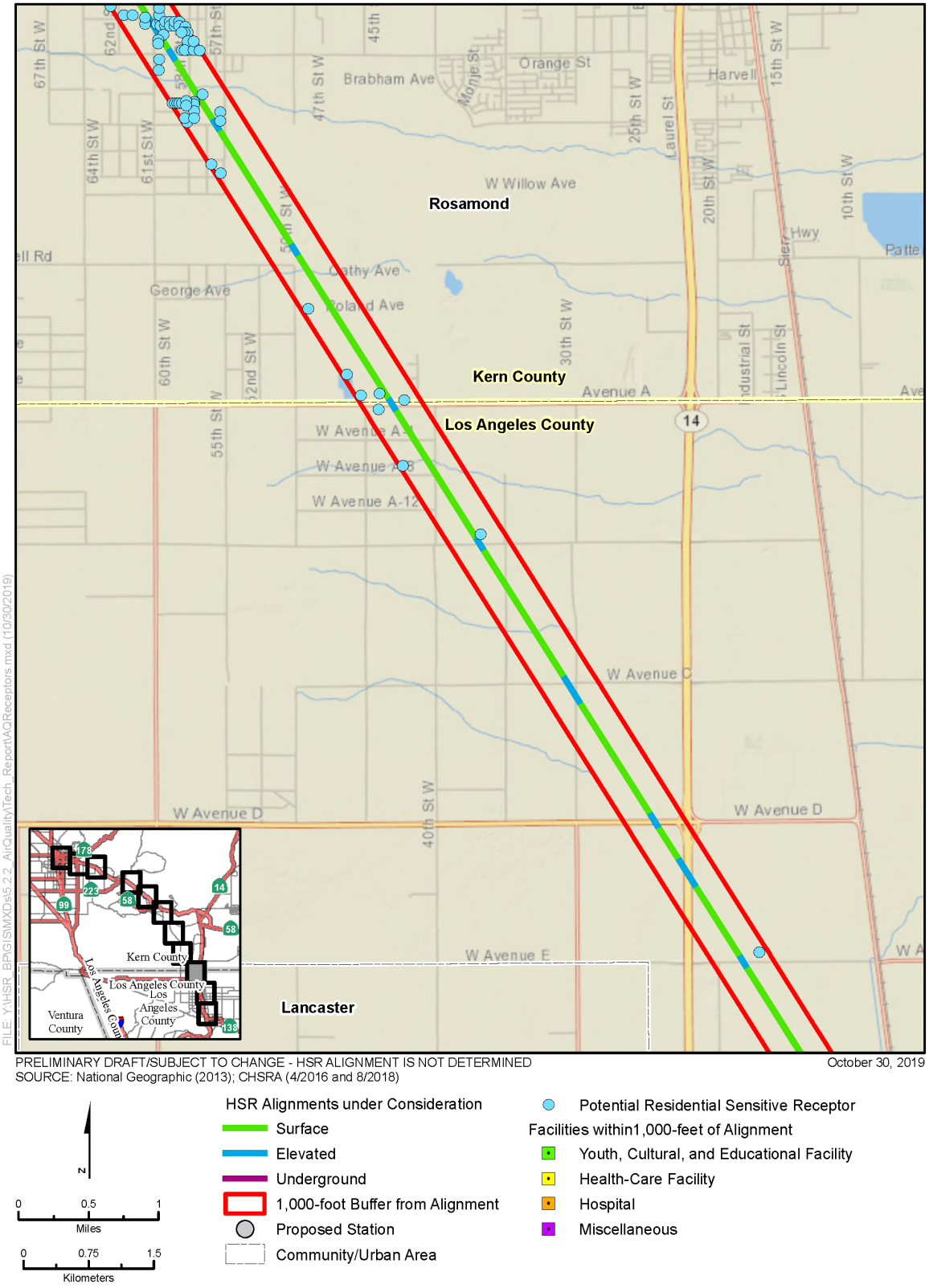



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 9 of 11)

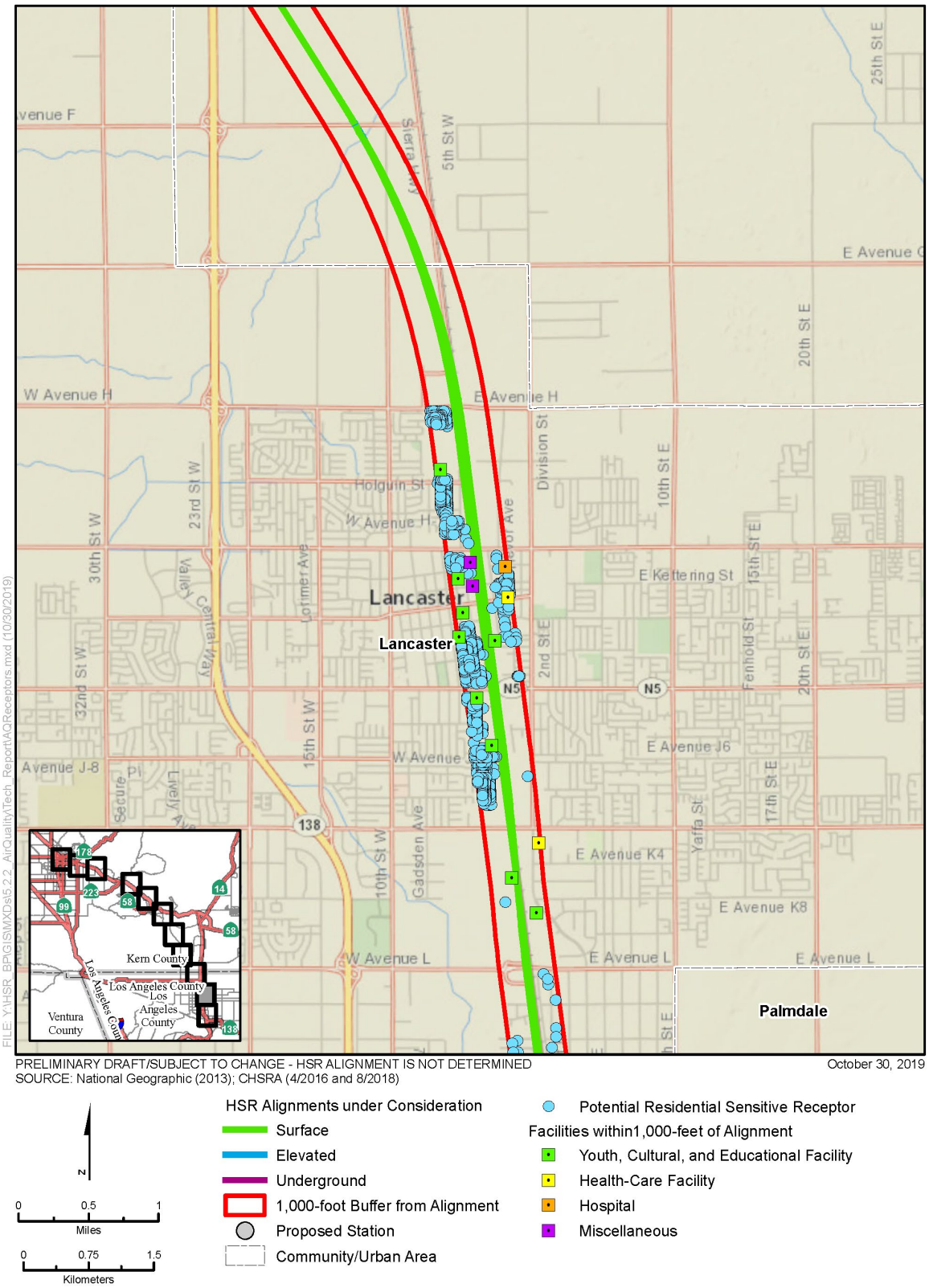



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 10 of 11)

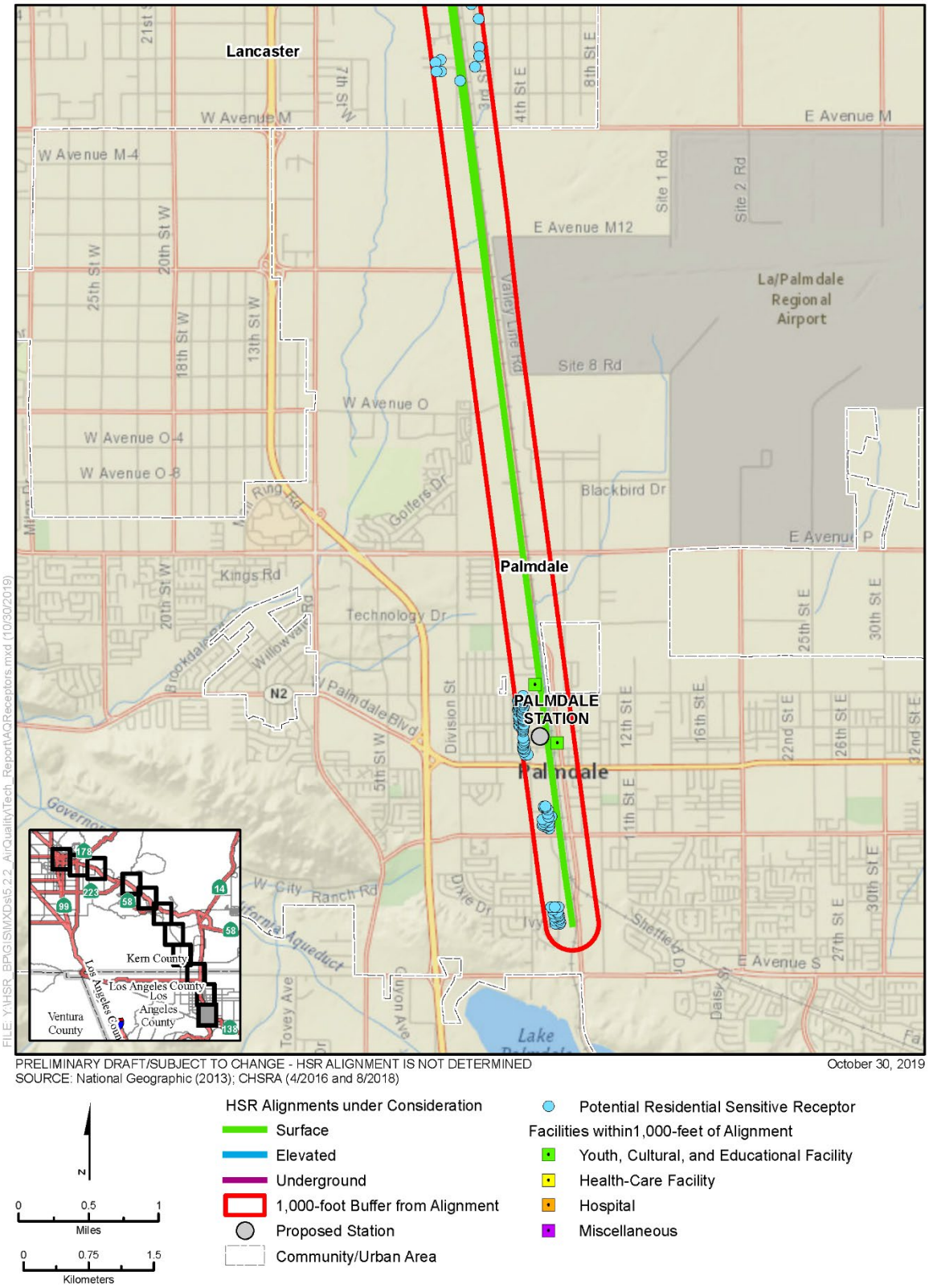



**Figure 3.3-3 Sensitive Receptors within the High-Speed Rail Project Vicinity**

(Sheet 11 of 11)

## 3.3.6 Environmental Consequences

### *3.3.6.1 Overview*

This section evaluates how the No Project Alternative and the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) could affect air quality and global climate change. The impacts of the No Project Alternative are described in Section 3.3.6.2, and the impacts of the B-P Build Alternatives are described in Section 3.3.6.3, B-P Build Alternatives. The B-P Build Alternatives are evaluated for each of the following types of impacts:

**Construction Impacts**

- Impact AQ #1: Regional Air Quality Impacts during Construction
- Impact AQ #2: Compliance with Air Quality Plans during Construction
- Impact AQ #3: Greenhouse Gas Emissions during Construction

**Local Impacts**

- Impact AQ #4: Asbestos and Lead-Based Paint Exposure during Construction
- Impact AQ #5: Localized Air Quality Impacts during Guideway/Alignment Construction
- Impact AQ #6: Localized Air Quality Impacts to Schools and Other Sensitive Receptors during Station Construction
- Impact AQ #7: Localized Air Quality Impacts from Concrete Batch Plants
- Impact AQ #8: Cumulative Impacts during Construction

**Operations Impacts**

- Impact AQ #9: Statewide and Regional Criteria Pollutant Emissions
- Impact AQ #10: Greenhouse Gas Analysis during Operation
- Impact AQ #11: Localized Air Quality Impacts during Train Operations
- Impact AQ #12: Localized Mobile-Source Air Toxics Analysis
- Impact AQ #13: Microscale CO Impact Analysis
- Impact AQ #14: Localized $PM_{10}$/$PM_{2.5}$ Hot-Spot Impact Analysis
- Impact AQ #15: Localized Air Quality Impacts to Sensitive Receptors including Schools
- Impact AQ #16: Odor Impacts from Operations
- Impact AQ #17: Compliance with Air Quality Plans during Project Operation
- Impact AQ #18: Cumulative Impacts during Operation

### *3.3.6.2 No Project Alternative*

The No Project Alternative represents future-year 2040 conditions without the HSR project. The general plans of the Cities of Bakersfield and Palmdale and of the County of Kern indicate continued land development and population growth within the region over the next 25 years, which would increase regional VMT under the No Project Alternative. However, increasingly stringent federal and state emission-control requirements and replacement of older, higher-polluting vehicles with newer, less-polluting ones would reduce basinwide emissions under the No Project Alternative when compared to existing conditions. In addition, air district rules and plans have been established to bring the affected air basins into compliance with the NAAQS and CAAQS, which would reduce emissions under the No Project Alternative, notwithstanding this growth. The increase in regional VMT over the next 25 years could potentially increase emissions; however, the impacts associated with land development and population growth would be reduced due to the general plan policies and the increasingly stringent federal and state emission-control requirements under the No Project Alternative. Therefore, overall air quality is

expected to improve in the basins under the No Project Alternative compared to the existing conditions.

### *3.3.6.3 Bakersfield to Palmdale Project Section Build Alternatives*

This section evaluates air quality and GHG impacts that would result from construction and operation of the Bakersfield to Palmdale Project Section. Impacts are assessed before consideration of the project mitigation measures identified in Section 3.3.8.

The air quality and global climate change impacts for the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street are addressed in Section 3.3.5 of the *Fresno to Bakersfield Section Final Supplemental EIR/EIS* (Authority 2017). However, the analysis within Section 3.3.6.3 of this EIR/EIS below also reflects this portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street in Bakersfield.

#### Construction Impacts

Construction activities associated with the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would result in criteria pollutant and GHG emissions. Construction emissions for the four B-P Build Alternatives are quantified and analyzed in this section. The analysis assumed that project construction would take place from 2018 to 2026. The construction schedule has since been revised. See Section 2.8 in Chapter 2 for additional details on the revised construction schedule. Although the schedule has been updated, the analysis is still valid as the equipment quantities and annual emission rates would remain unchanged.

#### *Impact AQ #1: Regional Air Quality Impacts during Construction (Threshold #2)*

Project construction activities expected to occur during the same calendar year were summarized according to the construction schedule presented in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b). The project emissions were also calculated on an annual basis for each year of construction. The summary of the construction emissions for the four B-P Build Alternatives over the entire construction period is shown in Table 3.3-18. The CCNM Design Option would be anticipated to result in slightly higher emissions due to the additional 124 feet of track required for the design, which would require some additional construction activities. The Refined CCNM Design Option would be anticipated to result in slightly higher emissions due to the additional 2,006 feet of track required for the design, which would require additional construction activities. Total emissions would be 0.028 percent higher with the CCNM Design Option. The Refined CCNM option would increase the length of the line by 0.45 percent and would require additional off-haul associated with additional earthwork activities. Emission estimates presented below for each B-P Build Alternative would be applicable with or without the CCNM Design Option, due to rounding, and the difference would be within the margin of error of the model estimates. Emission estimates for each B-P Alternative with the Refined CCNM Design Option are identified below.

**Table 3.3-18 Bakersfield to Palmdale Project Section Construction Regional Emissions—Total (Tons/Construction Duration)**

| Alternative | Emissions[1] | | | | | |
|---|---|---|---|---|---|---|
| | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[2] | $PM_{2.5}$[2] |
| Alternative 1 | 196 | 3,089 | 1,834 | 25 | 164 | 104 |
| Alternative 1 with Refined CCNM Design Option | 197 | 3,094 | 1,892 | 25 | 165 | 105 |
| Alternative 2 | 191 | 3,471 | 1,860 | 21 | 167 | 99 |
| Alternative 2 with Refined CCNM Design Option | 191 | 3,476 | 1,918 | 21 | 168 | 100 |
| Alternative 3 | 187 | 3,089 | 1,843 | 21 | 123 | 92 |
| Alternative 3 with Refined CCNM Design Option | 188 | 3,094 | 1,901 | 21 | 124 | 93 |
| Alternative 5 | 212 | 3,997 | 2,062 | 21 | 137 | 109 |
| Alternative 5 with Refined CCNM Design Option | 213 | 4,002 | 2,120 | 21 | 137 | 109 |

*Source: California High-Speed Rail Authority, 2019*

[1] Emissions include HSR project construction as well as roadway projects that are not included in RTPs.

[2] The $PM_{10}$ and $PM_{2.5}$ emissions consist of exhaust and fugitive dust emissions.

CO = carbon monoxide
CCNM = César E. Chávez National Monument
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
RTP = Regional Transportation Plan
$SO_2$ = sulfur dioxide
VOC = volatile organic compounds

Details of emissions from the four B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Option and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) from all construction phases and project alternatives are presented in Table 3.3-19 through Table 3.3-30. The predominant pollutants associated with construction of the guideway, stations, and maintenance facility would be fugitive dust ($PM_{10}$ and $PM_{2.5}$) from earthmoving and disturbed earth surfaces and from combustion pollutants, particularly $O_3$ precursors ($NO_X$ and VOC), from heavy equipment and trucks. During construction, programmatic emission reduction measures would be applied, including watering exposed surfaces twice daily, watering unpaved roads three times daily, reducing vehicle speeds on unpaved roads to 15 mph, and ensuring that haul trucks are covered.

### Alternative 1

#### *Construction Impacts within the San Joaquin Valley Air Pollution Control District*

Direct emissions from the construction phase of the project section within the SJVAPCD would exceed the General Conformity thresholds for VOC in 2020, 2021, 2022, and 2023 and for $NO_X$ in 2018, 2020, 2021, 2022, 2023, 2024, 2025, and 2026. VOC and $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants. The purchase of offset emissions through a Voluntary Emission Reduction Agreement (VERA) with the SJVAPCD (Mitigation Measure AQ-MM#1) for VOC and $NO_X$ would reduce impacts after mitigation because VOC and $NO_x$ emissions would be offset and be below the General Conformity thresholds.

**Table 3.3-19 Estimated Annual Average Emissions for the San Joaquin Valley Air Pollution Control District—Alternative 1**

| Activities | VOC | CO | CO[5] | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|---|
| SJVAPCD annual CEQA significance thresholds[2] | 10 | 100 | N/A | 10 | 27 | 15 | 15 |
| Annual General Conformity *de minimis* levels applicable to the SJVAB[3] | 10 | N/A | 100 | 10 | N/A | 70 | 100 |
| **Year 2018** | | | | | | | |
| Emissions (tons/year) | 5 | 30 | 7 | 55 | 1 | 4 | 3 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2019** | | | | | | | |
| Emissions (tons/year) | 1 | 1 | 1 | 2 | 0 | 1 | 1 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | No | No | No | N/A | No | No |
| **Year 2020** | | | | | | | |
| Emissions (tons/year) | 11 | 104 | 25 | 104 | 1 | 7 | 5 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2021** | | | | | | | |
| Emissions (tons/year) | 16 | 293 | 69 | 156 | 1 | 13 | 8 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2022** | | | | | | | |
| Emissions (tons/year) | 14 | 285 | 68 | 133 | 1 | 12 | 7 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2022 with Refined CCNM Design Option** | | | | | | | |
| Emissions (tons/year) | 14 | 286 | 68 | 142 | 1 | 12 | 7 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |

| Activities | VOC | CO | CO[5] | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|---|
| **Year 2023** | | | | | | | |
| Emissions (tons/year) | 11 | 253 | 60 | 107 | 1 | 11 | 6 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2023 with Refined Design Option** | | | | | | | |
| Emissions (tons/year) | 11 | 253 | 60 | 110 | 1 | 11 | 6 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2024** | | | | | | | |
| Emissions (tons/year) | 7 | 51 | 12 | 51 | 1 | 6 | 3 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2025** | | | | | | | |
| Emissions (tons/year) | 4 | 23 | 5 | 25 | 1 | 2 | 2 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2026** | | | | | | | |
| Emissions (tons/year) | 2 | 13 | 3 | 15 | 1 | 1 | 1 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |

1 These construction emissions were established for the Fresno to Bakersfield Locally Generated Alternative, which includes the entire alignment from Fresno to Bakersfield.

2 The SJVAPCD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, ROG, VOC, $PM_{10}$, and $PM_{2.5}$ in the *Guide for Assessing and Mitigating Air Quality Impacts* (San Joaquin Valley Air Pollution Control District 2015).

3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the SJVAB federal attainment status. The SJVAB is considered in extreme nonattainment for the ozone NAAQS, is a nonattainment area for $PM_{2.5}$, and is a maintenance area for the CO NAAQS (Fresno and Bakersfield urbanized areas only) and $PM_{10}$ NAAQS. Although the SJVAB is in attainment for $SO_X$, since $SO_X$ is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* threshold was used.

