3.3 Air Quality and Global Climate Change

3.3.1 Introduction

This section describes the regulatory and environmental setting associated with the air quality and global climate changes for the study area affected by the HST project, the potential impacts on air quality and global climate change that would result from the project, and mitigation measures that would eliminate or reduce these impacts. Emission reduction measures identified in the 2005 Statewide Program EIR/EIS (Authority and FRA 2005) are incorporated for the Fresno to Bakersfield Section as described in Section 3.3.9, Mitigation Measures.

The 2005 Statewide Program EIR/EIS (Authority and FRA 2005) concluded that the HST project would have low potential to result in significant impacts on air quality. The HST would reduce vehicle miles otherwise traveled and result in an air quality benefit when viewed on a systemwide and regional basis. The HST alternatives incorporate, to the extent possible, design measures, such as state-of-the-art, energy-efficient equipment and renewable energy sources, to minimize potential air pollution impacts associated with power used by the HST System.

The *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014) provides more detailed air quality and global climate change information. Section 3.18, Regional Growth, and Section 3.19, Cumulative Impacts, of this Draft Project EIR/EIS discuss growth-inducing impacts and cumulative impacts, respectively. As discussed in Section 3.1.5 and the Executive Summary, the analysis in this chapter includes revisions based on design refinements and analytical refinements. Gray shading is used as a guide to help the reader navigate the revisions.

3.3.2 Laws, Regulations, and Orders

3.3.2.1 Federal

The U.S. Environmental Protection Agency (U.S. EPA) is responsible for establishing the National Ambient Air Quality Standards (NAAQS), enforcing the Clean Air Act (CAA), and regulating transportation-related emission sources, such as aircraft, ships, and certain types of locomotives, under the exclusive authority of the federal government. The U.S. EPA 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).

Clean Air Act and Conformity Rule

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 U.S. EPA. Section 176(c) of the CAA provides that federal agencies cannot engage, support, or provide financial assistance for licensing, permitting, or approving any project unless the project conforms to the applicable SIP. The State's and U.S. EPA'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, U.S. EPA promulgated Title 40 Code of Federal Regulations Part 51 (40 C.F.R. Part 51), Subpart W and 40 CFR Part 93, Subpart B, "Determining Conformity of General Federal Actions to State or Federal Implementation Plans" (see 58 Federal Register [FR] 63214, [November 30, 1993], as amended; 75 FR 17253 [April 5, 2010]). These regulations, commonly referred to as the General Conformity Rule, apply to all federal actions including those by FRA, except for those federal actions which are excluded from review (e.g., stationary source emissions) or related to transportation plans, programs, and projects under Title 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 51, Subpart W, applies; in states that do not have an approved SIP revision adopting General Conformity regulations, 40 C.F.R. Part 93, Subpart B, applies.

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

- Cause or contribute to new violations of a NAAQS.
- Increase the frequency or severity of any existing violation of a NAAQS.
- Delay timely attainment of a 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; that one or more specific exemptions do not apply to the action; the action is not included in the federal agency's "presumed to conform" list; the emissions from the proposed action are not within the approved emissions budget for an applicable facility; and the total direct and indirect emissions of a pollutant (or its precursors) are at or above the *de minimis* levels established in the General Conformity regulations (75 FR 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 U.S. EPA 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, U.S. EPA has established NAAQS for six major air pollutants. These pollutants, known as criteria pollutants, are ozone (O_3), particulate matter (PM) (PM with an aerodynamic diameter less than or equal to 10 microns [PM_{10}] and PM with an aerodynamic diameter less than or equal to 2.5 microns [$PM_{2.5}$]), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. CARB has also established ambient air quality standards, known as the California Ambient Air Quality Standards (CAAQS), which 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 the state and federal standards. The primary standards have been established to protect public health. The secondary standards are intended to protect the nation's welfare and account for air pollutant impacts on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

Table 3.3-1
State and Federal Ambient Air Quality Standards

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	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)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)[8]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)[8]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[9]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[10]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[10]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[10]	—	
Lead[11,12]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[13]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[11]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page …

Table 3.3-1
State and Federal Ambient Air Quality Standards (Continued)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

For more information please call ARB-PIO at (916) 322-2990 **California Air Resources Board (6/4/13)**

Source: CARB 2013.

Mobile Source Air Toxics

In addition to the criteria pollutants for which there are NAAQS, the U.S. EPA regulates mobile source air toxics (MSATs). In February 2007, the U.S. EPA finalized a rule (Control of Hazardous Air Pollutants from Mobile Sources, February 9, 2007) to reduce hazardous air pollutants from mobile sources. The rule limits the benzene content of gasoline and reduces toxic emissions from passenger vehicles and gas cans. The U.S. EPA estimates that in 2030 this rule would reduce total emissions of MSATs by 330,000 tons and volatile organic compound (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 federal or California ambient standards exist for MSATs. Specifically, the U.S. EPA has not established NAAQS or provided standards for hazardous air pollutants.

On February 3, 2006, the FHWA released *Interim Guidance on Air Toxic Analysis in NEPA Documents.* This guidance was superseded on December 6, 2012 by FHWA's *Interim Guidance Update on Air Toxic Analysis in NEPA*. The purpose of FHWA's guidance is to advise on when and how to analyze MSATs in the National Environmental Policy Act (NEPA) environmental review process for highways and other transportation-related projects. This guidance will be followed to define the MSAT analysis for the HST project. This guidance is considered interim since MSAT science is still evolving. As the science progresses, FHWA will update the guidance.

Greenhouse Gas Regulations

Greenhouse gas (GHG) emissions are regulated at both the federal and state level. Laws and regulations, as well as plans and policies, have been adopted to address global climate change issues. Key federal regulations relevant to the project are summarized below.

On September 22, 2009, the U.S. EPA published the Final Rule that requires mandatory reporting of GHG emissions from large sources in the U.S. (U.S. EPA 2010a). The gases covered by the Final Rule are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and other fluorinated gases including nitrogen trifluoride (NF_3) and hydrofluorinated ethers (HFE). 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 U.S. EPA 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, HFCs, PFCs, 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 (U.S. EPA 2010b).

Based on the endangerment finding, the U.S. EPA revised vehicle emission standards under the endangerment finding of the CAA. U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) updated the Corporate Average Fuel Economy (CAFE) fuel standards on May 7, 2010 (75 FR 25324), requiring substantial improvements in fuel economy for all vehicles sold in the United States. The new standards apply to new passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The U.S. EPA GHG standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile in model year 2016, which would be equivalent to 35.5 miles per gallon if the automotive industry were to meet this CO_2 level entirely through fuel economy improvements.

On September 15, 2011, the U.S. EPA and NHTSA issued a final rule of Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles (76 FR 57106). 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 U.S. EPA and NHTSA estimated that the new standards in this rule will 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.

In January 2012, the California Air Resources Board (CARB) approved a vehicle emission control program for model years 2017 through 2025. This is called the Advanced Clean Cars Program. On August 28, 2012, U.S. EPA and the NHTSA issued a joint final rulemaking to establish 2017 through 2025 GHG emissions and CAFE Standards. To further California's support of the national program to regulate emissions, CARB submitted a proposal that would allow automobile manufacturer compliance with U.S.EPA'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.

Greenhouse Gas Guidance

On February 18, 2010, CEQ released draft guidance on the consideration of GHG in NEPA documents for federal actions. The draft guidelines include a presumptive threshold of 25,000 metric tons of carbon dioxide equivalent (CO_2e) emissions from a proposed action to trigger a quantitative analysis. CEQ has not established when GHG emissions are “significant” for NEPA purposes, but rather poses that question to the public (CEQ 2010).

3.3.2.2 State

California Clean Air Act

The California Clean Air Act (CCAA) requires that nonattainment areas achieve and maintain the health-based CAAQS by the earliest practicable date. The Act is administered by CARB at the state level, and by local air quality management districts at the regional level and air districts are required to develop plans and control programs for attaining the state standards.

CARB is responsible for ensuring implementation of the CCAA, meeting state requirements of the federal CAA, and establishing the state ambient air quality standards. 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 and the Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations. Also, U.S. EPA is responsible for enforcing regulations relating to asbestos renovations and demolitions; however, U.S. EPA 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.

Greenhouse Gas Regulations

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 1493 (AB 1493), California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the state level. AB 1493 requires CARB to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the model year 2009. Although litigation challenged these regulations and U.S. EPA initially denied California's related request for a waiver, the waiver request was granted (U.S. EPA 2010c).

Executive Order S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this executive order is to reduce California's GHG emissions to year 2000 levels by 2010; 1990 levels by 2020; and 80% below the 1990 levels by 2050. Executive Order S-3-05 also calls for California Environmental Protection Agency (Cal/EPA) 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 Climate Adaptation Strategy (CAS) was released in December 2009 following extensive interagency coordination and stakeholder input. The latest of these reports, *Climate Action Team Biennial Report*, was published in December 2010 (Cal/EPA 2010).

Assembly Bill 32

In 2006, the goal of Executive Order S-03-05 was further reinforced with the passage of AB 32, the Global Warming Solutions Act of 2006. AB 32 sets overall GHG emissions reduction goals and mandates that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of GHGs." Executive Order 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 (Health and Safety Code [HSC] Section 38561). The scoping plan, approved by CARB on December 12, 2008, provides the outline for future actions to reduce GHG emissions in California via regulations, market mechanisms, and other measures.
- The scoping plan includes the implementation of high-speed rail as a GHG reduction measure, estimating a 2020 reduction of 1 million metric tons of CO_2 equivalent (MMT CO_2e).
- Identify the statewide level of greenhouse gas emissions in 1990 to serve as the emissions limit to be achieved by 2020 (HSC Section 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 greenhouse gas emissions (HSC Section 38530). In December 2007, CARB adopted a regulation requiring the largest industrial sources to report and verify their GHG emissions. The reporting regulation serves as a solid foundation to determine GHG emissions and track future changes in emission levels.

Executive Order S-01-07

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

Sustainable Communities and Climate Protection Act of 2008

The Sustainable Communities and Climate Protection Act of 2008 (SB 375), signed into law by the governor on September 30, 2008, 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 (MPOs). 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 sustainable communities' strategy as part of their RTP or through an unconstrained alternative planning strategy. If regions develop integrated land use, housing, and transportation plans that meet the SB 375 targets, new projects in these regions can be relieved of certain review requirements of CEQA.

Pursuant to SB 375, CARB appointed a Regional Targets Advisory Committee (RTAC) on January 23, 2009, to provide recommendations on factors to be considered and methodologies to be used in CARB's target-setting process. The RTAC 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.

3.3.2.3 Regional and Local

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

- SJVAPCD Rule 2201 New and Modified Stationary Source Review.
- SJVAPCD Rule 2280 Portable Equipment Registration.
- SJVAPCD Rule 2303 Mobile Source Emission Reduction Credits.
- SJVAPCD Rule 4201 and Rule 4202 Particulate Matter Concentration and Emission Rates.
- SJVAPCD Rule 4301 Fuel Burning Equipment.
- SJVAPCD Rule 8011 General Requirements–Fugitive Dust Emission Sources.
- SJVAPCD Rule 9510 Indirect Source Review.
- SJVAPCD CEQA Guidelines.

Descriptions of Rules 2201, 8011, and 9510 are included in the following sections because these rules may directly affect the measures to be included in the design features or may need to be implemented during the planning stage of this project. Additional descriptions of other rules were discussed in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA

2014). These other rules would apply to the project, but would not need to be directly implemented during the planning stage of this project.

SJVAPCD Rule 2201: New and Modified Stationary Source Review

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 (BACT) requirements, if applicable. Many stationary sources would be associated with heavy maintenance facility (HMF) activities, such as exterior washing, welding, material storage, cleaning solvents, abrasive blasting, painting, oil/water separation, and wastewater treatment and combustion. Permits would need to be obtained for equipment associated with these activities from the SJVAPCD and would need to comply with applicable new source review rules such as BACT requirements.

SJVAPCD 8011: General Requirements–Fugitive Dust Control Measures

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 in Table 6-2 in the *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI) (SJVAPCD 2002) to reduce fugitive dust emissions. These measures are not considered mitigation measures because they are required by law but will be required during project construction and implementation as part of project design.

Many of the control measures required by the SJVAPCD are the same or similar to the control measures listed in the 2005 Statewide Program EIR/EIS. The SJVAPCD Rule 8011 requirements are listed below:

- All disturbed areas, including storage piles, which are not being actively used for construction purposes, will 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 onsite unpaved roads and offsite unpaved access roads will 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 will be effectively controlled for fugitive dust emissions by an application of water or by presoaking.
- With the demolition of buildings up to six stories in height, all exterior surfaces of the building will be wetted during demolition.
- All materials transported offsite will be covered or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container will be maintained.
- All operations will 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, said piles will be effectively stabilized for fugitive dust emissions using sufficient water or a chemical stabilizer/suppressant.

- Within urban areas, trackout will 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 will prevent carryout and trackout.

SJVAPCD Rule 9510: Indirect Source Review

In December 2005, the SJVAPCD adopted the Indirect Source Rule (Rule 9510) to meet the SJVAPCD's emission reduction commitments in the PM_{10} and Ozone Attainment Plans. Indirect Source Review (ISR) regulation applies to any transportation project in which construction emissions equal or exceed 2 tons of nitrogen oxide (NO_x) or PM_{10} per year. Construction of the HST alignment (specifically, onsite off-road construction exhaust emissions) would be subject to ISR. Accordingly, the Authority would have to submit an Air Impact Assessment (AIA) application to the SJVAPCD with commitments to reduce construction exhaust NO_x and PM_{10} emissions by 20% and 45%, respectively. According to SJVAPCD, if successful, air quality mitigation measure AQ-MM#1 (use of cleaner-burning construction equipment) might, as a practical matter, satisfy these numerical reduction requirements; if not, AQ-MM#4 (offset project construction emissions through an SJVAPCD Voluntary Emission Reduction Agreement [VERA]) would satisfy the ISR requirements. Operation of the HST would be exempt under Sections 4.1 and 4.2 of Rule 9510.

3.3.3 Pollutants for Analysis

Three general classes of air pollutants are of concern for this project: criteria pollutants, toxic air contaminants (TACs), and GHGs. Criteria pollutants are those for which the U.S. EPA and the State of California 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 U.S. EPA as having significant contributions from mobile sources: acrolein, benzene, 1,3-butadiene, diesel particulate matter 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.

3.3.3.1 Criteria Pollutants

For these pollutants, both federal and state ambient air quality standards have been established to protect public health and welfare. The following sections briefly describe each pollutant.

Ozone

CARB inventories two classes of hydrocarbons: total organic gases (TOGs), and reactive organic gases (ROGs). ROGs have relatively high photochemical reactivity. The principal nonreactive hydrocarbon is CH_4, which is also a GHG. The major source of ROG is the incomplete combustion of fossil fuels in internal combustion engines. Other sources of ROGs include the evaporative emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products. Adverse impacts on human health are not caused directly by ROG, but rather by reactions of ROG that form secondary pollutants. ROGs are also transformed into organic aerosols in the atmosphere, contributing to higher levels of fine particulate matter and lower

> **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 man-made. Although O_3 is not directly emitted, it forms in the lower atmosphere through a chemical reaction between hydrocarbons and oxides of nitrogen, also referred to as VOC and NO_x, which are emitted from industrial sources and from automobiles.

visibility. CARB uses the term ROG for air quality analysis, and ROG has the same definition as the federal term VOC. In this analysis, ROG is assumed to be equivalent to VOC.

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. This 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 also can include bits of solid or liquid substances that can be highly toxic. Of particular concern are PM_{10} and $PM_{2.5}$.

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

A small portion of particulate matter is the product of fuel combustion processes. In the case of $PM_{2.5}$, the combustion of fossil fuels accounts for a significant portion of this pollutant. The main health impact of airborne particulate matter is on the respiratory system. $PM_{2.5}$ results from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can form in the atmosphere from gases such as SO_2, NO_x, and 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 impacts of PM_{10} and $PM_{2.5}$ emissions for the project are examined on a localized—or microscale—basis, on a regional basis, and on a statewide basis.

> **Definition of PM_{10} and $PM_{2.5}$**
>
> PM_{10} refers to particulate matter less than 10 microns in diameter, about one seventh 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, roughly 1/28th the diameter of a human hair.

Carbon Monoxide

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

> **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 monoxide, also known as nitric oxide (NO) and NO_2, collectively referred to as nitrogen oxides (NO_x), are major contributors to O_3 formation. NO_2 also contributes to the formation of $PM_{2.5}$. 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 and 3 years old) has been observed at concentrations below 0.3 ppm.

Definition of NO_2

NO_2 is a brownish gas that irritates the lungs. It can cause breathing difficulties at high concentrations. NO_2 is one of a group of highly reactive gasses known as "oxides of nitrogen," or "nitrogen oxides (NO_x)." As with O_3, NO_2 can be formed through a reaction between nitric oxide (NO) and atmospheric oxygen.

Lead

Lead levels from mobile sources in the urban environment have decreased significantly because of the federally mandated switch to lead-free gasoline, and lead levels are expected to continue to decrease. Therefore, an analysis of the impacts of lead emissions from transportation projects is not warranted, and not conducted for this project.

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, U.S. EPA (and other regulatory agencies) does not consider transportation sources to be significant 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.

3.3.3.2 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.” U.S. EPA uses the term “hazardous air pollutant” in a similar sense. Controlling air toxic emissions became a national priority with the passage of the CAA, whereby Congress mandated that the U.S. EPA regulate 188 air toxics, also known as hazardous air pollutants. Toxic air contaminants can be emitted from stationary and mobile sources.

Stationary sources of TACs from HST operations would include use of solvent-based materials (cleaners and coatings) and combustion of fossil fuel in boilers, heaters, and ovens at maintenance facilities. Although the HSTs would not emit TACs, MSATs would be associated with the project chiefly through motor vehicle traffic to and from the HST stations.

For MSAT, U.S. EPA has assessed the expansive list of 188 air toxics in its latest rule on the Control of Hazardous Air Pollutants from Mobile Sources, and identified 93 compounds emitted from mobile sources that are listed in its Integrated Risk Information System. U.S. EPA 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, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. This list, however, is subject to change and may be adjusted in consideration of future U.S. EPA rules.

3.3.3.3 Greenhouse Gases

> **Definition of Greenhouse Gases**
>
> Greenhouse gas (GHG) is any gas that absorbs infrared radiation in the atmosphere. GHG include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrochlorofluorocarbons (HCFCs), ozone (O_3), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).GHGs contribute to the global warming trend, a regional and ultimately a worldwide concern. What was once a natural phenomenon of climate has been changing because of human activities, resulting in an increase in CO_2.

GHGs trap heat in the atmosphere, keeping the earth's surface warmer than it otherwise would be. According to National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) data, the earth's average surface temperature has increased by 1.2 to 1.4ºF in the last 100 years. Eleven of the last 12 years rank among the 12 warmest years on record (since 1850), with the warmest 2 years being 2010 and 2005. 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.

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 emissions of CO_2 has a different effect than 1 ton of emissions of CH_4. To compare emissions of different GHGs, inventory compilers use a weighting factor called a 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, and emissions are expressed in terms of CO_2 equivalent, but can also be expressed in terms of carbon equivalent. 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 include CO_2, CH_4, N_2O, HCFCs, HFCs, PFCs, and SF_6. Because of the global nature of GHG emissions and the nature of the electrical grid system, GHG was examined on a statewide level.

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. In accordance with CEQA requirements, an EIR must include a description of the existing physical environmental conditions in the vicinity of the project. Those conditions, in turn, "will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant" (CEQA Guidelines Section 15125[a]).

For a project such as the HST project that would not commence operation of HST service for almost 10 years and would not reach full operation for almost 25 years, use of only existing conditions as a baseline for air quality impacts would be misleading. It is more likely that existing background traffic volumes (and background roadway changes from other programmed traffic improvement projects) and vehicle emission factors would change between today and 2020/2035 than it is that existing conditions would remain unchanged over the next 10 to 25 years. For example, RTPs include funded transportation projects programmed to be constructed by 2035.To ignore that these projects would be in place before the HST project reaches maturity (i.e., the point/year at which HST-related traffic emissions reaches its maximum), and to evaluate the HST project's air quality impacts ignoring that these RTP improvements would change the underlying background conditions to which HST project traffic would be added, would be misleading because it would represent a hypothetical comparison.

Therefore, the air quality analysis for operations uses a dual-baseline approach. That is, the HST project's air quality impacts are evaluated both against existing conditions and against background (i.e., No Project) conditions as they are expected to be in 2035. This approach complies with CEQA. (See *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority, et al.* (2013) 57 Cal.4th 439, 454.) Results for both baselines are presented. Additional details are presented in *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

3.3.4.1 Study Areas for Analysis

Statewide

A statewide study area was identified to evaluate potential changes in air quality from large-scale, non-localized impacts, such as HST power requirements, changes in air traffic, and project conformance with the SIP.

Regional

This section of the HST System would potentially affect regional air pollutant concentrations in the San Joaquin Valley Air Basin (SJVAB), which contains the entire Fresno to Bakersfield Section. Figure 3.3-1 shows the alignment as it is situated in the SJVAB, which includes all of Fresno, Kings, and Tulare counties, and a portion of Kern County. 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 14,000 feet in elevation), the Coast Range 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 valley opens to the sea at the Carquinez Strait, where the Sacramento–San Joaquin River Delta empties into San Francisco Bay.

During construction, the hauling of ballast material from quarries outside of the SJVAB 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 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 PM concentrations, public exposure, and asthma symptoms in children (Cal/EPA 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 located within 1,000 feet of intersections operating at LOS D or worse.

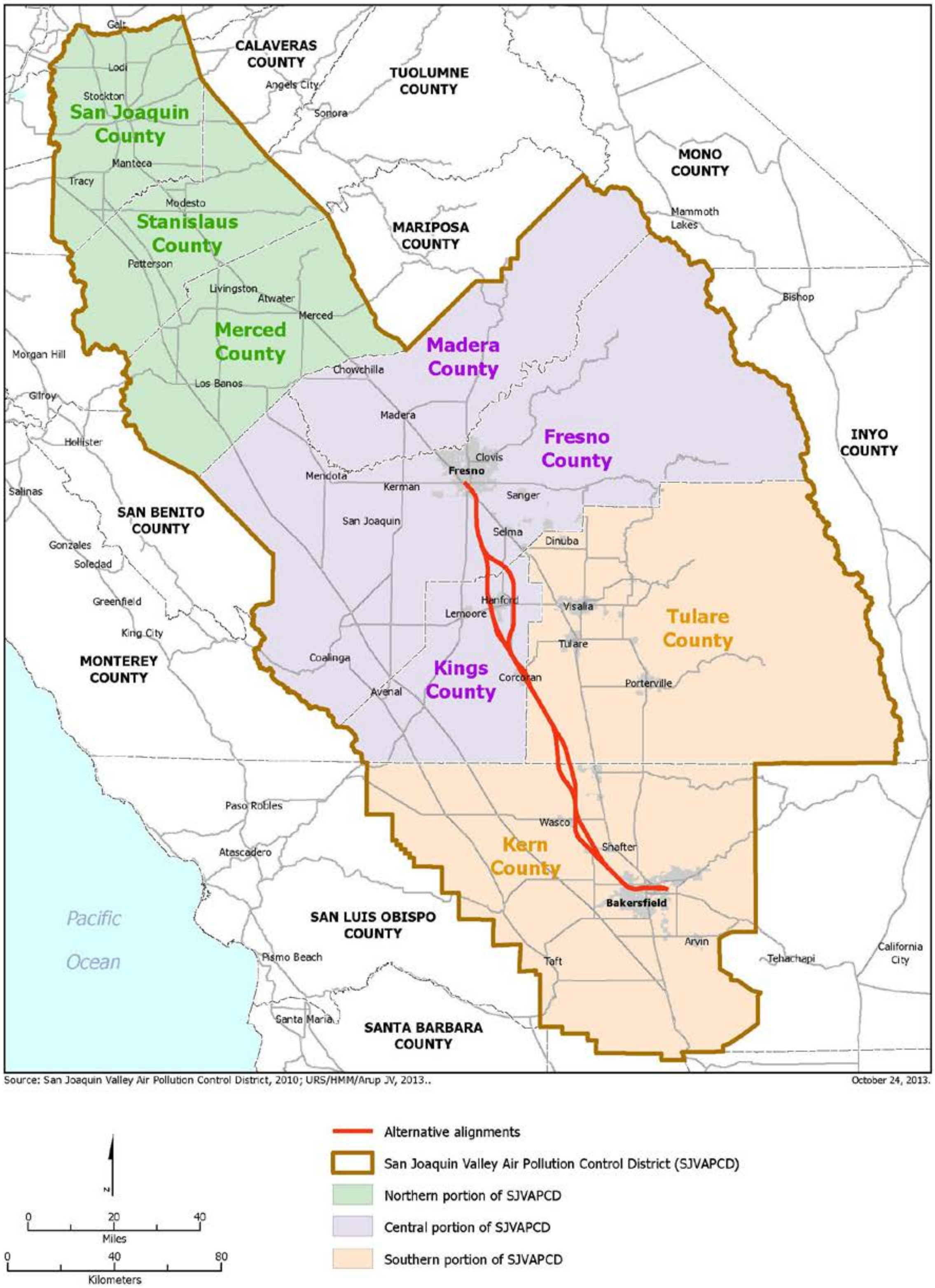


Figure 3.3-1
San Joaquin Valley Air Basin

3.3.4.2 Statewide and Regional Emission Calculations

The emission burden analysis of a project determines a project's potential overall impact on air quality. The proposed project would affect long-distance, city-to-city vehicular travel along freeways and highways throughout the state, as well as long-distance, city-to-city aircraft take-offs and landings. The project would also affect electrical demand throughout the state.

On-Road Vehicles

An on-road vehicle emission analysis was conducted using average daily vehicle miles traveled (VMT) estimates and associated average daily speed estimates for each affected county.[1] Emission factors were estimated by using the CARB emission factor program, EMission FACtors 2011 (EMFAC2011); see Emission Model in Section 3.3.4.4, Microscale CO Analysis, Emissions Model (CARB 2007a). Parameters were set in the program for each individual county to reflect conditions within each county, and statewide parameters were used to reflect statewide conditions. The analysis was conducted for the future No Project Alternative and HST alternative for the project's design year, both of which are 2035; the existing condition (2009); and the Existing Condition Plus Project (2009).

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

Airport Emissions

The Federal Aviation Administration's (FAA's) Emission and Dispersion Modeling System (EDMS) Version 5.1.3 (FAA 2009) was used to estimate airplane emissions. EDMS estimates emissions generated from a specified number of landing and take-off cycles. Along with the emissions from the planes themselves, emissions generated from associated ground maintenance requirements are included. Average plane emissions were calculated based on the profile of aircraft currently servicing the San Francisco to Los Angeles Corridor. The number of air trips removed because of the HST was estimated through the travel demand modeling analyses conducted for the project.

Power Plant Emissions

The HST System, including the propulsion of the trains and the operations of the stations and maintenance facilities, would be powered by the state's electricity grid. Because no dedicated generating facilities are proposed for this project, no source facilities can be identified. Therefore, emission changes from power generation were predicted on a statewide level. In addition, because of the state requirement that an increasing fraction (33% by 2020) of electricity generated for the state's power portfolio must come from renewable energy sources, the emissions generated for the HST System are expected to be lower in the future as compared to emissions estimated for this analysis, which are based on the state's current power portfolio. In addition, the Authority has adopted a goal to purchase the HST System's power from renewable energy providers.

3.3.4.3 Local Operational Emission Sources at HST Stations

Emissions associated with the operation of the Fresno and Bakersfield HST stations, as well as the Kings/Tulare Regional Station, would primarily result from space heating and facility landscaping, energy consumption for facility lighting, indirect emissions associated with water use

[1] VMT data are based on information from Cambridge Systematics, Inc. (2012), Transportation Technical Report.

and solid waste disposal, emergency generator testing, CO emissions from vehicle activity at the parking structures (refer to Section 6.3.2), and employee and passenger traffic (refer to Section 6.2.3).[2] Emissions from deliveries to the HST stations are considered negligible.

Emissions of criteria pollutants and GHGs were estimated for operation of Fresno and Bakersfield HST stations, as well as the potential Kings/Tulare Regional Station, for the design year of 2035.

Area and Stationary Sources

Emissions from area and stationary sources, including natural gas consumption for space heating and landscaping equipment, were calculated using URBEMIS2007, which estimates emissions from land use sources (Rimpo and Associates 2007). Emissions were based on the land use data, entered as the size of the station buildings (square feet). The parking structures were excluded from the land use as they would not require heating and would require minimal landscaping. The URBEMIS2007 output files, the emissions estimated for each operational activity, and the activity data details used to perform the estimations are summarized in Appendix B of the *Fresno to Bakersfield Section Air Quality Technical Report* (Authority and FRA 2014).

Indirect Electricity

The Fresno and Bakersfield HST stations, as well as the Kings/Tulare Regional Station, would generate indirect emissions from purchased electricity consumed for facility lighting. It is expected that the power used by the HST stations 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 HST stations were calculated based on the building square footage, electricity consumption rates provided by the South Coast Air Quality Management District (SCAQMD) (SCAQMD 1993), and emission factors from the Emissions and Generation Resource Integrated Database (eGRID) (U.S. EPA 2011b). The retail consumption rate of 13.55 kilowatt-hours/square foot/year was assumed to be representative for the HST stations. The emission factors used were for the California region (CAMX-WECC California) and are for the year 2007.

Indirect Water

The Fresno and Bakersfield HST stations, as well as the Kings/Tulare Regional 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 HST stations were calculated based on the station estimated water usage (see Public Utilities Section of Final EIR/EIS) and electricity associated with sourcing, treatment, and distribution of water (CEC 2006), and emission factors from eGRID (U.S. EPA 2011b). The water consumption rates of 15.33, 16.79, and 18.07 million gallons per year were used at the Fresno, Bakersfield, and Kings/Tulare stations, respectively. Wastewater was estimated as 8.43, 9.23, and 9.86 million gallons per year for the Fresno, Bakersfield, and Kings/Tulare stations, respectively.

[2] Emissions from these local operational sources were not quantified in the Revised DEIR/Supplemental DEIS. These sources have been added to the Final EIR/EIS in response to comments and to more conservatively evaluate the net benefits from project operations.

Indirect Solid Waste

The Fresno and Bakersfield HST stations, as well as the Kings/Tulare Regional Station, would generate indirect GHG emissions from solid waste disposal. Indirect emissions from solid waste disposed by the HST stations were calculated based on a rate of 1.13, 1.3, and 0.48 tons per day for the Fresno, Bakersfield, and Kings/Tulare stations, respectively. To estimate the amount of degradable organic carbon content of 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 was estimated assuming a landfill gas-capture system with combustion with a 75% capture efficiency and 98% destruction efficiency. This is consistent with the method used in the California Emission Estimator Model (CalEEMod) (SCAQMD 2011).

Emergency Generator

The Fresno and Bakersfield HST stations, as well as the Kings/Tulare Regional 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 kW generators. It was assumed that the emergency generators 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 permitting requirements and are consistent with SJVAPCD CEQA guidance, 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.

3.3.4.4 Microscale CO Analysis

> **What Is a Microscale CO Analysis?**
> A microscale CO analysis is an estimation of potential future localized CO concentrations and a comparison of those concentrations to the NAAQS.

Analyses were conducted to estimate the potential localized air quality impacts of HST-related changes in traffic conditions near heavily traveled roadways, congested intersections, and areas near train station parking structures. Microscale CO modeling was performed using the mobile-source emission-estimate program EMFAC2007 and the California Line Source Dispersion Model, Version 4 (CALINE 4) air quality dispersion model to estimate Existing (2009), Existing (2009) Plus Project, Future (2035) No Project Alternative, and Future (2035) CO levels with the HST alternative at selected locations in the Revised DEIR/Supplemental DEIS (Caltrans 1989). For the Final EIR/EIS, an additional intersection in Corcoran was also modeled. Also for the Final EIR/EIS, there is a revised traffic analysis; however, not all microscale CO modeling was revised. Based on the values reported previously, the traffic volumes from the revised traffic analysis would not substantially change CO modeling results and CO concentrations would not exceed the significance threshold (see Impact AQ#14 for a more detailed discussion). To support this conclusion, the highest-volume intersection was remodeled using the revised traffic analysis data. The emissions for this intersection were calculated using updated emission factors from the mobile-source emission-estimate program EMFAC2011.

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 level of service (LOS) between the existing condition, No Project Alternative, and HST alternatives. Intersections were considered to have the potential to cause a CO hot spot if the LOS decreased from D, or better, to D, or worse, under any of the HST 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 volume would increase from the existing condition or No Project Alternative with any of the HST alternatives. Using these criteria, intersections were ranked according to LOS, increased delay, and total traffic volume of the HST alternative compared to the existing condition and No Project Alternative. The three intersections with the worst LOS, delay, and/or traffic volume were included in the CO hot-spot modeling for the Revised DEIR/Supplemental DEIS. For the Final EIR/EIS, an additional intersection in Corcoran was also analyzed. Also for the Final EIR/EIS, the highest traffic volume intersection was selected to support the conclusion that the previously modeled CO concentrations would not substantially change in the revised traffic volumes and updated EMFAC2011 emission factors.

Changes in emissions from vehicular activities near the Fresno, Kings/Tulare Regional, and Bakersfield parking structure locations were also modeled because of emission increases near these locations.

Receptor locations for both the intersection and parking structure analyses were located in accordance with University of California, Davis, CO Protocol (Caltrans 1997). All receptors used were located at a height of 6 feet. Receptors for the intersection analysis were located 3 meters from the roadway spaced at 25 and 50 meters from the intersection corner for both the 1-hour and 8-hour analyses. For the parking structure 1-hour and 8-hour analysis receptors were located 3 meters from the parking structure along the property line at each corner and the entrance of the structure.

Emission Model

Vehicular emissions were estimated using EMFAC2007 for intersections modeled in the Revised DEIR/Supplemental DEIS. For the highest traffic volume intersection that was remodeled in support of the Final EIR/EIS, emissions were estimated using EMFAC2011. EMFAC2007 and EMFAC2011 are mobile-source emission-estimate programs that provide current and future estimates of emissions from highway motor vehicles. The EMFAC programs were designed by CARB to address a wide variety of air pollution modeling needs and incorporate updated information on basic emission rates, more realistic driving patterns, separation of start and running emissions, improved correction factors, and changing fleet composition. EMFAC2011 is an update to the previously released EMFAC2007.

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 compose the models attempt to describe a complex physical phenomenon as closely as possible. The dispersion modeling program used in this study for estimating pollutant concentrations near roadway intersections is the CALINE4 dispersion model developed by Caltrans.

The analysis of roadway CO impacts followed the protocol recommended by Caltrans (Caltrans 1997). It is also consistent with CO modeling procedures identified in the SJVAPCD CEQA guidance (SJVAPCD 2002).

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). The *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014), which was prepared for the project, provides these values. Their selection was based on recommendations from the CEQA Air Quality Handbook (South Coast Air Quality Management District [SCAQMD] 1993), Caltrans' CO Protocol, and the U.S. EPA Guidelines.

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 fact that over 8-hour (as distinct from a single hour) vehicle volumes will fluctuate downward from the peak hour, vehicle speeds may vary, and meteorological conditions, including wind speed and wind direction, will vary compared to the conservative assumptions used for the single hour. A persistence factor of 0.7, as in the CO protocol, was used in this analysis (Caltrans 1997).

Background Concentrations

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 these values to account for CO entering the area from other sources upwind of the receptors. CO background levels were 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 Fresno First Street monitoring station for the Fresno Station sites, the Fresno-Drummond monitoring station for the Kings/Tulare Regional Station sites, and the Bakersfield Golden State Highway monitoring station for the Bakersfield Station sites were used.

The use of these monitors is conservative because while they are the closest monitors to the general study area stations and have a neighborhood spatial scale, they are influenced by traffic-related emissions. 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 concentrations, based on the latest 3 years of available data, were 3.1 ppm for the Fresno First Street monitoring station, 3.50 ppm for the Fresno-Drummond monitoring station and 2.8 ppm for the Bakersfield Golden State Highway monitoring station. The second-highest 8-hour average was 2.34 ppm for the Fresno First Street monitoring station, 2.14 ppm for the Fresno-Drummond monitoring station, and 2.13 ppm for the Bakersfield Golden State Highway 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 project. Output from the Traffix 8.0 (Dowling Associates, Inc. 2008) and from Synchro6 (Trafficware Ltd. 2004) signal-timing traffic model was used to obtain signal-timing parameters. The microscale CO analysis was performed based on data from this analysis for the AM and PM 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 existing conditions (2009) and the project's design year (2035).

3.3.4.5 Particulate Matter Hot Spot

> **What Is a PM Hot-Spot Analysis?**
> A hot-spot analysis is an estimation of likely future localized PM_{10} and $PM_{2.5}$ pollutant concentrations and a comparison of those concentrations to the NAAQS (40 C.F.R. Part 93.101).

While the HST project is subject to the general conformity and not transportation conformity guidelines, because the region is classified as a federal nonattainment area for $PM_{2.5}$ and a federal maintenance area for PM_{10}, a hot-spot analysis following the U.S. EPA's 2010 *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (U.S. EPA 2010c) was conducted. The analysis focused on potential air quality concerns under NEPA from project effects on roads and followed the recommended practice in the U.S. EPA's Final Rule regarding the localized or "hot-spot" analysis of $PM_{2.5}$ and PM_{10} (40 C.F.R. Part 93, issued March 10, 2006).

U.S. EPA specifies in 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. U.S. EPA defines projects of air quality concern as certain highway and transit projects that involve significant levels of diesel traffic or any other project that is identified by the $PM_{2.5}$ SIP as a localized air quality concern:

- New or expanded highway projects that have a significant number of, or significant increase, in diesel vehicles.
- 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.
- 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.

A discussion of the proposed project compared to projects of air quality concern, as defined by 40 C.F.R. Part 93.123(b)(1), is provided below.

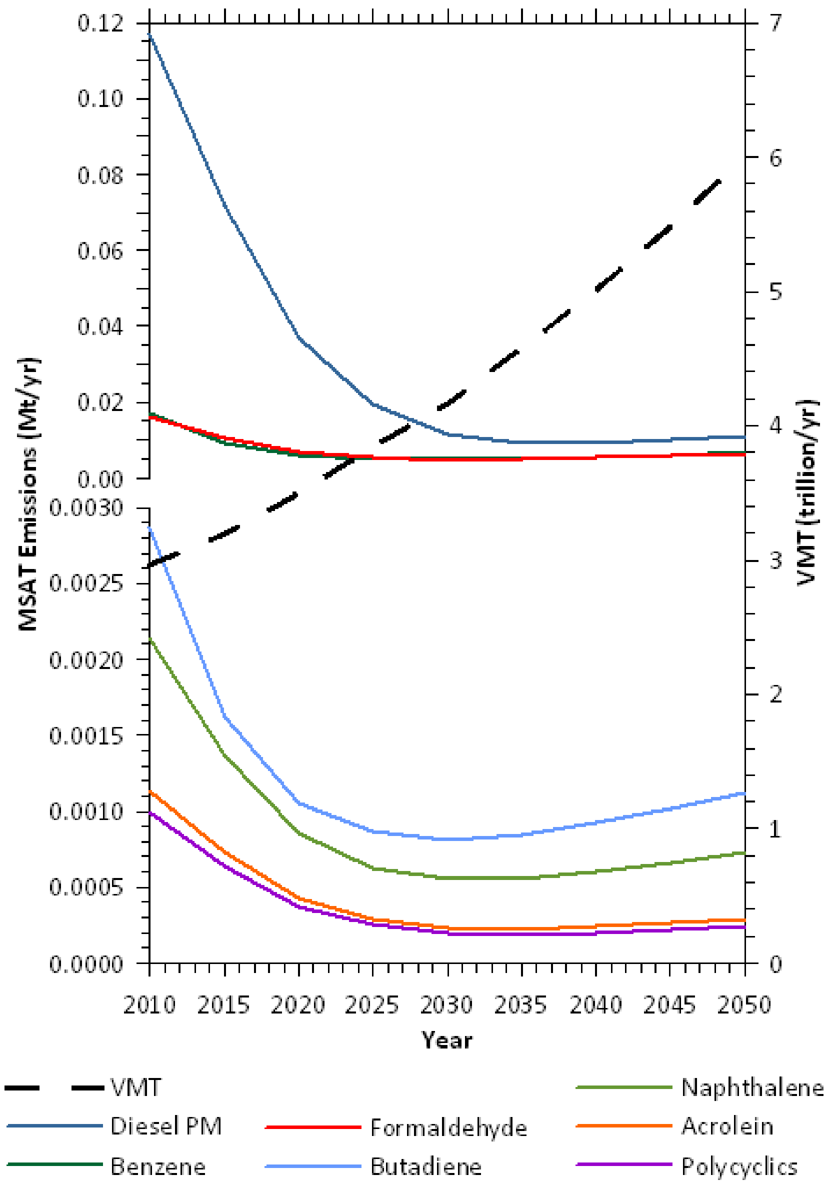
3.3.4.6 Mobile Source Air Toxics Analysis

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. EPA regulate 188 air toxics, also known as hazardous air pollutants. The U.S. EPA assessed this expansive list in its latest rule on the "Control of Hazardous Air Pollutants from Mobile Sources" (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007 [U.S. EPA 2007]) and identified a group of 93 compounds emitted from mobile sources that are listed in the Integrated Risk Information System (IRIS) (U.S. EPA 2011a). In addition, U.S. EPA identified seven compounds with significant contributions from mobile sources that are among the national- and regional-scale cancer risk drivers from the 1999 National-Scale Air Toxics Assessment (NATA) (U.S. EPA 1999). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter.

Under the 2007 rule, U.S. EPA sets standards on fuel composition, vehicle exhaust emissions, and evaporative losses from portable containers. The new standards are estimated to reduce total emissions of MSATs by 330,000 tons in 2030, including 61,000 tons of benzene. Concurrently, total emissions of VOCs will be reduced by over 1.1 million tons in 2030 as a result of adopting these standards. Future emissions likely would be lower than present levels as a result of the U.S. EPA's national control programs, which are projected to reduce MSAT emissions by 83% from 2010 to 2050, even if VMT increases by 102%, as shown in Figure 3.3-2.

On February 3, 2006, FHWA released *Interim Guidance on Air Toxic Analysis in NEPA Documents* (FHWA 2006). This guidance was superseded on September 30, 2009, by FHWA's Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents (FHWA 2009), and was most recently updated on December 6, 2012 (FHWA 2012). The purpose of FHWA's guidance is to advise 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 will update the guidance. The FHWA's Interim Guidance groups projects into the following tier categories:

- No analysis for projects that have no potential for meaningful MSAT impacts.
- Qualitative analysis for projects with a low potential for MSAT impacts.
- Quantitative analysis to differentiate alternatives for projects with a higher potential for MSAT impacts.



[a] 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.

Source: FHWA 2012.

Figure 3.3-2
Projected national MSAT emission trends (2010–2050) for vehicles operating on roadways using EPA's MOVES2010b model

The 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 among MSAT emissions, if any, from the HST alternatives. The qualitative assessment is derived in part from an FHWA study, *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (FHWA 2010).

3.3.4.7 Asbestos

Asbestos minerals occur in rock 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 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 that 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 that inhibit lung function. U.S. EPA is working to address concerns about the potential impacts of NOA in a number of areas in California.

The California Geological Survey identifies ultramafic rocks in California to be the source of NOA. The California Geological Survey published *A General Location Guide for Ultramafic Rocks in California–Areas More Likely to Contain Naturally Occurring Asbestos* (CDMG 2000). This study map was used to determine if NOA would be located within the project area.

3.3.4.8 Greenhouse Gas Analysis

The proposed project would reduce long-distance, city-to-city travel along freeways and highways throughout the state, as well as long-distance, city-to-city aircraft take-offs and landings. The project would also affect electrical demand throughout the state. These elements would affect GHG emissions on both a statewide and regional study area level. The following sections discuss the methodology for estimating GHG emissions associated with the operation of the project.

The methodology for estimating GHG emissions associated with construction is included in Section 3.3.4.10, Construction Phase Analysis.

On-Road Vehicles Emissions

On-road vehicle GHG emissions were estimated using the same methodology as described in Section 3.3.4.2.

Airport Emissions

Plane emissions were calculated by using the fuel consumption factors and emission factors from CARB's 2000–2009 Greenhouse Gas Emissions Inventory Technical Support Document and the accompanying appendix. The emission factors include both landing-take-off (LTO) and cruise operations (formula: plane emission per flight = fuel consumption * emission factor; plane emission = flights removed * plane emission per flight). Average plane GHG emissions are calculated based on the profile of the aircraft currently servicing the San Francisco to Los Angeles corridor. The number of air trips removed due to the HST was estimated through the travel demand modeling analysis conducted for the project.

Power Plant Emissions

The electrical demands due to propulsion of the trains, the trains at terminal stations, and in storage depots and in maintenance facilities were calculated as part of the project design. An average GHG emission factor of 650 lb of CO_2e for each kilowatt-hour required was provided by CARB. This factor represents the estimated emission rate for a new electrical load on the system. The GHG estimates used in this analysis for the propulsion of the HST include the use of regenerative brake power.

The HST System will be powered by the state's electric grid. Because no dedicated generating facilities are proposed for this project, no specific source facilities can be identified. GHG emission changes from power generation were therefore predicted on a statewide level. In addition, because of the state requirement that an increasing fraction (33% by 2020) of electricity generated for the state's power portfolio come from renewable energy sources, the emissions generated for the HST System are expected to be lower in the future when compared with the emissions estimated for this analysis, which are based on the state's current power portfolio.

3.3.4.9 HMF and MOWF Operations Impact Analysis

The HST project would include a heavy maintenance facility (HMF) co-located near a maintenance-of-way facility (MOWF) that would service and repair the rail cars and locomotives. The facility would include locomotives, heavy-duty equipment (e.g., cranes, backhoes, loaders, and emergency generators), heavy-duty delivery trucks, and a spray booth for painting the trains. The activities at the HMF site would generate emissions that could affect sensitive land uses. Dispersion modeling analysis was conducted for the HMF/MOWF emissions to evaluate the impacts on air quality. In addition, a health-risk analysis was conducted to evaluate the cancer risk impacts on sensitive receptors near the HMF/MOWF. The major sources of HMF/MOWF emissions include:

- Switch diesel locomotive activities associated with maintenance-of-way operations.
- Spray booth painting operations.
- Diesel equipment.[3.]
- Diesel trucks.