4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

5 Bakersfield urbanized maintenance area only.

CCNM = César E. Chávez National Monument
CEQA = California Environmental Quality Act
CO = carbon monoxide
N/A = not applicable
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAB = San Joaquin Valley Air Basin
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxide
VOC = volatile organic compounds

NAAQS = National Ambient Air Quality Standards
The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-20 Estimated Annual Average Emissions for the Eastern Kern Air Pollution Control District—Alternative 1**

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| EKAPCD annual CEQA significance thresholds[2] | 25 | N/A | 25 | 27 | 15 | 15 |
| Annual General Conformity *de minimis* levels applicable to the EKAPCD[3] | 50 | N/A | 50 | N/A | 100 | N/A |
| **Year 2018** | | | | | | |
| Emissions (tons/year) | 3 | 18 | 33 | 1 | 4 | 2 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2019** | | | | | | |
| Emissions (tons/year) | 6 | 35 | 60 | 1 | 5 | 3 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2020** | | | | | | |
| Emissions (tons/year) | 17 | 161 | 172 | 1 | 13 | 8 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2021** | | | | | | |
| Emissions (tons/year) | 20 | 392 | 207 | 1 | 18 | 11 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2022** | | | | | | |
| Emissions (tons/year) | 18 | 381 | 177 | 1 | 16 | 10 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2022 with Refined Design Option** | | | | | | |
| Emissions (tons/year) | 18 | 384 | 213 | 1 | 16 | 10 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| **Year 2023** | | | | | | |
| Emissions (tons/year) | 15 | 346 | 121 | 1 | 15 | 9 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2023 with Refined Design Option** | | | | | | |
| Emissions (tons/year) | 16 | 346 | 131 | 1 | 15 | 9 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2024** | | | | | | |
| Emissions (tons/year) | 7 | 55 | 56 | 1 | 7 | 3 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2025** | | | | | | |
| Emissions (tons/year) | 5 | 29 | 32 | 1 | 2 | 2 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2026** | | | | | | |
| Emissions (tons/year) | 3 | 17 | 20 | 1 | 1 | 1 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |

1 These construction emissions were established for the alignment from Bakersfield to Palmdale.
2 The EKAPCD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, VOC, $PM_{10}$, and $PM_{2.5}$.
3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the EKAPCD federal attainment status. The EKAPCD is considered an unclassifiable/attainment area for the $PM_{2.5}$, $PM_{10}$, and CO NAAQS, and is unclassified for the $NO_2$ and $SO_X$ NAAQS.
4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

CEQA = California Environmental Quality Act
CO = carbon monoxide
EKAPCD = Eastern Kern Air Pollution Control District
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxides
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-21 Estimated Annual Average Emissions for the Antelope Valley Air Quality Management District—Alternative 1**

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| AVAQMD annual CEQA significance thresholds[2] | 25 | 100 | 25 | 25 | 15 | 12 |
| Annual General Conformity *de minimis* levels applicable to the AVAQMD[3] | 25 | N/A | 25 | N/A | N/A | N/A |
| **Year 2018** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2019** | | | | | | |
| Emissions (tons/year) | 2 | 7 | 12 | 1 | 1 | 1 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2020** | | | | | | |
| Emissions (tons/year) | 7 | 68 | 69 | 1 | 5 | 3 |
| Exceeds AVAQMD CEQA thresholds? | No | No | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2021** | | | | | | |
| Emissions (tons/year) | 7 | 175 | 74 | 1 | 5 | 3 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2022** | | | | | | |
| Emissions (tons/year) | 6 | 169 | 63 | 1 | 4 | 3 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2023** | | | | | | |
| Emissions (tons/year) | 5 | 150 | 50 | 1 | 4 | 3 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| **Year 2024** | | | | | | |
| Emissions (tons/year) | 2 | 17 | 17 | 1 | 2 | 1 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2025** | | | | | | |
| Emissions (tons/year) | 2 | 11 | 12 | 1 | 2 | 2 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2026** | | | | | | |
| Emissions (tons/year) | 1 | 8 | 10 | 1 | 1 | 1 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |

1 These construction emissions were established for the alignment from Bakersfield to Palmdale.
2 The AVAQMD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, VOC, $PM_{10}$, and $PM_{2.5}$.
3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the AVAQMD federal attainment status. The AVAQMD is considered an unclassifiable/attainment area for $PM_{2.5}$, $NO_X$, and $SO_X$ NAAQS, an unclassified area for $PM_{10}$ NAAQS, and an attainment area for CO NAAQS.
4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

AVAQMD = Antelope Valley Air Quality Management District
CEQA = California Environmental Quality Act
CO = carbon monoxide
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxides
VOC = volatile organic compounds

**The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.**

**Table 3.3-22 Estimated Annual Average Emissions for the San Joaquin Valley Air Pollution Control District—Alternative 2**

| Activities | VOC | CO | CO[5] | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|---|
| SJVAPCD annual CEQA significance thresholds[2] | 10 | 100 | N/A | 10 | 27 | 15 | 15 |
| Annual General Conformity *de minimis* levels applicable to the SJVAB[3] | 10 | N/A | 100 | 10 | N/A | 70 | 100 |
| **Year 2018** | | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | No | N/A | No | No |
| **Year 2019** | | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | No | N/A | No | No |
| **Year 2020** | | | | | | | |
| Emissions (tons/year) | 13 | 121 | 29 | 134 | 1 | 10 | 6 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2021** | | | | | | | |
| Emissions (tons/year) | 15 | 361 | 86 | 151 | 1 | 15 | 8 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2022** | | | | | | | |
| Emissions (tons/year) | 13 | 351 | 83 | 127 | 1 | 13 | 8 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2022 with Refined CCNM Design Option** | | | | | | | |
| Emissions (tons/year) | 13 | 352 | 84 | 136 | 1 | 13 | 8 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |

| Activities | VOC | CO | CO[5] | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|---|
| **Year 2023** | | | | | | | |
| Emissions (tons/year) | 8 | 203 | 48 | 76 | 1 | 10 | 5 |
| Exceeds SJVAPCD CEQA thresholds? | No | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2023 with Refined CCNM Design Option** | | | | | | | |
| Emissions (tons/year) | 8 | 204 | 48 | 78 | 1 | 10 | 5 |
| Exceeds SJVAPCD CEQA thresholds? | No | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2024** | | | | | | | |
| Emissions (tons/year) | 4 | 31 | 7 | 31 | 1 | 6 | 2 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2025** | | | | | | | |
| Emissions (tons/year) | 2 | 12 | 3 | 15 | 1 | 1 | 1 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2026** | | | | | | | |
| Emissions (tons/year) | 2 | 12 | 3 | 15 | 1 | 1 | 1 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |

1 These construction emissions were established for the Fresno to Bakersfield Locally Generated Alternative, which includes the entire alignment from Fresno to Bakersfield.

2 The SJVAPCD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, ROG, VOC, $PM_{10}$, and $PM_{2.5}$ in the *Guide for Assessing and Mitigating Air Quality Impacts* (San Joaquin Valley Air Pollution Control District 2015).

3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the SJVAB federal attainment status. The SJVAB is considered in extreme nonattainment for the ozone NAAQS, is a nonattainment area for $PM_{2.5}$, and is a maintenance area for the CO NAAQS (Fresno and Bakersfield urbanized areas only) and $PM_{10}$ NAAQS. Although the SJVAB is in attainment for $SO_X$, since $SO_X$ is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* threshold was used.

4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

5 Bakersfield urbanized maintenance area only.

CCNM = César E. Chávez National Monument
CEQA = California Environmental Quality Act
CO = carbon monoxide
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAB = San Joaquin Valley Air Basin
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxide
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-23 Estimated Annual Average Emissions for the Eastern Kern Air Pollution Control District—Alternative 2**

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| EKAPCD annual CEQA significance thresholds[2] | 25 | N/A | 25 | 27 | 15 | 15 |
| Annual General Conformity *de minimis* levels applicable to the EKAPCD[3] | 50 | N/A | 50 | N/A | 70 | N/A |
| **Year 2018** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2019** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2020** | | | | | | |
| Emissions (tons/year) | 15 | 149 | 152 | 1 | 14 | 7 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2021** | | | | | | |
| Emissions (tons/year) | 25 | 521 | 254 | 1 | 22 | 13 |
| Exceeds EKAPCD CEQA thresholds? | Yes | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2022** | | | | | | |
| Emissions (tons/year) | 19 | 486 | 185 | 1 | 18 | 10 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2022 with Refined CCNM Design Option** | | | | | | |
| Emissions (tons/year) | 19 | 489 | 222 | 1 | 18 | 10 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| **Year 2023** | | | | | | |
| Emissions (tons/year) | 12 | 287 | 114 | 1 | 14 | 7 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2023 with Refined CCNM Design Option** | | | | | | |
| Emissions (tons/year) | 12 | 288 | 124 | 1 | 14 | 7 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2024** | | | | | | |
| Emissions (tons/year) | 4 | 33 | 33 | 1 | 7 | 3 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2025** | | | | | | |
| Emissions (tons/year) | 2 | 16 | 20 | 1 | 1 | 1 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2026** | | | | | | |
| Emissions (tons/year) | 2 | 16 | 20 | 1 | 1 | 1 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |

1 These construction emissions were established for the alignment from Bakersfield to Palmdale.
2 The EKAPCD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, VOC, $PM_{10}$, and $PM_{2.5}$.
3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the EKAPCD federal attainment status. The EKAPCD is considered an unclassifiable/attainment area for the $PM_{2.5}$, $PM_{10}$, and CO NAAQS, and is unclassified for the $NO_2$ and $SO_X$ NAAQS.
4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

CCNM = César E. Chávez National Monument
CEQA = California Environmental Quality Act
CO = carbon monoxide
EKAPCD = Eastern Kern Air Pollution Control District
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxides
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-24 Estimated Annual Average Emissions for the Antelope Valley Air Quality Management District—Alternative 2**

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| AVAQMD annual CEQA significance thresholds[2] | 25 | 100 | 25 | 25 | 15 | 15 |
| Annual General Conformity *de minimis* levels applicable to the AVAQMD[3] | 25 | N/A | 25 | N/A | N/A | N/A |
| **Year 2018** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2019** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2020** | | | | | | |
| Emissions (tons/year) | 9 | 87 | 95 | 1 | 6 | 4 |
| Exceeds AVAQMD CEQA thresholds? | No | No | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2021** | | | | | | |
| Emissions (tons/year) | 12 | 264 | 132 | 1 | 8 | 6 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2022** | | | | | | |
| Emissions (tons/year) | 12 | 263 | 122 | 1 | 7 | 6 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2023** | | | | | | |
| Emissions (tons/year) | 9 | 161 | 81 | 1 | 5 | 4 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| **Year 2024** | | | | | | |
| Emissions (tons/year) | 7 | 52 | 56 | 1 | 4 | 3 |
| Exceeds AVAQMD CEQA thresholds? | No | No | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2025** | | | | | | |
| Emissions (tons/year) | 5 | 36 | 38 | 1 | 3 | 2 |
| Exceeds AVAQMD CEQA thresholds? | No | No | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2026** | | | | | | |
| Emissions (tons/year) | 1 | 8 | 10 | 1 | 1 | 1 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |

1 These construction emissions were established for the alignment from Bakersfield to Palmdale.
2 The AVAQMD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, VOC, $PM_{10}$, and $PM_{2.5}$.
3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the AVAQMD federal attainment status. The AVAQMD is considered an unclassifiable/attainment area for $PM_{2.5}$, $NO_X$, and $SO_X$ NAAQS, an unclassified area for $PM_{10}$ NAAQS, and an attainment area for CO NAAQS.
4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

AVAQMD = Antelope Valley Air Quality Management District
CEQA = California Environmental Quality Act
CO = carbon monoxide
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxides
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-25 Estimated Annual Average Emissions for the San Joaquin Valley Air Pollution Control District—Alternative 3**

| Activities | VOC | CO | CO[5] | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|---|
| SJVAPCD annual CEQA significance thresholds[2] | 10 | 100 | N/A | 10 | 27 | 15 | 15 |
| Annual General Conformity *de minimis* levels applicable to the SJVAB[3] | 10 | N/A | 100 | 10 | N/A | 100 | 100 |
| **Year 2018** | | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | No | N/A | No | No |
| **Year 2019** | | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | No | N/A | No | No |
| **Year 2020** | | | | | | | |
| Emissions (tons/year) | 15 | 130 | 31 | 145 | 1 | 8 | 6 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2021** | | | | | | | |
| Emissions (tons/year) | 17 | 377 | 90 | 168 | 1 | 11 | 9 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2022** | | | | | | | |
| Emissions (tons/year) | 16 | 374 | 89 | 151 | 1 | 11 | 8 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2022 with Refined CCNM Design Option** | | | | | | | |
| Emissions (tons/year) | 16 | 375 | 89 | 160 | 1 | 11 | 8 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |

| Activities | VOC | CO | CO[5] | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|---|
| **Year 2023** | | | | | | | |
| Emissions (tons/year) | 9 | 92 | 22 | 84 | 1 | 6 | 4 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2023 with Refined CCNM Design Option** | | | | | | | |
| Emissions (tons/year) | 9 | 92 | 22 | 87 | 1 | 6 | 4 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2024** | | | | | | | |
| Emissions (tons/year) | 7 | 52 | 12 | 51 | 1 | 4 | 3 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2025** | | | | | | | |
| Emissions (tons/year) | 2 | 13 | 3 | 15 | 1 | 1 | 1 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2026** | | | | | | | |
| Emissions (tons/year) | 2 | 12 | 3 | 15 | 1 | 1 | 1 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |

1 These construction emissions were established for the Fresno to Bakersfield Locally Generated Alternative, which includes the entire alignment from Fresno to Bakersfield.

2 The SJVAPCD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, ROG, VOC, $PM_{10}$, and $PM_{2.5}$ in the *Guide for Assessing and Mitigating Air Quality Impacts* (San Joaquin Valley Air Pollution Control District 2015).

3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the SJVAB federal attainment status. The SJVAB is considered in extreme nonattainment for the ozone NAAQS, is a nonattainment area for $PM_{2.5}$, and is a maintenance area for the CO NAAQS (Fresno and Bakersfield urbanized areas only) and $PM_{10}$ NAAQS. Although the SJVAB is in attainment for $SO_X$, since $SO_X$ is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* threshold was used.

4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

5 Bakersfield urbanized maintenance area only.

CCNM = César E. Chávez National Monument
CEQA = California Environmental Quality Act
CO = carbon monoxide
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$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAB = San Joaquin Valley Air Basin
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxide
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-26 Estimated Annual Average Emissions for the Eastern Kern Air Pollution Control District—Alternative 3**

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| EKAPCD annual CEQA significance thresholds[2] | 25 | N/A | 25 | 27 | 15 | 15 |
| Annual General Conformity *de minimis* levels applicable to the EKAPCD[3] | 50 | N/A | 50 | N/A | 70 | N/A |
| **Year 2018** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2019** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2020** | | | | | | |
| Emissions (tons/year) | 17 | 161 | 184 | 1 | 10 | 7 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2021** | | | | | | |
| Emissions (tons/year) | 27 | 534 | 277 | 1 | 17 | 13 |
| Exceeds EKAPCD CEQA thresholds? | Yes | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2022** | | | | | | |
| Emissions (tons/year) | 24 | 521 | 233 | 1 | 16 | 12 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2022 with Refined CCNM Design Option** | | | | | | |
| Emissions (tons/year) | 24 | 524 | 269 | 1 | 16 | 12 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| **Year 2023** | | | | | | |
| Emissions (tons/year) | 13 | 137 | 132 | 1 | 10 | 7 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2023 with Refined CCNM Design Option** | | | | | | |
| Emissions (tons/year) | 13 | 138 | 142 | 1 | 10 | 7 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2024** | | | | | | |
| Emissions (tons/year) | 7 | 57 | 57 | 1 | 5 | 3 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2025** | | | | | | |
| Emissions (tons/year) | 3 | 17 | 20 | 1 | 1 | 1 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2026** | | | | | | |
| Emissions (tons/year) | 2 | 17 | 20 | 1 | 1 | 1 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |

1 These construction emissions were established for the alignment from Bakersfield to Palmdale.
2 The EKAPCD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, VOC, $PM_{10}$, and $PM_{2.5}$.
3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the EKAPCD federal attainment status. The EKAPCD is considered an unclassifiable/attainment area for the $PM_{2.5}$, $PM_{10}$, and CO NAAQS, and is unclassified for the $NO_2$ and $SO_X$ NAAQS.
4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

CEQA = California Environmental Quality Act
CO = carbon monoxide
EKAPCD = Eastern Kern Air Pollution Control District
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxides
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-27 Estimated Annual Average Emissions for the Antelope Valley Air Quality Management District—Alternative 3**

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| AVAQMD annual CEQA significance thresholds[2] | 25 | 100 | 25 | 25 | 15 | 12 |
| Annual General Conformity *de minimis* levels applicable to the AVAQMD[3] | 25 | N/A | 25 | N/A | N/A | N/A |
| **Year 2018** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2019** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2020** | | | | | | |
| Emissions (tons/year) | 3 | 53 | 46 | 1 | 3 | 2 |
| Exceeds AVAQMD CEQA thresholds? | No | No | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2021** | | | | | | |
| Emissions (tons/year) | 8 | 232 | 84 | 1 | 6 | 4 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2022** | | | | | | |
| Emissions (tons/year) | 9 | 239 | 88 | 1 | 6 | 5 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2023** | | | | | | |
| Emissions (tons/year) | 3 | 39 | 35 | 1 | 2 | 1 |
| Exceeds AVAQMD CEQA thresholds? | No | No | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| **Year 2024** | | | | | | |
| Emissions (tons/year) | 2 | 1 | 17 | 1 | 1 | 1 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2025** | | | | | | |
| Emissions (tons/year) | 1 | 8 | 10 | 1 | 1 | 1 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2026** | | | | | | |
| Emissions (tons/year) | 1 | 8 | 10 | 1 | 1 | 1 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |

1 These construction emissions were established for the alignment from Bakersfield to Palmdale.
2 The AVAQMD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, VOC, $PM_{10}$, and $PM_{2.5}$.
3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the AVAQMD federal attainment status. The AVAQMD is considered an unclassifiable/attainment area for $PM_{2.5}$, $NO_X$, and $SO_X$ NAAQS, an unclassified area for $PM_{10}$ NAAQS, and an attainment area for CO NAAQS.
4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

AVAQMD = Antelope Valley Air Quality Management District
CEQA = California Environmental Quality Act
CO = carbon monoxide
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxides
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-28 Estimated Annual Average Emissions for the San Joaquin Valley Air Pollution Control District—Alternative 5**

| Activities | VOC | CO | CO[5] | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|---|
| SJVAPCD annual CEQA significance thresholds[2] | 10 | 100 | N/A | 10 | 27 | 15 | 15 |
| Annual General Conformity *de minimis* levels applicable to the SJVAB[3] | 10 | N/A | 100 | 10 | N/A | 100 | 100 |
| **Year 2018** | | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | No | N/A | No | No |
| **Year 2019** | | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | No | N/A | No | No |
| **Year 2020** | | | | | | | |
| Emissions (tons/year) | 15 | 177 | 42 | 155 | 1 | 10 | 7 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2021** | | | | | | | |
| Emissions (tons/year) | 17 | 380 | 90 | 177 | 1 | 11 | 9 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2022** | | | | | | | |
| Emissions (tons/year) | 16 | 378 | 90 | 161 | 1 | 11 | 8 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2022 with Refined CCNM Design Option** | | | | | | | |
| Emissions (tons/year) | 16 | 378 | 90 | 170 | 1 | 11 | 8 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |

| Activities | VOC | CO | CO[5] | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|---|
| **Year 2023** | | | | | | | |
| Emissions (tons/year) | 13 | 357 | 85 | 128 | 1 | 9 | 7 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2023 with Refined Design Option** | | | | | | | |
| Emissions (tons/year) | 13 | 358 | 85 | 131 | 1 | 9 | 7 |
| Exceeds SJVAPCD CEQA thresholds? | Yes | Yes | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | Yes | N/A | No | Yes | N/A | No | No |
| **Year 2024** | | | | | | | |
| Emissions (tons/year) | 6 | 50 | 12 | 50 | 1 | 4 | 3 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2025** | | | | | | | |
| Emissions (tons/year) | 5 | 29 | 7 | 32 | 1 | 2 | 2 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |
| **Year 2026** | | | | | | | |
| Emissions (tons/year) | 2 | 11 | 3 | 13 | 1 | 1 | 1 |
| Exceeds SJVAPCD CEQA thresholds? | No | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | Yes | N/A | No | No |

1 These construction emissions were established for the Fresno to Bakersfield Locally Generated Alternative, which includes the entire alignment from Fresno to Bakersfield.

2 The SJVAPCD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, ROG, VOC, $PM_{10}$, and $PM_{2.5}$ in the *Guide for Assessing and Mitigating Air Quality Impacts* (San Joaquin Valley Air Pollution Control District 2015).

3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the SJVAB federal attainment status. The SJVAB is considered in extreme nonattainment for the ozone NAAQS, is a nonattainment area for $PM_{2.5}$, and is a maintenance area for the CO NAAQS (Fresno and Bakersfield urbanized areas only) and $PM_{10}$ NAAQS. Although the SJVAB is in attainment for $SO_X$, since $SO_X$ is a precursor for $PM_{2.5}$, the $PM_{2.5}$ General Conformity *de minimis* threshold was used.

4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

5 Bakersfield urbanized maintenance area only.

CCNM = César E. Chávez National Monument
CEQA = California Environmental Quality Act
CO = carbon monoxide
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAB = San Joaquin Valley Air Basin
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxide
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-29 Estimated Annual Average Emissions for the Eastern Kern Air Pollution Control District—Alternative 5**

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| EKAPCD annual CEQA significance thresholds[2] | 25 | N/A | 25 | 27 | 15 | 15 |
| Annual General Conformity *de minimis* levels applicable to the EKAPCD[3] | 50 | N/A | 50 | N/A | 70 | N/A |
| **Year 2018** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2019** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2020** | | | | | | |
| Emissions (tons/year) | 18 | 127 | 187 | 1 | 12 | 9 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2021** | | | | | | |
| Emissions (tons/year) | 27 | 540 | 279 | 1 | 18 | 14 |
| Exceeds EKAPCD CEQA thresholds? | Yes | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2022** | | | | | | |
| Emissions (tons/year) | 24 | 522 | 232 | 1 | 15 | 12 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2022 with Refined CCNM Design Option** | | | | | | |
| Emissions (tons/year) | 24 | 525 | 268 | 1 | 15 | 12 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | Yes | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| **Year 2023** | | | | | | |
| Emissions (tons/year) | 19 | 491 | 183 | 1 | 12 | 10 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2023 with Refined CCNM Design Option** | | | | | | |
| Emissions (tons/year) | 19 | 492 | 193 | 1 | 12 | 10 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2024** | | | | | | |
| Emissions (tons/year) | 7 | 54 | 54 | 1 | 4 | 3 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | No | N/A |
| **Year 2025** | | | | | | |
| Emissions (tons/year) | 6 | 37 | 41 | 1 | 3 | 3 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |
| **Year 2026** | | | | | | |
| Emissions (tons/year) | 2 | 14 | 17 | 1 | 1 | 1 |
| Exceeds EKAPCD CEQA thresholds? | No | N/A | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | No | N/A |

1 These construction emissions were established for the alignment from Bakersfield to Palmdale.
2 The EKAPCD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, VOC, $PM_{10}$, and $PM_{2.5}$.
3 The General Conformity *de minimis* thresholds for criteria pollutants are based on the EKAPCD federal attainment status. The EKAPCD is considered an unclassifiable/attainment area for the $PM_{2.5}$, $PM_{10}$, and CO NAAQS, and is unclassified for the $NO_2$ and $SO_X$ NAAQS.
4 $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

CCNM = César E. Chávez National Monument
CEQA = California Environmental Quality Act
CO = carbon monoxide
EKAPCD = Eastern Kern Air Pollution Control District
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxides
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-30 Estimated Annual Average Emissions for the Antelope Valley Air Quality Management District—Alternative 5**

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| AVAQMD annual CEQA significance thresholds[2] | 25 | 100 | 25 | 25 | 15 | 12 |
| Annual General Conformity *de minimis* levels applicable to the AVAQMD[3] | 25 | N/A | 25 | N/A | N/A | N/A |
| **Year 2018** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2019** | | | | | | |
| Emissions (tons/year) | 0 | 0 | 0 | 0 | 0 | 0 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |
| **Year 2020** | | | | | | |
| Emissions (tons/year) | 16 | 177 | 155 | 1 | 10 | 7 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2021** | | | | | | |
| Emissions (tons/year) | 17 | 380 | 177 | 1 | 11 | 9 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2022** | | | | | | |
| Emissions (tons/year) | 16 | 378 | 161 | 1 | 11 | 8 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2023** | | | | | | |
| Emissions (tons/year) | 13 | 357 | 128 | 1 | 9 | 7 |
| Exceeds AVAQMD CEQA thresholds? | No | Yes | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |

| Activities | VOC | CO | $NO_X$ | $SO_2$ | $PM_{10}$[4] | $PM_{2.5}$[4] |
|---|---|---|---|---|---|---|
| **Year 2024** | | | | | | |
| Emissions (tons/year) | 6 | 50 | 50 | 1 | 4 | 3 |
| Exceeds AVAQMD CEQA thresholds? | No | No | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2025** | | | | | | |
| Emissions (tons/year) | 5 | 29 | 32 | 1 | 1 | 1 |
| Exceeds AVAQMD CEQA thresholds? | No | No | Yes | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | Yes | N/A | N/A | N/A |
| **Year 2026** | | | | | | |
| Emissions (tons/year) | 2 | 11 | 13 | 1 | 1 | 1 |
| Exceeds AVAQMD CEQA thresholds? | No | No | No | No | No | No |
| Exceeds General Conformity threshold? | No | N/A | No | N/A | N/A | N/A |

[1] These construction emissions were established for the alignment from Bakersfield to Palmdale.
[2] The AVAQMD has identified construction emissions significance thresholds for CO, $SO_2$, $NO_X$, VOC, $PM_{10}$, and $PM_{2.5}$.
[3] The General Conformity *de minimis* thresholds for criteria pollutants are based on the AVAQMD federal attainment status. The AVAQMD is considered an unclassifiable/attainment area for $PM_{2.5}$, $NO_X$, and $SO_X$ NAAQS, an unclassified area for $PM_{10}$ NAAQS, and an attainment area for CO NAAQS.
[4] $PM_{10}$ and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program Environmental Impact Report/Environmental Impact Statement (California High-Speed Rail Authority 2005).

AVAQMD = Antelope Valley Air Quality Management District
CEQA = California Environmental Quality Act
CO = carbon monoxide
N/A = not applicable
NAAQS = National Ambient Air Quality Standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
$SO_X$ = sulfur oxides
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

The analysis acknowledges that, without mitigation, exceedances of the SJVAPCD's VOC, CO, and $NO_X$ thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for VOC, CO, and $NO_X$ at a regional level without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and the CAAQS for these pollutants. VOC and $NO_x$ emissions would be offset through a VERA between the Authority and the SJVAPCD (AQ-MM#1, resulting in no net increase in regional VOC and $NO_x$ emission burdens due to the project. However, the emissions offset program does not apply to CO emissions; therefore, the project would continue to exceed the significance thresholds for CO.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and the CAAQS at a localized level. The local air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As detailed in Section 4.1.1 of the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b), ground-level $O_3$ (smog) is not directly emitted into the air but is formed when precursor pollutants $NO_x$ and VOCs enter the atmosphere and undergo complex chemical reactions in the process with sunlight. Once formed, $O_3$ can be transported long distances by wind. Because of the complexity of $O_3$ formation, a specific tonnage amount of $NO_x$ (or VOCs) emitted in a particular area does not translate to a particular concentration of $O_3$ in that area. It is therefore not possible to predict whether $NO_x$ or VOC $O_3$ precursor emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the VERA. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risks or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emission SJVAPCD CEQA thresholds for VOCs in 2020, 2021, 2022, and 2023; for CO in 2020, 2021, 2022, and 2023; and for $NO_X$ in 2018, 2020, 2021, 2022, 2023, 2024, 2025, and 2026. Therefore, construction emissions of these pollutants may cause significant impacts on air quality under CEQA, and may also impede or obstruct implementation of the 8-hour SJVAPCD 2007 Ozone Plan, or the 2013 Plan for the Revoked 1-hour Ozone Standard the 2007 $PM_{10}$ Maintenance Plan, and the 2015 $PM_{2.5}$ Plan. Impacts of $SO_2$ emissions are expected to be less than significant.

With on-site minimization features (AQ-IAMF#4), VOC, $NO_X$, $PM_{10}$, and $PM_{2.5}$, impacts would be reduced but could remain significant under CEQA. As stated in the SJVAPCD's 2015 GAMAQI (SJVAPCD 2015a), purchase of offset emissions through a VERA with the SJVAPCD (Mitigation Measure AQ-MM#1) for VOC and $NO_x$ would be required to reduce impacts to a less than significant level after mitigation under CEQA. However, CO emissions would remain significant. Therefore, this impact would be significant and unavoidable after mitigation under CEQA.

***Construction Impacts within the Eastern Kern Air Pollution Control District***

The construction emission estimates shown in Table 3.3-19 through Table 3.3-30 assume standard diesel fuel, which results in exhaust emissions that are approximately 30 percent higher than renewable diesel. The results also assume twice-per-day water application, which reduces fugitive emissions by 50 percent. AQ-IAMF#1 and AQ-IAMF#3 would be implemented during construction of the project. AQ-IAMF#1 would require the project contractor to prepare a fugitive dust control plan, which would be consistent with the EKAPCD's Rule 402. AQ-IAMF#1 would implement additional dust suppression methods, which would reduce the $PM_{10}$ fugitive dust emissions by up to 91 percent (SCAQMD 2007). AQ-IAMF#3 would require the use of renewable diesel fuel for all construction equipment. Therefore, $PM_{10}$ exhaust emissions would be

30 percent less with implementation of AQ-IAMF#3, while fugitive $PM_{10}$ emissions would be approximately 40 percent less than the emissions shown in Table 3.3-20.

Construction $PM_{10}$ emissions in 2021 are anticipated to be 18 tons per year, which would exceed the EKAPCD's threshold of 15 tons per year or less. Emission modeling indicates that approximately 58 percent of the PM emissions are attributable to exhaust emissions, while the other 42 percent is attributable to fugitive dust. With implementation of AQ-IAMF#1 and AQ-IAMF#3, total $PM_{10}$ emissions would be reduced to 11.65 tons per year, which would not exceed the EKAPCD threshold of 15 tons per year.

Construction emissions for the B-P Build Alternatives within the EKAPCD would exceed the General Conformity thresholds for $NO_X$ in 2019, 2020, 2021, 2022, 2023, 2024, and 2025. $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants. The purchase of offset emissions through the Emission Banking Certificate Program with the EKAPCD (Mitigation Measure AQ-MM#1) for $NO_X$ would reduce impacts after mitigation because $NO_X$ emissions would be offset and be reduced to a level below the General Conformity thresholds.

The analysis acknowledges that, without mitigation, exceedances of the EKAPCD's $NO_x$ thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for $NO_x$ at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and CAAQS for these pollutants. These emissions would be offset through the Emission Banking Certificate Program between the Authority and the EKAPCD (AQ-MM#1); resulting in no net increase in regional emission burdens due to the project.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The localized air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS. Although the area already exceeds the NAAQS and CAAQS for $PM_{10}$, project emissions would not substantially contribute to further exceedances of the $PM_{10}$ standard. The NAAQS and CAAQS are established to provide protection for the nation's public health and environment. As the project is not predicted to cause an exceedance of these standards or to substantially contribute to further exceedances of the $PM_{10}$ standard, the project would not adversely impact air quality or result in adverse health impacts.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_X$ and VOC emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the Emission Banking Certificate Program. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emission EKAPCD CEQA thresholds for $NO_X$ in 2018, 2019, 2020, 2021, 2022, 2023, 2024 and 2025. Therefore, construction emissions of $NO_X$, may cause significant impacts on air quality under CEQA. EKAPCD CEQA thresholds would not be exceeded for any of the other criteria pollutants. Therefore, impacts of the other criteria pollutants are expected to be less than significant. $NO_X$ emission impacts could remain significant under CEQA. The purchase of offset emissions through the EKAPCD's Emission Banking Certificate Program (Mitigation Measure AQ-MM#1) for $NO_X$ would be required to reduce impacts to less than significant after mitigation under CEQA.

***Construction Impacts within the Antelope Valley Air Quality Management District***

General Conformity thresholds within the AVAQMD would be exceeded for $NO_X$ in 2020, 2021, 2022, and 2023. $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants.

The purchase of offset emissions through the Air Quality Investment Program with the AVAQMD (Mitigation Measure AQ-MM#1) for $NO_X$ would reduce impacts after mitigation because $NO_X$ emissions would be offset.

The analysis acknowledges that, without mitigation, exceedances of the AVAQMD's $NO_x$ and CO thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for $NO_x$ and CO at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and the CAAQS for this pollutant. $NO_x$ emissions would be offset through the Air Quality Investment Program between the Authority and the AVAQMD (AQ-MM#1) resulting in no net increase in regional $NO_x$ emission burdens due to the project. However, the emissions offset program does not apply to CO emissions; therefore, the project would continue to exceed the significance thresholds for CO.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The localized air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_X$ and VOC emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the Air Quality Investment Program. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emissions AVAQMD CEQA thresholds for CO in 2021, 2022, and 2023, and $NO_X$ in 2020, 2021, 2022, and 2023. Therefore, construction emissions of CO and $NO_X$ may cause significant impacts on air quality under CEQA. The purchase of offset emissions through the AVAQMD's Air Quality Investment Program (Mitigation Measure AQ-MM#1) for $NO_X$ would be required to reduce impacts to less than significant after mitigation under CEQA. However, CO emissions would remain significant, as additional measures to reduce this impact are not available. Therefore, this impact would be significant and unavoidable after mitigation under CEQA.

**Alternative 2**

***Construction Impacts within the San Joaquin Valley Air Pollution Control District***

Direct emissions from the construction phase of the B-P Build Alternatives within the SJVAPCD would exceed the General Conformity thresholds for VOC in 2020, 2021, and 2022 and for $NO_X$ in 2020, 2021, 2022, 2023, 2024, 2025, and 2026. VOC, and $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants.

The purchase of offset emissions through a VERA with the SJVAPCD (Mitigation Measure AQ-MM#1) for VOC and $NO_X$ would reduce impacts after mitigation because VOC and $NO_x$ emissions would be offset and be below the General Conformity thresholds.

The analysis acknowledges that, without mitigation, exceedances of the SJVAPCD's VOC, CO, and $NO_x$ thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for VOC, CO, and $NO_x$ at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and the CAAQS for these pollutants. The VOC and $NO_x$ emissions would be offset through a VERA between the Authority and the SJVAPCD (AQ-MM#1), resulting in no net increase in regional VOC and $NO_x$ emission burdens due to the project. However, the emissions offset program does not apply to CO emissions; therefore, the project would continue to exceed the significance thresholds for CO.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The localized air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_x$ or VOC $O_3$ precursor emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the VERA. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emission SJVAPCD CEQA thresholds for VOC in 2020, 2021, and 2022; for CO in 2020, 2021, 2022, and 2023; and for $NO_X$ in 2020, 2021, 2022, 2023, 2024, 2025, and 2026. Therefore, construction emissions of these pollutants may cause significant impacts on air quality under CEQA, and may also impede or obstruct implementation of the 8-hour SJVAPCD 2007 Ozone Plan, or the 2013 Plan for the Revoked 1-hour Ozone Standard the 2007 $PM_{10}$ Maintenance Plan, and the 2015 $PM_{2.5}$ Plan. Impacts of $SO_2$ emissions are expected to be less than significant.

With on-site minimization measures (i.e., AQ-IAMF#4 and AQ-IAMF#5), VOC, $NO_X$, $PM_{10}$, and $PM_{2.5}$ impacts would be reduced but could remain significant under CEQA. As stated in the SJVAPCD's 2015 GAMAQI (SJVAPCD 2015a), purchase of offset emissions through a VERA with the SJVAPCD (Mitigation Measure AQ-MM#1) for VOC and $NO_x$ would be required to reduce impacts to a less than significant level after mitigation under CEQA. However, CO emissions would remain significant, as additional measures to reduce this impact are not available. Therefore, this impact would be significant and unavoidable after mitigation under CEQA.

***Construction Impacts within the Eastern Kern Air Pollution Control District***

The construction emission estimates shown in Table 3.3-19 through Table 3.3-30 assume the use of standard diesel fuel. Standard diesel fuel results in exhaust emissions that are approximately 30 percent higher than renewable diesel. The results also assume twice-per-day water application, which reduces fugitive emissions by 50 percent. AQ-IAMF#1 and AQ-IAMF#3 would be implemented during construction of the project. AQ-IAMF#1 would require the project contractor to prepare a fugitive dust control plan, which would be consistent with the EKAPCD's Rule 402. AQ-IAMF#1 would implement additional dust suppression methods that would reduce the $PM_{10}$ fugitive dust emissions by up to 91 percent (SCAQMD 2007). AQ-IAMF#3 would require the use of renewable diesel fuel for all construction equipment. Therefore, $PM_{10}$ exhaust emissions would be 30 percent less with implementation of AQ-IAMF#3, while fugitive $PM_{10}$ emissions would be approximately 40 percent less than the emissions shown in Table 3.3-23.

Construction $PM_{10}$ emissions in 2021 are anticipated to be 22 tons per year, which would exceed the EKAPCD's threshold of 15 tons per year or less. Emission modeling indicates that approximately 58 percent of the PM emissions are attributable to exhaust emissions, while the

other 42 percent is attributable to fugitive dust emissions. With implementation of AQ-IAMF#1 and AQ-IAMF#3, total $PM_{10}$ emissions would be reduced to 14 tons per year, which would not exceed the EKAPCD 15 tons per year threshold.

Construction emissions for the B-P Build Alternatives within the EKAPCD would exceed the General Conformity thresholds for $NO_X$ in 2020, 2021, 2022, and 2023. $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants. The purchase of offset emissions through the Emission Banking Certificate Program with the EKAPCD (Mitigation Measure AQ-MM#1) for $NO_X$ would reduce impacts after mitigation because $NO_X$ emissions would be offset and be reduced to a level below the General Conformity thresholds.

The analysis acknowledges that, without mitigation, exceedances of the EKAPCD's $NO_X$ thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for $NO_X$ at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and CAAQS for this pollutant. These emissions would be offset through the Emission Banking Certificate Program between the Authority and the EKAPCD (AQ-MM#1), resulting in no net increase in regional emission burdens due to the project.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The localized air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_X$ and VOC emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the Emission Banking Certificate Program. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emission EKAPCD CEQA thresholds for VOC in 2021 and for $NO_X$ in 2020, 2021, 2022, 2023, and 2024. Therefore, construction emissions of VOC and $NO_X$, may cause significant impacts on air quality under CEQA. EKAPCD CEQA thresholds would not be exceeded for any of the other criteria pollutants. Therefore, impacts of the other criteria pollutants are expected to be less than significant. VOC and $NO_X$ emission impacts could remain significant under CEQA, and the purchase of offset emissions through the EKAPCD's Emission Banking Certificate Program (Mitigation Measure AQ-MM#1) for VOC and $NO_X$ would be required to reduce impacts to less than significant after mitigation under CEQA.

***Construction Impacts within the Antelope Valley Air Quality Management District***

General Conformity thresholds within the AVAQMD would be exceeded for $NO_X$ in 2020, 2021, 2022, 2023, 2024, and 2025. $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants.

The purchase of offset emissions through the Air Quality Investment Program with the AVAQMD (Mitigation Measure AQ-MM#1) for $NO_X$ would reduce impacts after mitigation because $NO_x$ emissions would be offset.

The analysis acknowledges that, without mitigation, exceedances of the AVAQMD's $NO_x$ and CO thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for $NO_X$ and CO at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and CAAQS for this pollutant. $NO_x$ emissions would be offset through the Air Quality Investment Program between the Authority and the AVAQMD (AQ-MM#1), resulting in no net increase in regional $NO_x$ emission burdens due to the project. However, the emissions offset program does not apply to CO emissions; therefore, the project would continue to exceed the significance thresholds for CO.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The localized air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_X$ $O_3$ precursor emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the Air Quality Investment Program. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emissions AVAQMD CEQA thresholds for CO in 2021, 2022, and 2023, and for $NO_X$ in 2020, 2021, 2022, 2023, 2024, and 2025. Therefore, construction emissions of CO and $NO_X$ may cause significant impacts on air quality under CEQA. Impacts of the other criteria pollutants are expected to be less than significant. With on-site minimization measures (i.e., AQ-IAMF#4 and AQ-IAMF#5), VOC, CO, $NO_X$, $PM_{10}$, and $PM_{2.5}$ impacts would be reduced, but CO and $NO_X$ emission impacts could remain significant under CEQA. The purchase of offset emissions through the AVAQMD's Air Quality Investment Program (Mitigation Measure AQ-MM#1) for $NO_X$ would be required to reduce impacts to a less than significant level after mitigation under CEQA. However CO emissions would remain significant. Therefore, this impact would be significant and unavoidable after mitigation under CEQA.

**Alternative 3**

***Construction Impacts within the San Joaquin Valley Air Pollution Control District***

Direct emissions from the construction phase of the B-P Build Alternatives within the SJVAPCD would exceed the General Conformity thresholds for VOC in 2020, 2021, and 2022 and for $NO_X$ in 2020, 2021, 2022, 2023, 2024, 2025, and 2026. VOC and $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants.

The purchase of offset emissions through a VERA with the SJVAPCD (Mitigation Measure AQ-MM#1) for VOC and $NO_X$ would reduce impacts after mitigation because VOC and $NO_x$ emissions would be offset and be below the General Conformity thresholds.

The analysis acknowledges that, without mitigation, exceedances of the SJVAPCD's VOC, CO, and $NO_X$ thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for VOC, CO, and $NO_X$ at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and the CAAQS for these pollutants. VOC and $NO_x$ emissions would be offset through a VERA between the Authority and the SJVAPCD (AQ-MM#1), resulting in no net increase in regional VOC and $NO_x$ emission

burdens due to the project. However, the emissions offset program does not apply to CO emissions; therefore, the project would continue to exceed the significance thresholds for CO.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The local air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_x$ or VOC $O_3$ precursor emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the VERA. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emission SJVAPCD CEQA thresholds for VOC in 2020, 2021, and 2022; for CO in 2020, 2021, and 2022; and for $NO_X$ in 2020, 2021, 2022, 2023, 2024, 2025, and 2026. Therefore, construction emissions of these pollutants may cause significant impacts on air quality under CEQA and may also impede or obstruct implementation of the 8-hour SJVAPCD 2007 Ozone Plan, or the 2013 Plan for the Revoked 1-hour Ozone Standard, the 2007 $PM_{10}$ Maintenance Plan, and the 2015 $PM_{2.5}$ Plan. Impacts of $SO_2$ emissions are expected to be less than significant.

With on-site IAMFs (i.e., AQ-IAMF#4 and AQ-IAMF#5), VOC, $NO_X$, $PM_{10}$, and $PM_{2.5}$ impacts would be reduced but could remain significant under CEQA. As stated in the SJVAPCD's 2015 GAMAQI (SJVAPCD 2015), purchase of offset emissions through a VERA with the SJVAPCD (Mitigation Measure AQ-MM#1) for VOC and $NO_x$ would be required to reduce impacts to a less than significant level after mitigation under CEQA. However, CO emissions would remain significant. Therefore, this impact would be significant and unavoidable after mitigation under CEQA.

***Construction Impacts within the Eastern Kern Air Pollution Control District***

The construction emission estimates shown in Table 3.3-19 through Table 3.3-30 assume the use of standard diesel fuel. Standard diesel fuel results in exhaust emissions that are approximately 30 percent higher than renewable diesel. The results also assume twice-per-day water application, which reduces fugitive emissions by 50 percent. AQ-IAMF#1 and AQ-IAMF#3 would be implemented during construction of the project. AQ-IAMF#1 would require the project contractor to prepare a fugitive dust control plan, which would be consistent with the EKAPCD's Rule 402. AQ-IAMF#1 would implement additional dust suppression methods that would reduce the $PM_{10}$ fugitive dust emissions by up to 91 percent (SCAQMD 2007). AQ-IAMF#3 would require the use of renewable diesel fuel for all construction equipment. Therefore, $PM_{10}$ exhaust emissions would be 30 percent less with implementation of AQ-IAMF#3, while fugitive $PM_{10}$ emissions would be approximately 40 percent less than the emissions shown in Table 3.3-23.