HMF and MOWF Locations

Several locations are being considered for the HMF and co-located MOWF site including the Fresno Works–Fresno, Kings County–Hanford, Kern Council of Government–Wasco, Kern Council of Government–Shafter East, and Kern Council of Government–Shafter West. The final location of the HMF and co-located MOWF will be determined after the analysis has been completed for all of the potential locations within the Central Valley. Therefore, an air quality analysis was conducted for a prototypical facility (using the current facility design and anticipated activities) to determine whether HMF/MOWF operations have the potential to significantly affect nearby sensitive land uses.

HMF and MOWF Pollutants of Concern

Both criteria and non-criteria TACs were considered in this analysis. The criteria pollutants considered are:

- NO_2 from diesel locomotives, heavy-duty equipment, and trucks.
- PM_{10} and $PM_{2.5}$ from both diesel engines and spray booth operations.

The TACs considered are contaminants identified according to the California's Office of Environmental Health Hazard Assessment's (OEHHA) the Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2003) that may be emitted from HMF/MOWF operations, including diesel engines and spray booth activities. Of these, diesel PM has the likelihood of contributing the most to the potential health effects of the HMF/MOWF operations due to the type of activities that would occur at these facilities. Diesel PM has been identified by OEHHA as a TAC based on its potential to cause cancer and other adverse health

[3] The diesel equipment includes non-road diesel engines such as internal combustion engines (not including motor vehicle engines) and stationary engines.

problems, including respiratory illnesses and increased risk of heart disease. There are also a number of other toxic pollutants of varying toxicities that are either carcinogenic or non-carcinogenic that can be potentially released from spray booth operations and diesel vehicular exhaust. Analyses were therefore conducted for diesel PM and applicable TACs that considered both chronic (long-term) carcinogenic and non-carcinogenic and acute (short-term) health risks.

In addition to the above pollutants, CO, VOC, SO_2, and GHG emissions from HMF/MOWF operations were estimated. CO, SO_2, and GHG emissions are not expected to cause localized air quality impacts because of the relatively low CO and SO_2 background concentrations and the global nature of GHG impacts. VOC emissions are evaluated in terms of speciated toxics in the analysis. Therefore, CO, VOC, SO_2, and GHG emissions from HMF/MOWF operations are only included in the regional air quality impact discussion.

HMF/MOWF Operations Emission Factors and Rates

Emission rates for diesel combustion equipment were estimated based on the following HMF/MOWF operating scenario, which was supplied by the project's design engineers:

- Two switch locomotives (for maintenance-of-way operations) and six pieces of diesel-fueled equipment would be operating at the HMF.
- Two maintenance-of-way locomotives, 2,000 horsepower (hp) each, would idle for 2 hours and move around the HMF site for 2 hours over a 24-hour period, and the locomotives would go through all notches (gears) when moving.
- The diesel equipment, 200 hp each, would operate for 8 hours over a 24-hour period.
- Twenty diesel trucks would operate on the site for 8 hours over each 24-hour time period.

Emissions factors from the diesel-powered engines and spray booth operations were estimated as follows:

- PM_{10} emission factors were conservatively used to represent diesel PM emission factors. Most diesel PM emissions, however, are made up of particles smaller than 2.5 microns ($PM_{2.5}$), which are estimated to be 92% of PM_{10} values (SCAQMD 2006).
- Diesel PM (PM_{10}), $PM_{2.5}$, NO_2, VOC, and CO emissions from switch locomotives were estimated using U.S. EPA Tier 4 emission standards (which are also adopted by CARB) applicable for newly manufactured (after 2015) locomotives (40 C.F.R. Title 40, Part 89) that use stringent control technologies and use ultra-low sulfur diesel fuel (ULSD). This is a reasonable assumption since the HMF will begin operation no sooner than 2021.
- All new locomotives after 2015 must meet these standards. To enable catalytic after-treatment methods at the Tier 4 stage, the U.S. EPA requires the use of low-sulfur diesel fuel for all on-road and off-road engines after 2015. A sulfur limit of 500 parts per million (ppm) has been in effect since June 2007, and after June 2012, this limit becomes 15 ppm. In 2006, California also adopted regulations lowering the sulfur content of diesel fuel to less than 15 ppm. Refineries in California are already making low-sulfur diesel so it is available where needed, and transit agencies in California have been required to use ULSD fuel since July 2002.
- Locomotive emission rates were also estimated based on locomotive type and operations/usage plans regarding notch setting, activity time, and duration.

- The assumption that all switch locomotives would be diesel-powered might be conservative because some or all of these vehicles may be electrically powered (or duel-fueled) and therefore have no (or fewer) onsite generated emissions.

- CO_2 emissions from moving locomotives were estimated using a standard diesel fuel density, carbon content, and consumption rate per brake-horsepower (hp)-hour (U.S. EPA-420-F-09-025). CO_2 emissions from idling locomotives were estimated using the same fuel density and carbon content as well as a factor for consumption per idling-hour, based on the seasonal conditions.

- It was conservatively assumed that all the NO_x released from the diesel engines (which are generally composed of only a small percentage of NO_2) would be converted in the atmosphere to NO_2 by the time they reached the site boundary even though a lower conversion rate would likely occur.

- SO_2 emissions from moving and idling locomotives were estimated using a standard diesel-fuel density, a sulfur content of ULSD (which was assumed to be 15 ppm), and a consumption rate per brake-hp-hour (EPA-420-F-09-025).

- For other diesel equipment, the U.S. EPA's Tier 4 emission standards for non-road diesel engines were used (69 FR 38957-39273, 29 June 2004) to estimate diesel PM (PM_{10}), $PM_{2.5}$, NO_2, VOC, and CO emissions. VOC emissions were represented using the non-methane hydrocarbon Tier 4 emission standard.

- CO_2 emissions from other diesel equipment were estimated using the CARB's OFFROAD 2011 (CARB 2011c), for 200 horsepower (hp), model-year 2017 equipment belonging to the Other General Industrial Equipment category. CARB's OFFROAD2011 model provides emission factors for different types of off-road sources.

- SO_2 emissions from diesel equipment were estimated using Santa Barbara County Air Pollution Control District's *Technical Information and References: Construction Equipment Emission Factors*, "Table 2, Construction Equipment Controlled Emission Factors" (SBCAPCD 1997).

- On-road diesel truck PM (PM_{10}), $PM_{2.5}$, NO_2, VOC, CO, SO_2, and CO_2 emissions were estimated using EMFAC2011 emissions factors for Heavy–Heavy Duty Trucks running at 10 miles per hour for the year 2017, which is a conservative assumption since the HMF would be operational only by 2021.

- VOCs from paint booth emissions were estimated using conservative volatility rates (i.e., using the high end of the percent VOC content allowed by state and district regulations)) and paint usage projections.

- VOCs from paint booth emissions were also estimated based on the assumption that paint booths would be equipped with conventional filters with 90% control efficiency.

- Speciated TAC emissions from paint booth operations were estimated using CARB's "Organic Speciation Profile for Surface Coating Operations" found in *Organic Chemical Profiles for Source Categories* (CARB 2011a).

- Emissions of metal compounds, which are bonded to diesel particulate matter (DPM) from diesel combustion, were calculated by using CARB's "PM Speciation Profile for Diesel Vehicle Exhaust" found in *PM Speciation Profile for Source Categories* (CARB 2011b).

- Emissions of organic compounds from diesel combustion were estimated using CARB's "Organic Speciation Profile for Diesel Light and Heavy Equipment" found in *Organic Chemical Profiles for Source Categories* (CARB 2011a).

The *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014) provides estimated emission factors and emission rates for the pollutants evaluated.

Additional mass emissions were estimated for indirect GHG emissions associated with indirect water use and solid waste disposal. The water use was estimated to be 16.94 million gallons per year and wastewater was 5.69 million gallons per year. The solid waste disposed was estimated to be 1.3 tons per employee per year. The GHG emissions were estimated from the water use and solid waste disposed, using the same methodology described in Section 3.3.4.3.

HMF and MOWF Station Source Dispersion Analysis

A detailed dispersion modeling analysis was conducted to estimate the potential impacts of HMF/MOWF emissions on nearby sensitive land uses and on local ambient criteria pollutant concentrations. Using the same emission rates as those used in the screening analysis, the U.S. EPA AERMOD model (U.S. EPA 2004) was used to simulate physical conditions and predict pollutant concentrations at specific distances from the boundaries of a HMF site. AERMOD is generally applied to estimate impacts from simple point-source emissions from stacks, as well as emissions from volume and area sources such as onsite mobile diesel equipment. The model accepts actual hourly meteorological observations and directly estimates hourly and average concentrations for various time periods.

A prototypical site layout was analyzed to evaluate the HMF/MOWF operational impacts. Pollutant concentrations were estimated approximately at the site boundary and in increments of 100 feet around the site. Regulatory default options and the rural dispersion algorithm of AERMOD were used in the analysis. The maximum concentrations at these distances were compared with NAAQS, CAAQS, and health-related guidelines to determine the level of impacts.

Emissions from expected operations were simulated as one area source spread out over the 400-acre prototypical HMF site. Five years of meteorological data (2005 through 2009) from Merced County Airport, as compiled by the San Joaquin Valley Air Pollution Control District, were used. An emissions release height was estimated to be 14.8 feet to approximate the stack heights of the locomotive engines, diesel trucks, and spray booth stack(s).

Maximum diesel PM and applicable TAC concentrations were used to estimate cumulative cancer risks and the overall non-cancer chronic and acute hazard indices associated with HMF/MOWF operations following procedures developed by the California Office of Environmental Health Hazard Assessment (OEHHA 2012). The cancer risk calculation procedure developed by OEHHA was used to estimate increased cancer risks resulting from the HMF's diesel PM and TAC emissions. Details of the risk analysis are in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014). Cancer risks were compared to the SJVAPCD CEQA threshold of 10 in a million to assess the level of impacts.

HMF and MOWF Mobile Source CO Hot-Spot Analysis

CO hot-spot analysis was conducted to evaluate the potential impacts of traffic volume change near HMF sites. The Fresno Works–Fresno and Kern Council of Governments–Wasco HMF sites are near the largest populations and the most sensitive receptor land uses; these sites were evaluated in the CO hot-spot analysis because of the sites' proximity to signalized intersections. CO hot-spot analysis was not conducted for the other potential HMF locations because they are located in remote rural areas and thus are not expected to cause traffic congestion at nearby intersections (see Section 3.2, Transportation).

3.3.4.10 Construction Phase Analysis

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

- At-grade guideway segments.
- Elevated guideway segments.
- Retained-fill guideway segments.
- Substations.
- HMF/MOWF.
- HST stations.
- Roadways and roadway overpasses.

These major construction activities would account for the vast majority of earthwork, the largest number of diesel-powered off-road construction equipment, and the majority of material to be hauled along public streets compared to other minor construction activities of the project. Therefore, the regional emissions and localized emissions from these major activities would account for the majority of construction emissions that would be generated by the 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 then used to estimate the regional air quality impacts and localized air quality impacts that would occur during the construction phase.

Methodologies and Assumptions

Construction Activities: 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, industrial buildings at the HMF, and HST stations, including parking garages and platform facilities, were calculated using emission factors from CARB's OFFROAD 2011 and 2007 models (CARB 2011c). The OFFROAD 2011 model provides the latest emission factors for construction off-road equipment, and accounts for lower fleet population and growth factors due to the economic recession and updated load factors based on feedback from engine manufacturers (CARB 2010). For emission rates not available in OFFROAD 2011, rates from OFFROAD2007 were conservatively applied. 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 calculated using VMT estimates and appropriate emission factors from EMFAC2011. Fugitive dust emissions from dirt and aggregate handling were calculated using emission factors derived from equations from U.S. EPA's AP-42 (U.S. EPA 2006b).

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 a spreadsheet tool specific to the HST project for each year of construction. It should be noted that the values reported in this Final EIR/EIS are different from values reported in the earlier Revised DEIR/Supplemental DEIS and Draft EIR/EIS due to refinements to the construction schedule, proposed equipment, and demolition quantities.

This Final EIR/EIS uses the calculation methodology that was introduced in the Revised DEIR/Supplemental DEIS. The method used in the Revised DEIR/Supplemental DEIS was different than the methodology used in the Draft EIR/EIS. The values reported in the earlier Draft EIR/EIS were based on results from the URBEMIS2007 model (Rimpo and Associates 2007). The

Fresno to Bakersfield Revised DEIR/Supplemental DEIS used an alternative approach that provides more flexibility for modeling the complexity associated with the proposed HST construction activities than the URBEMIS2007 and California Emission Estimator Model (CALEEMOD) (SCAQMD 2011) models allowed for. It also allows incorporation of the OFFROAD 2011 emission rates. This revised approach was developed in consultation with the SJVAPCD. This Final EIR/EIS also uses the alternative approach that was used in the Revised DEIR/Supplemental DEIS.

Detailed analysis of the construction emissions can be found in the *Fresno to Bakersfield Section Air Quality Technical Report* (Authority and FRA 2014).

Fugitive dust control measures outlined in the 2005 Statewide Program EIR/EIS that construction contractors are required to implement (such as watering unpaved access roads and disturbed areas three times daily, and promptly replacing ground cover over disturbed areas) were incorporated in the analysis as project design features (see Section 3.3.8).

The project's construction schedule is provided in Chapter 2, Alternatives.

Major activities were grouped into the following categories:

- Mobilization: would occur at four main staging areas.
- Site preparation, including demolition, land clearing, and grubbing.
- Earth-moving.
- Roadway crossings.
- Elevated structures.
- Track laying: elevated, at-grade, and retained fill.
- Traction power supply station.
- Switching station.
- Paralleling station.
- HMF, including demolition, building, and track construction.
- Fresno Station.
- Kings/Tulare Regional Station.
- Bakersfield Station.
- Hauling emissions, including truck and rail.
- Demobilization.

Material Hauling: Emissions from the exhaust of trucks used to haul material (including concrete slabs) to the construction site were calculated using the heavy-duty truck emission factors from EMFAC2011 and anticipated travel distances of haul trucks within SJVAB. Ballast materials could potentially be hauled by rail within the air basin. Locomotive emission factors from the U.S. EPA document *Emission Factors for Locomotives* (U.S. EPA 2009a) and the travel distance by rail to the project site were used to estimate rail emissions.

Ballast materials would be potentially transported from locations outside of SJVAB. For the regional emission analysis, emissions from ballast material-hauling were calculated using the distance traveled within the SJVAB. Emissions from ballast material-hauling by trucks and locomotives outside the SJVAB were also estimated based on the travel distances and transportation method (by rail or by truck) from the locations where ballast materials would be available. Locomotive emission factors using U.S. EPA guidance (U.S. EPA 2009a) were used to estimate the rail emissions. Other construction materials would likely be delivered from supply facilities within the SJVAB.

Five potential quarries that provide ballast material were identified. Of these, three quarries, including Napa Quarry, Lake Herman Quarry, and San Rafael Rock Quarry, were included in the evaluation because of their proximity to the project construction site. These three quarries are all within 70 miles of the SJVAB border and would have material available for the project construction. The Bangor Rock Quarry Site A was included in the evaluation because it is located within 100 miles of the SJVAB border. In addition, this quarry would have material available for the project needs in quantities that exceed the material quantities available at the closest quarries. The other quarry, Kaiser Eagle Mountain Quarry, which is located 350 miles by rail (250 miles by road) from the border of the SJVAB, was analyzed because the annual production rate at this quarry was sufficient to meet construction material requirements.

The analysis was based on the assumption that ballast would be transferred either by diesel truck from the quarry to rail (if there was no rail head onsite) and then by rail to the border of SJVAB, entirely by rail to the border of the SJVAB (if there was a rail head onsite), or by diesel truck from the quarry to the border of the SJVAB. Emissions could potentially occur in several air basins and air districts outside SJVAB.

Concrete Batch Plants: Concrete would also be required for construction of bridges used to support the elevated sections of the alignment and for construction of the retaining wall used to support the retained-fill sections of the alignment. To provide enough concrete onsite, it is estimated that three batch plants would operate in the project area during construction of the alignment sections. Because the locations of the concrete batch plants are unknown, emissions were estimated based on the total amount of concrete required and emission factors from AP-42 Chapter 11.12–Concrete Batching (U.S. EPA 2006a). Emissions from on-road truck trips associated with transporting material to and from the concrete batch plants were included in material-hauling emissions calculations.

Localized Impacts from Construction Activities: The construction of the Fresno to Bakersfield Section of the HST has the potential to exceed or contribute to exceedances of the ambient air quality standards and to cause adverse health impacts on nearby sensitive land uses. A detailed air dispersion modeling analysis and a health risk assessment were conducted to determine whether these impacts would be significant. Specific details of the model parameters for the localized impacts analyses can be found in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

The U.S. EPA's AERMOD (version 12345) atmospheric dispersion model was used to simulate physical conditions and predict pollutant concentrations at locations near the fence line of construction site types. This allowed for an analysis of impacts at specified distances away from the boundaries of these prototypical construction sites. Guidance from U.S. EPA, state, and local air agencies was followed in conducting the air dispersion analysis. AERMOD is generally applied to estimate impacts from simple point-source emissions from stacks, as well as emissions from volume and area sources such as onsite mobile diesel equipment. The model accepts actual hourly meteorological observations and directly estimates maximum and average concentrations for various time periods.

A prototypical site layout was analyzed to evaluate each construction work area. Pollutant concentrations were estimated near the site boundary and in the surrounding area. The modeled concentrations were compared with the applicable NAAQS, CAAQS, and health-related guidelines to determine the level of impacts. The analysis used available meteorological data from the 5-year period from 2005 through 2009, as compiled by the SJVAPCD.

TAC concentrations at the maximally exposed individual (MEI) sensitive receptor locations were used to estimate the cancer risks and the overall non-cancer chronic and acute hazard index associated with construction emissions, following procedures developed by the California Office of Environmental Health Hazard Assessment (OEHHA) (2012). Details of the risk analysis are in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014). Cancer risks were compared with the SJVAPCD CEQA threshold of 10 in a million to assess the level of impacts. Chronic and acute hazard indices were compared with the SJVAPCD CEQA threshold of 1 to assess the level of impacts.

This Final EIR/EIS analysis of localized impacts from construction activities contains additional and updated assessments to those already included in the Revised DEIR/Supplemental DEIS. This was done as a response to comments regarding local air quality impacts from construction. These analyses have been expanded and revised to include both qualitative and quantitative information on potential localized impacts from construction emissions in the SJVAB to provide the public with additional information about the potential project impacts.

The Revised DEIR/Supplemental DEIS qualitatively discussed the health risks from construction of the HST alignment, HMF and MOWF, and concrete batch plants. In response to comments, this Final EIR/EIS includes quantitative analyses to evaluate the localized impacts of these construction activities. The quantitative analyses evaluated impacts from construction criteria pollutant emissions and determined the potential to cause or contribute to exceedances of ambient air quality standards. The quantitative analysis also evaluated impacts from TAC emissions and determined the potential to cause adverse health impacts on nearby sensitive receptors, including schools, child-care centers, health care facilities, and residences.

The Revised DEIR/Supplemental DEIS quantitatively analyzed the health impacts to schools from construction of the HST stations. In response to comments, this Final EIR/EIS includes several updates to the previous analysis. Site-specific station footprints and local meteorological data were incorporated into the air dispersion modeling for the Final EIR/EIS, whereas generalized site data were used for the analysis in the Revised DEIR/Supplemental DEIS. Updates to construction activity, schedule, and emissions have also been incorporated into the analysis for the Final EIR/EIS. These updates reflect expected phased construction activities and equipment usage, which are more accurate for the expected HST station construction.[4] Consistent with the Final EIR/EIS analysis for construction of the HST alignment, HMF, MOWF, and concrete batch plants, the Final EIR/EIS analysis for construction of the HST stations analyzed localized impacts from criteria pollutant emissions and impacts from TAC emissions. The quantitative analyses evaluated construction criteria pollutant emissions and determined the potential to cause or contribute to exceedances of ambient air quality standards. The quantitative analysis also evaluated impacts from TAC emissions and determined the potential to cause adverse health impacts on nearby sensitive receptors, including schools, child-care centers, health care facilities, and residences.

Schedule

Chapter 2, Alternatives, provides more information regarding construction methods and schedules for the project. The equipment and workforce schedule were used with OFFROAD 2011 emission factors to calculate construction emissions. The *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014) provides the detailed equipment and workforce schedule.

For the purposes of this analysis, project mobilization was assumed to occur from April 2014 to July 2014. Regional building demolition and land grubbing for the at-grade, elevated, and retained-fill rail segments was anticipated to begin in July 2014 and conclude in November

4 Refinements included phased construction activities within each major construction task. For example, the analysis in the Revised DEIR/Supplemental DEIS incorrectly assumed that all equipment used in station construction would be operated for the entirety of the station construction period (e.g., a grader being used even during interior building finishing). Refined construction estimates accounted for phased construction activities and assigned equipment usage to their proper tasks rather than grossly assuming that they would be active over the entire construction period.

2014.[5] The major construction activities were anticipated to occur between 2014 and 2023, with construction of the HMF as well as the MOWF completed by the end of 2018, and stations completed by 2023. Power systems construction was anticipated to occur between November 2016 and May 2019. Project demobilization would occur from November 2016 to April 2017.

Statewide EIR/EIS Programmatic Control Measures

The project design incorporates the following design elements from the 2005 Statewide Program EIR/EIS mitigation strategies to reduce air quality impacts associated with construction and operation of the HST System (see Section 3.3.8). Because the 2005 Statewide Program EIR/EIS includes these measures, they are not considered mitigation but are calculated as part of the project construction emissions prior to mitigation. The effectiveness of these measures was not included in the mitigated emissions calculations but was included in the unmitigated emission estimates. The programmatic measures and their corresponding emissions reductions include:

- Replacing ground cover in disturbed areas (PM, 5%).
- Watering exposed surfaces three times daily (PM, 61%).
- Watering unpaved access roads three times daily (PM, 61%).
- Reducing speed on unpaved roads to 15 miles per hour (PM, 45%).
- Ensuring that trucks hauling loose materials are covered (PM, 69%).
- Using low-VOC paint (VOC, 10%).
- Washing all trucks and equipment before exiting construction sites.
- Suspending dust generating activities when wind speeds exceed 25 mph.

Local Regulatory Control Measures

Many of the control measures required by the SJVAPCD Regulation VIII are the same as or similar to the control measures listed in the 2005 Statewide Program EIR/EIS. The emission reductions associated with SJVAPCD Regulation VIII are the same as the emission reductions associated with the 2005 Statewide EIR/EIS (Authority and FRA 2008) listed above.

3.3.4.11 Significance Thresholds

The following values were used to determine whether estimated project impacts are considered to be significant.

Federal

Pursuant to NEPA regulations (40 C.F.R. 1500-1508), project effects are evaluated based on the criteria of context and intensity. Context means the affected environment in which a proposed project occurs. Intensity refers to the severity of the effect, which is examined in terms of the type, quality, and sensitivity of the resource involved, location and extent of the effect, duration of the effect (short- or long-term), and other considerations of context. Beneficial effects are identified and described. When there is no measurable effect, impact is found not to occur. Intensity of adverse effects is summarized as the degree or magnitude of a potential adverse effect, where the adverse effect is thus determined to be negligible, moderate, or substantial.

Project emissions of criteria pollutants are compared to the general conformity *de minimis* applicability thresholds (general conformity [GC] thresholds) on a calendar-year basis for both

5 Construction is conservatively estimated to occur in 2014, although it is likely that construction may not start until 2015. Using 2014 as the first year of construction represents worst case assumptions because it assumes a slightly older mix of construction equipment and trucks, and emission factors are anticipated to decrease over time as newer and cleaner vehicles enter the fleet.

construction and operational emissions. If annual project-related emissions generated in a nonattainment or maintenance area exceed the GC thresholds, a GC determination is required. In addition, the project emissions may not cause new violations or exacerbate an existing violation of NAAQS. Table 3.3-2 presents the GC thresholds for the project.

If the project pollutant emissions are below the GC thresholds, and are expected to cause pollutant emissions that do not exceed other applicable emissions, air quality, or health risk thresholds (such as those in SJVAPCD CEQA guidelines), then the intensity of the impact is considered negligible. Air quality impacts of moderate intensity are defined as pollutant emissions below corresponding GC thresholds, but having the potential to exceed other applicable emissions, air quality, or health risk thresholds. Impacts of substantial intensity are defined as pollutant emissions that are greater than the corresponding GC thresholds, and having the potential to exceed other applicable emissions, air quality, or health risk thresholds.

Table 3.3-2
General Conformity Thresholds

Pollutant	Federal Attainment Status	Threshold Values (tons/year)[a]
NO_2	Attainment	N/A
Ozone precursor (NO_x)[b]	Nonattainment: Extreme	10
Ozone precursor (VOC)[c]	Nonattainment: Extreme	10
CO[d]	Maintenance	100
SO_x	Attainment	N/A
$PM_{2.5}$	Nonattainment	100
PM_{10}	Maintenance	100
$PM_{2.5}$ precursor (SO_2)[e]	Nonattainment	100
Lead	No Designation	N/A

[a] Thresholds from 40 C.F.R. Parts 51 and 93.
[b, c] Ozone reclassifications were made by the U.S. EPA on May 5, 2010.
[d] Only the urban portions of Fresno County and Kern County are maintenance areas for CO.
[e] SO_2 has a GC threshold of 100 tons per year. Due to the stringent requirement of using ultra low sulfur content diesel in California, emissions of SO_2 anticipated from the project are expected to be negligible compared to the threshold.

Acronyms:

GC General Conformity
N/A not applicable
NO_2 nitrogen dioxide
NO_x nitrogen oxide
$PM_{2.5}$ 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

State

For this project, the following criteria are used in determining whether the project would result in a significant impact on air quality and global climate change:

- Conflict with, or obstruct implementation of, the applicable air quality plan.

- Exceed or contribute to an exceedance of any air quality standard or contribute substantially to an existing or projected air quality violation (see discussion immediately below under “Local”).
- 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 (including releasing emissions that exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

Quantitative emission thresholds that can be used to evaluate the significance level of impacts have been developed by SJVAPCD and are discussed in the following section.

Local

The SJVAPCD *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI) (SJVAPCD 2002) contains emissions thresholds used to evaluate the significance of a project’s emissions (see Table 3.3-3). If a project’s emissions are below the significance thresholds, impacts would be considered less than significant; if the construction- or operational-phase emissions are greater than these values, impacts for that phase would be considered 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 any ambient air quality standard.

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 background concentrations of PM_{10} and $PM_{2.5}$ in the San Joaquin Valley Air Basin exceed their respective ambient air quality standards. Therefore, SJVAPCD recommends comparing the incremental increase in PM_{10} and $PM_{2.5}$ concentrations to the applicable significant impact levels (SILs) for PM_{10} and $PM_{2.5}$. For construction, the SJVAPCD-recommended SILs are 10.4 micrograms per cubic meter ($\mu g/m^3$) for the 24-hour average concentration and 2.08 $\mu g/m^3$ for the annual average concentration. For operations, the SJVAPCD-recommended SILs of 5 $\mu g/m^3$ for the 24-hour average concentration and 1 $\mu g/m^3$ for the annual average concentration. 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.

Table 3.3-3
SJVAPCD CEQA Construction and Operational Thresholds of Significance

Pollutant	Thresholds(tons/year)
NO_x	10
ROG	10
PM_{10}	15
$PM_{2.5}$	15

Source: SJVAPCD 2002; Willis 2010, personal communication; Barber 2011, personal communication.
Acronyms:
NO_x nitrogen oxide
PM_{10} particulate matter smaller than or equal to 10 microns in diameter
$PM_{2.5}$ particulate matter smaller than or equal to 2.5 microns in diameter
ROG reactive organic gas

SJVAPCD does not have quantitative SO_2 mass-emission thresholds, and SO_2 is not expected to be a pollutant of concern given the low background concentrations of the area and limited amount of SO_2 emissions associated with the proposed project. Air dispersion modeling of SO_2 emissions was used to determine if the increased concentration would exceed the ambient air quality standard. Impacts from SO_2 emissions would be of negligible intensity and less than significant if the air dispersion analysis demonstrated that the SO_2 emissions would not cause or contribute to an exceedance of any air quality standard or contribute substantially to an existing or projected air quality violation.

SJVAPCD does not have a construction or operational CO CEQA emission threshold. CO impacts during operation would be considered significant if the projected CO concentrations at potential hot-spot locations exceed NAAQS or CAAQS.

3.3.5 Affected Environment

This section discusses the affected environment related to air quality and global climate change in the study area.

3.3.5.1 Local Meteorological Conditions

The rate and location of pollutant emissions and the meteorological conditions that influence movement and dispersal of pollutants in the atmosphere affect air quality. 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 greatly affect localized air quality. The hills and mountains surrounding the San Joaquin Valley restrict air movement through and out of the majority of the basin. The SJVAB encompasses the southern two-thirds of California's Central Valley. Mountain ranges border the sides and southern boundary of the bowl. The valley's weather conditions include frequent temperature inversions; long, hot summers; and stagnant, foggy winters, all of which are conducive to forming and retaining air pollutants (SJVAPCD 2009a).

The SJVAB is typically arid in the summer, with cool temperatures and prevalent Tule fog (i.e., a dense ground fog) in the winter and fall. The average high temperature in the summer is in the mid-90s, and the average low temperature in the winter is in the high 40s. January is typically the wettest month of the year, with an average of about 2 inches of rain. Wind direction is typically from the northwest, with speeds around 30 mph (Western Regional Climate Center 2009).

3.3.5.2 Local Monitored Air Quality Data

CARB maintains ambient air monitoring stations for criteria pollutants throughout California. The stations closest to the HST alignment alternatives are located at 3425 N. First Street in Fresno, 310 N. Church Street in Visalia, and 1128 Golden State Highway in Bakersfield. These stations as shown in Figure 3.3-3, monitor NO_2, O_3, PM_{10}, CO, and $PM_{2.5}$, but do not monitor SO_2. Additional monitoring stations shown in Figure 3.3-3 are located at 1520 Patterson Avenue in Corcoran (no CO, NO_2, or SO_2 monitored), 807 South Irwin Street in Hanford (no CO, SO_2, or $PM_{2.5}$ monitored), and 548 Walker Street in Shafter (no $PM_{2.5}$ monitored). Table 3.3-4 summarizes the results of ambient monitoring at these six stations from the 3-year period from 2007 to 2009. The land uses in the region range from urban and residential to rural and agricultural. As shown, exceedances of the NAAQS and CAAQS, primarily for O_3 and PM, have been recorded.

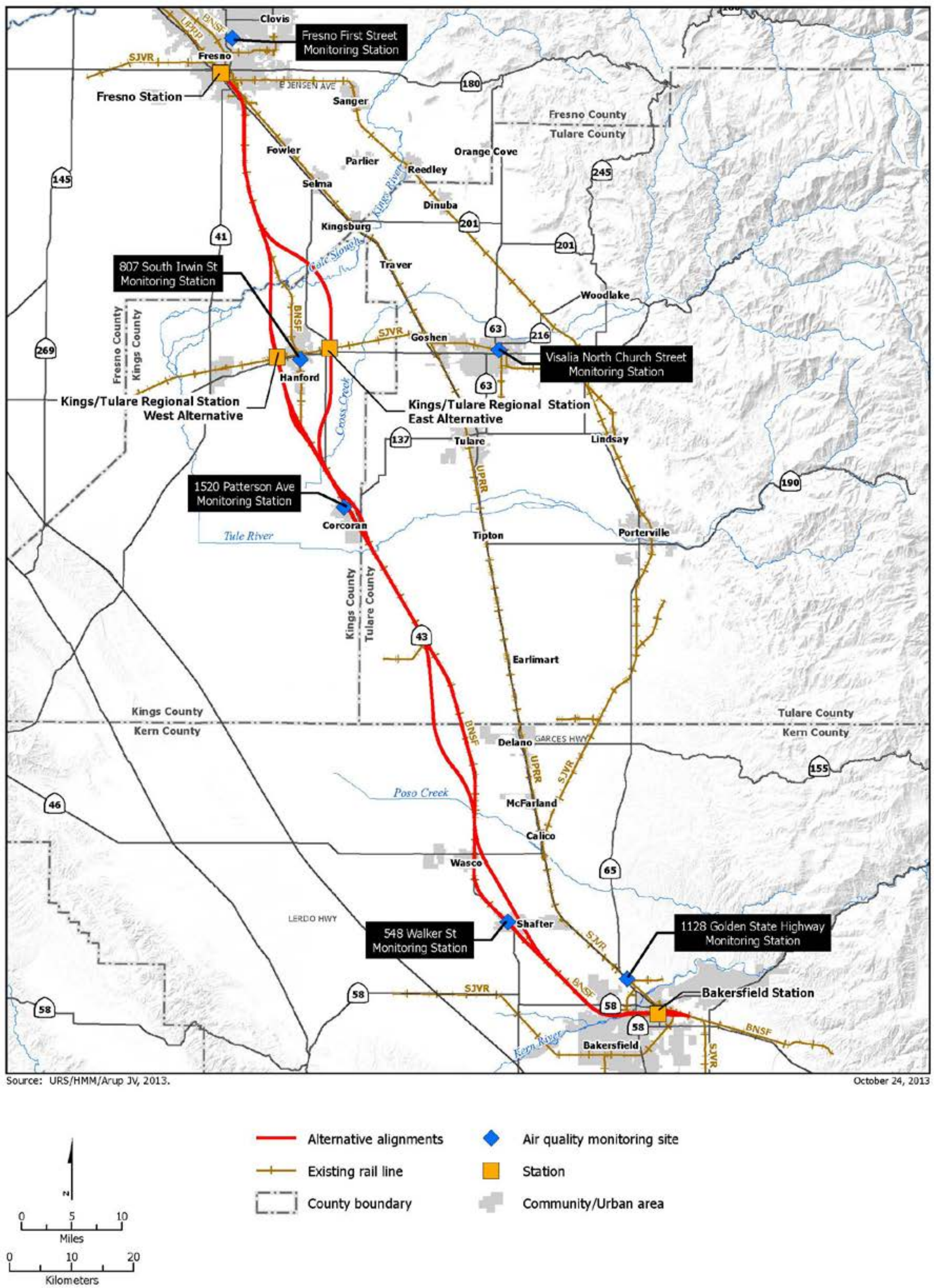


Figure 3.3-3
Air quality ambient air monitors

Table 3.3-4
Ambient Criteria Pollutant Concentration Data at Air Quality Monitoring Stations Closest to the Project

Air Pollutant	Standard/Exceedance	3425 N. First Street, Fresno			310 N. Church Street, Visalia			1128 Golden State Hwy, Bakersfield		
		2007	2008	2009	2007	2008	2009	2007	2008	2009
Carbon Monoxide (CO)	Year Coverage	98%	96%	97%	NM	NM	NM	96%	88%	94%
	Max. 1-hour Concentration (ppm)	3.4	3.1	NM	NM	NM	NM	2.8	3.5	NM
	Max. 8-hour Concentration (ppm)	2.60	2.34	2.07	NM	NM	NM	1.97	2.17	1.51
	# Days>Federal 1-hour Std. of >35 ppm	0	0	0	NM	NM	NM	0	0	0
	# Days>Federal 8-hour Std. of >9 ppm	0	0	0	NM	NM	NM	0	0	0
	# Days>California 8-hour Std. of >9.0 ppm	0	0	0	NM	NM	NM	0	0	0
Ozone (O_3)	Year Coverage[a]	98%	98%	99%	99%	98%	99%	98%	91%	87%
	Max. 1-hour Concentration (ppm)	0.119	0.157	0.121	0.107	0.130	0.120	0.127	0.115	0.096
	Max. 8-hour Concentration (ppm)	0.102[b]	0.132[b]	0.104[b]	0.100[b]	0.122[b]	0.093[b]	0.103[b]	0.106[b]	0.085[b]
	# Days>Federal 8-hour Std. of >0.075 ppm	37	62	51	31	60	48	14	21	4
	# Days>California 1-hour Std. of >0.09 ppm	14	44	36	11	44	23	1	9	1
	# Days>California 8-hour Std. of >0.07 ppm	62	86	73	56	9	68	26	36	24
Nitrogen Dioxide (NO_2)	Year Coverage	99%	95%	99%	98%	99%	100%	95%	95%	89%
	Max. 1-hour Concentration (ppm)	0.086	0.070	0.068	0.071	0.077	0.068	0.073	0.075	0.073
	Annual Average (ppm)	0.017	0.016	0.014	0.015	0.014	0.015	0.020	0.019	0.018
	# Days>California 1-hour Std. of >0.18 ppm	0	0	0	0	0	0	0	0	0
Sulfur Dioxide (SO_2)	Year Coverage	89%	98%	99%	NM	NM	NM	NM	NM	NM
	Max. 24-hour Concentration (ppm)	0.007	0.003	0.005	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

Table 3.3-4
Ambient Criteria Pollutant Concentration Data at Air Quality Monitoring Stations Closest to the Project

Air Pollutant	Standard/Exceedance	3425 N. First Street, Fresno			310 N. Church Street, Visalia			1128 Golden State Hwy, Bakersfield		
		2007	2008	2009	2007	2008	2009	2007	2008	2009
Respirable Particulate Matter (PM_{10})	Year Coverage	97%	100%	99%	100%	94%	100%	96%	81%	93%
	Max. 24-hour Concentration (µg/m^3)	107.0	78.3	75.3	99.0	104.7	93.2	135.0	266.8[b]	139.5
	#Days>Fed. 24-hour Std. of >150 µg/m^3	0	0	0	0	0	0	0	1	0
	#Days>California 24-hour Std. of >50 µg/m^3	9	15	8	15	26	20	28	31	31
	Annual Average (µg/m^3)	32.4	35.1	30.9	42.3	47.1	41.8	NM	NM	NM
Fine Particulate Matter ($PM_{2.5}$)	Year Coverage	98%	99%	98%	92%	97%	100%	88%	90%	37%
	Max. 24-hour Concentration (µg/m^3)	103.8[b]	93.0[b]	82.3[b]	73.3[b]	88.5[b]	74.5[b]	154.0[b]	88.7[b]	71.5[b]
	State Annual Average (µg/m^3)	22.3	21.2	15.1	22.5	19.8	16.6	25.2	NM	NM
	#Days>Fed. 24-hour Std. of >35 µg/m^3	64	50	35	60.4	52.3	23.9	17	13	6
	Annual Average (µg/m^3)	18.8[b]	17.3[b]	15.1[b]	20.3[b]	19.8[b]	16.0[b]	19.9b	17.8[b]	15.1[b]

Source: CARB 2013b.

Notes:
[a] Coverage is for an 8-hour standard.
[b] Exceeds annual NAAQS.

Acronyms and Abbreviations:

µg/m^3	micrograms per cubic meter
>	greater than
Fed.	federal
Max.	maximum
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	part(s) per million
Std.	standard

Table 3.3-4
Ambient Criteria Pollutant Concentration Data at Air Quality Monitoring Stations Closest to the Project

Air Pollutant	Standard/Exceedance	1520 Patterson Ave Corcoran			807 South Irwin St Hanford			548 Walker St Shafter		
		2007	2008	2009	2007	2008	2009	2007	2008	2009
Carbon Monoxide (CO)	Year Coverage	NM	NM	NM	NM	NM	NM	NM	NM	NM
	Max. 1-hour Concentration (ppm)	NM	NM	NM	NM	NM	NM	NM	NM	NM
	Max. 8-hour Concentration (ppm)	NM	NM	NM	NM	NM	NM	NM	NM	NM
	# Days>Federal 1-hour Std. of >35 ppm	NM	NM	NM	NM	NM	NM	NM	NM	NM
	# Days>Federal 8-hour Std. of >9 ppm	NM	NM	NM	NM	NM	NM	NM	NM	NM
	# Days>California 8-hour Std. of >9 ppm	NM	NM	NM	NM	NM	NM	NM	NM	NM
Ozone (O_3)	Year Coverage[a]	NM	95%	88%	81%	NM	NM	99%	99%	98%
	Max. 1-hour Concentration (ppm)	NM	0.132	0.123	0.102	NM	NM	0.111	0.131	0.105
	Max. 8-hour Concentration (ppm)	NM	0.124	0.091	0.091	NM	NM	0.103	0.111	0.084
	# Days>Federal 8-hour Std. of >0.075 ppm	NM	38	21	8	NM	NM	18	33	11
	# Days>California 1-hour Std. of >0.09 ppm	NM	28	6	2	NM	NM	3	14	2
	# Days>California 8-hour Std. of >0.07 ppm	NM	66	43	20	NM	NM	47	45	31
Nitrogen Dioxide (NO_2)	Year Coverage	NM	NM	NM	78%	NM	NM	95%	95%	95%
	Max. 1-hour Concentration (ppm)	NM	NM	NM	0.058	NM	NM	0.101	0.057	0.052
	Annual Average (ppm)	NM	NM	NM	N/A	NM	NM	0.014	0.014	0.012
	# Days>California 1-hour Std. of >0.18 ppm	NM	NM	NM	0	NM	NM	0	0	0

Table 3.3-4
Ambient Criteria Pollutant Concentration Data at Air Quality Monitoring Stations Closest to the Project

Air Pollutant	Standard/Exceedance	1520 Patterson Ave Corcoran			807 South Irwin St Hanford			548 Walker St Shafter		
		2007	2008	2009	2007	2008	2009	2007	2008	2009
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	100%	100%	99%	94%	96%	100%	NM	NM	NM
	Max. 24-hour Concentration (μg/m³)	125.0	353.5	124.4	106.0	230.6	105.2	NM	NM	NM
	#Days>Fed. 24-hour Std. of >150 μg/m³	0	6.6	1	0	10.6	0	NM	NM	NM
	#Days>California 24-hour Std. of >50 μg/m³	134	182.2	106.9	145.1	N/A	109.2	NM	NM	NM
	Annual Average (μg/m³)	45.6	55.9	42.5	44.3	N/A	42.1	NM	NM	NM
Fine Particulate Matter ($PM_{2.5}$)	Year Coverage	96%	90%	100%	NM	NM	NM	NM	NM	NM
	Max. 24-hour Concentration (μg/m³)	75	51	75.7	NM	NM	NM	NM	NM	NM
	State Annual Average (μg/m³)	21.1	19.9	N/A	NM	NM	NM	NM	NM	NM
	#Days>Fed. 24-hour Std. of >35 μg/m³	55	33.5	42.9	NM	NM	NM	NM	NM	NM
	Annual Average (μg/m³)	18.3	15.7	17.7	NM	NM	NM	NM	NM	NM

Source: CARB 2013b.
Note:
[a] Coverage is for 8-hour standard.
Acronyms and Abbreviations:
\> greater than
* Exceeds annual NAAQS
μg/m³ micrograms per cubic meter

Acronyms and Abbreviations (continued):
NM not monitored
N/A not available
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 part(s) per million

3.3.5.3 Attainment Status of Study Area

Both U.S. EPA and CARB designate each county (or portions of counties) within California as attainment, maintenance, or nonattainment based on the area's ability to maintain ambient air concentrations below the air quality standards. Areas are designated as attainment if ambient air concentrations of a criteria pollutant are below the ambient standards. Areas are designated as nonattainment if ambient air concentrations are above the ambient standards. Areas previously designated nonattainment that subsequently demonstrated compliance with the standards are designated as maintenance. Table 3.3-5 shows the designation status of the SJVAB for each criteria pollutant.

Table 3.3-5
Federal and State Attainment Status

Pollutant	Federal Classification	State Classification
O_3	Nonattainment (Extreme)	Nonattainment
PM_{10}	Maintenance	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Urban portion of Fresno County and Kern County: Maintenance Remaining basin: Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment

Sources: U.S. EPA 2013; SJVAPCD 2013.

Acronyms:
CO carbon monoxide
NO_2 nitrogen dioxide
O_3 ozone
PM_{10} particulate matter smaller than or equal to 10 microns in diameter
$PM_{2.5}$ particulate matter smaller than or equal to 2.5 microns in diameter
SO_2 sulfur dioxide

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

Under the state criteria, the SJVAB is currently designated as nonattainment for the 1-hour O_3 and 8-hour O_3, PM_{10}, and $PM_{2.5}$ standards. 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 and the visibility-reducing particle standards; it is an attainment area for the sulfates and vinyl chloride standards.

3.3.5.4 Air Quality Plans and Programs

State Implementation Plan

Planning documents for pollutants for which the study area is classified as a federal nonattainment or maintenance area are developed by the SJVAPCD and CARB and approved by U.S. EPA. Table 3.3-6 lists the planning documents relevant to the proposed project's study area.

Table 3.3-6
Planning Documents Relevant to Project's Study Area

Title	Status
1-Hour O_3 Attainment Plan	On March 8, 2010, U.S. EPA approved San Joaquin Valley's 2004 Extreme Ozone Attainment Plan for the 1-hour O_3 standard. However, effective June 15, 2005, the U.S. EPA revoked the federal 1-hour O_3 standard for areas, including SJVAB.[a] Due to subsequent litigation, U.S. EPA withdrew its plan approval in November 2012 and the SJVAPCD and CARB withdrew this plan from consideration. SJVAPCD adopted a revised plan in September 2013 and is currently seeking CARB's approval.
8-hour O_3 Attainment Plan	On May 5, 2010, U.S. EPA reclassified the 8-hour O_3 nonattainment status of San Joaquin Valley from "serious" to "extreme." The reclassification requires the state to incorporate more-stringent requirements, such as lower permitting thresholds and implementing reasonably available control technologies at more sources.[a] The 2007 Ozone Plan contained a comprehensive and exhaustive list of regulatory and incentive-based measures to reduce emissions of O_3 and particulate matter precursors throughout the San Joaquin Valley. On December 18, 2007, the SJVAPCD Governing Board adopted the plan with an amendment to extend the rule adoption schedule for organic waste operations. On January 8, 2009, U.S. EPA found that the motor vehicle budgets for the years 2008, 2020, and 2030 from the 2007 8-hour Ozone Plan were not adequate for transportation conformity purposes.[b]
PM_{10} Maintenance Plan	On September 25, 2008, U.S. EPA redesignated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the 2007 PM_{10} Maintenance Plan.[c]
$PM_{2.5}$ Attainment Plan	The SJVAPCD Governing Board adopted the 2012 $PM_{2.5}$ Plan on January 24, 2013, following a public hearing. This plan includes measures to attain the 2006 federal standards as well as the state standard.[d] U.S. EPA designated the SJVAB as nonattainment under the 2006 $PM_{2.5}$ national standard on October 8, 2009. This plan satisfies the SIP requirements for compliance with the 2006 $PM_{2.5}$ standard. The federal annual $PM_{2.5}$ standard has recently been revised by U.S. EPA, but designations are not anticipated until December 2014.
CO Maintenance Plan	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. On November 30, 2005, U.S. EPA approved and promulgated the implementation plans and designation of areas for air quality purposes.[e]

[a] SJVAPCD 2004.
[b] SJVAPCD 2007a.
[c] SJVAPCD 2007b.
[d] CARB 2013a.
[e] CARB 2004.