Construction $PM_{10}$ emissions in 2021 are anticipated to be 17 tons per year and construction $PM_{10}$ emissions in 2022 are anticipated to be 16 tons per year, which would exceed the EKAPCD's threshold of 15 tons per year. Emission modeling indicates that approximately 58 percent of the PM emissions are attributable to exhaust emissions, while the other 42 percent is attributable to fugitive dust emissions. With implementation of AQ-IAMF#1 and AQ-IAMF#3, total $PM_{10}$ emissions would be reduced to 11 tons per year in 2021 and 2022, which would not exceed the EKAPCD 15 tons per year threshold.

Construction emissions for the B-P Build Alternatives within the EKAPCD would exceed General Conformity thresholds for $NO_X$ in 2020, 2021, 2022, 2023, and 2024. $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air

quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants.

The purchase of offset emissions through the Emission Banking Certificate Program with the EKAPCD (Mitigation Measure AQ-MM#1) for $NO_X$ would reduce impacts after mitigation because $NO_X$ emissions would be offset and be reduced to a level below the General Conformity thresholds.

The analysis acknowledges that, without mitigation, exceedances of the EKAPCD's $NO_X$ thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for $NO_x$ at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and CAAQS for this pollutant. These emissions would be offset through the Emission Banking Certificate Program between the Authority and the EKAPCD (AQ-MM#1), resulting in no net increase in regional emission burdens due to the project.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The localized air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_X$ $O_3$ precursor emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the Emission Banking Certificate Program. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emission EKAPCD CEQA thresholds for VOC in 2021, $NO_X$ in 2020, 2021, 2022, 2023, and 2024. Therefore, construction emissions of VOC and $NO_X$ may cause significant impacts on air quality under CEQA. EKAPCD CEQA thresholds would not be exceeded for any of the other criteria pollutants. Therefore, impacts of the other criteria pollutants are expected to be less than significant. With on-site minimization measures (i.e., AQ-IAMF#4 and AQ-IAMF#5), VOC, CO, $NO_X$, $PM_{10}$, and $PM_{2.5}$ impacts would be reduced, but VOC and $NO_X$ emission impacts could remain significant under CEQA. The purchase of offset emissions through the EKAPCD's Emission Banking Certificate Program (Mitigation Measure AQ-MM#1) for VOC and $NO_X$ would be required to reduce impacts to less than significant after mitigation under CEQA.

***Construction Impacts within the Antelope Valley Air Quality Management District***

General Conformity thresholds within the AVAQMD would be exceeded for $NO_X$ in 2020, 2021, 2022, and 2023. $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants.

The purchase of offset emissions through the Air Quality Investment Program with the AVAQMD (Mitigation Measure AQ-MM#1) for $NO_X$ would reduce impacts after mitigation because $NO_X$ emissions would be offset.

The analysis acknowledges that, without mitigation, exceedances of the AVAQMD's $NO_X$ and CO thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for $NO_X$ and CO at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to

cause or exacerbate an exceedance of the NAAQS and CAAQS for this pollutant. $NO_x$ emissions would be offset through the Air Quality Investment Program between the Authority and the AVAQMD (AQ-MM#1), resulting in no net increase in regional $NO_x$ emission burdens due to the project. However, the emissions offset program does not apply to CO emissions; therefore, the project would continue to exceed the significance thresholds for CO.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The localized air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_X$ $O_3$ precursor emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the Air Quality Investment Program. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emissions AVAQMD CEQA thresholds for CO in 2021 and 2022 and for $NO_X$ in 2020, 2021, 2022, and 2023. Therefore, construction emissions of CO and $NO_X$ may cause significant impacts on air quality under CEQA. Impacts of the other criteria pollutants are expected to be less than significant. With on-site minimization measures (i.e., AQ-IAMF#4 and AQ-IAMF#5), VOC, CO, $NO_X$, $PM_{10}$, and $PM_{2.5}$ impacts would be reduced, but CO and $NO_X$ emission impacts could remain significant under CEQA. The purchase of offset emissions through the AVAQMD's Air Quality Investment Program (Mitigation Measure AQ-MM#1) for $NO_X$ would be required to reduce impacts to less than significant after mitigation under CEQA. However, CO emissions would remain significant. Therefore, this impact would be significant and unavoidable after mitigation under CEQA.

**Alternative 5**

***Construction Impacts within the San Joaquin Valley Air Pollution Control District***

Direct emissions from the construction phase of the B-P Build Alternatives within the SJVAPCD would exceed the General Conformity thresholds for VOC in 2020, 2021, 2022, and 2023 and for $NO_X$ in 2020, 2021, 2022, 2023, 2024, 2025, and 2026. VOC and $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants.

The purchase of offset emissions through a VERA with the SJVAPCD (Mitigation Measure AQ-MM#1) for VOC and $NO_X$ would reduce impacts after mitigation because VOC and $NO_x$ emissions would be offset and be below the General Conformity thresholds.

The analysis acknowledges that, without mitigation, exceedances of the SJVAPCD's VOC, CO, and $NO_X$ thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for VOC, CO, and $NO_X$ at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and the CAAQS for these pollutants. VOC and $NO_x$ emissions would be offset through a VERA between the Authority and the SJVAPCD (AQ-MM#1, resulting in no net increase in regional VOC and $NO_x$ emission burdens due to the project. However, the emissions offset program does not apply to CO emissions; therefore, the project would continue to exceed the significance thresholds for CO.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The local air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_X$ or VOC $O_3$ precursor emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the VERA. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emission SJVAPCD CEQA thresholds for VOC in 2020, 2021, 2022, and 2023; for CO in 2020, 2021, 2022, and 2023; and for $NO_X$ in 2020, 2021, 2022, 2023, 2024, 2025, and 2026. Therefore, construction emissions of these pollutants may cause significant impacts on air quality under CEQA, and may also impede or obstruct implementation of the 8-hour SJVAPCD 2007 Ozone Plan, or the 2013 Plan for the Revoked 1-hour Ozone Standard the 2007 $PM_{10}$ Maintenance Plan, and the 2015 $PM_{2.5}$ Plan. Impacts of $SO_2$ emissions are expected to be less than significant.

With on-site minimization measures (i.e., AQ-IAMF#4 and AQ-IAMF#5), VOC, $NO_X$, $PM_{10}$, and $PM_{2.5}$ impacts would be reduced but could remain significant under CEQA. As stated in the SJVAPCD's 2015 GAMAQI (SJVAPCD 2015a), purchase of offset emissions through a VERA with the SJVAPCD (Mitigation Measure AQ-MM#1) for VOC and $NO_x$ would be required to reduce impacts to less than significant after mitigation under CEQA. However CO emissions would remain significant. Therefore, this impact would be significant and unavoidable after mitigation under CEQA.

***Construction Impacts within the Eastern Kern Air Pollution Control District***

The construction emission estimates shown in Table 3.3-19 through Table 3.3-30 assume the use of standard diesel fuel. Standard diesel fuel results in exhaust emissions that are approximately 30 percent higher than renewable diesel. The results also assume twice-per-day water application, which reduces fugitive emissions by 50 percent. AQ-IAMF#1 and AQ-IAMF#3 would be implemented during construction of the project. AQ-IAMF#1 would require the project contractor to prepare a fugitive dust control plan, which would be consistent with the EKAPCD's Rule 402. AQ-IAMF#1 would implement additional dust suppression methods that would reduce the $PM_{10}$ fugitive dust emissions by up to 91 percent (SCAQMD 2007). AQ-IAMF#3 would require the use of renewable diesel fuel for all construction equipment. Therefore, $PM_{10}$ exhaust emissions would be 30 percent less with implementation of AQ-IAMF#3, while fugitive $PM_{10}$ emissions would be approximately 40 percent less than the emissions shown in Table 3.3-23.

Construction $PM_{10}$ emissions in 2021 are anticipated to be 18 tons. Emission modeling indicates that approximately 58 percent of the PM emissions are attributable to exhaust emissions, while the other 42 percent is attributable to fugitive dust emissions. With implementation of AQ-IAMF#1 and AQ-IAMF#3, total $PM_{10}$ emissions would be reduced to 12 tons, which would not exceed the EKAPCD 15 tons per year threshold.

Construction emissions for the B-P Build Alternatives within the EKAPCD would exceed General Conformity thresholds for $NO_X$ in 2020, 2021, 2022, 2023, and 2024. $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants.

The purchase of offset emissions through the Emission Banking Certificate Program with the EKAPCD (Mitigation Measure AQ-MM#1) for $NO_X$ would reduce impacts after mitigation because

$NO_X$ emissions would be offset and be reduced to a level below the General Conformity thresholds.

The analysis acknowledges that, without mitigation, exceedances of the EKAPCD's $NO_X$ thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for $NO_x$ at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and CAAQS for this pollutant. These emissions would be offset through the Emission Banking Certificate Program between the Authority and the EKAPCD (AQ-MM#1), resulting in no net increase in regional emission burdens due to the project.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The local air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_X$ and VOC emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the Emission Banking Certificate Program. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emission EKAPCD CEQA thresholds for VOC in 2021 and for $NO_X$ in 2020, 2021, 2022, 2023, 2024, and 2025. Therefore, construction emissions of VOC and $NO_X$ may cause significant impacts on air quality under CEQA. EKAPCD CEQA thresholds would not be exceeded for any of the other criteria pollutants. Therefore, impacts of the other criteria pollutants are expected to be less than significant. The purchase of offset emissions through the EKAPCD's Emission Banking Certificate Program (Mitigation Measure AQ-MM#1) would be required to reduce VOC and $NO_X$ impacts to less than significant after mitigation under CEQA.

***Construction Impacts within the Antelope Valley Air Quality Management District***

General Conformity thresholds within the AVAQMD would be exceeded for $NO_X$ in 2020, 2021, 2022, 2023, 2024, and 2025. $NO_X$ emissions that exceed the General Conformity thresholds are therefore considered to have the potential to cause air quality impacts. General Conformity thresholds would not be exceeded for any of the other criteria pollutants.

The purchase of offset emissions through the Air Quality Investment Program with the AVAQMD (Mitigation Measure AQ-MM#1) for $NO_X$ would reduce impacts after mitigation because $NO_x$ emissions would be offset.

The analysis acknowledges that, without mitigation, exceedances of the AVAQMD's $NO_X$ and CO thresholds of significance may occur during specific construction periods. Although the project would exceed the significance thresholds for $NO_X$ and CO at a regional level, without mitigation, no localized adverse health effects are predicted to occur because the project is not predicted to cause or exacerbate an exceedance of the NAAQS and the CAAQS for these pollutants. $NO_x$ emissions would be offset through the Air Quality Investment Program between the Authority and the AVAQMD (AQ-MM#1), resulting in no net increase in regional $NO_x$ emission burdens due to the project. However, the emissions offset program does not apply to CO emissions; therefore, the project would continue to exceed the significance thresholds for CO.

In contrast to emissions burdens, emission concentrations reflect the quality of the air in terms of the amount of pollution per unit volume and are used to measure a project's compliance with the NAAQS and CAAQS at a localized level. The localized air quality analysis for the project concludes that the project would not cause or exacerbate an exceedance of the applicable NAAQS or CAAQS.

Although construction activities would emit $O_3$ precursors, that alone would not cause adverse health effects related to $O_3$. As described above, it is not possible to predict whether $NO_X$ $O_3$ precursor emissions would result in localized health effects related to $O_3$. Moreover, and in any event, emissions of $O_3$ precursors caused by the project would be offset through the Air Quality Investment Program. Therefore, no increases in $O_3$ levels are expected to occur as a result of the project.

In addition, a health risk assessment was conducted, and it was determined that the project would not exceed applicable thresholds for cancer risk or for acute and chronic noncancer health impacts.

**CEQA Conclusion**

Construction emissions would exceed the mass emissions AVAQMD CEQA thresholds for CO in 2020, 2021, 2022, and 2023 and for $NO_X$ in 2020, 2021, 2022, 2023, 2024, and 2025. Therefore, construction emissions of CO and $NO_X$ may cause significant impacts on air quality under CEQA. Impacts of the other criteria pollutants are expected to be less than significant. The purchase of offset emissions through the AVAQMD's Air Quality Investment Program (Mitigation Measure AQ-MM#1) would be required to reduce $NO_X$ impacts to a less than significant level after mitigation under CEQA. However, CO emissions would remain significant. Therefore, this impact would be significant and unavoidable after mitigation under CEQA.

***Impact AQ #2: Compliance with Air Quality Plans during Construction (Threshold #1)***

Planning documents for pollutants for which the study area is classified as a federal nonattainment or maintenance area are developed by the SJVAPCD, the EKAPCD, the AVAQMD, and CARB and approved by the USEPA. The study area air districts are presently guided by the California SIP (CARB 2012) and other planning documents.

The applicable air quality plans for the SJVAPCD include the 2016 Plan for the 2008 8-Hour Ozone Standard, the 2004 Extreme Ozone Attainment Demonstration Plan, the 2015 $PM_{2.5}$ Plan, the 2004 Revision to the California State Implementation Plan for Carbon Monoxide, and the 2007 $PM_{10}$ Maintenance Plan and Request for Redesignation. The applicable air quality plans for the EKAPCD include the 2003 Eastern Kern County Ozone Attainment Demonstration, Maintenance Plan, and Redesignation Request. The applicable air quality plans for the AVAQMD include the 2007 Western Mojave Desert Ozone Attainment Plan and the 2004 Antelope Valley Ozone Attainment Plan.

Emissions from construction of the B-P Build Alternatives would be temporary. However, based on the amount of construction to be completed, construction activities would involve heavy-duty construction equipment and have the potential to cause air quality impacts that would conflict with or obstruct implementation of the applicable air quality plan. AQ-IAMF#1, AQ-IAMF#2, AQ-IAMF#4, AQ-IAMF#5, and AQ-IAMF#6 are included as part of the B-P Build Alternatives and would be implemented to avoid or minimize effects. These IAMFs would reduce potential adverse effects resulting from factors related to criteria pollutants during construction.

As discussed above, VOC and $NO_X$ emissions within the SJVAPCD associated with the B-P Build Alternatives would exceed the General Conformity thresholds, while CO, $PM_{10}$, and $PM_{2.5}$ emissions would be below the General Conformity thresholds. The emission thresholds set by the SJVAPCD are also applicable to the plan's compliance under NEPA, as emissions above these thresholds would have the potential to conflict with or obstruct implementation of the SJVAPCD's air quality plans, which have been prepared to attain NAAQS and CAAQS. Construction VOC and $NO_X$ emissions could exceed the SJVAPCD thresholds and impede the implementation of the respective air quality plans, including plans prepared to attain the NAAQS. With on-site minimization measures (AQ-IAMF#1, AQ-IAMF#2, AQ-IAMF#4, AQ-IAMF#5, and AQ-IAMF#6),

VOC and $NO_X$ effects would be reduced. With implementation of Mitigation Measure AQ-MM#1, construction emissions of VOC and $NO_x$ would be offset through the SJVAPD's VERA, which would further reduce effects to air quality.

$NO_X$ emissions within the EKAPCD associated with the B-P Build Alternatives would exceed the General Conformity thresholds. The emission thresholds set by the EKAPCD are also applicable to the plan's compliance under NEPA, as emissions above these thresholds would have the potential to conflict with or obstruct implementation of the EKACPD's air quality plans, which have been prepared to attain NAAQS and CAAQS. Construction $NO_X$ emissions could exceed the EKAPCD thresholds and impede the implementation of the respective air quality plans, including plans prepared to attain the NAAQS. With on-site minimization measures (AQ-IAMF#1, AQ-IAMF#2, AQ-IAMF#4, AQ-IAMF#5, and AQ-IAMF#6), $NO_X$ effects would be reduced. With implementation of Mitigation Measure AQ-MM#1, construction emissions would be offset through the EKAPCD's Emission Banking Certificate Program, which would further reduce effects to air quality.

In addition, $NO_X$ emissions within the AVAQMD associated with the B-P Build Alternatives would also exceed the General Conformity thresholds. The emission thresholds set by the AVAQMD are also applicable to the plan's compliance under NEPA, as emissions above these thresholds would have the potential to conflict with or obstruct implementation of the AVAQMD air quality plans, which have been prepared to attain NAAQS and CAAQS. With on-site minimization measures (AQ-IAMF#1, AQ-IAMF#2, AQ-IAMF#4, AQ-IAMF#5, and AQ-IAMF#6), $NO_X$ effects would be reduced. With implementation of Mitigation Measure AQ-MM#1, construction emissions would be offset through the AVAQMD's Air Quality Investment Program which would further reduce effects to air quality

**CEQA Conclusion**

As discussed above, VOC, CO, and $NO_X$ emissions within the SJVAPCD associated with the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would be greater than applicable mass emission CEQA significance thresholds, which would impede or obstruct implementation of the SJVAPCD's GAMAQI. VOC and $NO_X$ emissions within the EKAPCD would be greater than applicable emission CEQA significance thresholds, which would impede or obstruct implementation of the EKAPCD's CEQA Guidelines. In addition, CO and $NO_X$ emissions within the AVAQMD would be greater than applicable emission CEQA significance thresholds, which would impede or obstruct implementation of the AVAQMD's CEQA Guidelines and attainment of air quality standards. Therefore, VOC and $NO_X$ emissions would have a significant impact under CEQA.

Even with implementation of on-site minimization measures (i.e., AQ-IAMF#4 and AQ-IAMF#5), VOC, CO, $NO_X$, $PM_{10}$, and $PM_{2.5}$ impacts would be reduced but could remain significant under CEQA. Purchase of offset emissions through a VERA with the SJVAPCD, the Air Quality Investment Program with the AVAQMD, and the Emission Banking Certificate Program with the EKAPCD (Mitigation Measure AQ-MM#1) for these pollutants would reduce impacts of VOC and $NO_x$. However CO emissions would remain significant. Therefore, CO emissions would remain significant, resulting in the potential obstruction of the implementation of the applicable air quality plans, which would be significant and unavoidable after mitigation under CEQA.

***Impact AQ #3: Greenhouse Gas Emissions during Construction (Threshold #5)***

GHG emissions generated from HSR project construction would be short-term in nature. 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.

The following analysis describes the potential $CO_2e$ emissions associated with construction of the B-P Build Alternatives. The CCNM Design Option would be anticipated to result in slightly higher

$CO_2e$ emissions due to the additional 124 feet of track required for the design, which would require some additional construction activities. The Refined CCNM Design Option would also be anticipated to result in higher emissions due to the additional 2,006 feet of track required for the design. Total emissions associated with the CCNM Design Option would be approximately 0.028 percent higher than the B-P Build Alternatives, and therefore emission estimates presented below for each B-P Build Alternative would be applicable with or without the CCNM Design Option due to rounding and the difference would be within the margin of error of the model estimates. The Refined CCNM Design Option would increase the length of the track by 0.45 percent and would require additional haul trips associated with the additional earthwork activities. Emissions associated with the Refined CCNM Design Option were quantified and are shown in Table 3.3-31.

The Authority has pledged to reduce emissions from construction-related activities. AQ-IAMF#3 would require the contractor to use renewable diesel fuel to minimize $CO_2$ emissions. The $CO_2e$ emissions presented in this analysis assume use of renewable diesel fuel. Renewable diesel fuel as required under AQ-IAMF#3 would reduce the estimated $CO_2e$ emissions by 99.1 percent.

As shown in Table 3.3-31, the GHG construction emissions for Alternative 1 would total 3,672 metric tons of $CO_2e$, the GHG construction emissions for Alternative 2 of the B-P Build Alternatives would total 3,857 metric tons of $CO_2e$, the GHG construction emissions for Alternative 3 of the B-P Build Alternatives would total 3,740 metric tons of $CO_2e$, and the GHG construction emissions for Alternative 5 of the B-P Build Alternatives would total 4,463 metric tons of $CO_2e$. GHG construction emissions would represent 0.001 percent of the most recently reported total annual statewide GHG emissions (CARB 2016b). The GHG emission inventory for California that was most recent at the time of section preparation was released in June 2016 and showed that total annual GHG emissions for California in 2014 were 441.5 MMT $CO_2e$.

**Table 3.3-31 Bakersfield to Palmdale Project Section Carbon Dioxide Equivalent Construction Emissions (Metric Tons per Year)**

| Year | Alternative | | | | Alternative with Refined CCNM Design Option | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 5 | 1 | 2 | 3 | 5 |
| 2018 | 106 | 0 | 0 | 0 | 106 | 0 | 0 | 0 |
| 2019 | 99 | 0 | 0 | 0 | 99 | 0 | 0 | 0 |
| 2020 | 506 | 606 | 597 | 724 | 506 | 606 | 597 | 724 |
| 2021 | 979 | 1,241 | 1,182 | 1,269 | 979 | 1,241 | 1,182 | 1,269 |
| 2022 | 735 | 870 | 953 | 981 | 952 | 1,088 | 1,171 | 1,199 |
| 2023 | 851 | 738 | 682 | 1,057 | 912 | 799 | 743 | 1,118 |
| 2024 | 264 | 250 | 251 | 288 | 264 | 250 | 251 | 288 |
| 2025 | 72 | 93 | 16 | 84 | 72 | 93 | 16 | 84 |
| 2026 | 15 | 14 | 14 | 14 | 15 | 14 | 14 | 14 |
| **Total Rail Construction Emissions** | **3,627** | **3,812** | **3,695** | **4,418** | **3,906** | **4,091** | **3,974** | **4,696** |
| Station Construction Emissions | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| **Combined Total** | **3,672** | **3,857** | **3,740** | **4,463** | **3,951** | **4,136** | **4,019** | **4,741** |

| Year | Alternative | | | | Alternative with Refined CCNM Design Option | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 5 | 1 | 2 | 3 | 5 |
| **Amortized GHG Emissions (averaged over 25 years)**[1] | | | | | | | | |
| $CO_2e$ per Year | 147 | 154 | 150 | 179 | 158 | 165 | 161 | 190 |
| **Payback of GHG Emissions (days)**[2] | | | | | | | | |
| Payback Period (Medium) | 1.3 | 1.4 | 1.4 | 1.6 | 1.4 | 1.5 | 1.5 | 1.7 |
| Payback Period (High) | 0.9 | 0.9 | 0.9 | 1.1 | 1.0 | 1.0 | 1.0 | 1.2 |

*Source: U.S. Environmental Protection Agency, 2015a*
Emission factors for $CO_2$ do not account for improvements in technology.
[1] Project life is assumed to be 25 years.
[2] Payback periods were estimated by dividing the GHG emissions during construction years by the annual GHG emissions reduction during project operation. See Table 3.3-45 and Table 3.3-46 for operational GHG emissions reduction data. The data range represents the emission changes based on the two ridership scenarios (medium and high) for the project's horizon year (2040).
CCNM = César E. Chávez National Monument
$CO_2$ = carbon dioxide
$CO_2e$ = carbon dioxide equivalent
GHG = greenhouse gas
The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

As shown in Table 3.3-31, with implementation of the Refined CCNM Design Option, the GHG construction emissions for Alternative 1 would total 3,951 metric tons of $CO_2e$, the GHG construction emissions for Alternative 2 of the B-P Build Alternatives would total 4,136 metric tons of $CO_2e$, the GHG construction emissions for Alternative 3 of the B-P Build Alternatives would total 4,019 metric tons of $CO_2e$, and the GHG construction emissions for Alternative 5 of the B-P Build Alternatives would total 4,741 metric tons of $CO_2e$. GHG construction emissions would represent 0.001 percent of the most recently reported total annual statewide GHG emissions (CARB 2016b).