Acronyms:

CARB	California Air Resources Board
CO	carbon monoxide
NAAQS	National Ambient Air Quality Standards
O_3	ozone
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
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
U.S. EPA	U.S. Environmental Protection Agency

Transportation Plans and Programs

Regional Transportation Planning Agencies (RTPAs) and MPOs within the SJVAB and the study area (i.e., the Fresno Council of Governments [Fresno COG], the Kings County Association of Governments [KCAG], the Tulare County Association of Governments [TCAG], and the Kern Council of Governments [Kern COG]) are responsible for preparing RTPs. RTPs address a region's transportation goals, objectives, and policies for the next 20 to 25 years, and identify the actions necessary to achieve those goals. MPOs prepare Transportation Improvement Programs (TIPs), which are 5-year programs of proposed projects that incrementally develop the RTP, and contain a listing of proposed transportation projects committed for funding. Transportation conformity projects are analyzed for air quality conformity with the SIP as components of RTPs and TIPs.

The Fresno COG adopted the 2011 RTP and associated transportation conformity determination in July 2010. The Fresno COG's Final RTP supports the high-speed rail and corridor alignment option that provides service to major population centers within the Central Valley (CFCG 2010a). However, the HST project is not included in the unconstrained project list in Appendix D of the Fresno COG's 2011 RTP, or the 2011 Final TIP (FTIP) and is therefore not included in the conformity determination (CFCG 2010b).

The KCAG and TCAG adopted their respective 2011 RTPs, the 2011 FTIPs, and final associated transportation conformity analyses in July 2010. The KCAG and TCAG 2011 RTPs discuss the background and purpose of the HST through the Central Valley. However, the HST project is not included in the unconstrained projects listed in Appendix II of the KCAG 2011 RTP (KCAG 2010a) or in Appendix D of the KCAG 2011 FTIP (KCAG 2010b) and is therefore not part of the air transportation conformity analysis. In addition, the TCAG air transportation conformity analysis Appendix B (Transportation Project Listing) did not list the HST project, and therefore the HST project was not considered in the TCAG air transportation conformity analysis (TCAG 2010).

The Kern COG adopted the 2011 RTP, the 2011 FTIP, and the air transportation conformity determination in July 2010. The Fresno to Bakersfield Section of the HST and the HMF are included in the constrained program of projects in the Kern COG 2011 RTP, Table 4.1 (Kern COG 2010a). However, neither the HST project nor the HMF is listed in the mass transportation list of projects in the Kern COG 2011 FTIP or in the projects listed in the air transportation conformity determination, Appendix B (Kern COG 2010b). This means that the project was not considered in the Kern COG 2011 air transportation conformity analysis.

3.3.6 Environmental Consequences

3.3.6.1 Overview

Construction: Construction of the HST alternatives have the potential to cause temporary and significant localized air quality impacts including the exceedance of applicable *de minimis* thresholds for specific criteria pollutants. Construction emissions are largely a function of alignment length. The lengths of the alignments for alternatives that deviate from the BNSF Alternative are comparable to the length of the BNSF Alternative for the equivalent section for at-grade and elevated alignments. Therefore, alignment construction emissions of the BNSF Alternative are analyzed and presented. These emissions are representative of the alignment construction emissions from the other alternatives. Implementation of mitigation measures during construction phases could reduce PM_{10} and $PM_{2.5}$ emissions by reducing fugitive dust and exhaust from construction and on-road vehicles. Mitigation measures could also reduce the quantity of other criteria pollutants (NO_x, VOC, and CO) and GHG emissions by controlling exhaust emissions from construction and on-road vehicles. Finally, funding of emissions offsets for certain criteria pollutants would result in further mitigation.

Operation: Operation of the HST alternatives would provide a net regional air quality benefit. Operation of the HST alternatives would generally reduce regional criteria and GHG pollutants and would have a beneficial impact under NEPA and a less-than-significant impact under CEQA on air quality.

There is no appreciable difference in localized operation impacts among the HST alternatives, except for the operation of the HMF/MOWF. Because sensitive receptors located near the HMF/MOWF facility could potentially be exposed to cancer risks greater than 10 in a million at all HMF/MOWF sites, HMF/MOWF TAC emissions could potentially result in a significant health impact under CEQA, and an impact with moderate intensity under NEPA to those sensitive receptors because of the potential to exceed state health risk thresholds. Regarding other emissions, although operation of the HMFs/MOWFs (all of them) could cause localized increases in criteria pollutants from HMF/MOWF onsite equipment operation, as well as from localized CO increases at intersections near the facility, associated impacts would be less than significant under CEQA, and would be of negligible intensity under NEPA.

Section 3.3.9 provides measures to avoid or minimize significant localized impacts from the HMF/MOWF sites. Implementation of mitigation measures could reduce the exposure of nearby populations from pollutants associated with HMF/MOWF operations.

3.3.6.2 No Project Alternative

The No Project Alternative represents future year 2035 conditions without the HST project. The general plans of Fresno, Tulare, and Kern counties indicate continued land development and population growth within the region over the next 25 years, which would increase emissions under the No Project Alternative (Fresno County 2003; Tulare County 2012; Kern County 2009). However, increasingly stringent federal and state emission-control requirements and the replacement of older, higher-polluting vehicles with newer, less-polluting ones would reduce basin-wide emissions under the No Project Alternative. In addition, SJVAPCD rules and plans have been established to bring the SJVAB into compliance with the NAAQS and CAAQS, which would reduce emissions under the No Project Alternative, notwithstanding this growth. The general plan of Kings County indicates that continued land development and growth within the region over the next 25 years would increase emissions, but these could be mitigated with the general plan policies under the existing and No Project Alternative (Kings County 2010). Therefore, air quality is expected to improve in the basin under the No Project Alternative compared to the existing conditions.

3.3.6.3 High-Speed Train Alternatives

Construction Period Impacts

Impact AQ#1–Common Regional Air Quality Impacts During Construction

Common effects are those that would occur with implementation of any of the HST alternatives and do not differ depending on the HST alternative chosen. Common effects would include regional emissions from construction and the potential effects of construction on sensitive receptors in proximity to the HST alternatives. Another common effect of construction in general would be to cause or contribute to a localized exceedance of an ambient air quality standard or to affect compliance with air quality plans.

Criteria pollutant emissions were estimated for each year of construction. The HST construction schedule is provided in Chapter 2, Alternatives. The HST construction activities during each calendar year were summed based on the construction schedule. The *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014) provides information on the assumptions for the construction quantities, building square footages, construction equipment fleets for each unit operation, and OFFROAD emission factors.

For the Fresno to Bakersfield Section, all regional construction impacts for the alignment were analyzed as common impacts. The BNSF Alternative was used as the proxy alignment to estimate air quality emissions for the at-grade and elevated alignment for all alternatives. This is because the length of the alignment for alternatives that deviate from the BNSF Alternative is comparable to the length of the equivalent section of the BNSF Alternative. Therefore, construction emissions from construction of BNSF Alternative alignments are expected to be similar to the construction emissions for the alignments of the other alternatives. Based on the alignment length, the number of structures demolished, and the number of road crossings, it is estimated that construction emissions from the other alternatives would differ from the BNSF alternative by less than 3%. See Appendix A of the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014) for details.

The predominant pollutant associated with construction of the guideway, stations, and maintenance facilities 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. Construction emissions from the HST stations, power substations, maintenance facilities, material hauled to the site, and the regional roadway realignment construction emissions would be the same for all HST alternatives.

The unmitigated emissions (i.e., the actual estimated amounts/quantities) for construction of the BNSF Alternative, as well as detailed model parameters and assumptions, are included in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

Table 3.3-7 identifies the years in which the BNSF Alternative mass emissions would exceed either the GC thresholds or the SJVAPCD CEQA thresholds.

NEPA Impacts: Direct emissions from the construction phase of the HST alternatives would exceed the GC applicability thresholds for VOC and NO_x in certain calendar years in which construction would occur. VOC and NO_x emissions that exceed the GC thresholds are therefore considered to have the potential to cause air quality impacts with substantial intensity. GC thresholds would not be exceeded for any of the other criteria pollutants, and the potential impacts of the HST alternatives related to these pollutants are therefore considered to be of negligible intensity.

Purchase of offset emissions through a Voluntary Emission Reduction Agreement (VERA) with the SJVAPCD (mitigation measure AQ-MM#4) for VOC and NO_x would reduce impacts to negligible intensity after mitigation because VOC and NO_x emissions would be offset and be below the GC applicability thresholds.

Table 3.3-7
BNSF Alternative At-Grade and Elevated Alignment Construction Emissions for Years 2014–2023[a] (tons/year)

Activities	VOC	CO			NO_x	SO_2	PM_{10}[d]	$PM_{2.5}$[d]
		Total	Fresno[e]	Bakersfield[e]				
SJVAPCD annual CEQA significance thresholds[b]	10	N/A	N/A	N/A	10	N/A	15	15
Annual general conformity *de minimis* levels applicable to the SJVAB[c]	10	N/A	100	100	10	100	100	100
Year 2014								
Emissions (tons/year)	16.86	104.03	27.67	26.95	380.80	0.63	42.66	13.40
Exceeds SJVAPCD CEQA thresholds?	Yes	N/A	N/A	N/A	Yes	N/A	Yes	No
Exceeds GC threshold?	Yes	N/A	No	No	Yes	No	No	No
Year 2015								
Emissions (tons/year)	36.69	289.42	72.31	62.12	617.99	1.17	67.63	30.85
Exceeds SJVAPCD CEQA thresholds?	Yes	N/A	N/A	N/A	Yes	N/A	Yes	Yes
Exceeds GC threshold?	Yes	N/A	No	No	Yes	No	No	No
Year 2016								
Emissions (tons/year)	32.27	256.37	65.63	57.37	500.73	0.88	60.47	27.22
Exceeds SJVAPCD CEQA thresholds?	Yes	N/A	N/A	N/A	Yes	N/A	Yes	Yes
Exceeds GC threshold?	Yes	N/A	No	No	Yes	No	No	No
Year 2017								
Emissions (tons/year)	8.51	48.99	12.17	15.31	161.43	0.22	15.79	12.03
Exceeds SJVAPCD CEQA thresholds?	No	N/A	N/A	N/A	Yes	N/A	Yes	No
Exceeds GC threshold?	No	N/A	No	No	Yes	No	No	No
Year 2018								
Emissions (tons/year)	3.89	30.27	3.92	3.74	70.89	0.24	14.90	9.67
Exceeds SJVAPCD CEQA thresholds?	No	N/A	N/A	N/A	Yes	N/A	No	No
Exceeds GC threshold?	No	N/A	No	No	Yes	No	No	No

Table 3.3-7
BNSF Alternative At-Grade and Elevated Alignment Construction Emissions for Years 2014–2023[a] (tons/year)

Activities	VOC	CO			NO_x	SO_2	PM_{10}[d]	$PM_{2.5}$[d]
		Total	Fresno[e]	Bakersfield[e]				
Year 2019								
Emissions (tons/year)	0.42	4.07	1.31	1.70	4.17	0.01	8.63	6.94
Exceeds SJVAPCD CEQA thresholds?	No	N/A	N/A	N/A	No	N/A	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No	No	No
Year 2020								
Emissions (tons/year)	0.25	2.50	1.43	1.21	1.95	0.01	2.95	0.14
Exceeds SJVAPCD CEQA thresholds?	No	N/A	N/A	N/A	No	N/A	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No	No	No
Year 2021								
Emissions (tons/year)	3.87	19.56	8.85	9.26	79.74	0.12	4.33	2.49
Exceeds SJVAPCD CEQA thresholds?	No	N/A	N/A	N/A	Yes	N/A	No	No
Exceeds GC threshold?	No	N/A	No	No	Yes	No	No	No
Year 2022								
Emissions (tons/year)	0.09	1.13	0.00	0.00	0.53	0.00	0.13	0.05
Exceeds SJVAPCD CEQA thresholds?	No	N/A	N/A	N/A	No	N/A	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No	No	No
Year 2023								
Emissions (tons/year)	0.03	0.39	0.00	0.00	0.19	0.00	0.08	0.02
Exceeds SJVAPCD CEQA thresholds?	No	N/A	N/A	N/A	No	N/A	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No	No	No

Notes:
[a] These construction emissions were estimated for the BNSF Alternative, which is used as a proxy to estimate construction emissions for all other alternatives. Total construction emissions of criteria pollutants from all other alternatives are estimated to differ from the BNSF by less than 3%.
[b] The SJVAPCD has significance thresholds for NO_x, ROG/VOC, PM_{10}, and $PM_{2.5}$. The district currently does not have thresholds for CO or SO_x. Section 3.3.11 summarizes the CEQA

Table 3.3-7

BNSF Alternative At-Grade and Elevated Alignment Construction Emissions for Years 2014–2023[a] (tons/year)

Activities	VOC	CO			NO_x	SO_2	PM_{10}[d]	$PM_{2.5}$[d]
		Total	Fresno[e]	Bakersfield[e]				

significance for these pollutants.

[c] The GC *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 SOx, since SOx is a precursor for $PM_{2.5}$, the $PM_{2.5}$ GC *de minimis* thresholds was used.

[d] PM_{10} and $PM_{2.5}$ emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the Authority committed to in the Statewide Program EIR/EIS.

[e] The Fresno Urbanized Area and the Bakersfield Metropolitan Area are separate CO maintenance areas. CO emissions presented for these areas represent the Fresno and Bakersfield urbanized maintenance areas only.

Acronyms:

CEQA	California Environmental Quality Act
CO	carbon monoxide
GC	general conformity
N/A	not applicable
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
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	sulfur dioxide
VOC	volatile organic compound

CEQA Impacts: Construction emissions would exceed the mass emission SJVAPCD CEQA thresholds for VOC, NO_x, PM_{10}, and $PM_{2.5}$ in some construction years. 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 2004 Extreme Ozone 1-hour Attainment Demonstration Plan,[6] the 2007 PM_{10} Maintenance Plan, and the 2012 $PM_{2.5}$ Plan. There is no mass emission CEQA threshold for SO_2 from SJVAPCD; however, SO_2 impacts are expected to be less than significant based on the air dispersion modeling of ambient air concentrations of SO_2 and the state requirement of using ultra-low-sulfur diesel.

With onsite mitigation (i.e., AQ MM#1 and #2), VOC, NO_x, PM_{10}, and $PM_{2.5}$ impacts would be reduced, but could remain significant under CEQA. As stated in SJVAPCD 2012 Draft GAMAQI (SJVAPCD 2012a), purchase of offset emissions through a Voluntary Emission Reduction Agreement (VERA) with the SJVAPCD (mitigation measure AQ-MM#4) for these pollutants would reduce impacts to less than significant after mitigation.

Impact AQ#2–Compliance with Air Quality Plans

Emissions from project construction would be temporary, occurring for 9 years, from April 2014 through June 2023. However, based on the amount of construction to be completed, construction activities would involve heavy-duty construction equipment and have the potential to cause adverse air quality impacts.

NEPA Impacts: VOC and NO_x emissions exceed the GC applicability thresholds, while PM_{10} and $PM_{2.5}$ emissions are below the GC applicability thresholds. The mass 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 federal and state ambient air quality standards. VOC, NO_x, PM_{10}, and $PM_{2.5}$ emissions could exceed the mass emission SJVAPCD thresholds and impede the implementation of the respective air quality plans, including plans prepared to attain federal ambient air quality standards. Therefore, the effect would be of substantial intensity for VOC and NO_x and moderate intensity for PM_{10} and $PM_{2.5}$ under NEPA.

CEQA Impacts: VOC, NO_x, PM_{10}, and $PM_{2.5}$ emissions would be greater than applicable mass emission significance thresholds, which would impede implementation of the 8-hour SJVAPCD 2007 Ozone Plan, the 2004 Extreme Ozone 1-hour Attainment Demonstration Plan,[7] the 2007 PM_{10} Maintenance Plan, and the 2008 $PM_{2.5}$ Plan. Therefore, this impact would be significant under CEQA for VOC, NO_x, PM_{10}, and $PM_{2.5}$ emissions.

With onsite mitigation (i.e., AQ–MM#1 and AQ-MM#2), VOC, NO_x, PM_{10}, and $PM_{2.5}$ impacts would be reduced, but could remain significant under CEQA. As stated in SJVAPCD 2012 Draft GAMAQI (SJVAPCD 2012a) and consistent with strategies outlined for incentive-based programs in the most recent $PM_{2.5}$ and O_3 plans (SJVAPCD 2012b), purchase of emission offsets for these pollutants through a Voluntary Emission Reduction Agreement (VERA) with the SJVAPCD (Mitigation Measure AQ-4) would reduce impacts to less than significant after mitigation.

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[6] The 1-hour ozone standard was revoked by the U.S. EPA effective June 15, 2005, for areas including the SJVAB. However, the U.S. EPA still approved the 2004 Extreme Ozone Attainment Plan for 1-hour ozone on March 8, 2010 (SJVAPCD 2010).

[7] The 1-hour ozone standard was revoked by the U.S. EPA effective June 15, 2005, for areas including the SJVAB. However, the U.S. EPA still approved the 2004 Extreme Ozone Attainment Plan for 1-hour ozone on March 8, 2010 (SJVAPCD 2010).

Impact AQ#3–Material-Hauling Emissions Outside of SJVAB

Construction emissions included in the regional impacts analysis (Impact AQ #1) considered emissions within the SJVAB. High speed rail track bed would be constructed using ballast, sub-ballast, and concrete slabs. Sub-ballast and concrete slab would be available within the SJVAB; however, the ballast could potentially be transported from areas outside the SJVAB. An emissions evaluation was conducted for transporting ballast materials from outside the SJVAB to the border of the air basin. Five hauling scenarios from five quarries were analyzed: (1) all ballast transported by rail from Kaiser Eagle Mountain Quarry; (2) ballast transported by truck and rail from Napa Quarry, Lake Herman Quarry, San Rafael Quarry, and Kaiser Eagle Mountain Quarry; (3) ballast transported by truck and rail from a mixture of the five quarries; (4) ballast transported by truck from a mixture of the five quarries; and (5) ballast transported by truck from Napa Quarry, Lake Herman Quarry, San Rafael Quarry, and Kaiser Eagle Mountain Quarry.

Details of the evaluations are presented in Appendix G of the *Fresno to Bakersfield Section Air Quality Technical Report* (Authority and FRA 2014).

NEPA Impacts: The emission results demonstrated at least one scenario where the emissions would not exceed the GC thresholds in any of the surrounding air basins. However, the emissions results also showed that the worst-case emissions would be above the GC thresholds for NO_x in the South Coast Air Basin for four of the five scenarios analyzed, in the Salton Sea Air Basin for one of the five scenarios analyzed, and in the Mojave Desert Air Basin[8] for one of the five scenarios analyzed. The emissions of NO_x in the other air basins (Sacramento Valley Air Basin and San Francisco Bay Area Air Basin) would be below the GC thresholds for all scenarios. The emissions for all other pollutants would be below the GC thresholds for all scenarios in all air basins. Therefore, under NEPA, depending on the hauling scenario implemented, the material-hauling emissions outside of the SJVAB could have air quality impacts of substantial intensity for NO_x emissions in the South Coast Air Basin, the Salton Sea Air Basin, and the Mojave Desert Air Basin, but would be of negligible intensity for all other pollutants in these air basins. Under NEPA, the material-hauling emissions could have air quality impacts of negligible intensity for all pollutants in the other air basins. Mitigation measures to reduce the material-hauling emission impacts are discussed in Section 3.3.9, Mitigation Measures.

CEQA Impacts: Emissions would exceed the CEQA thresholds for NO_x for all scenarios in multiple air quality management districts (AQMDs) or air pollution control districts (APCDs). All other pollutants for these scenarios would be below the CEQA thresholds.

Under CEQA, the material-hauling emissions outside the SJVAB could exceed the SCAQMD (includes both South Coast Air Basin and Salton Sea Air Basin) CEQA NO_x thresholds in all five scenarios, and could exceed the Bay Area AQMD's CEQA NO_x thresholds for two of the scenarios. The material-hauling emissions could also exceed the Mojave Desert AQMD NO_x CEQA threshold for two of the scenarios.

Therefore, NO_x emissions could have a significant impact in SCAQMD, BAAQMD, and Mojave Desert AQMD. Material-hauling emissions would be below the CEQA thresholds for all other air districts and pollutants and would have insignificant impacts. Mitigation measures to reduce the

8 The Mojave Desert Air Basin attainment status was reclassified from "Moderate" to "Severe-15" on May 8, 2012, lowering the de minimis threshold for NO_X from 100 tons per year to 25 tons per year. Based on the "Moderate" classification at the time of preparation of the Revised DEIR/Supplemental DEIS, there was no exceedance under NEPA, but there was an impact under CEQA, and mitigation was already required (purchase of offsets) in the Revised DEIR/Supplemental DEIS for CEQA. This mitigation will be the same in this Final EIR/EIS and will be used to offset CEQA and NEPA impacts.

material-hauling emission impacts are discussed in Section 3.3.9, Mitigation Measures (see AQ-MM#2 and AQ-MM#5).

Detailed analysis for the material-hauling emissions is presented in the *Fresno to Bakersfield Section: Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

Impact AQ#4–Greenhouse Gas Emissions During Construction

The time that CO_2 remains in the atmosphere cannot be definitively quantified because of the wide range of the time scales in which carbon reservoirs exchange CO_2 with the atmosphere. Consequently, there is no single value for the half-life of CO_2 in the atmosphere (IPCC 1997). Therefore, the duration that CO_2 emissions from a short-term project (i.e., construction emissions) would remain in the atmosphere is unknown.

As shown in Table 3.3-8, GHG emissions from the construction phase were quantified according to the CEQ guidelines on considering GHG emissions in NEPA documents (CEQ 2010), because total emissions would be greater than the 25,000 metric tons of CO_2e threshold. The total GHG construction emissions would be less than 0.05% of the total annual statewide GHG emissions.[9,10] 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 (IPCC 1997). To conservatively estimate the amortized GHG emissions, the HST project life is assumed to be only 25 years (although the actual project life will be much longer ([Barber 2010, personal communication]). The estimated amortized GHG construction emissions for each alternative would be less than 9,200 metric tons CO_2e per year as shown in Table 3.3-8.

However, the increase in GHG emissions generated during construction would be offset by the net GHG reductions in operation (because car and plane trips are removed in the Fresno to Bakersfield area) in less than 12 months for the alignment for the alternatives (using the BNSF Alternative as a proxy). Operational GHG emissions are presented in Tables 3.3-17 and 3.3-18, below.

NEPA Impacts: The project's total GHG construction emissions for the BNSF alternative would be greater than 25,000 metric tons of CO_2e threshold suggested in the CEQ guidelines. However the construction emissions would be offset in less than 12 months of the train operations. Therefore, the construction GHG emissions would have impacts of negligible intensity under NEPA.

CEQA Impacts: The increase in the project's construction GHG emissions would be offset in less than 12 months of the train operations.[11] Therefore, the construction GHG emissions would be less than significant under CEQA.

[9] A GHG emission inventory for the SJVAPCD was not available at the time of the release of this document so the comparison was made to the most recent CARB emissions inventory (2006) that estimated the annual CO_2e emissions in California are about 484 MMT (CARB 2007b).

[10] The value of 0.05% is much lower than the value presented in the first Draft EIR/EIS due mostly to refined construction information, resulting in lower overall GHG emission rates.

[11] The GHG emissions from construction will be partially paid back prior to operation since the VERA program will also have the co-benefit of reducing some GHG emissions, although this is not formally part of the VERA. The Authority will track these reductions, which will be included in both the GHG report to the legislature and the Sustainability Plan. This will result in some of the construction GHG emissions being paid back closer in time to their occurrence. Lastly, the Authority is developing a multi-faceted urban forestry program that would offset all construction GHG emissions in the Fresno – Bakersfield section. Although not necessary to support a less-than-significant conclusion, this program would further reduce GHG impacts.

Table 3.3-8
HST Alternative CO_2e Construction Emissions (metric tons/ year)[a, b, c]

Year	BNSF Alternative
2014	51,661
2015	75,421
2016	51,561
2017	16,782
2018	18,509
2019	498
2020	271
2021	10,876
2022	111
2023	38
Total	**225,728**
Amortized GHG Emissions (averaged over 25 years)	
CO_2e per Year	9,029
Payback of GHG Emissions (months)[d]	
Payback period (Project vs. No Project)	7 to 12
Payback period (Project vs. Existing condition)	7 to 12

Source: U.S. EPA 2005.

Notes:
[a] The CO_2 emissions for each year of construction are included in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

[b] Project life assumed to be 25 years.

[c] According to the U.S. EPA, emissions of CH_4 and N_2O from passenger vehicles are much lower than emissions of CO_2, which contribute in the range of 5% to 6% of the CO_2e emissions. In addition, the URBEMIS 2007 model does not estimate CH_4 and N_2O emissions. Therefore, to account for the CH_4 and N_2O emissions, the CO_2 emissions were conservatively increased by 5% to calculate the CO_2e emissions. This approach for passenger vehicles was assumed to be applicable to all emission sources evaluated.

[d] Payback periods were estimated by dividing the GHG emissions during construction years by the annual GHG emission reduction during project operation. See Tables 3.3-17 and 3.3-18 for operation GHG emission reduction data. The data range represents the emission changes based on the range of HST ticket price of 50% to 83% of airfare.

Acronyms:
CO_2 carbon dioxide
CO_2e carbon dioxide equivalent
GHG greenhouse gas

Local Impacts

Impact AQ#5–Asbestos and Lead-based Paint Exposure During Construction

The demolition of asbestos-containing materials is subject to the limitations of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations and would require an asbestos inspection. The SJVAPCD's Compliance Division would be consulted before demolition begins. As described in Section 3.10, Hazardous Materials and Wastes, the project would include strict compliance with existing asbestos regulations as part of project design.

NEPA Impacts: Compliance with existing asbestos regulations would prevent asbestos from having an impact with substantial intensity under NEPA. Therefore, the localized impacts from asbestos and lead-based paint exposure would be of negligible intensity under NEPA.

CEQA Impacts: Compliance with existing asbestos regulations would prevent asbestos from being a significant impact under CEQA (SJVAPCD 2002). Therefore, the localized impacts from asbestos and lead-based paint exposure would be less than significant under CEQA.

Fresno, Kings, Tulare, and Kern counties are designated by California Department of Conservation Division of Mines and Geology (CDMG) as areas likely to contain NOA. However, the specific locations of the counties where project construction would occur are in areas designated not likely to contain NOA (CDMG 2000). Therefore, NOA would not likely 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. If encountered during structure demolitions and relocations, lead-based paint and asbestos will 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 project construction.

Impact AQ#6–Localized Air Quality Impacts During Guideway/Alignment Construction

Sensitive receptors (such as schools, residences, and health care facilities) are located near the construction areas in Fresno, Bowles, Corcoran, Wasco, Shafter, Rosedale, Green Acres, and Bakersfield. During construction, sensitive receptors would be exposed to increased concentrations of criteria pollutants and diesel particulate matter exhaust, which CARB classifies as a carcinogen. 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 2012). Construction activities along the guideway/alignment (including the construction of road crossings and power substations) were evaluated for potential localized impacts. According to the construction localized-impact air dispersion modeling conducted, construction activities along the guideway/alignment would not exceed the applicable NAAQS and CAAQS or substantially contribute to further exacerbation of exceedances of PM_{10} and $PM_{2.5}$ standards. The health risk assessment concludes that the incremental increase in cancer risk associated with the diesel particulate matter from construction equipment exhaust would not exceed the applicable threshold of 10 in a million. For details on the localized impact air dispersion modeling and HRA, see Appendix H of the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

NEPA Impacts: Since the 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 estimate that concentration levels and health risks would be below applicable thresholds, the localized air quality impacts would be of negligible intensity under NEPA.

CEQA Impacts: Since the construction of the guideway/alignment would be short term, and air dispersion modeling and health risk assessments estimate that concentration levels and health risks would be below applicable thresholds, the localized air quality impacts would be less than significant under CEQA.

Impact AQ#7–Localized Air Quality Impacts to Schools and Other Sensitive Receptors During Station Construction

Station construction would take place over a period of 4 years, and sensitive receptors could potentially be exposed to health impacts from elevated concentrations of criteria pollutants and cancer risks associated with TACs. According to the construction localized-impact air dispersion modeling conducted, construction of the stations would not exceed the applicable NAAQS and CAAQS or substantially contribute to further exacerbation of exceedances of PM10 and PM2.5 standards. Health risk analysis for DPM using AERMOD indicated that the incremental increase in cancer risk associated with the diesel particulate matter from construction equipment exhaust would not exceed the applicable threshold of 10 in a million for the sensitive receptors located in the vicinity of the Bakersfield, Fresno, and Kings/Tulare Regional Station construction areas12

NEPA Impacts: The very minor incremental increase in cancer risk from station construction would result in an impact with negligible intensity under NEPA.

CEQA Impacts: The cancer risk impacts from TAC emissions associated with station construction would be less than significant under CEQA.

Impact AQ#8–Localized Air Quality Impacts from Concrete Batch Plants

The emissions generated from operation of concrete batch plants are included in the total regional construction emissions for the at-grade and elevated alignment for each alternative (using the BNSF Alternative as a proxy). The concrete batch plants are estimated to generate 7 tons per year of particulate emissions for the at-grade and elevated alignments for each alternative. The concrete generated would include concrete for the elevated structures (elevated rail) and retaining wall (retained-fill rail).

The concrete batch plants would be located along the alignment. According to Cal/EPA and CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (Cal/EPA and CARB 2005), emission impacts at receptors would be greatly reduced by locating a facility 1,000 feet from sensitive receptors. The air dispersion modeling and health risk analysis for fugitive dust emissions and their associated TAC constituents indicated that excess cancer risks and non-cancer health impacts would not exceed the applicable thresholds, but emissions may contribute to further exacerbation of exceedances of PM_{10} and $PM_{2.5}$ standards. After mitigation, emissions would not substantially contribute to further exceedances of PM_{10} and $PM_{2.5}$ standards (see AQ–MM#3).

12 As noted in Section 3.3.4.10, Construction Phase Analysis, several updates were incorporated into the localized analysis for the Final EIR/EIS in response to the comments received on the Revised DEIR/Supplemental DEIS. The previous analysis for the Revised DEIR/Supplemental DEIS showed potentially significant impacts before mitigation, and the analysis for the Final EIR/EIS showed less than significant impacts. This impact was accordingly revised down. More information on the Final EIR/EIS analysis is available in Section 3.3.4.10 and in the Fresno to Bakersfield Section: Air Quality Technical Report (Authority and FRA 2014).

NEPA Impacts: The effect from concrete batch plants would be of moderate intensity under NEPA to sensitive receptors within 1,000 feet of the batch plant.

CEQA Impacts: The localized air quality impacts from concrete batch plants would be significant under CEQA to sensitive receptors within 1,000 feet of the batch plant.

Impact AQ#9–Localized Air Quality Impacts from HMF and MOWF Construction

Air emissions associated with construction of the HMF and potentially co-located MOWF would be small relative to the quantity of emissions from construction of the alignment/guideway. However, unlike construction of the guideway/alignment, which would be spread out over approximately 117 miles, emissions from HMF construction would be located in one area. TACs, mostly DPM exhaust from construction equipment, and criteria pollutants would be emitted during construction of the HMF and potentially during construction of the co-located MOWF.

Impacts of construction of the HMF would be localized; therefore, potential exposure to DPM was evaluated for areas adjacent to the construction site. The majority of the construction emissions would be DPM from diesel construction equipment used for mass site grading, building construction, and the HMF guideway construction. The main health risk concerns of DPM are cancer and chronic risks. Cancer risk from exposure to carcinogens is typically evaluated based on a long-term (70-year) continuous exposure, and chronic risks are also typically evaluated for long-term exposure. The period of construction for the HMF would be approximately 20 months spread between 2017 and 2018. The construction period for the potentially co-located MOWF would be approximately 20 months, spread between May 2017 and November 2018. This short period and level of exposure is not expected to increase the cancer risk to sensitive receptors in the vicinity of the HMF/MOWF construction area. This is confirmed by the localized air dispersion analysis and health risk assessment. For details on the localized impact air dispersion modeling and HRA, see Appendix H of the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014). The concentration increase of criteria air pollutants associated with construction of the HMF/MOWF would not exceed the applicable thresholds. The incremental increase in cancer risk associated with the DPM emissions from construction equipment would be less than the applicable threshold of 10 in a million.

NEPA Impacts: Under NEPA, the local impact of the HMF/MOWF construction would be of negligible intensity, because sensitive receptors are not expected to be exposed to long-term DPM emissions during HMF/MOWF construction that would cause substantial cancer or non-cancer health risks.

CEQA Impacts: Under CEQA, the local impact of the HMF/MOWF construction would be less than significant because sensitive receptors are not expected to be exposed to long-term DPM emissions during HMF/MOWF construction that would cause significant cancer or non-cancer health risks.

Project Operation 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, mobile source air toxics, 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 particulates (PM_{10} and $PM_{2.5}$) emissions would not cause violations of NAAQS, but the operation of the HMF/MOWF could increase sensitive receptor exposure to air pollutants.

Statewide and Regional Impacts

Statewide Emissions

Table 3.3-9 summarizes statewide emission changes for the HST alternatives in 2035 compared to the No Project Alternative. The project is predicted to have a beneficial effect on (i.e., reduce) statewide emissions of all criteria pollutants. The analysis estimated the emission changes due to projected reductions of VMT and intrastate airport travel, and increases in electrical demand (required to power the HST).[13] The reductions of VMT and intrastate plane travel will vary depending upon the price of an HST ticket. The more expensive the ticket relative to other travel modes, the less likely riders will travel by HST, and vice versa. Accordingly, Tables 3.3-9 to 3.3-18, below, present emissions results using a range. One end of the range is based on HST ticket prices being 50% of the equivalent airfare. The other end of the range is based on HST ticket prices being 83% of airfare.

In the Existing Plus Project scenario versus existing conditions scenario, the project is also predicted to have a beneficial effect on (i.e., reduce) statewide emissions of all applicable pollutants, compared to the existing conditions scenario (Table 3.3-10). Details of the Existing Condition Plus Project analysis are presented in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

Table 3.3-9
Summary of Estimated 2035 Statewide Emission Burden Changes (Project versus No Project - 2035) (tons/year)

Project Element	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Roadways	-420 to -280	-10,295.42 to -6,864	-958 to -638	-54 to -36	-586 to -391	-245 to -163
Airport	-124 to -83	-1,677 to -1,124	-1,324 to -887	-159 to -106	-24 to -16	-24 to -16
Energy (Power Plants)	61 to 40	616 to 411	468 to 312	52 to 35	88 to 59	81 to 54
Total	**-483 to -323**	**-11,356 to -7,576**	**-1,814 to -1,214**	**-160 to -107**	**-522 to -348**	**-188 to -125**

Note: Totals may not add up exactly due to rounding.

The values in the table represent the ranges of emission burden change based on the range of HST ticket price of 50% to 83% of airfare.

Operational emissions in this Final EIR/EIS reflect the refined energy usage estimates for the HST System, which resulted in lower energy requirements and also reflected updated speed correlations between the No Build and Build 50% scenarios.

Acronyms:
CO carbon monoxide
HST high-speed train
NO_x nitrogen oxide
PM_{10} particulate matter smaller than or equal to 10 microns in diameter
$PM_{2.5}$ particulate matter smaller than or equal to 2.5 microns in diameter
SO_2 sulfur dioxide
VOC volatile organic compound

13 VMT data is based on information from Cambridge Systematics (2012), Transportation Technical Report.

Table 3.3-10
Summary of Estimated 2009 Statewide Emission Burden Changes (Existing Plus Project versus Existing Conditions–2009) (tons/year)

Project Element	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Roadways	-1,458 to -970	-31,267 to -20,813	-3,444 to -2,292	-39 to -26	-444 to -296	-195 to -130
Airport	-72 to -48	-973 to -652	-768 to -514	-92 to -62	-14 to -9	-14 to -9
Energy (Power Plants)	61 to 40	616 to 411	468 to 312	52 to 35	88 to 59	81 to 54
Total	**-1,469 to -978**	**-31,624 to -21,053**	**-3,744 to -2,495**	**-79 to -53**	**-370 to -246**	**-127 to -85**

Note: Totals may not add up exactly due to rounding.
The values in the table represent the emission changes based on the range of HST ticket price of 50% to 83% of airfare.
Operational emissions in this Final EIR/EIS reflect refined energy usage estimates for the HST System, which resulted in lower energy requirements and also reflected updated speed correlations between the No Build and Build 50% scenarios.

Acronyms:
CO carbon monoxide
HST high-speed train
NO_x nitrogen oxide
PM_{10} particulate matter smaller than or equal to 10 microns in diameter
$PM_{2.5}$ particulate matter smaller than or equal to 2.5 microns in diameter
SO_2 sulfur dioxide
VOC volatile organic compound

Impact AQ#10–Regional Criteria Pollutant Emissions

Motor vehicle emissions would decrease in the region as a result of the project. These reductions, however, would be partially offset by operational emissions associated with the train itself (the HST would be powered by electricity from the regional power grid), by station operations, and by HMF/MOWF operations. These emissions were analyzed for the No Project Alternative versus the HST alternatives scenario in 2035 and existing condition versus Existing Plus Project scenario in 2009.

As described in the sections below, the project would result in a regional decrease in emissions of criteria pollutants compared to the No Project (Table 3.3-11). The air quality impacts would be beneficial for all pollutants. The Existing Condition Plus Project would have a net regional emission decrease compared to existing conditions for all criteria pollutants (refer to Table 3.3-12). Emission decreases would be beneficial to the air basin and help the SJVAB meet its attainment goals for O_3 and PM. This is true even with the lower ridership associated with HST fares being at 83% of equivalent air travel (i.e., compared to the 50% scenario); the project would result in fewer, but still positive, regional benefits.

NEPA Impacts: Under NEPA, there would be a net benefit to regional air quality from operation of the HST.

CEQA Impacts: Under CEQA, operational air quality impacts would be beneficial because of the reduction of emissions in the region.

Table 3.3-11
Summary of Regional Changes in Operational Emissions in (Project versus No Project 2035) (tons/year)

Activities	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Indirect Emissions						
Changes in VMT emissions	-100.9 to -67.28	-2,539.9 to -1,693.02	-243.4 to -162.21	-13.7 to -9.14	-149.7 to -99.81	-62.1 to -41.40
Changes in airport emissions	-2.3 to -1.5	-31 to -21	-24 to -16	-2.9 to -1.9	-0.44 to -0.29	-0.43 to -0.29
Changes in power plant emissions	8.5 to 5.7	86.3 to 57.6	65.5 to 43.7	7.3 to 4.9	12.4 to 8.3	11.4 to 8.0
Direct Emissions						
Station operation	2.2	144	15.2	0.8	10.7	4.5
HMF onsite emissions	0.56	9.0	3.5	0.47	0.13	0.12
HMF offsite mobile source emissions	0.24	12	1.8	0.07	1.02	0.44
Maintenance-of-way facility offsite emissions	0.06	4	0.4	0.02	0.30	0.13
HST operations (fugitive dust)	N/A	N/A	N/A	N/A	29	4.3
Total[a]	-92 to-60	-2,315 to -1,486	-181 to -114	-7.9 to -4.8	-97 to -51	-42 to -24
SJVAPCD significance thresholds	10	N/A	10	N/A	15	15
Exceeds SJVAPCD CEQA thresholds?[b]	No	N/A	No	N/A	No	No
GC thresholds[c]	10	100	10	100	100	100
Exceeds GC thresholds?	No	No	No	No	No	No

Notes:
[a] The total includes the indirect and direct emissions.

[b] The SJVAPCD has significance thresholds for NO_x and VOC. The district currently does not have thresholds for CO or $PM_{2.5}$. Section 3.3.11 summarizes the CEQA significance for these pollutants.

[c] The GC thresholds for criteria pollutants are based on the SJVAB federal attainment status. The SJVAB is considered an extreme nonattainment area for the O_3 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.

[d] The values in the table represent the emission changes based on the range of HST ticket price of 50% to 83% of airfare.

Acronyms:
CEQA California Environmental Quality Act
CO carbon monoxide
GC general conformity
HMF heavy maintenance facility
HST high-speed train
NO_x nitrogen oxide(s)
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
SJVAPCD San Joaquin Valley Air Pollution Control District
SO_2 sulfur dioxide
VMT vehicle mile(s) traveled
VOC volatile organic compound

Table 3.3-12
Summary of Regional Changes in Operational Emissions (Existing Plus Project versus Existing Condition 2009) (tons/year)

Activities	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Indirect Emissions						
Changes in VMT emissions	-314.64 to -210.11	-7,078.12 to -4,726.64	-812.63 to -542.62	-9.03 to -6.03	-102.22 to -68.25	-44.29 to -29.57
Changes in airport emissions	-1.3 to -0.9	-18 to -12	-14 to -9	-1.7 to -1.1	-0.25 to -0.17	-0.25 to -0.17
Changes in power plant emissions	8.5 to 5.7	86.3 to 57.6	65.5 to 43.7	7.3 to 4.9	12.4 to 8.3	11.4 to 8.0
Direct Emissions						
Station operation	33.4	900	101.3	0.8	11.3	5.1
HMF onsite emissions	0.56	9.0	3.5	0.47	0.13	0.12
HMF offsite mobile source emissions	2.93	77	11.9	0.07	1.10	0.51
Maintenance-of-way facility offsite emissions	0.83	23	2.6	0.02	0.32	0.14
HST operations (fugitive dust)	N/A	N/A	N/A	N/A	29	4.3
Total[a]	-270 to-168	-6,000 to -3,672	-642 to -389	-2.04 to -0.88	-48.2 to -18.3	-23.0 to -11.6
SJVAPCD significance thresholds	10	N/A	10	N/A	15	15
Exceeds SJVAPCD CEQA thresholds?[b]	No	N/A	No	N/A	No	No
GC thresholds[c]	10	100	10	100	100	100
Exceeds GC thresholds?	No	No	No	No	No	No

Notes:
[a] The total includes the indirect and direct emissions.
[b] The SJVAPCD has significance thresholds for NO_x and VOC. The district currently does not have thresholds for CO or $PM_{2.5}$. Section 3.3.11 summarizes the CEQA significance for these pollutants.
[c] The GC thresholds for criteria pollutants are based on the SJVAB federal attainment status. The SJVAB is considered an extreme nonattainment area for the O_3 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.
[d] The values in the table represent the emission changes based on the range of HST ticket price of 50% to 83% of airfare.

Acronyms:
CEQA California Environmental Quality Act
CO carbon monoxide
GC general conformity
HMF heavy maintenance facility
HST high-speed train
NO_x nitrogen oxide(s)
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
SJVAPCD San Joaquin Valley Air Pollution Control District
SO_2 sulfur dioxide
VMT vehicle mile(s) traveled
VOC volatile organic compound

Mobile Source Emissions

The project would decrease VMT from other modes of travel (passenger cars, buses, diesel trains, and airports) and their associated emissions. The 2005 Statewide Program EIR/EIS (Authority and FRA 2005) demonstrated that the overall statewide project would reduce long-distance, city-to-city travel along freeways and state highways within the SJVAB and would reduce long-distance, city-to-city aircraft take-offs and landings within the air basin.

As a result of the HST project, some vehicles may need to travel additional distances to cross the HST track on new roadway overpasses. On average, roadway overpasses would be provided approximately every 2 miles along the track. It is estimated that the proposed project would result in no more than 1 mile of out-of-direction travel for vehicles to cross the HST tracks. The width of the roadway overpasses would accommodate both farm equipment and school buses traveling in opposite lanes. Due to this frequency of roadway overpasses, additional distances traveled by vehicles to cross the HST tracks are expected to be negligible relative to regional VMT reductions; therefore, this is not discussed further in the analysis.

At the regional level, the air quality analysis is based primarily on the regional VMT. According to the traffic analysis, all the HST alternatives would have the same regional VMT effects (Authority and FRA 2014b). Therefore, the HST alternatives would have the same regional impact on air quality.

The regional VMT for the HST alternatives would decrease by about 10% (if the price of the HST ticket were based on 50% of the cost of airfare), and by about 7% (if the ticket price were 83% of airfare) compared to the No Project Alternative (2035); the decrease would be about 10% to 7% (if the ticket price were based on 50% and 83%, respectively, of the cost of airfare) compared to existing conditions. These reductions would result in lower pollutant emissions. Therefore, according to NEPA, and under CEQA guidelines, there would be a beneficial impact on air quality from the operation of regional on-road vehicles for the HST alternatives.

Despite overall projected VMT growth between existing conditions and the No Project conditions in 2035, emission factors for 2035, which take into account improved technology designed to meet higher emission standards in the future, would be lower than existing values. Regional on-road vehicle emissions for 2035 with the HST alternatives would be much less than emissions estimated under existing conditions.