Table 3.3-31 also shows the amortized GHG emissions during the construction of each alternative. The half-life of $CO_2$ is not defined, and other GHG pollutants such as $N_2O$ can remain in the atmosphere for 120 years (Intergovernmental Panel on Climate Change 1997). To conservatively estimate the amortized GHG emissions, the HSR project's life is conservatively assumed to be only 25 years, although the actual project life would be much longer. As shown in Table 3.3-31, the amortized GHG construction emissions for Alternative 1 would be 147 metric tons of $CO_2e$ per year, the amortized GHG construction emissions for Alternative 2 would be 145 metric tons of $CO_2e$ per year, the amortized GHG construction emissions for Alternative 3 would be 150 metric tons of $CO_2e$ per year, and the amortized GHG construction emissions for Alternative 5 would be 179 metric tons of $CO_2e$ per year. The increase in GHG emissions generated during HSR project construction would be offset by the net GHG reductions during project operation (because of car and plane trips removed in the Bakersfield to Palmdale area) in less than 2 days of HSR operations for all alternatives under the medium ridership scenario. Under the high ridership scenario, the construction emissions would be offset in less than 1 day of HSR operations for Alternatives 1, 2, and 3 and would be offset in less than 2 days of HSR operations for Alternative 5.

With implementation of the Refined CCNM Design Option, the amortized GHG construction emissions for Alternative 1 would be 158 metric tons of $CO_2e$ per year, the amortized GHG construction emissions for Alternative 2 would be 165 metric tons of $CO_2e$ per year, the amortized GHG construction emissions for Alternative 3 would be 161 metric tons of $CO_2e$ per year, and the amortized GHG construction emissions for Alternative 5 would be 190 metric tons of $CO_2e$ per year. Under the medium ridership scenario and the high ridership scenario, the increase in GHG emissions generated during HSR project construction would be offset in less than 2 days of HSR operations for all alternatives.

The projected GHG emissions from implementation of the HSR project have been quantified. As shown in Table 3.3-31, under the medium ridership scenario, the construction emissions would be offset in less than 2 days of HSR operations for all alternatives. Under the high ridership scenario, the construction emissions would be offset in less than 1 day of HSR operations for Alternatives 1, 2, and 3 and would be offset in less than 2 days of HSR operations for Alternative 5. With implementation of the Refined CCNM Design Option, the increase in GHG emissions generated during HSR project construction would be offset in less than 2 days of HSR operations for all alternatives under the medium ridership scenario and the high ridership scenario.

The significance of GHG emissions is evaluated for conformity with AB 32 and SB 32. The scoping plan for AB 32 includes the implementation of the HSR project as a GHG reduction measure, estimating a 2020 reduction of 1 MMT $CO_2e$ emissions. SB 32 effectively establishes a new GHG reduction goal for statewide emissions of 40 percent below 1990 levels by 2030. Although the current schedule for build out of Phase 1 of the Statewide HSR Program would not result in GHG emission reductions until approximately 2040, the HSR project is still considered to be in conformance with AB 32 and SB 32 because implementation of the project is specifically highlighted as a GHG reduction measure. Therefore, implementation of the project would be considered to be in conformance with AB 32 and SB 32.

***CEQA Conclusion***

Implementation of the project would be in conformance with SB 32. Moreover, the increase in GHG emissions generated during HSR project construction would be offset by the net GHG reductions during project operations in less than 2 days. Therefore, the construction GHG emissions associated with the HSR project would not result in the generation of GHG emissions that may have a significant impact on the environment. Therefore, this impact would be considered less than significant under CEQA.

### *Impact AQ #4: Asbestos and Lead-Based Paint Exposure during Construction (Threshold #3)*

The demolition of asbestos-containing materials is subject to the limitations of Section 112 of the CAA, the National Emissions Standards for Hazardous Air Pollutants (USEPA 2016a) regulations, and would require an asbestos inspection. The compliance divisions of the SJVAPCD, the EKAPCD, and the AVAQMD would be consulted before demolition begins. Strict compliance with existing asbestos regulations would prevent asbestos from being a significant impact (SJVAPCD 2015a). As described in Section 3.10, Hazardous Materials and Wastes, the project would include strict compliance with existing asbestos regulations as part of its design.

A portion of Kern County is designated by the California Department of Conservation, Division of Mines and Geology, as an area likely to contain NOA. However, the specific locations of the counties where project construction would take place are in areas designated not likely to contain NOA (California Department of Conservation, Division of Mines and Geology 2000). Therefore, NOA would not be disturbed during construction.

Buildings in the study area might be contaminated with 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. Historically, asbestos was a widely used material, and it could make up a portion of the demolition materials, such as fire retardant in buildings and cement in roadways and bridges. If encountered during demolition activities, lead-based paint and asbestos would be handled and disposed of in accordance with applicable standards. Section 3.10, Hazardous Materials and Wastes, discusses potential issues concerning lead-based paint during HSR project construction and describes how HSR project construction would include strict compliance with existing asbestos regulations as part of its design.

**CEQA Conclusion**

During construction of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street), compliance with existing asbestos and lead-based paint regulations would prevent impacts from asbestos and lead-based paint from being a significant impact under CEQA (SJVAPCD 2015a). Therefore, the localized impacts from asbestos and

lead-based paint exposure would not expose sensitive receptors to substantial pollutant concentrations. This impact would be less than significant under CEQA.

***Impact AQ #5: Localized Air Quality Impacts during Guideway/Alignment Construction (Threshold #3)***

Construction emissions have the potential to cause elevated criteria pollutant concentrations. These elevated concentrations may cause or contribute to exceedances of the NAAQS and CAAQS, which are established concentrations of criteria pollutants that provide public health protection. Sensitive receptors (e.g., schools, residences, and health-care facilities) are located near the construction areas, such as those in Bakersfield, Edison, Rosamond, Lancaster, and Palmdale. During construction, sensitive receptors would be exposed to increased concentrations of TACs, such as DPM, which may present cancer risks. According to the OEHHA guidance, cancer risk is defined as the predicted risk of cancer (unitless) over a lifetime based on a long-term (70-year) continuous exposure, and is usually expressed as chances per million persons exposed (OEHHA 2015).

The construction emissions associated with the guideway/alignment construction include several different phases such as mobilization, demolition, earthmoving, land clearing, track construction at-grade, and elevated structures. These emissions were modeled using the USEPA's AERMOD atmospheric dispersion model to predict pollutant concentrations at locations near the construction of the guideway/alignment. AERMOD requires meteorological data as input into the model. These are typically processed using AERMET, a pre-processor to AERMOD. AERMET requires surface meteorological data, upper air meteorological data and surface parameter data. The SJVAPCD and CARB have several meteorological datasets that have been processed using AERMET available on their websites. The Arvin meteorological data were used for the rail segment construction areas in Bakersfield and Edison. For the eastern Kern County and Antelope Valley areas, meteorological datasets were obtained from the CARB website. The Tehachapi meteorological data were used for the rail segment construction areas in Keene and Tehachapi. General William J. Fox Airfield meteorological data were used for the Rosamond area, and Palmdale Regional Airport meteorological data were used for the Lancaster area. Five years of meteorological data from 2009 through 2013 were used (or as many complete years as were available).

The four B-P Build Alternatives (Alternatives 1, 2, 3, and 5) were analyzed separately for the Bakersfield to Palmdale Project Section. Alternative 2 was determined to have the highest total emissions rate; therefore, those emissions were used as a conservative representation of all B-P Build Alternatives.

Since it is not practical to model the entire 80-mile Bakersfield to Palmdale Project Section, a 2-mile section of track was modeled, as this was determined to be an appropriate segment length to represent the construction work area. The increase in pollutant concentrations associated with HSR project emissions was added to the background concentration to estimate the ambient air pollutant concentration. The modeled DPM concentrations were used to determine the exposure dose and associated health impact following OEHHA guidance for health risk assessments. Specific details of the air dispersion modeling and health risk assessment are found in Appendix H of the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b).

Based on the results of the construction localized impact air dispersion modeling, construction activities along the guideway/alignment would result in an incremental increase in cancer risk associated with the DPM emissions from construction equipment exhaust of 6.73 in 1 million. For areas within the SJVAPCD, the maximum 1-hour $NO_2$ concentration would be 21.59 µg/m$^3$, with an annual $NO_2$ concentration of 0.54 µg/m$^3$. The maximum 24-hour $PM_{10}$ and $PM_{2.5}$ concentration increments due to construction would be 4.56 µg/m$^3$ and 0.13 µg/m$^3$, respectively. Within the EKAPCD, the maximum 1-hour $NO_2$ concentration would be 6.14 µg/m$^3$, while the annual $NO_2$ concentration would be 0.19 µg/m$^3$. The maximum 24-hour $PM_{10}$ and $PM_{2.5}$ concentration increments due to construction would be 1.69 µg/m$^3$ and 0.05 µg/m$^3$, respectively.

**CEQA Conclusion**
Construction activities associated with the guideway/alignment would occur near the sensitive receptors for short periods of time, and air dispersion modeling and health risk assessments indicate that concentration levels and health risks would be below applicable thresholds of 10 in 1 million for cancer risk. In addition, implementation of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would not cause or contribute to exceedances of the NAAQS and CAAQS. Therefore, the localized air quality impacts would be less than significant under CEQA.

***Impact AQ #6: Localized Air Quality Impacts to Schools and Other Sensitive Receptors during Station Construction (Threshold #3)***

Station construction would take place over a period of 4 years, and sensitive receptors at schools, residences, and health-care facilities near the station construction areas could potentially be exposed to health impacts from elevated concentrations of criteria pollutants and cancer risks associated with TACs. Several sensitive receptors are located near the proposed Bakersfield and Palmdale stations, including residences, schools, and parks. The NAAQS and CAAQS are established concentrations of criteria pollutants that provide public health protection. According to the OEHHA guidance, cancer risk is defined as the predicted risk of cancer (unitless) over a lifetime based on a long-term (70-year) continuous exposure, and is usually expressed as chances per million persons exposed (OEHHA 2015). For this analysis, the Palmdale Station was only evaluated for localized construction impacts in the Lancaster/Palmdale area. The project team evaluating the construction activities estimated construction emissions and requirements for this work area. Estimated construction emission rates were entered into the AERMOD emission dispersion model to determine air quality concentrations at 25 meters (82 feet) from the construction site. The AERMOD model was set up to geolocate the Palmdale Station and to set receptor locations at an imaginary fence line with 25-meter spacing around the area. Local meteorological data were used from the nearby meteorological station and terrain data for the project area were uploaded from the U.S. Geological Survey web database.

The modeled work area for the Palmdale Station was based on the approximate station footprint. The increase in pollutant concentration associated with the project emissions is added to the background concentration to estimate the ambient air pollutant concentration for comparison to the applicable NAAQS and CAAQS. The modeled DPM concentrations were used to determine the exposure dose and associated health impact following OEHHA guidance for health risk assessments. Specific details of the air dispersion modeling and health risk assessment are found in Appendix H of the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b).

The long-term (cancer risk) impacts from TAC emissions associated with station construction would be less than significant under CEQA because the proposed station construction would not exceed the applicable threshold of 10 in 1 million. Exposure to TAC emissions associated with station construction would not result in substantial short-term (acute) impacts and would not expose schools or other sensitive receptors to localized air quality impacts during station construction.

**CEQA Conclusion**
The cancer risk impacts from TAC emissions associated with station construction would be less than significant under CEQA because the proposed Palmdale Station construction would not exceed the applicable threshold of 10 in 1 million. Exposure to TAC emissions associated with station construction would not result in substantial short-term (acute) impacts. Therefore, localized concentrations would not result in the exposure of sensitive receptors to substantial pollutant concentrations and the potential contribution of emissions to an existing air quality violation. Therefore, the short-term construction activities of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would have a less than significant impact on local air quality and sensitive receptors under CEQA.

### *Impact AQ #7: Localized Air Quality Impacts from Concrete Batch Plants (Threshold #3)*

Emissions generated from operation of concrete batch plants, which would produce concrete for the elevated structures (elevated rail) and retaining wall (retained-fill rail), are included in the total regional construction emissions for each B-P Build Alternative. These plants would be located along the HSR alignment. Without implementation of measures that would limit exposure of emissions to sensitive receptors within 1,000 feet of a concrete batch plant, fugitive dust emissions and their associated TAC constituents could result in effects related to cancer risks, as well as chronic and acute noncancer health effects. AQ-IAMF#6: Reduce the Potential Impact of Concrete Batch Plants would require the contractor to prepare a technical memorandum documenting the concrete batch plant siting criteria, including locating the plant at least 1,000 feet from sensitive receptors and utilization of typical control emission measures to reduce any potential localized impacts. Therefore, with implementation of AQ-IAMF#6, concrete batch plants would be sited at least 1,000 feet from sensitive receptors, including places such as day-care centers, hospitals, senior care facilities, residences, parks, and other areas where people may congregate.

**CEQA Conclusion**

With implementation of AQ-IAMF#6, localized air quality impacts from concrete batch plants would not result in a violation of any air quality standard or expose sensitive receptors to substantial pollutant concentrations. Therefore, concrete batch plants associated with the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would be less than significant under CEQA.

### *Impact AQ #8: Cumulative Impacts during Construction (Threshold #2)*

The study area for cumulative air quality impacts is the SJVAB and MDAB. The study area for GHG emissions encompasses the State of California, because existing reports and plans typically describe GHG emissions at the state level, policies establish emissions targets at the state level, and the regional CEQA thresholds are established based on statewide goals. Additionally, the HSR system's GHG impacts (benefits) would also occur at the state level because many of the reductions in mobile-source emissions would be achieved by long-distance travel on the HSR system.

Regulatory agencies continue to adopt increasingly stringent standards for criteria pollutants, TACs, and GHGs, with the goal of reducing the amount of pollutant emissions in the atmosphere. Many of these regulations are not yet fully implemented as of 2016 but would be implemented prior to the project planning horizon of 2040. Overall, air quality has improved and is anticipated to continue to improve because of these current and foreseeable regulations. However, population growth and proposed developments are projected to result in thousands of new homes and millions of square feet of new retail uses. The associated increase in traffic congestion would continue to incrementally affect air quality and GHG emissions.

The SJVAB is in federal nonattainment for $O_3$ and $PM_{2.5}$, federal maintenance for $PM_{10}$ and CO (for the urban portions of Kern County only), and state nonattainment for $O_3$, $PM_{10}$, and $PM_{2.5}$. As a result, the area is subject to stringent emissions requirements for $O_3$ precursors (VOC and $NO_X$) and particulate matter.

Construction emissions associated with the project would be temporary but would contribute to air quality degradation and impede the region's ability to attain air quality standards. In addition, past, present, and reasonably foreseeable future projects would have significant VOC, $NO_X$, and $PM_{10}$ emissions. Because these projects would be constructed during the same timeframe as the B-P Build Alternatives, a cumulative substantial air quality effect would occur.

**CEQA Conclusions**

As discussed above, VOC, CO, and $NO_X$ emissions within the SJVAPCD associated with the B-P Build Alternatives would be greater than applicable mass emission CEQA significance thresholds. VOC and $NO_X$ emissions within the EKAPCD would be greater than applicable emission CEQA significance thresholds. In addition, CO and $NO_X$ emissions within the AVAQMD would be greater

than applicable emission CEQA significance thresholds. Therefore, these construction emissions would contribute to air quality degradation and impede the region's ability to attain air quality standards. In addition, past, present, and reasonably foreseeable future projects would have significant VOC, CO, and $NO_X$ emissions. Because these projects would be constructed during the same timeframe as the B-P Build Alternatives, a cumulatively significant air quality impact would occur.

Even with implementation of on-site minimization measures (i.e., AQ-IAMF#4 and AQ-IAMF#5), VOC, CO, $NO_X$, $PM_{10}$, and $PM_{2.5}$ impacts would be reduced but could remain significant under CEQA. Purchase of offset emissions through a VERA with the SJVAPCD, the Air Quality Investment Program with the AVAQMD, and the Emission Banking Certificate Program with the EKAPCD (Mitigation Measure AQ-MM#1) for these pollutants would reduce VOC and $NO_x$ impacts to a less than significant level. However, CO impacts would remain significant. Therefore, with implementation of Mitigation Measure AQ-MM#1, CO emissions during construction of all HSR Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would result in a cumulatively significant air quality impact. Cumulative impacts under CEQA would be significant and unavoidable.

### Operations Impacts

#### *Common Air Quality Impacts*

Common benefits to regional air quality would come from a reduction of VMT and airplane emissions, which would reduce criteria pollutants, MSATs, and GHG emissions. Additionally, the project would have the common benefit of meeting a GHG reduction measure identified in the AB 32 scoping plan. At the local level, negligible localized increases of CO and particulate ($PM_{10}$ and $PM_{2.5}$) emissions would not cause violations of NAAQS.

#### *Impact AQ #9: Statewide and Regional Criteria Pollutant Emissions (Threshold #2)*

**Statewide Emissions**

For comparison purposes, the air quality analysis was conducted for conditions without the project for the existing conditions and a future horizon year (2040). Statewide and regional emissions without the project are shown for 2015 and 2040 in Table 3.3-32 and Table 3.3-33, respectively.

**Table 3.3-32 Statewide No Project Emissions in Tons per Year (2015)**

| Project Element | TOG | CO | $NO_X$ | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | ROG |
|---|---|---|---|---|---|---|---|
| Roadways | 10,506 | 323,019 | 33,326 | 816 | 10,518 | 4,369 | 7,785 |
| Planes | 341 | 2,888 | 2,779 | 299 | 84 | 84 | 338 |
| Energy (power plants) | 16,458 | 29,616 | 15,531 | 2,303 | 2,953 | 2,683 | 1,646 |
| **Total** | **27,305** | **355,523** | **51,636** | **3,418** | **13,555** | **7,135** | **9,768** |

*Source: California High-Speed Rail* Authority, *2018b*
Totals may not add up exactly due to rounding.
CO = carbon monoxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal 10 microns in diameter
ROG = reactive organic gas
$SO_2$ = sulfur dioxide
TOG = total organic gas
tons/yr = tons per year

**Table 3.3-33 Statewide No Project Emissions in Tons per Year (2040)**

| Project Element | TOG | CO | $NO_X$ | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | ROG |
|---|---|---|---|---|---|---|---|
| Roadways | 1,451 | 86,627 | 6,312 | 489 | 27,540 | 7,091 | 996 |
| Planes | 479 | 3,968 | 3,908 | 423 | 118 | 118 | 474 |
| Energy (power plants) | 20,757 | 45,146 | 20,858 | 3,177 | 3,921 | 3,564 | 2,205 |
| **Total** | **22,686** | **135,741** | **31,077** | **4,089** | **31,580** | **10,773** | **3,675** |

*Source: California High-Speed Rail* Authority, *2018b*
Totals may not add up exactly due to rounding.
CO = carbon monoxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
ROG = reactive organic gas
$SO_2$ = sulfur dioxide
TOG = total organic gas
tons/year = tons per year

Table 3.3-34 and Table 3.3-35 summarize the estimated statewide emission burden changes resulting from the project in the year 2015. Table 3.3-36 and Table 3.3-37 summarize estimated statewide emission burden changes resulting from the project in the year 2040. The analysis estimated the emission changes due to projected reductions of on-road VMT and intrastate air travel, and increases in electrical demand (i.e., to power the HSR system).

**Table 3.3-34 Estimated Statewide Emissions Burden Changes Due to the High-Speed Rail Project versus No Project (Medium Ridership Scenario) in Tons per Year (2015)**

| Project Element | TOG | CO | $NO_X$ | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | ROG |
|---|---|---|---|---|---|---|---|
| Roadways | -176 | -5,406 | -558 | -14 | -385 | -104 | -130 |
| Planes | -102 | -862 | -829 | -89 | -25 | -25 | -101 |
| Energy (power plants) | 124 | 207 | 105 | 17 | 23 | 21 | 12 |
| **Total** | **-153** | **-6,061** | **-1,281** | **-86** | **-387** | **-108** | **-219** |

*Source: California High-Speed Rail Authority, 2018b*
Totals may not add up exactly due to rounding.
CO = carbon monoxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
ROG = reactive organic gas
$SO_2$ = sulfur dioxide
TOG = total organic gas
The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-35 Estimated Statewide Emissions Burden Changes Due to the High-Speed Rail Project versus No Project (High Ridership Scenario) in Tons per Year (2015)**

| Project Element | TOG | CO | $NO_X$ | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | ROG |
|---|---|---|---|---|---|---|---|
| Roadways | -242 | -7,432 | -767 | -19 | -529 | -144 | -179 |
| Planes | -98 | -829 | -798 | -86 | -24 | -24 | -97 |
| Energy (power plants) | 137 | 227 | 116 | 19 | 25 | 23 | 14 |
| **Total** | **-203** | **-8,034** | **-1,448** | **-86** | **-528** | **-145** | **-262** |

*Source: California High-Speed Rail Authority, 2018b*
Totals may not add up exactly due to rounding.
CO = carbon monoxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
ROG = reactive organic gas
$SO_2$ = sulfur dioxide
TOG = total organic gas
The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-36 Estimated Statewide Emission Burden Changes Due to the High-Speed Rail Project versus No Project (Medium Ridership Scenario) in Tons per Year (2040)**

| Project Element | TOG | CO | $NO_X$ | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | ROG |
|---|---|---|---|---|---|---|---|
| Roadways | -10 | -564 | -109 | -9 | -500 | -127 | -7 |
| Planes | -140 | -1,162 | -1,145 | -124 | -35 | -35 | -139 |
| Energy (power plants) | 125 | 207 | 106 | 17 | 23 | 21 | 12 |
| **Total** | **-25** | **-1,520** | **-1,148** | **-116** | **-512** | **-141** | **-133** |

*Source: California High-Speed Rail Authority, 2018b*
Totals may not add up exactly due to rounding.
CO = carbon monoxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
ROG = reactive organic gas
$SO_2$ = sulfur dioxide
TOG = total organic gas
The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-37 Estimated Statewide Emission Burden Changes Due to the High-Speed Rail Project versus No Project (High Ridership Scenario) in Tons per Year (2040)**

| Project Element | TOG | CO | $NO_X$ | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | ROG |
|---|---|---|---|---|---|---|---|
| Roadways | -36 | -2,174 | -158 | -12 | -691 | -178 | -25 |
| Planes | -135 | -1,118 | -1,101 | -119 | -33 | -33 | -134 |
| Energy (power plants) | 137 | 227 | 116 | 19 | 25 | 23 | 14 |
| **Total** | **-34** | **-3,065** | **-1,144** | **-113** | **-699** | **-188** | **-145** |

*Source: California High-Speed Rail Authority, 2018b*
Totals may not add up exactly due to rounding.
CO = carbon monoxide
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
ROG = reactive organic gas
$SO_2$ = sulfur dioxide
TOG = total organic gas
VOC = volatile organic compounds

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

Results for the medium and high ridership scenarios are presented in the tables below, with the larger reductions in roadway and airplane emissions and the larger increases in energy emissions occurring with the high ridership scenario (i.e., when more riders would use the HSR system). As shown in these four tables, the HSR project is predicted to have a beneficial effect on (i.e., reduce) statewide emissions of applicable pollutants, with the exception of energy emissions, which would increase with the project due to increased power requirements. In the opening year of HSR operations, the reduction in criteria pollutant emissions would be more modest, but still beneficial. Details are presented in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b). However, it should be noted that the HSR system was analyzed as if it would be powered by the state's current electric grid. This is a conservative assumption because of the state requirement that an increasing fraction of electricity (50 percent by 2030) generated for the state's power portfolio comes from renewable energy sources. As such, the emissions generated for the HSR system are expected to be lower in the future than the emissions estimated for this analysis. Furthermore, under the 2013 Policy Directive POLI-PLAN-03, the Authority has adopted a goal to purchase 100 percent of the HSR system's power from renewable energy sources.