Table 3.3-11 summarizes the reduction in VMT and in criteria pollutant emissions in the regional study area between the 2035 No Project Alternative and the 2035 Project Alternative based on travel mode projections of VMT developed for the project. Table 3.3-12 summarizes the reduction in criteria pollutant emissions in the regional study area between the 2009 existing condition and the 2009 Existing Plus Project scenario based on travel mode projections of VMT developed for the project. Details of the VMT comparison of the HST alternatives to existing conditions are included in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

Emissions from Power Generating Facilities

The HST project would increase electrical requirements compared to the No Project Alternative and existing conditions. Analysts conservatively estimated the electrical demands resulting from the propulsion of the trains to be 13.17 to 8.78 gigawatt-hours per day (corresponding to the ticket price range 50% or 83% of airfare) compared to the No Project Alternative in 2035, and for the existing condition scenario in 2009. The state's electrical grid would power the HST System; therefore, no one-generation source for the electrical power requirements can be identified. Project-related emission changes from power generation were therefore predicted on a statewide level only. To derive the portion of electricity usage required by the Fresno to

Bakersfield Section of the HST, the electricity usage is assumed to be proportional to the track alignment length. The alignment distance of approximately 114 miles was divided by the total HST distance to estimate the percentages of the statewide electricity consumed by the HST alternatives. Tables 3.3-11 and 3.3-12 provide the emissions estimated for the Fresno to Bakersfield Section for the project compared to No Project in 2035 and existing condition in 2009, respectively.

The estimated emission changes shown in Table 3.3-11 and Table 3.3-12 represent the portion of the emissions generated by HST electricity usage allocated to the SJVAB based on the alignment distance within the SJVAB. The State of California requires that an increasing fraction (33% by 2020) of the electricity generated for the state's power portfolio come from renewable energy sources. As such, the emissions generated for powering the HST System are expected to be lower in the future compared to the emission estimates used in this analysis, which are based on the existing state power portfolio. In addition, the Authority has adopted a goal to purchase the HST System's power from renewable energy sources, which would further reduce the emissions compared to the existing estimates.

Airport Emissions

The HST project is projected to affect four regional airports: Fresno Yosemite International Airport, Hanford Municipal Airport, Visalia Municipal Airport, and Meadow Fields Airport. The 2005 Statewide Program EIR/EIS (Authority and FRA 2005) demonstrated that the long-distance, city-to-city aircraft take-offs and landings within the Fresno to Bakersfield Section would be reduced by about seven flights per day. The latest analysis shows that the HST project would reduce the regional long-distance, city-to-city aircraft take-offs and landings within the Fresno to Bakersfield Section by seven to five flights per day (corresponding to the ticket price range 50% or 83% of airfare) in 2035 and by four to three flights per day (corresponding to the ticket price range 50% or 83% of airfare) in 2009. This would reduce regional airport-related emissions of CO, NO_x, and VOC relative to the No Project Alternative and existing conditions. Table 3.3-11 and Table 3.3-12 summarize the estimated effects of this reduction relative to the No Project Alternative and existing conditions, respectively. Details of the aircraft comparison for both the No Project Alternative to the HST alternatives and the existing conditions to Existing Plus Project conditions are included in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

Station Emissions

Emissions associated with the operation of the Fresno, Kings/Tulare Regional, and Bakersfield HST stations are expected as a result of combustion sources used primarily for space heating, facility landscaping, backup emergency generators, energy consumption for facility lighting, minor solvent and paint usage, and employee and passenger traffic. Deliveries to the HST stations were considered negligible. URBEMIS2007 was used to estimate these emissions from each station, based on the square footage of the stations. EMFAC2011 was used to estimate emissions from mobile sources. Tables 3.3-11 and 3.3-12 summarize the annual emissions from the stations for 2035 and 2009 conditions, respectively.

HMF and MOWF Emissions

Typical activities expected at the HMF/MOWF include in-service monitoring, inspections and testing, toilet servicing, train car washing, minor and major repair of mechanical components, exterior maintenance (grinding, painting, and cutting activities), parts cleaning, heating, ventilation, and air-conditioning repair, and welding and fabrication. Because site-specific information for all activities at the HMF/MOWF is not available at this time, reasonable assumptions were made based on the type of activities that would occur at the facility, and emissions from these emissions sources, as well as from mobile sources operating onsite, were estimated based on these assumptions.

The emissions from the stationary and mobile sources at the HMF and the mobile sources at the MOWF are included in Tables 3.3-11 and 3.3-12 for the No Project Alternative compared to the HST alternatives, and the existing condition compared to the Existing Plus Project conditions, respectively.

Air dispersion modeling was performed to determine the potential impact on local air quality and is discussed in the local impacts section (AQ Impact #17). The stationary sources required for the HMF operation would require permits from the SJVAPCD unless they are exempt. Evaluation of applicable permitting requirements and the subsequent emissions estimates for permitting purposes will be performed during permitting processes and thus are not discussed in this report, but is part of project implementation and will not change any conclusions or analysis in this Revised Draft EIR/Supplemental Draft EIS. Details of the sources associated with the HMF are included in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

Maintenance of way, which includes activities associated with track and right-of-way maintenance, would involve the travel of several types of vehicles either along the track or adjacent to the track in the right-of-way. Light-duty diesel trucks would travel along the right-of-way once a month. In addition, a patrol vehicle would travel along the right-of-way for security purposes twice a month. Track recording cars used for measuring track geometry and other parameters of the rail, the track, and the alignment infrastructure, would travel on the track every other month (six times a year). These frequencies are approximations and could vary depending on the situation. The *Fresno to Bakersfield Section: Air Quality Technical Report* includes the vehicle specifications, frequencies, and emission calculations (Authority and FRA 2014).

Impact AQ#11–Greenhouse Gas Analysis During Operation

The SJVAPCD released a guidance document in December 2009 for addressing GHG impacts within the context of CEQA. For projects to have a less than significant impact on an individual and cumulative basis, the project must comply with an approved Climate Change Action Plan, demonstrate that it would not impede the state from meeting the statewide 2020 GHG emissions target, adopt the SJVAPCD's Best Performance Standards for stationary sources, or reduce or mitigate GHG emissions by 29% (SJVAPCD 2009b).

The HST project, which is included in the AB 32 scoping plan as Measure #T-9, would help the state meet the 29% reduction in GHG emissions by 2020 (CARB 2008). Overall, the project operation would have a net beneficial impact on GHG emissions. Table 3.3-13 summarizes the statewide GHG emission changes from the No Project Alternative (expressed in terms of CO_2) resulting from the operation of the project. The analysis estimated the emission changes from reduced on-road VMT, reduced intrastate plane travel, and increased electrical demand. Operation of the HST project would not have an impact of substantial intensity on the current water supply system for the area around the project, nor would it have any measurable impact on the state's water supply system as a whole. Because the project would convert water-using agricultural land to non-water-using HST track, predominantly, water use and associated GHG emissions from pumping water would decrease.

Table 3.3-13
2035 Estimated Statewide GHG Emissions (Project versus No Project) (MMT/year)

Project Element	Change in CO_2 Emissions
Roadways	-2.8 to -1.9
Airports	-1.1 to -0.7
Energy	1.4 to 1.0
Total	**-2.5 to -1.7**

Note: Totals may not add up exactly because of rounding.
The values in the table represent the ranges emission changes based on the range of HST ticket prices of 50% to 83% of airfare.

Acronyms:
CO_2 carbon dioxide
GHG greenhouse gas
MMT million metric tons

As compared to existing conditions of 2009, the HST alternatives would reduce GHG emissions due to the reduction in VMT. Table 3.3-14 presents the statewide GHG emission changes for the Existing Plus Project compared to existing conditions (expressed in CO_2). The decrease in statewide GHG emissions is a result of reduced on-road miles traveled, reduced intrastate plane travel, and increased electrical demand compared to existing conditions.

NEPA Impacts: Under NEPA, there would be a net benefit to statewide GHG emissions from operation of the HST.

CEQA Impacts: Under CEQA, operational air quality impacts would be beneficial because of the reduction of GHG emissions in the state.

Table 3.3-14
2009 Estimated Statewide GHG Emission Changes (Existing Plus Project versus Existing Conditions) (MMT/year)

Project Element	Change in CO_2 Emissions
Roadways	-3.2 to -2.1
Airports	-0.6 to -0.4
Energy	1.4 to 1.0
Total	**-2.4 to -1.6**[14]

Note: Totals may not add up exactly because of rounding.
The values in the table represent the ranges emission changes based on the range of HST ticket prices of 50% to 83% of airfare.

Acronyms:
CO_2 carbon dioxide
GHG greenhouse gas

[14] For an explanation of why GHG benefits (numerically) from HST operation are revised in this Final EIR/EIS see Appendix I to the Fresno to Bakersfield Section: Air Quality Technical Report (Authority and FRA 2014).

Details of the GHG comparison of the HST alternatives to the No Project Alternative and the Existing Plus Project compared to Existing Conditions are included in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

On-Road Vehicles

The HST alternatives would reduce statewide daily roadway VMT by more than 30 million miles because of travelers using the HST rather than driving. This equates to approximately 7,700 tons of CO_2 per day. As shown in Tables 3.3-13 and 3.3-14, the proposed project would reduce statewide GHG emissions compared to the No Project Alternative and existing conditions, respectively.

On a regional basis, under the HST alternatives, Fresno and Kern counties would have some of the larger VMT reductions in the state. As shown in Table 3.3-15, annual on-road vehicle GHG emissions would be lower than the No Project Alternative emissions for the design year for the Fresno to Bakersfield Section and would contribute to an overall reduction throughout the state. Table 3.3-16 presents the reduction in annual on-road vehicle GHG emissions for Existing Plus Project compared to existing conditions in 2009.

Table 3.3-15
2035 On-Road Vehicles Regional GHG Emissions (Project versus No Project) (MMT/year)

County	No Build Daily VMT Total Traffic	Build Daily VMT Total Traffic	Change in CO_2 Emissions with HST (MMT/year)
Fresno	27,368,000	24,364,000 to 25,366,000	-0.25 to -0.17
Kern	39,240,000	35,149,000 to 36,513,000	-0.34 to -0.23
Kings	3,137,000	2,663,000 to 2,821,000	-0.04 to -0.03
Tulare	10,112,000	9,649,000 to 9,803,000	-0.04 to -0.03
Statewide	1,254,608,000	1,223,333,000 to 1,233,758,000	-2.8 to -1.9

Note: Totals may not add up exactly because of rounding.

The values in the table represent the ranges emission changes based on the range of HST ticket prices of 50% to 83% of airfare.

Acronyms:
CO_2 carbon dioxide
GHG greenhouse gas
HST high-speed train
MMT million metric tons
VMT vehicle mile(s) traveled

Table 3.3-16
2009 On-Road Vehicles Regional GHG Emissions (Existing Plus Project versus Existing Condition) (MMT/year)

County	No Build Daily VMT Total Traffic	Build Daily VMT Total Traffic	Change in CO_2 Emissions with HST (MMT/year)
Fresno	17,311,000	15,300,000 to 15,970,000	-0.26 to -0.17
Kern	22,379,000	19,750,000 to 20,620,000	-0.34 to -0.23
Kings	2,151,000	1,800,000 to 1,920,000	-0.04 to -0.03
Tulare	6,046,000	5,770,000 to 5,860,000	-0.03 to -0.02
Statewide	948,510,000	925,860,000 to 933,420,000	-3.2 to -2.1

Note: Totals may not add up exactly because of rounding.

The values in the table represent the ranges emission changes based on the range of HST ticket prices of 50% to 83% of airfare.

Acronyms:
CO_2 carbon dioxide
GHG greenhouse gas
HST high-speed train
MMT million metric tons
VMT vehicle mile(s) traveled

Airport Operations

The HST project would reduce the number of plane flights statewide, because of travelers using the HST rather than flying. Therefore, the project would have no measurable effect or it would slightly reduce regional emissions because of the HST (compared to the No Project Alternative). The 2005 Statewide Program EIR/EIS (Authority and FRA 2005) demonstrated that the long-distance, city-to-city aircraft take-offs and landings within the Fresno to Bakersfield Section would reduce by about seven flights per day. The latest analysis shows that the HST project would reduce the regional long-distance, city-to-city aircraft take-offs and landings within the Fresno to Bakersfield Section by seven to five flights per day (corresponding to the ticket price range 50% or 83% of airfare) in 2035. This would reduce regional airport-related emissions of CO_2 emissions relative to the No Project Alternative, as shown in Table 3.3-17.

The Existing Plus Project compared to existing conditions would also reduce the long-distance, city-to-city airport take-offs and landings within the Fresno to Bakersfield Section by about four to three flights per day (corresponding to the ticket price range 50% or 83% of airfare) in 2009. This would reduce regional airport-related emissions of CO_2 emissions from Existing Plus Project compared to existing conditions, as shown in Table 3.3-18.

Table 3.3-17
2035 Project Alternatives Regional GHG Emissions (Project Versus No Project) (MMT/year)

2035 Operational Emissions CO_2	2035 CO_2 Emissions (MMT per year)
Regional Vehicle Miles Traveled[a]	-0.67 to -0.45
Regional Airport	-0.02 to -0.014
Indirect Regional Power	0.196 to 0.133
HST Station and HMF/MOWF Operations	0.098
Net Regional Difference	-0.40 to -0.23

Notes:
[a] Emission factors for CO_2 do not account for improvements in technology.
[b] The values in the table represent the ranges emission changes based on the range of HST ticket prices of 50% to 83% of airfare.

Totals may not add up exactly because of rounding.
Acronyms:
CO_2 carbon dioxide
GHG greenhouse gas
HMF heavy maintenance facility
HST high-speed train
MOWF maintenance-of-way facility

Table 3.3-18
2009 Project Alternatives Regional GHG Emissions(Existing Plus Project versus Existing Condition) (MMT/year)

2009 Operational Emissions CO_2	2009 CO_2 Emissions (MMT per year)
Regional Vehicle Miles Traveled[a]	-0.68 to -0.45
Regional Airport	-0.01 to -0.01
Indirect Regional Power	0.196 to 0.133
HST Station and HMF/MOWF Operations	0.098
Net Regional Difference	-0.40 to -0.23

Note:
[a] Emission factors for CO_2 do not account for improvements in technology.
[b] The values in the table represent the ranges emission changes based on the range of HST ticket prices of 50% to 83% of airfare.

Totals may not add up exactly because of rounding.

Acronyms:
CO_2 carbon dioxide
GHG greenhouse gas
HMF heavy maintenance facility
HST high-speed train
MOWF maintenance-of-way facility

Power Plant Operations

The HST would increase electrical requirements compared to the No Project Alternative and Existing Conditions. The statewide electrical demands from propulsion of the trains and the operation of the trains at terminal stations, in storage depots, and in maintenance facilities were conservatively estimated to be 13.17 gigawatt-hours per day under the 50% fare scenario and 8.78 gigawatt-hours per day under the 83% fare scenario. As shown in Table 3.3-13 and Table 3.3-14, the project would increase statewide indirect GHG emissions.

To derive the portion of electricity usage required by the Fresno to Bakersfield Section of the HST, the electricity usage is assumed to be proportional to the track alignment length. The alignment distance for each alternative was divided by the total HST distance of 830 miles to estimate the percentages of the statewide electricity consumed by each alternative. Table 3.3-17 summarizes the regional indirect CO_2 emissions compared to No Project Alternative for the Fresno to Bakersfield Section. Table 3.3-18 summarizes the regional indirect CO_2 emissions for the Existing Plus Project scenario compared to Existing Conditions.

The state's electrical grid would power the HST System, and therefore no one generation source for the electrical power requirements can be identified. As previously discussed, the state requires an increasing fraction (33%) of electricity generated for the state's power portfolio to come from renewable energy sources and the Authority has a policy goal to use 100% renewable energy to power the HST. As such, the GHG emissions generated for powering the HST System are expected to be lower in the future compared to emission estimates used in this analysis.

HST Stations and HMF/MOWF Operations

Operation of the HST would result in GHG emissions from the combustion of fossil fuels through onsite sources and offsite mobile sources used for employee commutes and vendor trips to the maintenance facilities and HST stations. No direct GHG emissions would result from operation of the trains on the alignment because the trains would be electrically powered. The operation of the train would only result in indirect GHG emissions from energy consumption, as discussed in the power plant analysis. In addition, indirect GHG emissions associated with water and wastewater use, and solid waste disposal would occur at the stations and HMF/MOWF.

Table 3.3-17 shows the total regional GHG emissions changes from the HST project operation when compared to the No Project Alternative in 2035. The proposed project would reduce regional GHG emissions when compared to No Project Alternative in 2035.

As previously discussed, there is no defined time for the half-life of CO_2 in the atmosphere. Therefore, it is reasonable to address GHG construction emissions by looking at the payback period. Because of the large reduction of GHG emissions during the operational phase, the GHG emissions from construction would be "paid back," meaning that the increases in construction emissions would be accounted for in less than 12 months of the HST operation under the worst-case construction-phase emission scenario. Therefore, the operation and construction of the project would result in a benefit under NEPA and in a less-than-significant GHG impact under CEQA when compared to the No Project Alternative.

Table 3.3-18 shows the total regional GHG emissions changes from the HST project operation when compared to the Existing Condition in 2009. The Existing Condition Plus Project would have a net GHG emission decrease compared to the Existing Condition.

Local Impacts

Impact AQ#12–Localized Air Quality Impacts During Train Operations

The HST project would use electric multiple unit (EMUs) trains, with the power distributed through the overhead contact system. Direct emissions from combustion of fossil fuels and associated emissions from HST trains would not occur. However, trains traveling at high velocities, such as those associated with the proposed HST, create sideways turbulence and rear wake, which resuspend particulates from the surface surrounding the track, resulting in fugitive dust emissions. Using a friction velocity of 0.19 meter/second (m/s) for disturbed desert soil that could lead to resuspended soils, a HST passing at 220 mph could resuspend soil particles out to approximately 10 feet from the train (Watson 1996). These resuspended soil particles within 10 feet from the train would be the same for the 2035 No Project Alternative compared to the HST alternatives and the 2009 existing condition compared to the Existing Plus Project scenario (Tables 3.3-11 and 3.3-12).

A detailed analysis of wind-induced fugitive dust emissions due to HST travel is discussed in Appendix 3.3-A, Potential Impact from Induced Winds.

NEPA Impacts: Based on this analysis, fugitive dust emissions due to HST travel are not expected to result in substantial amount of dust to cause health concerns in the project area and the effect would be of negligible intensity under NEPA.

CEQA Impacts: Since fugitive dust would be significantly reduced beyond the right-of-way, the health concerns impacts from dust would be less than significant under CEQA

In addition, Fresno, Kings, Tulare and Kern counties, as well as the San Joaquin Valley region in general, have higher rates of asthma in adults and children. Because the HST is electrically powered, it is not expected to generate direct combustion emissions along its route that cause substantial health concerns, such as asthma or other respiratory diseases, in the project area. There would be no impact under CEQA and no effect under NEPA.

Impact AQ#13–Localized Mobile Source Air Toxics Analysis

This MSAT analysis is a qualitative comparison between HST alternatives. An MSAT impact would occur if an HST alternative has a higher potential for MSAT emissions than the No Project Alternative or Existing Conditions. The qualitative MSAT analysis presented in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014) indicated that the impacts from MSAT emissions are similar for all the HST alternatives.

NEPA Impacts: Because there would be no increase in MSAT as a result of the HST project (and may actually be a reduction), the HST alternatives would have an impact of negligible intensity on MSAT under NEPA.

CEQA Impacts: Since the MSAT emissions would not increase due to the Project compared to no Project or Existing Conditions, the MSAT impact would be less than significant under CEQA.

No Project Alternative

MSAT emissions from the No Project Alternative in 2035 would likely be lower than existing conditions as a result of the U.S. EPA's national control programs that would reduce annual MSAT emissions by 83% from 2010 to 2050 (FHWA 2012). Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the U.S. EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area would likely be lower in the future when compared to existing conditions.

HST Alternatives

The HST project would provide another option for intercity travel in California that does not emit air pollutants, including MSATs, into the local atmosphere. The Fresno to Bakersfield Section of the HST would decrease overall VMTs from passenger vehicles compared to the No Project Alternative and the Existing Conditions, thus decreasing MSATs associated with passenger vehicles. MSATs would also decrease because of a reduction in travel modes involving diesel and aviation fuel (buses, diesel Amtrak trains, and airplanes).

The HST alternatives would reduce traffic congestion and increase vehicle speed as more people use the HST instead of driving when compared to the No Project Alternative. According to the U.S. EPA's MOVES2010b model (U.S. EPA 2012), emissions of priority MSATs decrease as speed increases (U.S. EPA 2009b). Therefore, the HST alternatives would decrease MSAT emissions compared to the No Project Alternative. HST alternatives would reduce regional VMT by 10% to 7% from existing conditions based on the ticket price of 50% to 83% airfare; therefore, MSAT emissions from the HST alternatives would similarly decrease MSAT emissions as compared to existing conditions. The project will have a beneficial impact on regional MSAT emissions.

The operation of the EMU used by HST alternatives would not have combustion emissions, so no toxic emissions would be expected from operation of the HSTs. The potential MSAT emission sources directly related to the project operation would be from vehicles used at maintenance facilities and passenger vehicles traveling to these facilities, and the passenger vehicles travelling to and from the HST stations. Buses serving the stations would be mostly fuelled by natural gas and would not generate a substantial amount of diesel PM emissions. Localized increases in MSAT emissions may occur near the HST stations because of passenger commutes and near the HMF, where diesel vehicles would be used.

This evaluation includes a basic analysis of the likely MSAT emission impacts of the HST alternatives. The lack of a national consensus on an acceptable level of risk and other air quality criteria assumed to protect the public health and welfare, as well as the unreliability of available technical tools, does not allow predicting, with confidence, the project-specific health impacts of the emission changes associated with the alternatives (FHWA 2009). The outcome of such an assessment would be influenced more by the uncertainty introduced into the process by the assumptions made rather than from insight into the actual health impacts from MSAT exposure directly attributable to the HST alternatives (FHWA 2009). As reductions in MSAT emissions are predicted with the HST alternatives, further MSAT analysis would not be suggested even if it were practicable to accomplish.

Impact AQ#14–Microscale CO Impact Analysis

The 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 alignment except for an intersection in Corcoran, which was specifically addressed due to comments received. Instead, the analysis focused on locations near the HST stations and the HMF and on locations that would experience a change in roadway structure (such as closure of existing crossings along the alignment if closure would result in traffic congestion) or traffic conditions. These areas of potential elevated CO concentrations are referred to as hot spots.

CO concentrations were modeled at worst-case intersections near the proposed Fresno station, the proposed Kings/Tulare Regional station, the proposed Bakersfield station,[15] the proposed Fresno–Fresno Works, the proposed Kern Council of Government–Wasco HMF sites, and a degraded intersection in Corcoran. The *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014) lists the intersections chosen for analysis, based on peak-hour volumes, delay times, and level of service (LOS). Receptors were placed at worst-case locations adjacent to the intersections to calculate the maximum 1-hour and 8-hour CO concentrations.

[15] Additional intersections were selected for the proposed Kings/Tulare Regional Station and Bakersfield Station because of the distance between the station options and localized traffic patterns.

The final traffic analysis resulted in changes to the number of trips associated with stations. This resulted in changes to the estimated peak hour volumes, delay times, and LOS at some intersections. These changes were evaluated by remodeling CO concentrations at the intersection that previously had the highest modeled CO concentrations: Oak Street/Truxtun Avenue in Bakersfield, which had concentrations 2 times below the thresholds. The remodeled Oak Street/Truxtun Avenue results are still 2 times below the thresholds, which demonstrates that the changes in the traffic analysis and the updated EMFAC2011 emission factors would result in CO concentrations that would remain below the CAAQS and NAAQS for all intersections. Therefore, intersections shown in Tables 3.3-19 and 3.3-20 do not reflect revised traffic analysis values or updated EMFAC2011 emission factors, with the exception of the remodeled Oak Street/Truxtun Avenue intersection in Bakersfield.