**Regional Emissions**

Table 3.3-38 through Table 3.3-41 show a summary of the total emission changes due to HSR project operation for the medium and high ridership scenarios, including the indirect emissions from regional vehicle travel, aircraft, and power plants, as well as direct project operational emissions from the Bakersfield and Palmdale stations, the LMF and the MOWF, and train

movements. The project would result in a net regional decrease in emissions of criteria pollutants. These decreases would be beneficial to the SJVAB and help the basin meet the attainment goals for $O_3$ and particulates ($PM_{10}$ and $PM_{2.5}$). However, lower ridership would result in fewer regional benefits, although even with lower ridership there would be a net benefit.

**Table 3.3-38 Summary of Regional Emissions Changes Existing Year—2015 with Project (Under the Medium Ridership Scenario)**

| Activities | ROG | TOG | CO | $NO_X$ | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|---|
| **Indirect Emissions (Tons per Year)** | | | | | | | |
| Changes in VMT Emissions | -49 | -66 | -1,866 | -210 | -5 | -144 | -39 |
| Changes in Airplane Emissions | -43 | -44 | -371 | -357 | -38 | -11 | -11 |
| Changes in Power Plant Emissions | 1 | 14 | 23 | 12 | 2 | 3 | 2 |
| **Direct Emissions (Tons per Year)** | | | | | | | |
| Station Operations | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| LMF and MOWF Operations | 2 | 2 | 1 | 0 | 0 | 0 | 0 |
| Fugitive Dust from Train Operations | N/A | N/A | N/A | N/A | N/A | 24 | 4 |
| Regional Total[1] | -88 | -93 | -2,232 | -555 | -41 | -128 | -44 |
| SJVAPCD Total | -20 | -21 | -513 | -128 | -9 | -29 | -10 |
| SJVAPCD Significance Criteria | 10 | NA | 100 | 10 | 27 | 15 | 15 |
| SJVAPCD Exceed? | No | N/A | No | No | No | No | No |
| EKAPCD Total | -43 | -46 | -1,094 | -272 | -20 | -63 | -22 |
| EKAPCD Significance Criteria | 25 | NA | N/A | 25 | 27 | 15 | 15 |
| EKAPCD Exceed? | No | N/A | No | No | No | No | No |
| AVAQMD Total | -25 | -26 | -625 | -155 | -12 | -36 | -12 |
| AVAQMD Significance Criteria | 25 | N/A | 100 | 25 | 25 | 15 | 12 |
| AVAQMD Exceed? | No | N/A | No | No | No | No | No |

*Source: California High-Speed Rail Authority, 2018b*

[1] Total includes indirect and direct emissions.

AVAQMD = Antelope Valley Air Quality Management District
CO = carbon monoxide
EKAPCD = Eastern Kern Air Pollution Control District
LMF = Light Maintenance Facility
MOWF = Maintenance-of-Way Facility
N/A = not available
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
TOG = total organic gas
VMT = vehicle miles traveled
VOC = volatile organic compound

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-39 Summary of Regional Emissions Changes Existing Year—2015 with Project (Under the High Ridership Scenario)**

| Activities | ROG | TOG | CO | $NO_X$ | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|---|
| **Indirect Emissions (Tons per Year)** | | | | | | | |
| Changes in VMT Emissions | -67 | -91 | -2,594 | -289 | -7 | -90 | -37 |
| Changes in Airplane Emissions | -1 | -1 | -11 | -10 | -1 | 0 | 0 |
| Changes in Power Plant Emissions | 2 | 15 | 25 | 13 | 2 | 3 | 3 |
| **Direct Emissions (Tons per Year)** | | | | | | | |
| HSR Station and Maintenance Facility Operations | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| LMF and MOWF Operations | 2 | 2 | 1 | 0 | 0 | 0 | 0 |
| Fugitive Dust from Train Operations | N/A | N/A | N/A | N/A | N/A | 24 | 4 |
| Regional Total[1] | -63 | -74 | -2,578 | -286 | -6 | -87 | -34 |
| SJVAPCD Total | -14 | -17 | -593 | -66 | -1 | -20 | -8 |
| SJVAPCD Significance Criteria | 10 | N/A | 100 | 10 | 27 | 15 | 15 |
| SJVAPCD Exceed? | No | N/A | No | No | No | No | No |
| EKAPCD Total | -31 | -36 | -1,263 | -140 | -3 | -43 | -17 |
| EKAPCD Significance Criteria | 25 | N/A | N/A | 25 | 27 | 15 | 15 |
| EKAPCD Exceed? | No | N/A | No | No | No | No | No |
| AVAQMD Total | -18 | -21 | -722 | -80 | -2 | -24 | -9 |
| AVAQMD Significance Criteria | 25 | N/A | 100 | 25 | 25 | 15 | 12 |
| AVAQMD Exceed? | No | N/A | No | No | No | No | No |

*Source: California High-Speed Rail Authority, 2018b*

[1] Total includes indirect and direct emissions.

AVAQMD = Antelope Valley Air Quality Management District
CO = carbon monoxide
EKAPCD = Eastern Kern Air Pollution Control District
LMF = Light Maintenance Facility
MOWF = Maintenance-of-Way Facility
N/A = not available
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
TOG = total organic gas
VMT = vehicle miles traveled
VOC = volatile organic compound

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-40 Summary of Regional Emissions Changes in Horizon Year—2040 with Project (under the Medium Ridership Scenario)**

| Activities | ROG | TOG | CO | $NO_X$ | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|---|
| **Indirect Emissions (Tons per Year)** | | | | | | | |
| Changes in VMT Emissions | -7 | -10 | -541 | -42 | -3 | -189 | -48 |
| Changes in Airplane Emissions | -60 | -60 | -501 | -493 | -53 | -15 | -15 |
| Changes in Power Plant Emissions | 1 | 14 | 23 | 12 | 2 | 3 | 2 |
| **Direct Emissions (Tons per Year)** | | | | | | | |
| HSR Station and Maintenance Facility Operations | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| LMF and MOWF Operations | 2 | 2 | 1 | 0 | 0 | 0 | 0 |
| Fugitive Dust from Train Operations | N/A | N/A | N/A | N/A | N/A | 24 | 4 |
| Regional Total[1] | -63 | -53 | -1,017 | -523 | -54 | -177 | -57 |
| SJVAPCD Total | -14 | -12 | -234 | -120 | -12 | -41 | -13 |
| SJVAPCD Significance Criteria | 10 | N/A | 100 | 10 | 27 | 15 | 15 |
| SJVAPCD Exceed? | No | N/A | No | No | No | No | No |
| EKAPCD Total | -31 | -26 | -498 | -256 | -27 | -87 | -28 |
| EKAPCD Significance Criteria | 25 | N/A | N/A | 25 | 27 | 15 | 15 |
| EKAPCD Exceed? | No | N/A | No | No | No | No | No |
| AVAQMD Total | -18 | -15 | -285 | -147 | -15 | -49 | -16 |
| AVAQMD Significance Criteria | 25 | N/A | 100 | 25 | 25 | 15 | 12 |
| AVAQMD Exceed? | No | N/A | No | No | No | No | No |

*Source: California High-Speed Rail Authority, 2018b*

[1] Total includes indirect and direct emissions.

AVAQMD = Antelope Valley Air Quality Management District
CO = carbon monoxide
EKAPCD = Eastern Kern Air Pollution Control District
LMF = Light Maintenance Facility
MOWF = Maintenance-of-Way Facility
N/A = not available
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
TOG = total organic gas
VMT = vehicle miles traveled
VOC = volatile organic compound

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**Table 3.3-41 Summary of Regional Emissions in Horizon Year—2040 with Project (under the High Ridership Scenario)**

| Activities | ROG | TOG | CO | $NO_X$ | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|---|
| **Indirect Emissions (Tons per Year)** | | | | | | | |
| Changes in VMT Emissions | -9 | -13 | -745 | -58 | -5 | -260 | -67 |
| Changes in Airplane Emissions | -56 | -57 | -472 | -465 | -50 | -14 | -14 |
| Changes in Power Plant Emissions | 2 | 15 | 25 | 13 | 2 | 3 | 3 |
| **Direct Emissions (Tons per Year)** | | | | | | | |
| Station Operations | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| LMF and MOWF Operations | 2 | 2 | 1 | 0 | 0 | 0 | 0 |
| Fugitive Dust from Train Operations | N/A | N/A | N/A | N/A | N/A | 24 | 4 |
| Regional Total[1] | -60 | -52 | -1,190 | -510 | -53 | -247 | -74 |
| SJVAPCD Total | -14 | -12 | -274 | -117 | -12 | -57 | -17 |
| SJVAPCD Significance Criteria | 10 | N/A | 100 | 10 | 27 | 15 | 15 |
| SJVAPCD Exceed? | No | N/A | No | No | No | No | No |
| EKAPCD Total | -29 | -25 | -583 | -250 | -26 | -121 | -36 |
| EKAPCD Significance Criteria | 25 | N/A | N/A | 25 | 27 | 15 | 15 |
| EKAPCD Exceed? | No | N/A | No | No | No | No | No |
| AVAQMD Total | -17 | -15 | -333 | -143 | -15 | -69 | -21 |
| AVAQMD Significance Criteria | 25 | N/A | 100 | 25 | 25 | 15 | 12 |
| AVAQMD Exceed? | No | N/A | No | No | No | No | No |

*Source: California High-Speed Rail Authority, 2018b*

[1] Total includes indirect and direct emissions.

AVAQMD = Antelope Valley Air Quality Management District
CO = carbon monoxide
EKAPCD = Eastern Kern Air Pollution Control District
LMF = Light Maintenance Facility
MOWF = Maintenance-of-Way Facility
N/A = not available
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAPCD = San Joaquin Valley Air Pollution Control District
$SO_2$ = sulfur dioxide
TOG = total organic gas
VMT = vehicle miles traveled
VOC = volatile organic compound

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

**CEQA Conclusion**

Based on the statewide and regional emission reductions discussed above, the statewide and regional operation of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would result in reduction of statewide and regional criteria pollutant emissions. The emissions reductions would be less under the medium ridership scenario than the high ridership scenario; the medium ridership scenario would be the more conservative assessment of air quality benefits, but both ridership scenarios would result in benefits to air quality. In the opening year of HSR operations, the reduction in criteria pollutant emissions would be more modest, but still beneficial. Details are presented in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b). Therefore, operation of the B-P Build Alternatives would result in a net benefit to statewide and regional air quality from operation of the HSR system and would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Under CEQA, the B-P Build Alternatives would have a less than significant impact related to statewide and regional operational emissions.

### *Impact AQ #10: Greenhouse Gas Analysis during Operation (Threshold #5)*

Guidance for the analysis of GHG emissions is provided at the federal, state, regional, and local levels. This guidance provides a comprehensive and complementary approach for the analysis of the potential effects of GHG emissions. Unlike criteria pollutant emissions, the GHGs of primary concern to global climate change have lifetimes long enough that mixing into the entire global atmosphere occurs. Due to the global nature of GHG emissions and the nature of the electrical grid system, GHGs are examined on a statewide level. However, regional and local guidance will be considered as a component of the overall statewide goal to reduce GHG emissions.

The HSR project, which is included in the AB 32 Scoping Plan as Measure #T-9, would help the state meet its GHG emissions reduction goals (CARB 2008). As shown in Table 3.3-43, the overall project operation would result in a net reduction in GHG emissions.

Table 3.3-42 summarizes the statewide GHG emissions (expressed in terms of $CO_2e$) that would result from implementation of the No Project Alternative for the three potential scenarios. The baseline GHG emissions for these three scenarios are shown for the existing condition (2015) and the horizon year condition (2040).

**Table 3.3-42 Estimated Statewide Greenhouse Gas Emissions for the No Project Alternative**

| Project Element | GHG Emissions for the No Project Alternative (MMT $CO_2e$/year) | |
|---|---|---|
| | Medium Ridership Scenario | High Ridership Scenario |
| **Year 2015** | | |
| Roadways | 64 | 64 |
| Planes | 2 | 2 |
| Energy (power plants) | N/A | N/A |
| **Total** | **66** | **66** |
| **Year 2040** | | |
| Roadways | 42 | 43 |
| Planes | 3 | 4 |
| Energy (power plants) | N/A | N/A |
| **Total** | **45** | **47** |

*Source: California High-Speed Rail Authority, 2018b*
Totals may not add up exactly due to rounding.
$CO_2e$ = carbon dioxide equivalent
GHG = greenhouse gas
MMT = million metric tons
MMT $CO_2e$/year = million metric tons per year of carbon dioxide equivalent
N/A = not available
The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

Table 3.3-43 summarizes the statewide GHG emission changes (expressed in terms of $CO_2e$) that would result from the HSR project for the medium and high ridership scenarios compared to No Project Alternative baseline conditions. The GHG emission changes for these two scenarios are shown for the existing baseline condition (2015) and the horizon year condition (2040). As shown, the HSR project is predicted to result in a net reduction in statewide GHG emissions under the future conditions (horizon year). The analysis estimated the potential GHG emission changes from reduced on-road VMT, reduced intrastate airplane travel, and increased demand for electricity. The baselines reflect the medium and high scenarios. The medium scenario represents a baseline ridership/revenue forecast that is the most likely scenario and the high scenario represents an optimistic ridership/revenue forecast. The scenario assumptions even affect how the no build and existing numbers are generated, which is why Table 3.3-42 shows different numbers between the scenarios. High scenario no-build data differs from medium scenario no-build data because the

high scenario and the medium scenarios assume different background conditions. These are differences in the conditions surrounding the 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 will lead to higher HSR ridership but will also decrease automobile travel that does not become HSR ridership. The ridership data is based on the Authority's 2016 Business Plan (Authority 2016).

**Table 3.3-43 Estimated Statewide Greenhouse Gas Emission for the High-Speed Rail Project**

| Project Element | Change in $CO_2e$ Emissions Due to HSR Project (MMT/year) | |
|---|---|---|
| | Medium Ridership Scenario | High Ridership Scenario |
| **Year 2015** | | |
| Roadways | -1.1 | -1.5 |
| Planes | -0.7 | -0.7 |
| Energy (power plants) | 0.5 | 0.5 |
| **Total** | **-1.3** | **-1.7** |
| **Year 2040** | | |
| Roadways | -0.5 | -1.1 |
| Planes | -1.0 | -0.9 |
| Energy (power plants) | 0.5 | 0.5 |
| **Total** | **-1.0** | **-1.5** |

*Source: California High-Speed Rail Authority, 2018b*
Totals may not add up exactly due to rounding.
$CO_2e$ = carbon dioxide equivalent
GHG = greenhouse gas
HSR = high-speed rail
MMT/yr = million metric tons per year
The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

Compared with existing conditions, all B-P Build Alternatives would reduce GHG emissions by amounts similar to those shown below because the B-P Build Alternatives would reduce VMT and intrastate airplane travel in a similar manner and would require a similar amount of electricity for operation. In the opening year of operations, GHG emissions reductions would be lower than shown, but still beneficial. Details are presented in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b).

**CEQA Conclusion**

As shown in Table 3.3-43, operation of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would result in a statewide reduction of GHG emissions. The GHG emissions reductions would be less under the medium ridership scenario than the high ridership scenario; the medium ridership scenario presents the more conservative assessment of GHG reduction benefits, but both scenarios would result in GHG reduction benefits. In the opening year of operations, GHG emissions reductions would be less, but still beneficial. Operation of any of the B-P Build Alternatives would help the state reach its GHG reduction goals. Therefore, the B-P Build Alternatives would not result in the generation of GHG emissions that would have a significant impact on the environment. Therefore, a less than significant impact would occur under CEQA.

***Impact AQ #11: Localized Air Quality Impacts during Train Operations (Threshold #3)***

The HSR project would use electric-multiple-unit trains, with the power distributed through the overhead contact system. Combustion of fossil fuels and associated emissions from HSR project operation would not occur. However, trains traveling at high velocities, such as those associated with the proposed HSR system, create sideways turbulence and rear wake, which would

resuspend particulates from the ground surface around the track, resulting in fugitive dust emissions. Assuming a friction velocity of 0.19 meter per second to resuspend soils in the project region, a high-speed train passing at 220 mph could resuspend soil particulates out to approximately 10 feet from the train (Watson 1996). Based on the USEPA methodology for estimating emissions from wind erosion (USEPA 2006), HSR project operations would generate approximately 22 tons per year of $PM_{10}$ and 3.2 tons per year of $PM_{2.5}$.

Kern and Los Angeles Counties, as well as the San Joaquin Valley region in general, have higher rates of asthma in adults and children. Because the HSR system would be electrically powered, it is not expected to generate direct combustion emissions along its route that would cause substantial health concerns, such as asthma or other respiratory diseases. In addition, a detailed analysis of wind-induced fugitive dust emissions from HSR travel is provided in the *Bakersfield to Palmdale Project Section Air Quality and Global Climate Change Technical Report* (Authority 2018b). Based on this analysis, fugitive dust emissions from HSR travel are not expected to result in substantial enough amounts of dust to cause health concerns.

**CEQA Conclusion**

Based on this analysis, with implementation of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street), fugitive dust emissions due to HSR travel are not expected to result in substantial dust that would cause health concerns in the project vicinity. Since fugitive dust would be significantly reduced beyond the right-of-way, the B-P Build Alternatives would not expose sensitive receptors to substantial pollutant concentrations. Therefore, this impact would result in a less than significant impact under CEQA.

### *Impact AQ #12: Localized Mobile-Source Air Toxics Analysis (Threshold #3)*

In accordance with the FHWA's Interim Guidance Update on Air Toxic Analysis in NEPA Documents (FHWA 2016), a qualitative assessment was derived for the project following a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (FHWA 2016). It provided the basis for identifying and comparing the potential differences in MSAT emissions, if any, among the B-P Build Alternatives, based on the high ridership scenario in 2040 (56.8 million).

The potential MSAT emission sources directly related to HSR project operation would be from vehicles used at maintenance facilities and passenger vehicles traveling to and from the train stations. Based on the anticipated equipment usage, the LMF and the MOWF are not expected to affect sensitive land uses. Localized increases in MSAT emissions could occur near the stations due to passenger commutes to and from the stations, regardless of a medium or high ridership scenario.

Localized emissions related to the HSR stations would be reduced substantially due to implementation of the USEPA's vehicle and fuel regulations. The B-P Build Alternatives would decrease regional MSAT emissions compared with the No Project Alternative.

**CEQA Conclusion**

The project would reduce regional MSAT emissions as a result of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). Although there could be areas that may see an increase in MSATs locally (i.e., near stations), the USEPA's vehicle and fuel regulations would substantially reduce MSAT emissions in the future. Therefore, because there would be no increase in MSAT emissions as a result of the HSR project, the B-P Build Alternatives would not expose sensitive receptors to substantial pollutant concentrations associated with MSAT emissions. This impact would be less than significant under CEQA.

### *Impact AQ #13: Microscale CO Impact Analysis (Threshold #3)*

A CO hot-spot analysis was performed for intersections that could potentially cause a localized CO hot spot and for the parking structure associated with the train station. The modeled CO concentrations were combined with CO background concentrations and compared with the air

quality standards. The CO hot-spot analysis results would be the same for all B-P Build Alternatives evaluated.

The HSR project would not worsen traffic conditions at intersections along the alignment because the alignment and roadways would be grade-separated. Therefore, the CO analysis did not consider intersections along the HSR alignment. Instead, the analysis focused on locations near the HSR stations and locations that would experience a change in roadway structure or traffic conditions. CO concentrations were modeled at intersections near the proposed Palmdale Station. Bakersfield Station data are included in the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014) and technical reports.

The results presented in Table 3.3-44 include the B-P Build Alternatives as well as the natural growth and other transportation improvement projects in the region, regardless of a medium or high ridership scenario. Results of the CO hot-spot analysis for the Palmdale Station and the Bakersfield Station indicate that 1-hour and 8-hour CO concentrations would be much lower than the NAAQS and the CAAQS. In addition, results of the CO hot-spot analysis show that with implementation of the Palmdale Station and the Bakersfield Station, CO concentrations at some intersections would decrease due to diverted traffic from roadway closures.

**CEQA Conclusion**

Since the modeled CO concentrations would be below the CAAQS for the worst-case intersections, implementation of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would not violate CO air quality standards or contribute substantially to an existing or projected CO air quality violation. This impact would be less than significant under CEQA.

### *Impact AQ #14: Localized $PM_{10}$/$PM_{2.5}$ Hot-Spot Impact Analysis (Threshold #3)*

The HSR project would provide regional benefits by reducing the regional VMT compared to the No Project Alternative and existing conditions, which would reduce $PM_{10}$ and $PM_{2.5}$ emissions from regional vehicle travel proportionally. For purposes of identifying and evaluating potential impacts, a hot-spot analysis was prepared because the HSR project location is designated nonattainment for $PM_{2.5}$ and maintenance for $PM_{10}$ and the project is subject to localized $PM_{10}$ and $PM_{2.5}$ hot-spot analysis, regardless of a medium or high ridership scenario. In December 2010, the USEPA released its *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas* (USEPA 2015b), which was used for this analysis. Although this analysis is normally associated with the Transportation Conformity Rule, this project is subject to the General Conformity Rule. The decision to use this analytical structure notwithstanding, additional analysis or associated activities required to comply with Transportation Conformity will be carried out only if discrete project elements become subject to those requirements in the future. In accordance with this guidance, if a project meets one of the following criteria, it is considered a project of air quality concern and a quantitative $PM_{10}$/$PM_{2.5}$ analysis is required.

- **New or expanded highway projects that have a significant number of or significant increase in diesel vehicles.** The HSR project is not a new highway project, nor would it expand an existing highway beyond its current capacity. The HSR vehicles would be electrically powered. While the HSR project would affect traffic conditions on roadways near the stations, it should not measurably affect truck volumes on the affected roadways. Most vehicle trips entering and leaving the station locations would be passenger vehicles, which are typically not diesel-powered, with the exception of delivery truck trips to support station activities. Furthermore, the HSR project would improve regional traffic conditions by reducing traffic congestion, increasing vehicle speeds, and reducing regional VMT within the project vicinity.

**Table 3.3-44 Maximum Modeled Carbon Monoxide Concentrations at Intersections near the Palmdale Station**

| Intersection[1] | Existing Conditions[2] | | Existing Plus Project[2] | | 2040 No Project/No Action[2] | | 2040 Plus Project[2] | |
|---|---|---|---|---|---|---|---|---|
| | Max 1-Hour CO Concentration (ppm) | Max 8-Hour CO Concentration (ppm)[3] | Max 1-Hour CO Concentration (ppm) | Max 8-Hour CO Concentration (ppm)[3] | Max 1-Hour CO Concentration (ppm) | Max 8-Hour CO Concentration (ppm)[3] | Max 1-Hour CO Concentration (ppm) | Max 8-Hour CO Concentration (ppm)[3] |
| Transportation Center Dr and Technology Dr | 1.8 | 1.4 | 2.3 | 1.6 | 1.9 | 1.3 | 2.0 | 1.3 |
| 5th St and Ave Q | 1.7 | 1.3 | 2.1 | 1.4 | 1.8 | 1.2 | 1.9 | 1.3 |
| 5th St and Palmdale Blvd | 2.5 | 1.9 | 2.8 | 1.9 | 2.2 | 1.5 | 2.2 | 1.5 |
| 6th St/Clock Tower Plaza Dr and Transportation Center Dr | 1.7 | 1.3 | 1.8 | 1.2 | 1.9 | 1.3 | 1.8 | 1.2 |
| 6th St and Ave Q | 1.7 | 1.3 | 1.8 | 1.2 | 1.9 | 1.3 | 1.8 | 1.2 |
| 6th St and Palmdale Blvd | 2.3 | 1.8 | 1.8 | 1.2 | 2.2 | 1.5 | 1.8 | 1.2 |
| Sierra Hwy and Technology Dr | 2.2 | 1.7 | 1.8 | 1.2 | 2.0 | 1.3 | 1.8 | 1.2 |
| Sierra Hwy and Ave Q | 2.1 | 1.6 | 2.7 | 1.8 | 2.0 | 1.3 | 2.1 | 1.4 |
| Sierra Hwy and Palmdale Blvd | 2.4 | 1.8 | 1.8 | 1.2 | 2.2 | 1.5 | 1.8 | 1.2 |
| 8th St and Palmdale Blvd | 2.3 | 1.8 | 1.8 | 1.2 | 2.2 | 1.5 | 1.8 | 1.2 |
| 9th St and Palmdale Blvd | 2.2 | 1.7 | 1.8 | 1.2 | 2.2 | 1.5 | 1.8 | 1.2 |
| 5th St E and Ave Q-3 | 1.6 | 1.3 | 2.0 | 1.3 | 1.8 | 1.2 | 1.9 | 1.3 |
| 5th St E and Ave Q-7 | 1.7 | 1.3 | 2.0 | 1.3 | 1.8 | 1.2 | 1.9 | 1.3 |

*Source: California High-Speed Rail Authority, 2018b*

[1] All proposed grade crossing configurations are pending California Public Utilities Commission approval.

[2] Concentrations include a predicted 1-hour background concentration of 1.5 ppm and an 8-hour background concentration of 1.2 ppm, representing the highest measured CO concentrations in years 2014–2016.

[3] A persistence factor of 0.7 was used to estimate the 8-hour CO concentrations based on the generalized persistence factor for urban locations in the CO Protocol (California Department of Transportation 1997).

CO = carbon monoxide

Max = maximum

ppm = part(s) per million

The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

- **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 project.** Generally, the HSR project would not change the existing traffic mix at signalized intersections. Although the maintenance facilities may use diesel vehicles, no signalized intersections were identified with LOS D, E, or F for these locations (Authority 2017). In some cases, the LOS of intersections near the HSR stations would change from LOS E under the No Project Alternative to LOS F under the B-P Build Alternatives. However, the traffic volume increases at the affected intersections would be primarily from passenger cars and transit buses used for transporting people to or from the stations. Passenger cars would be gasoline-powered. Golden Empire Transit currently operates compressed natural gas buses in Bakersfield (Golden Empire Transit 2010) and would likely continue to operate these buses in the future. Buses in Palmdale are operated by the Antelope Valley Transit Authority. The Antelope Valley Transit Authority currently operates a fleet primarily operated by diesel fuel, with some hybrids and electric buses. The Antelope Valley Transit Authority intends to replace all local transit buses with an all-electric fleet by 2018, while all commuter buses would be replaced with an all-electric fleet by 2020. Therefore, the B-P Build Alternatives would not measurably increase the number of diesel vehicles at these 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 HSR project would not have new or expanded bus or rail terminals or transfer points that significantly increase the number of diesel vehicles congregating at a single location. Although the project would include passenger rail terminals, there would not be a significant number of diesel vehicles congregating at a single location. The trains used for the project would be electric-multiple-unit trains, powered by electricity rather than diesel fuel. Most vehicle trips entering and leaving the station would be passenger vehicles, which are not typically diesel-powered. Improved bus service is not part of the HSR project. If the local bus service were to be improved to better serve the HSR stations, it would be subject to the local transit authority's environmental review. The maintenance facilities may have diesel vehicles (e.g., in-yard diesel locomotives) to pull in or pull out the electric-multiple-unit trains. However, the number of diesel locomotives and other diesel vehicles used at the maintenance facilities would be limited.
- **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 areas where the transit stations and maintenance facilities are located are not identified as sites of violation or of possible violation in the USEPA-approved 2003 SIP, the USEPA-approved $PM_{10}$ Maintenance Plan and Request for Redesignation, or the adopted 2012 $PM_{2.5}$ Plan for San Joaquin Valley (SJVAPCD 2007b, 2012).

Implementation of the B-P Build Alternatives would not cause a localized impact on air quality for $PM_{10}$/$PM_{2.5}$ NAAQS.

**CEQA Conclusion**

As described above, operation of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would have no effect on localized $PM_{10}$ and $PM_{2.5}$ emissions. Therefore, operation of the project would not result in localized pollutant concentrations that would violate air quality standards or contribute substantially to an existing or projected air quality violation. Therefore, the $PM_{10}$ hot-spot impact on air quality would be less than significant under CEQA.

***Impact AQ #15: Localized Air Quality Impacts to Sensitive Receptors, including Schools (Threshold #3)***

As described above, annual MSAT emissions impacts to sensitive receptors, including schools, would be substantially reduced due to current regulatory requirements. Additionally, based on the

anticipated equipment usage, the LMF and the MOWF are not expected to affect sensitive land uses. Emergency generators would be located at the stations and would emit DPM, which is a TAC. Emergency generators would be screened during the permitting phase with the SJVAPCD, EKAPCD, and AVAQMD to ensure that sensitive receptors, including schools, are not exposed to concentrations of TACs exceeding significance thresholds.

**CEQA Conclusion**

As described above, MSAT pollutant emissions would be reduced compared to existing conditions. Additionally, permitting requirements of the SJVAPCD, EKAPCD, and AVAQMD would ensure that DPM emissions would not result in substantial emissions. Therefore, the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would not expose sensitive receptors to substantial pollutant concentrations and the project would have a less than significant impact under CEQA for impacts related to localized air quality impacts to sensitive receptors.

***Impact AQ #16: Odor Impacts from Operations (Threshold #4)***

No potentially odorous emissions would be associated with HSR operation because the trains would be powered from the regional electrical grid. There would be some area-source emissions associated with station operation, 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.

**CEQA Conclusion**

Implementation of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would not result in the generation of odors affecting a substantial number of people and would therefore have a less than significant odor impact under CEQA.

***Impact AQ #17: Compliance with Air Quality Plans during Project Operation (Threshold #1)***

During operation, the HSR project would reduce VMT in the region, which would reduce regional $O_3$ precursor pollutant emissions. The project would also decrease emissions from other modes of travel (buses, diesel trains, and airports). This reduction in VMT would be consistent with the SJVAPCD GAMAQI, EKAPCD CEQA Guidelines, and AVAQMD CEQA and Federal Conformity Guidelines. Therefore, operation of the B-P Build Alternatives would not conflict with or obstruct implementation of applicable air quality plans.

**CEQA Conclusion**

Because operation of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would not conflict with or obstruct implementation of applicable air quality plans, a less than significant impact would occur under CEQA.

***Impact AQ #18: Cumulative Impacts during Operation (Threshold #2)***

On a regional scale, past, present, and foreseeable projects would contribute to traffic congestion associated with long-term growth and worsen air quality. Although there would be significant cumulative impacts in the region, the B-P Build Alternatives would help the region attain air quality standards and plans by reducing the amount of regional traffic and providing an alternative mode of transportation. Operation of the project would not exceed the SJVAPCD, EKAPCD, or MDAQMD cumulative thresholds of significance for $O_3$ precursors. Because operation of the B-P Build Alternatives would help the region attain air quality standards, the B-P Build Alternatives' contribution to the cumulative impact would be less than cumulatively considerable.

Regulatory agencies continue to pass more stringent GHG emission standards with the goal of reducing the amount of pollutant emissions in the atmosphere. While many of these regulations have not yet been implemented, they are anticipated to be in effect prior to the project planning horizon of 2040. Even with these regulatory reductions, the expected growth in the region would result in significant cumulative increases in GHG emissions. There is also a possibility that the B-P Build Alternatives' demand for electricity would result in indirect GHG emissions impacts from power generation facilities. However, the B-P Build Alternatives would decrease GHG emissions by reducing vehicle and aircraft trips. This reduction in GHG emissions would more than offset the increase in GHG emissions associated with HSR project facilities.

Therefore, the B-P Build Alternatives would result in a net decrease in GHG emissions and would have a cumulatively beneficial effect on global climate change.

Cumulative CO impacts are accounted for in the CO hot-spot analysis. The CALINE4 air dispersion modeling evaluation indicated that the B-P Build Alternatives would cause a less than significant impact for CO emissions. Therefore, project CO effects would be cumulatively negligible.

As described in the *Statewide Program EIR/EIS* (Authority and FRA 2005), the HSR system as a whole would have a less than significant impact on air quality. The HSR system would reduce VMT and result in systemwide air quality benefits. Temporary short-term emissions increases associated with construction activities and localized air pollution increases associated with traffic near the proposed HSR stations would be substantially reduced by mitigation strategies and design practices.

The HSR system would result in beneficial impacts related to GHGs and global climate change. Any additional carbon entering the atmosphere, whether by emissions from the system itself, indirect emissions from electrical power generation, or removal of carbon-sequestering plants (including agricultural crops), would be more than offset by the beneficial reduction of carbon resulting from the project due to a reduction in automobile VMT (mobile sources) and the number of airplane trips.

**CEQA Conclusion**

As described above, the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would reduce VMT and result in systemwide air quality benefits. In addition, temporary short-term emission increases associated with construction activities and localized air pollution increases associated with the B-P Build Alternatives would be reduced through IAMFs and mitigation measures.

In addition, the B-P Build Alternatives would result in beneficial impacts related to GHGs and global climate change due to a reduction in automobile VMT (mobile sources) and the number of airplane trips. Moreover, the increase in GHG emissions generated during project construction would be offset by the net GHG reductions during project operations in less than 1 day.

Therefore, with implementation of on-site minimization features (IAMF#1 through IAMF#6) and Mitigation Measures AQ-MM#1 through AQ-MM#4, emissions associated with the B-P Build Alternatives would not contribute to air quality degradation or impede the region's ability to attain air quality standards. Therefore, the B-P Build Alternatives would not result in a cumulative substantial air quality impact. Cumulative impacts under CEQA would be less than significant after mitigation.

### 3.3.7 Compliance with Conformity Rules

Projects requiring approval or funding from federal agencies that are in areas designated as nonattainment or maintenance for the NAAQS are subject to the USEPA's Conformity Rule. The two types of federal conformity are General Conformity, which applies to the B-P Build Alternatives due to FRA funding, and transportation conformity, which does not apply at this time but could apply to future actions related to the project's minor expansions or realignments of local roadways.

Pursuant to 23 U.S.C. 327 and a Memorandum of Understanding executed by the FRA and the State of California on July 23, 2019, FRA assigned its federal environmental review responsibilities under the National Environmental Policy Act (NEPA) and related statutes to the Authority under a federal program commonly known as NEPA Assignment. Accordingly, the Authority is now the NEPA lead agency. Consistent with 23 U.S.C. 327 and the July 23, 2019 NEPA Assignment Memorandum of Understanding, FRA retains its obligations to make general conformity determinations under the CAA. The Authority and FRA have agreed to collaborate on the development of general conformity determinations. As part of this collaboration, the Authority will develop and provide to FRA a Draft General Conformity Determination and supporting information, as well as the Authority's proposed approach for achieving general conformity. Because the analysis used for the Draft EIR/EIS will also generate the information necessary for the Draft General Conformity Determination, specific analysis may be incorporated by reference in the General Conformity Determination. FRA will make the ultimate general conformity determination for this project. FRA's conformity determination would be made prior to Authority issuance (pursuant to NEPA assignment under the MOU) of a ROD for this section.

#### *3.3.7.1 General Conformity*

To determine whether projects are subject to the General Conformity determination requirements, the USEPA has established General Conformity *de minimis* threshold values (in tons per calendar year) for each of the criteria pollutants for each type of designated nonattainment and maintenance area. If the annual emissions generated by construction or operation of a project (on an areawide basis) are less than these *de minimis* threshold values, the impacts of the project are not considered to be significant and no additional analyses are required. If the emissions are greater than these *de minimis* values, compliance with the General Conformity Rule must be demonstrated.

The applicable project area within the SJVAPCD is designated as nonattainment for 8-hour $O_3$, the 1997 annual $PM_{2.5}$ standard (annual standard of 15 µg/m$^3$) and 24-hour standard of 65 µg/m$^3$), and the 2006 24-hour $PM_{2.5}$ standard (35 µg/m$^3$). The SJVAB is a maintenance area for $PM_{10}$, and the Bakersfield urbanized area is a maintenance area for CO. The SJVAB is in attainment for the $NO_2$ and $SO_2$ NAAQS. The SJVAB is unclassified for the lead NAAQS. The General Conformity threshold values for this area, according to 40 C.F.R. Part 93, are 10 tons per year for VOC, 100 tons per year for CO, 10 tons per year for $NO_x$, 70 tons per year for $PM_{10}$, and 100 tons per year for $PM_{2.5}$.

The applicable project area within the EKAPCD is currently designated nonattainment for federal 8-hour $O_3$. The western portion of the district is currently designated nonattainment for $PM_{10}$. The EKAPCD is an attainment/unclassifiable area for the $PM_{2.5}$, CO, and lead NAAQS. The EKAPCD is unclassified for the federal $NO_2$ and $SO_2$ standards. The General Conformity threshold values for this area, according to 40 C.F.R. Part 93, are 50 tons per year for VOC, 50 tons per year for NOx, and 100 tons per year for $PM_{10}$.

The applicable project area within the AVAQMD is currently designated as nonattainment for 8-hour $O_3$. The AVAQMD is an attainment/unclassified area under the NAAQS for CO, $NO_2$, $SO_2$, and lead. The AVAQMD is unclassified for the $PM_{10}$ and $PM_{2.5}$ NAAQS. The General Conformity threshold values for this area, according to 40 C.F.R. Part 93, are 25 tons per year for VOC and 25 tons per year for $NO_X$.

Because the regional emissions for the applicable pollutants would be lower under the operational phase of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) than for the No Project Alternative, only emissions generated during the construction phase need to be compared to these threshold values to determine whether the General Conformity Rule would apply.

**Alternative 1**

***San Joaquin Valley Air Pollution Control District***

As shown in Table 3.3-19, construction-phase emissions under Alternative 1 in the SJVAPCD are greater than the General Conformity threshold values for:

- VOC for the years 2020–2023
- $NO_X$ for the years 2018 and 2020–2026

***Eastern Kern Air Pollution Control District***

As shown in Table 3.3-20, construction-phase emissions under Alternative 1 in the EKAPCD are greater than the General Conformity threshold values for:

- $NO_X$ for the years 2019–2025

***Antelope Valley Air Quality Management District***

As shown in Table 3.3-21, construction-phase emissions under Alternative 1 in the AVAQMD are greater than the General Conformity threshold values for:

- $NO_X$ for the years 2020–2023

**Alternative 2**

***San Joaquin Valley Air Pollution Control District***

As shown in Table 3.3-22, construction-phase emissions under Alternative 2 in the SJVAPCD are greater than the General Conformity threshold values for:

- VOC for the years 2020–2023
- $NO_X$ for the years 2020–2026

***Eastern Kern Air Pollution Control District***

As shown in Table 3.3-23, construction-phase emissions under Alternative 2 in the EKAPCD are greater than the General Conformity threshold values for:

- $NO_X$ for the years 2020–2024

***Antelope Valley Air Quality Management District***

As shown in Table 3.3-24, construction-phase emissions under Alternative 2 in the AVAQMD are greater than the General Conformity threshold values for:

- $NO_X$ for the years 2020–2025

**Alternative 3**

***San Joaquin Valley Air Pollution Control District***

As shown in Table 3.3-25, construction-phase emissions under Alternative 3 in the SJVAPCD are greater than the General Conformity threshold values for:

- VOC for the years 2020–2022
- $NO_X$ for the years 2020–2026

***Eastern Kern Air Pollution Control District***

As shown in Table 3.3-26, construction-phase emissions under Alternative 3 in the EKAPCD are greater than the General Conformity threshold values for:

- $NO_X$ for the years 2020–2024

***Antelope Valley Air Quality Management District***

As shown in Table 3.3-27, construction-phase emissions under Alternative 3 in the AVAQMD are greater than the General Conformity threshold values for:

- $NO_X$ for the years 2020–2023

**Alternative 5**

***San Joaquin Valley Air Pollution Control District***

As shown in Table 3.3-28, construction-phase emissions under Alternative 5 in the SJVAPCD are greater than the General Conformity threshold values for:

- VOC for the years 2020–2023
- $NO_X$ for the years 2020–2026

***Eastern Kern Air Pollution Control District***

As shown in Table 3.3-29, construction-phase emissions under Alternative 5 in the EKAPCD are greater than the General Conformity threshold values for:

- $NO_X$ for the years 2020–2024

***Antelope Valley Air Quality Management District***

As shown in Table 3.3-30, construction-phase emissions under Alternative 5 in the AVAQMD are greater than the General Conformity threshold values for:

- $NO_X$ for the years 2020–2025

As such, the project must demonstrate compliance with the General Conformity Rule. Compliance with the General Conformity Rule can be demonstrated in one, or more, of the following ways:

- By offsetting the project's construction-phase emissions for pollutant emissions that exceed the annual General Conformity thresholds. For example, if the project would exceed the VOC threshold in 2019, the project would offset those emissions in that year.
- By showing that the construction-phase emissions are included in the area's emission budget for the SIP.
- By demonstrating that the state agrees to include the emission increases in the SIP without exceeding emission budgets.

Compliance with the General Conformity Rule would be demonstrated through one or more of the methods listed above prior to completion of the NEPA process. Demonstration of compliance with the General Conformity rule is not expected to change the results of the analysis described in this section.

### *3.3.7.2 Transportation Conformity*

Transportation Conformity is an analytical process required for all federally funded highway and transit transportation projects, but it does not apply to this project. Under the 1990 CAA Amendments, the U.S. Department of Transportation cannot fund, authorize, or approve federal highway and transit actions that are not first found to conform to the SIP for achieving the goals of the CAA requirements. Transportation Conformity with the CAA takes place at both the regional level and the project level.

As discussed in previous sections, the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) are not subject to the Transportation Conformity Rule; however, if the project requires future actions that meet the definition of a project element subject to transportation conformity, additional determinations and associated analysis will be completed as may be required.

## 3.3.8 Mitigation Measures

This section describes the proposed mitigation measure and the impacts of implementing the measure. The mitigation measure would be implemented during construction.

### 3.3.8.1 Fresno to Bakersfield Locally Generated Alternative Mitigation Measures from 34th Street and L Street to Oswell Street

The *Fresno to Bakersfield Section Final Supplemental EIR/EIS* (Authority 2018a) and the *Fresno to Bakersfield Section Locally Generated Alternative Final Supplemental EIS* (Authority 2019a) identified mitigation measures that are applicable to the entire length of the F-B LGA from just north of Poplar Avenue to Oswell Street. Not all measures identified in the Final Supplemental EIR and the Final Supplemental EIS are applicable to the portion of the F-B LGA from 34th Street and L Street to Oswell Street. See Section 3.1.3.7 for further discussion of this issue. The following air quality and global climate change-related mitigation measures are applicable to the portion of the F-B LGA from 34th Street and L Street to Oswell Street:

- **F-B LGA AQ-MM#1:** This mitigation measure will apply to heavy-duty construction equipment used during the construction phase. All off-road construction diesel equipment will use the cleanest reasonably available equipment (including newer equipment and/or tailpipe retrofits), but in no case less clean than the average fleet mix for the current calendar year, as set forth in California Air Resources Board's (CARB) OFFROAD 2011 database, and no less than a 40 percent reduction compared to a Tier 2 engine standard for nitrogen oxides ($NO_X$) emissions. The contractor will document efforts undertaken to locate newer equipment (such as, in order of priority, Tier 4, Tier 3, or Tier 2 equipment) and/or tailpipe retrofit equivalents. The contractor will provide documentation of such efforts, including correspondence with at least two construction equipment rental companies. A copy of each unit's certified tier specification and any required CARB or San Joaquin Valley Air Pollution Control District (SJVAPCD) operating permit will be made available at the time of mobilization of each piece of equipment. The contractor will keep a written record (supported by equipment-hour meters, where available) of equipment usage during project construction for each piece of equipment.
- **F-B LGA AQ-MM#2:** This mitigation measure applies to all on-road trucks used to haul construction materials, including fill, ballast, rail ties, and steel. Material-hauling trucks will consist of an average fleet mix of equipment model year 2010 or newer, but no less than the average fleet mix for the current calendar year as set forth in CARB's Emission Factors Model 2011 database. The contractor will provide documentation of efforts to secure such a fleet mix. The contractor will keep a written record of equipment usage during project construction for each piece of equipment.
- **F-B LGA AQ-MM#3:** Concrete batch plants would be sited at least 1,000 feet from sensitive receptors, including daycare centers, hospitals, senior care facilities, residences, parks, and other areas where people may congregate. The concrete batch plant will utilize typical control measures to reduce fugitive dust, such as water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central dust collection systems and other suitable technology, to reduce emissions to be equivalent to the U.S. Environmental Protection Agency (USEPA) AP-42 controlled emission factors for concrete batch plants.
- **F-B LGA AQ-MM#4:** The California High-Speed Rail Authority (Authority) and SJVAPCD will enter into a contractual agreement to mitigate the project's emissions (by offsetting) to net zero the project's actual emissions from construction equipment and vehicle exhaust emissions of volatile organic compounds (VOC), $NO_X$, particulate matter smaller than or equal to 10 microns in diameter ($PM_{10}$), and particulate matter smaller than or equal to 2.5 microns in diameter ($PM_{2.5}$). The agreement will provide funds for the SJVAPCD's Emission Reduction Incentive Program (SJVAPCD 2011) to fund grants for projects that achieve emission reductions, with preference given to highly impacted communities, thus offsetting project impacts on air quality. Projects funded in the past include electrification of stationary internal combustion engines (such as agricultural irrigation pumps); replacement of old heavy-duty trucks with new, cleaner, more efficient heavy-duty trucks; and replacement of old farm tractors. The project will commit to reducing construction emissions for $NO_X$ and VOC through the Voluntary Emission Reduction Agreement (VERA) program. To lower overall cost, funding for the VERA program to cover estimated construction emissions for any funded

construction phase will be provided at the beginning of the construction phase, if feasible. At a minimum, funding shall be provided so that mitigation/offsets will occur in the year of impact, or as otherwise permitted by 40 C.F.R. Part 93 Section 93.163.

- **F-B LGA AQ-MM#5:** This mitigation measure will apply if ballast material is hauled from quarries outside the San Joaquin Valley Air Basin (SJVAB) and the hauling activities result in the exceedance of applicable annual General Conformity (GC) threshold(s) or local air basin California Environmental Quality Act (CEQA) threshold(s) for $NO_X$. To determine whether an exceedance will occur based on actual hauling activities, the Authority shall at the beginning of each calendar year, or as soon as practicable thereafter, (1) obtain the most up-to-date information based on actual or projected contractor-specific information about hauling in the Mojave Desert Air Quality Management District (AQMD), South Coast AQMD, and Bay Area AQMD; and (2) calculate the expected $NO_X$ emissions from hauling activities in those districts using the same methodology used in this F-B LGA Draft Supplemental Environmental Impact Report/Environmental Impact Statement (EIR/EIS). The analysis methodology shall specify the location, the year in which the emissions would be released, and the quantity of emissions. If, based on that calculation, exceedance of the applicable $NO_X$ threshold(s) is anticipated to occur in that next calendar year, the Authority will secure from the appropriate air district(s) or other appropriate source the production or generation of a sufficient quantity of $NO_X$ offsets for that calendar year necessary to achieve conformity (in the case of exceedance of GC thresholds) and/or to offset $NO_X$ emissions below the applicable CEQA threshold(s). At a minimum, mitigation/offsets will occur in the year of impact, or as otherwise permitted by Code of Federal Regulations (C.F.R.) Title 40, Part 93, Section 93.163.

  The Mojave Desert AQMD's emission bank has 3,274 tons of $NO_X$ credits (Mojave Desert AQMD 2016); therefore, there should be enough $NO_X$ credits to offset approximately 6 tons per year from this project in the Mojave Desert Air Basin. The exact number of $NO_X$ credits in the South Coast AQMD RECLAIM program is unknown, but 810.5 tons of $NO_X$ credits were traded in 2015 and 43.3 tons of $NO_X$ credits were traded in 2012 (South Coast AQMD 2016). Therefore, there should be enough available $NO_X$ credits in the program to offset approximately 75 tons of $NO_X$ per year from this project in the South Coast AQMD.

  In the Bay Area AQMD, any material emissions above the district's significance threshold will be mitigated through an off-site emission mitigation program to achieve emission reduction due to material hauling in the Bay Area AQMD. Potential off-site mitigation programs include the Bay Area AQMD's Carl Moyer Memorial Air Quality Standards Attainment Program (CMP) or other air district emission reduction incentive programs. Depending on the final location selected to obtain ballast material, this would amount to a maximum of 3 tons per year of $NO_X$ credits.

### *3.3.8.2 Bakersfield to Palmdale Project Section Mitigation Measures*

#### *AQ-MM#1: Offset Project Construction Emissions through Off-Site Emission Reduction Programs*

In 2014, the Authority and the San Joaquin Air Pollution Control District (SJVAPCD) entered into a contractual agreement through a Memorandum of Understanding and a Voluntary Emission Reduction Agreement (VERA). The VERA mitigates (by offsetting) to net zero the project's actual emissions from construction equipment and vehicle exhaust emissions of volatile organic compound (VOC), $NO_X$, particulate matter ($PM_{10}$), and $PM_{2.5}$. The agreement will provide funds for the SJVAPCD's Emission Reduction Incentive Program (SJVAPCD 2011) to fund grants for projects that achieve emission reductions, with preference given to highly affected communities, thus offsetting project-related impacts on air quality. To lower overall cost, funding for the VERA program to cover estimated construction emissions for any funded construction phase will be provided at the beginning of the construction phase. At a minimum, mitigation/offsets will occur in the year of impact, or as otherwise permitted by 40 Code of Federal Regulations (C.F.R.) Part 93 Section 93.163.

The Authority shall also enter into an agreement with the Antelope Valley Air Quality Management District (AVAQMD) and Eastern Kern Air Pollution Control District (EKAPCD) to mitigate (by offsetting) to net zero (to the extent that offsets are available) the project's actual emissions from construction equipment and vehicle exhaust emissions of VOC, $NO_X$, $PM_{10}$ and $PM_{2.5}$. In the AVAQMD, the Authority shall participate in the Air Quality Investment Program, which funds stationary- and mobile-source emission reduction strategies. In the EKAPCD, the Authority shall provide an application for the Emission Banking Certificate Program.

***Impacts from Implementing Mitigation Measures***

The methodologies used to reduce emissions may result in increased fuel or energy consumption associated with emissions control equipment. However, it is also possible that fuel and energy consumption may decrease. The change in fuel consumption would be small, on a per-equipment basis. If aftermarket control devices are used, such as diesel particulate filters, additional waste would be generated associated with disposal of spent filters. These additional increases would be small in comparison to the scope of the project, and it is expected that impacts of mitigation would be less than significant under CEQA.

## 3.3.9 NEPA Impact Summary

This section summarizes the effects identified in Section 3.3.6, Environmental Consequences. Effects are assessed after the implementation of HSR system IAMFs listed in Section 3.3.4.2.

### *3.3.9.1 No Project Alternative*

Increasingly stringent federal and state emission control requirements and the replacement of older, higher-polluting vehicles with newer, less-polluting ones would reduce basinwide emissions under the No Project Alternative. In addition, SJVAPCD, EKAPCD, and AVAQMD rules and plans have been established to bring the SJVAB and MDAB into compliance with the NAAQS and CAAQS, which would reduce emissions under the No Project Alternative. Continued land development and growth within the regions would increase emissions, but these could be mitigated with the general plan policies under the existing conditions and No Project Alternative. Therefore, air quality is expected to improve in the SJVAB and MDAB under the No Project Alternative compared to existing conditions.

### *3.3.9.2 Comparison of High-Speed Rail Alternatives*

This section summarizes the impacts of the B-P Build Alternatives and compares them to the anticipated impacts of the No Project Alternative. Table 3.3-45 provides a comparison of the potential impacts of each of the B-P Build Alternatives, summarizing the more detailed information provided in Section 3.3.6. A comparison of the impacts on air quality and global climate change of the different B-P Build Alternatives follows Table 3.3-45. Impacts associated with each B-P Build Alternative would be the same with or without the CCNM Design Option. Some years under all alternatives have slightly higher emissions under the Refined CCNM Design Option.

**Table 3.3-45 Comparison of Bakersfield to Palmdale Project Section Build Alternative Impacts for Air Quality and Global Climate Change**

| Impact | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 5 |
|---|---|---|---|---|
| **Construction** | | | | |
| **Impact AQ #1: Regional Air Quality Impacts during Construction (Threshold #2)** | | | | |
| Effects related to maximum annual construction $NO_X$ emissions exceeding the General Conformity *de minimis* threshold (tons per year) | 213 (2022) | 254 (2021) | 277 (2021) | 279 (2021) |

| Impact | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 5 |
|---|---|---|---|---|
| Effects related to maximum annual construction VOC emissions exceeding the General Conformity *de minimis* threshold (tons per year) | 20 (2021) | 25 (2021) | 27 (2021) | 27 (2021) |
| **Impact AQ #2: Compliance with Air Quality Plans during Construction (Threshold #1)** | | | | |
| Effects related to maximum annual construction $NO_X$ emissions exceeding the General Conformity *de minimis* threshold (tons per year) | 213 (2022) | 254 (2021) | 277 (2021) | 279 (2021) |
| Effects related to maximum annual construction VOC emissions exceeding the General Conformity *de minimis* threshold (tons per year) | 20 (2021) | 25 (2021) | 27 (2021) | 27 (2021) |
| **Impact AQ #3: Greenhouse Gas Emissions during Construction (Threshold #5)** | | | | |
| Effects related to total construction GHG emissions (metric tons of $CO_2e$ per year) | 3,951 | 4,136 | 4,019 | 4,741 |
| Effects related to 25-year amortized construction GHG emissions (metric tons of $CO_2e$ per year) | 158 | 165 | 161 | 190 |
| **Localized Impacts** | | | | |
| Impact AQ #4: Asbestos and Lead-Based Paint Exposure during Construction (Threshold #3) | All of the B-P Build Alternatives would avoid localized impacts from asbestos and lead-based paint exposure. | | | |
| Impact AQ #5: Localized Air Quality Impacts during Guideway/Alignment Construction (Threshold #3) | All of the B-P Build Alternatives would avoid localized impacts during guideway/alignment construction. | | | |
| Impact AQ #6: Localized Air Quality Impacts to Schools and Other Sensitive Receptors during Station Construction (Threshold #3) | All of the B-P Build Alternatives would avoid localized impacts to schools and other sensitive receptors during station construction. | | | |
| Impact AQ #7: Localized Air Quality Impacts from Concrete Batch Plants (Threshold #3) | All of the B-P Build Alternatives would avoid localized impacts from concrete batch plants. | | | |
| Impact AQ #8: Cumulative Impacts during Construction (Threshold #2) | All of the B-P Build Alternatives would avoid localized cumulative impacts during construction. | | | |

| Impact | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 5 |
|---|---|---|---|---|
| **Operations** | | | | |
| Impact AQ #9: Statewide and Regional Criteria Pollutant Emissions (Threshold #2) | All of the B-P Build Alternatives would avoid statewide and regional criteria pollutant emission impacts and would result in anticipated net reduction in criteria pollutant emissions within the SJVAB and MDAB. | | | |
| Impact AQ #10: Greenhouse Gas Analysis during Operation (Threshold #5) | All of the B-P Build Alternatives would avoid GHG emission impacts and would result in an anticipated net reduction in GHG emissions within the SJVAB and the MDAB. | | | |
| Impact AQ #11: Localized Air Quality Impacts during Train Operations (Threshold #3) | All of the B-P Build Alternatives would avoid localized air quality impacts during train operations. | | | |
| Impact AQ #12: Localized Mobile-Source Air Toxics Analysis (Threshold #3) | All of the B-P Build Alternatives would avoid localized mobile-source air toxic emissions. | | | |
| Impact AQ #13: Microscale CO Impact Analysis (Threshold #3) | All of the B-P Build Alternatives would result in CO concentrations below NAAQS for the worst-case intersections and would avoid microscale CO impacts. | | | |
| Impact AQ #14: Localized $PM_{10}$/$PM_{2.5}$ Hot-Spot Impact Analysis (Threshold #3) | All of the B-P Build Alternatives would avoid localized $PM_{10}$/$PM_{2.5}$ hot-spot impacts. | | | |
| Impact AQ #15: Localized Air Quality Impacts to Sensitive Receptors including Schools (Threshold #3) | All of the B-P Build Alternatives would avoid localized air quality impacts to sensitive receptors, including schools. | | | |
| Impact AQ #16: Odor Impacts from Operations (Threshold #5) | All of the B-P Build Alternatives would avoid impacts related to other emissions (such as those leading to odors) adversely affecting a substantial number of people. | | | |
| Impact AQ #17: Compliance with Air Quality Plans during Project Operation (Threshold #1) | All of the B-P Build Alternatives would avoid impacts related to compliance with applicable air quality plans during project operation and would result in an anticipated net reduction in criteria pollutant and GHG emissions within the SJVAB and the MDAB. | | | |
| Impact AQ #18: Cumulative Impacts During Operation (Threshold #2) | All of the B-P Build Alternatives would avoid cumulative impacts during project operation and would result in an anticipated net reduction in criteria pollutant and GHG emissions within the SJVAB and the MDAB. | | | |

B-P = Bakersfield to Palmdale Project Section
CO = carbon monoxide
$CO_2e$ = carbon dioxide equivalent
GHG = greenhouse gases
MDAB = Mojave Desert Air Basin
NAAQS = national ambient air quality standards
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
SJVAB = San Joaquin Valley Air Basin
VOC = volatile organic compounds
The analysis assumed that project construction would take place from 2018 to 2026. Although the project schedule has been updated, the analysis is still valid because equipment quantities and annual emission rates would remain unchanged irrespective of the start year for construction.

The B-P Build Alternatives do not all follow an identical route and have different track lengths; thus, each alternative's construction activity would be unique. Many factors influence the extent and magnitude of activity that would be required for construction (e.g., the number and type of existing structures to be demolished, the amount of imported and exported dirt required during grading, the number of traction power substations constructed). The combination of these factors is unique for each alternative and results in the emissions of pollutants that would be generated during construction. Because there are many factors involved in construction activity that determine the level of pollutant emissions, it is not possible to identify a single narrative between any one factor and the resulting emissions.

Construction emissions are largely a function of alignment length but are also influenced by the type and extent of construction activity. Therefore, although construction of all four B-P Build Alternatives would cause exceedances of the applicable thresholds, the extent of the impact (i.e. the magnitude of the exceedance above the General Conformity *de minimis* $NO_X$ and VOC thresholds) would vary slightly based on alternative. The maximum exceedance of the $NO_X$ threshold would be 279 tons per year for Alternative 5, and the minimum would be 213 tons per year for Alternative 1. The maximum exceedance of the VOC threshold would be 27 tons per year for Alternatives 3 and 5, and the minimum would be 20 tons per year for Alternative 1. Implementation of Mitigation Measure AQ-MM#1 would offset emissions through the VERA Program (in the SJVAPCD), the Emission Banking Certificate program (in the EKAPCD), and the Air Quality Investment Program (in the AVAQMD) to bring all B-P Build Alternatives into compliance with SJVAPCD, EKAPCD, and AVAQMD air quality plans.

The B-P Build Alternatives would generate direct and indirect GHG emissions during construction that could contribute to global climate change. Total construction GHG emissions would be a maximum of 4,741 metric tons per year for Alternative 5 and a minimum of 3,951 metric tons per year for Alternative 1. These emissions from all B-P Build Alternatives would be temporary and would be offset from the emissions benefit that would occur during the operations period. The emissions benefit achieved during the operations period would be equal for all B-P Build Alternatives; as a result, none of the B-P Build Alternatives would result in global climate change impacts from GHG emissions.

All of the B-P Build Alternatives would avoid localized impacts from asbestos and lead-based paint exposure, impacts from guideway/alignment construction, impacts to schools and other sensitive receptors during station construction, and impacts from concrete batch plants. In addition, all of the B-P Build Alternatives would avoid localized cumulative impacts during construction.

During operations, none of the B-P Build Alternatives would result in exceedances of the *de minimis* thresholds or SJVAPVD, EKAPCD, or AVAQMD thresholds because the B-P Build Alternatives would result in net reductions in operational emissions, resulting in an overall benefit to emissions during the operations phase. The reductions in emissions from reduced on-road vehicle and aircraft activity and the increase in emissions from electricity consumption to power the trains would be equal for all four B-P Build Alternatives. There would be an emissions benefit for GHG emissions as well, and the B-P Build Alternatives would result in a net reduction of GHG emissions statewide.

All of the B-P Build Alternatives would avoid localized air quality impacts during train operations and avoid localized air quality impacts from MSAT emissions. In addition, all of the B-P Build Alternatives would avoid microscale CO impacts and localized $PM_{10}/PM_{2.5}$ hot-spot impacts. It is also anticipated that all of the B-P Build Alternatives would avoid localized air quality impacts to sensitive receptors, including schools. All of the B-P Build Alternatives would also avoid impacts related to other emissions (such as those leading to odors) adversely affecting a substantial number of people.

All of the B-P Build Alternatives would avoid impacts related to compliance with applicable air quality plans during project operation and would result in anticipated net reduction in criteria pollutant and GHG emissions within the SJVAB and the MDAB. All of the B-P Build Alternatives would avoid cumulative impacts during project operation and would result in anticipated net reduction in criteria pollutant and GHG emissions within the SJVAB and the MDAB.

### 3.3.10 CEQA Significance Conclusions

Table 3.3-46 provides a summary of the CEQA determination of significance for all construction and operations impacts discussed in Section 3.3.6.3. If there are differences in impacts before or after mitigation among the B-P Build Alternatives, these are noted in the table. Where there is no difference in the CEQA level of significance before and after mitigation for a particular impact, the level of significance for that impact is the same for all B-P Build Alternatives.

**Table 3.3-46 Summary of CEQA Significance Conclusions for Air Quality and Global Climate Change**

| Impact | Impact Description and CEQA Level of Significance | Mitigation Measure | CEQA Level of Significance After Mitigation |
|---|---|---|---|
| **Construction** | | | |
| Impact AQ #1: Regional Air Quality Impacts during Construction | Significant. All B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would exceed the CEQA emission thresholds for VOC, CO, and $NO_X$. | AQ-MM#1 | Significant and unavoidable for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) for CO emissions. |
| Impact AQ #2: Compliance with Air Quality Plans during Construction | Significant. Construction of the B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) would exceed the CEQA emission thresholds for VOC, CO, and $NO_X$, which could conflict with ozone plans. | AQ-MM#1 | Significant and unavoidable for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) for CO emissions. |
| Impact AQ #3: Greenhouse Gas Emissions during Construction | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| **Localized Impacts** | | | |
| Impact AQ #4: Asbestos and Lead-Based Paint Exposure during Construction | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| Impact AQ #5: Localized Air Quality Impacts During Guideway/Alignment Construction | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |

| Impact | Impact Description and CEQA Level of Significance | Mitigation Measure | CEQA Level of Significance After Mitigation |
|---|---|---|---|
| Impact AQ #6: Localized Air Quality Impacts to Schools and Other Sensitive Receptors during Station Construction | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| Impact AQ #7: Localized Air Quality Impacts from Concrete Batch Plants | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| Impact AQ #8: Cumulative Impacts during Construction | Significant. Construction of all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) could result in cumulative air quality impacts during construction. | AQ-MM#1 | Significant and unavoidable for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street) for CO emissions. |
| **Operations** | | | |
| Impact AQ #9: Statewide and Regional Criteria Pollutant Emissions | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| Impact AQ #10: Greenhouse Gas Analysis during Operation | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| Impact AQ #11: Localized Air Quality Impacts During Train Operations | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |

| Impact | Impact Description and CEQA Level of Significance | Mitigation Measure | CEQA Level of Significance After Mitigation |
|---|---|---|---|
| Impact AQ #12: Localized Mobile-Source Air Toxics Analysis | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| Impact AQ #13: Microscale CO Impact Analysis | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| Impact AQ #14: Localized $PM_{10}$/$PM_{2.5}$ Hot-Spot Impact Analysis | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| Impact AQ #15: Localized Air Quality Impacts to Sensitive Receptors including Schools | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| Impact AQ #16: Odor Impacts from Operations | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |
| Impact AQ #17: Compliance with Air Quality Plans during Project Operation | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |

| Impact | Impact Description and CEQA Level of Significance | Mitigation Measure | CEQA Level of Significance After Mitigation |
|---|---|---|---|
| Impact AQ #18: Cumulative Impacts During Operation | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). | No mitigation measures are required | Less than significant for all B-P Build Alternatives (including the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street). |

B-P = Bakersfield to Palmdale Project Section
CCNM = César E. Chávez National Monument
CEQA = California Environmental Quality Act
CO = carbon monoxide
F-B LGA = Fresno to Bakersfield Locally Generated Alternative
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter smaller than or equal to 2.5 microns in diameter
$PM_{10}$ = particulate matter smaller than or equal to 10 microns in diameter
$O_3$ = ozone
VOC = volatile organic compounds