Furthermore, many air districts in California have developed screening thresholds for CO hot spots based on air dispersion modeling with recent emission factors which have significantly decreased in the past three decades due to vehicle emission standards. For example, BAAQMD developed a screening threshold of 44,000 vehicles per hour unless intersections would have vertical and/or horizontal mixing substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway) in which case a threshold of 24,000 vehicles per hour is used (BAAQMD 2010). Similarly, the Sacramento Metropolitan AQMD screening threshold is 31,600 vehicles per hour for intersections that do not have limited vertical and/or horizontal mixing (SMAQMD 2013). This is several times higher than the vehicles per hour for the worst intersections analyzed.

Project versus No Project

Intersections modeled in this analysis around the Fresno, Kings/Tulare Regional, and Bakersfield stations are signalized because traffic volumes at the unsignalized intersections in the study area are less than at the signalized intersections. For intersections around the Fresno and Wasco HMFs and the Corcoran area, there were only unsignalized intersections. Figure 3.3-4 shows the intersections included in the CO hot-spot analysis for the Project versus No Project condition. Table 3.3-19 summarizes the modeled CO concentrations at the intersections around the proposed Fresno, Kings/Tulare Regional, and Bakersfield stations and the Fresno–Fresno Works and Kern Council of Governments–Wasco HMF sites, as well as an intersection in the Corcoran area.

The results presented in Table 3.3-19 include the HST alternatives as well as the No Project Alternative growth and other transportation improvement projects in the region, as described in Chapter 2, Alternatives. Results in Table 3.3-19 include background concentrations of CO. As shown in the tables, CO concentrations at affected intersections in 2035 for both the No Project and HST alternatives are expected to be lower than existing conditions in 2009. HST alternatives would have a slightly higher CO concentration at intersections than the No Project Alternative in 2035 due to the additional traffic caused by the station or HMF operation. Predicted CO concentrations for all modeled intersections are below NAAQS and CAAQS and are not expected to cause violations of CO NAAQS during project operation.

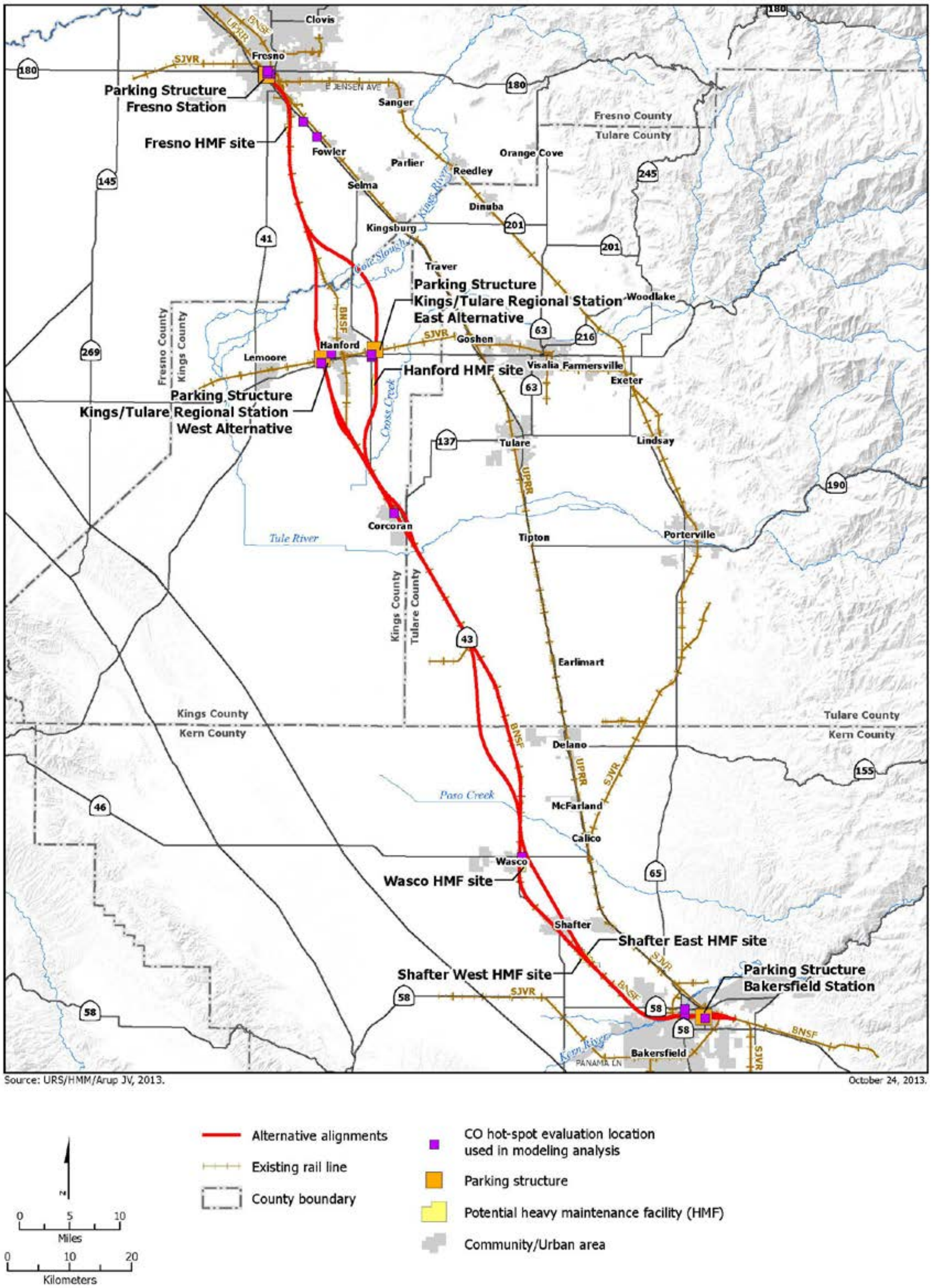

Figure 3.3-4
CO hot-spot evaluation intersection locations

Table 3.3-19
Maximum Modeled CO Concentrations at Intersections near the Fresno, Kings/Tulare Regional, and Bakersfield HST Stations and HMF Sites

Intersection	Existing Conditions[a]		Existing Plus Project[a]		2035 No Project/No Action[a]		2035 Project[a]	
	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]
Fresno HST Station Area[a]								
Van Ness St / Inyo St	3.5	2.6	3.5	2.6	3.3	2.5	3.3	2.5
H St / Tulare St	3.5	2.6	3.6	2.7	3.4	2.6	3.4	2.6
Van Ness Ave / Fresno St	3.7	2.8	3.8	2.8	3.4	2.6	3.5	2.6
Tulare St / F St	3.2	2.4	3.2	2.4	3.2	2.4	3.2	2.4
Fresno St / F St	3.4	2.6	3.5	2.6	3.1	2.3	3.2	2.4
Kings/Tulare Regional HST Station Area (East and West Alternatives)[b]								
8th Ave / SR 99 WB Ramps	3.7	2.3	3.7	2.3	3.5	2.1	3.5	2.1
8th Ave / SR 198 EB Ramps	3.7	2.3	3.7	2.3	3.5	2.1	3.5	2.1
SR 43 / Lacey Blvd	3.8	2.4	3.8	2.4	3.5	2.1	3.5	2.1
12th Ave / Lacey Blvd	4.3	3.2	4.3	3.2	3.5	2.6	3.5	2.6
N 11th Ave / SR 198 EB Off-Ramp / E 3rd St	4.1	3.0	4.1	3.0	3.4	2.6	3.4	2.6
S 10th Ave / E 3rd St	3.7	2.8	3.7	2.8	3.4	2.6	3.4	2.6

Table 3.3-19

Maximum Modeled CO Concentrations at Intersections near the Fresno, Kings/Tulare Regional, and Bakersfield HST Stations and HMF Sites

Intersection	Existing Conditions[a]		Existing Plus Project[a]		2035 No Project/No Action[a]		2035 Project[a]	
	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]
Bakersfield HST Station Area[c]								
Union Ave / California Ave	4.2	3.1	4.2	3.1	3.3	2.5	3.3	2.5
Oak St / Truxtun Ave	5.1	3.7	5.1	3.7	3.5	2.6	3.5	2.6
Oak St / Truxtun Ave (with revised traffic data and EMFAC2011 emission factors)	6.2	4.5	6.2	4.5	3.8	2.8	3.8	2.8
Oak St / SR 178	4.8	3.5	4.8	3.5	3.5	2.6	3.5	2.6
Oak St / 24th St	4.8	3.5	4.8	3.5	3.6	2.7	3.7	2.8
Fresno–Fresno Works HMF Area								
SR 99 Off-Ramp / E. American Ave	3.6	2.21	3.7	2.28	3.5	2.14	3.5	2.14
SR 99 SB Off-Ramp / Clayton Ave	3.5	2.14	3.6	2.21	3.5	2.14	3.5	2.14

Table 3.3-19
Maximum Modeled CO Concentrations at Intersections near the Fresno, Kings/Tulare Regional, and Bakersfield HST Stations and HMF Sites

Intersection	Existing Conditions[a]		Existing Plus Project[a]		2035 No Project / No Action[a]		2035 Project[a]	
	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[e]
Kern Council of Governments–Wasco HMF Area								
SR 43–Wasco Ave / SR 46	2.9	2.20	2.9	2.20	2.8	2.13	2.8	2.13
Wasco Ave J St / 6th St	2.8	2.13 2.8		2.13	2.8	2.13	2.8	2.13
Corcoran Area[d]								
Whitley Ave / Pickerell Ave	3.6	2.21	3.70	2.28	3.6	2.21	3.6	2.21
CAAQS	20	9	20	9	20	9	20	9
NAAQS	35	9	35	9	35	9	35	9

Notes:
[a] Concentrations include a predicted 1-hour background concentration of 3.1 ppm and an 8-hour background concentration of 2.34 ppm, representing the second-highest measured CO concentrations in years 2007–2009 for Fresno HST station.
[b] Concentrations include a predicted 1-hour background concentration of 3.5 ppm and an 8-hour background concentration of 2.14 ppm, representing the second-highest measured CO concentrations in years 2007–2009 for Kings/Tulare HST station using Fresno-Drummond Station since there is no station in Hanford area.
[c] Concentrations include a predicted 1-hour background concentration of 2.8 ppm and an 8-hour background concentration of 2.13 ppm, representing the second-highest measured CO concentrations in years 2007–2009 for Bakersfield HST station.
[d] Concentrations include a predicted 1-hour background concentration of 3.5 ppm and an 8-hour background concentration of 2.14 ppm, representing the second-highest measured CO concentrations in years 2007–2009 for Corcoran using the Fresno-Drummond Station since there is no station in Corcoran.
[e] 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 (Caltrans 1997).

Acronyms:

CAAQS	California Ambient Air Quality Standards
CO	carbon monoxide
EB	eastbound
HMF	heavy maintenance facility
HST	high-speed train
Max	maximum
NAAQS	National Ambient Air Quality Standards
ppm	part(s) per million
SB	southbound
SJVAB	San Joaquin Valley Air Basin
SR	state route
WB	westbound

Table 3.3-20
Maximum Modeled 2035 CO Concentrations at Fresno, Kings/Tulare Regional, and Bakersfield Parking Facilities

Park-and-Ride Station	1-Hour Concentration (ppm)		8-Hour Concentration (ppm)	
	Maximum Modeled Increase[a]	Total Concentration[b]	Maximum Modeled Increase[a]	Total Concentration[b]
Fresno Station–Mariposa Alternative[c]	0.5	3.6	0.35	2.69
Fresno Station–Kern Alternative[c]	0.6	3.7	0.42	2.76
Kings/Tulare Regional Station–East[d]	0.2	3.7	0.14	2.28
Kings/Tulare Regional Station–West (at-grade)[d]	0.2	3.3	0.14	2.48
Kings/Tulare Regional Station–West (below-grade)[d]	0.0	3.1	0.0	2.34
Bakersfield Station–North Alternative[e]	0.5	3.3	0.35	2.48
Bakersfield Station–South Alternative[e]	0.6	3.4	0.42	2.55
Bakersfield Station–Hybrid Alternative	0.2	3.0	0.14	2.27

Notes:
[a] 8-hour CO concentrations at the parking garages were compared to the federal and state 8-hour CO standard of 9 ppm. 1-hour CO concentrations at the parking garages were compared to the federal 1-hour CO standard of 35 ppm and to the state 1-hour CO standard of 20 ppm. There were no exceedances of any standards due to CO concentrations at parking garages.

[b] 8-hour CO concentrations determined by multiplying the 1-hour modeled concentrations by a persistence factor of 0.7, and adding the 8-hour background concentration.

[c] Background CO data taken from Fresno First Street monitoring station for both Fresno station parking structures (Fresno Station–Mariposa Alternative and Fresno Station–Kern Alternative) were found to be 3.10 ppm for 1-hour CO concentration and 2.34 ppm for 8-hour CO concentration.

[d] Background CO data taken from Fresno-Drummond monitoring station for the Kings/Tulare Regional Station parking structures were found to be 3.50 ppm for 1-hour CO concentration and 2.14 ppm for 8-hour CO concentration.

[e] Background CO data taken from Bakersfield Golden State Highway monitoring station for all the Bakersfield station parking structures (Bakersfield Station–North Alternative and Bakersfield Station–South Alternative) were found to be 2.80 ppm for 1-hour CO concentration and 2.13 ppm for 8-hour CO concentration.

Acronyms:
CO carbon monoxide
ppm part(s) per million

NEPA Impacts: Since the modeled CO concentrations would be below NAAQS for the worst-case intersections near the proposed Fresno station, the proposed Kings/Tulare Regional station, the proposed Bakersfield station, the proposed Wasco HMF site, the proposed Fresno HMF site, and the Corcoran area, these impacts would be of negligible intensity under NEPA.

CEQA Impacts: Since the modeled CO concentrations would be below CAAQS for the worst-case intersections near the proposed Fresno station, the proposed Kings/Tulare Regional station, the proposed Bakersfield station, the proposed Wasco HMF site, the proposed Fresno HMF site, and the Corcoran area, these impacts would be less than significant under CEQA.

In addition to evaluating the potential CO hot spots associated with changes in traffic near intersections, maximum 1-hour and 8-hour CO concentrations were estimated near HST station parking structures. Figure 3.3-4 shows the approximate locations of the HST station parking structures. To be conservative, it was assumed that all the parking structures were at full capacity[16] and would have vehicles departing within the same hour each day. To be conservative, the 8-hour CO impacts were based on this 1-hour scenario. Table 3.3-20 summarized the modeled CO concentrations at the Fresno, Kings/Tulare Regional, and Bakersfield parking structures, respectively, including ambient background. To be conservative, the 8-hour CO impacts were based on this 1-hour scenario. For this analysis, only vehicles within the parking structures were evaluated as contributing to CO hot spots. Vehicle travel outside of the parking structure is evaluated in the CO hot-spot analysis for the intersections, and therefore is not included in the parking structure analysis.

As shown in Tables 3.3-19 and 3.3-20, the intersections and parking structures evaluated would have CO concentrations lower than the NAAQS and the CAAQS.

NEPA Impacts: Since the modeled CO concentrations would be below NAAQS for the parking structures at the Fresno station, the proposed Kings/Tulare Regional station, the proposed Bakersfield station, these impacts would be of negligible intensity under NEPA.

CEQA Impacts: Since the modeled CO concentrations would be below CAAQS for the parking structures at the proposed Fresno station, the proposed Kings/Tulare Regional station, the proposed Bakersfield station, these impacts would less than significant under CEQA.

Existing Condition Plus Project versus Existing Condition

In addition to this analysis for the Project versus No Project, a comparison between the HST alternatives, not accounting for natural growth and other transportation improvement projects in the region (i.e., Existing Condition Plus Project), relative to existing conditions was performed. According to this analysis, the project would not cause a violation of CO NAAQS or CAAQS at affected intersections. Details of the CO hot-spot analysis of the HST alternatives compared to existing conditions are included in the *Fresno to Bakersfield Section*: *Air Quality Technical Report* (Authority and FRA 2014).

Intersections included in the CO hot-spot modeling were selected based on comparisons of LOS, traffic volumes, and delay time under existing conditions and Existing Conditions Plus Project at the intersections. Intersections for existing conditions and Existing Conditions Plus Project were the same as those intersections analyzed for No Project and HST alternatives, as shown in Figure 3.3-4. Table 3.3-19 summarizes the modeled CO concentrations for the selected intersections. The CO hot-spot analysis results presented in the tables include the modeled concentrations plus the background concentrations. The background CO concentrations are from monitored data representing existing conditions (2007–2009).

As shown in Table 3.3-19, the intersections evaluated would have CO concentrations lower than the NAAQS and CAAQS for the existing conditions and Existing Conditions Plus Project. CO impacts at parking structures are assumed to be the same as the No Project versus HST alternatives analysis shown in Table 3.3-20 because traffic patterns in the parking structure

[16] For the Fresno-Mariposa Station option, a total of 1,050 parking spaces; for the Kings/ Tulare Regional–East option, a total of 1,601 parking spaces; for the Kings/Tulare Regional–West option (at-grade) a total of 1,750 parking spaces; for the Kings/Tulare Regional–West option (below-grade), a total of 1,680 parking spaces; for the Bakersfield-North option, a total of 4,500 parking spaces; for the Bakersfield-South option, a total of 4,500 parking spaces; and for the Bakersfield-Hybrid option, a total of 4,960 parking spaces.

described for the HST alternatives are not expected to change in the Existing Plus Project versus existing condition analysis.

NEPA Impacts: Since the modeled CO concentrations from the Existing Condition Plus Project would be below NAAQS for the worst-case intersections near the proposed Fresno station, the proposed Kings/Tulare Regional station, the proposed Bakersfield station, the proposed Wasco HMF site, the proposed Fresno HMF site, and the Corcoran area, these impacts would be of negligible intensity under NEPA.

CEQA Impacts: Since the modeled CO concentrations from the Existing Condition Plus Project would be below CAAQS for the worst-case intersections near the proposed Fresno station, the proposed Kings/Tulare Regional station, the proposed Bakersfield station, the proposed Wasco HMF site, the proposed Fresno HMF site, and the Corcoran area, these impacts would be less than significant under CEQA.

Impact AQ#15–Localized PM_{10}/$PM_{2.5}$ Hot-Spot Impact Analysis

The project would provide regional benefits in reducing the area VMT by approximately 10% to 7% compared to the No Project Alternative, and 10% to 2% compared to existing conditions based on the ticket price of 50% to 83% airfare, which would reduce PM_{10} and $PM_{2.5}$ from regional vehicle travel proportionally. For purposes of identifying and evaluating potential impacts under NEPA and CEQA, a PM hot-spot analysis was prepared because the area where the project would be located is designated nonattainment for $PM_{2.5}$ and maintenance for PM_{10}. In December 2010, U.S. EPA released its *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (U.S. EPA 2010c), which was used for the analysis. This project is subject to the general conformity rule, but will use this analytical structure associated with the transportation conformity rule. Although this analytical structure will be used for this project, additional analysis of associated activities required to comply with transportation conformity will be carried out 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 proposed project is not a new highway project, nor would it expand an existing highway beyond its current capacity. The HST vehicles would be electrically powered. While it 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 stations would be passenger vehicles, which are typically not diesel-powered, with the exception of delivery truck trips to support station activities. Truck trips would be minimal and changes in diesel emissions would be negligible. Furthermore, the HST project would improve regional traffic conditions by reducing traffic congestion, increasing vehicle speeds, and reducing regional VMT within the project vicinity.

- 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 HST project would not change the existing traffic mix at signalized intersections. Although the maintenance facilities would use diesel vehicles, no signalized intersections were identified with LOS D, E, or F for these locations (Authority and FRA 2014). In some cases, the LOS of intersections near the HST stations would change from LOS E under the No Project Alternative to LOS F under the HST 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. By

2016, transit buses in Fresno would be natural-gas fueled (Shenson 2010, personal communication). Buses in Bakersfield operated by GET (Golden Empire Transit) currently operate compressed-natural-gas buses (GET 2010) and would likely continue to operate these buses in the future. Therefore, the HST 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. Although the proposed project would include passenger rail terminals, there would not be a significant number of diesel vehicles congregating at a single location. The HST vehicles would be electrically powered; most vehicle trips entering and leaving the stations would be passenger vehicles, which are not typically diesel-powered; the transit buses used at the stations would be mostly natural-gas–fueled—with approximately 30 trips per day, including 4 trips during each AM or PM peak hour. The maintenance facilities may have diesel vehicles, such as in-yard diesel locomotives, to pull in or pull out the EMUs. 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 HST stations and maintenance facilities are located are not identified as sites of violation or possible violation in the U.S. EPA-approved 2003 SIP, the U.S. EPA-approved PM_{10} Maintenance Plan, or the adopted 2008 $PM_{2.5}$ Plan for San Joaquin Valley (SJVAPCD 2008, 2007b).

For the reasons above, the proposed HST project was determined not to be a project of air quality concern, as defined by 40 C.F.R. Part 93.123(b)(1), and would not likely cause violation of PM_{10}/$PM_{2.5}$ NAAQS during its operation. Therefore, quantitative $PM_{2.5}$ and PM_{10} hot-spot evaluations are not required. CAA 40 C.F.R. Part 93.116 requirements are thus met without a quantitative hot-spot analysis.

NEPA Impacts: Based on the criteria listed above, the HST project is unlikely to cause any localized adverse impact on air quality for PM_{10}/$PM_{2.5}$ NAAQS. Therefore, the PM_{10} hot-spot impact on air quality has negligible intensity under NEPA.

CEQA Impacts: The HST project is unlikely to cause adverse impact on air quality for PM_{10}/$PM_{2.5}$ CAAQS. Therefore, the PM_{10} hot-spot impact on air quality would be less than significant under CEQA.

Impact AQ#16–Localized Analysis of HMF Impacts

Because the preferred HMF location has not been identified and the design has not been finalized, a detailed modeling analysis was conducted for a prototypical facility using a conceptual design and anticipated HMF/MOWF activities. Details of the HMF/MOWF operational impact analysis are presented in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

Refined air quality and health risk assessments will be conducted once the options for the HMF facility have been narrowed and a more specific site design can be developed. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1997) requires stationary sources to report the types and quantities of certain substances routinely released into the air. Under this program, facilities evaluate their prioritization and determine if a detailed health risk assessment needs to be performed. In the San Joaquin Valley Air Basin, this is required for facilities with a cancer risk greater than 10 in a million or a non-cancer hazard index greater than 1. This Final EIR/EIS analysis is conservative in assessing impacts and developing mitigation measures (e.g., ensuring facilities are 1,300 feet from sensitive receptors). A health risk assessment performed at the time a site is chosen and development of a precise design may result in lower impacts but not higher impacts. While this Final EIR/EIS contains a thorough analysis of the potential impacts of the alternative HMF sites in the project area, no HMF site selection will be made at this time.

Modeling Results: In general, emissions of criteria pollutants from the HMF operations would not cause exceedances of NO_2, NAAQS, CAAQS, or federal and state health guidelines at the facility boundary of the HMF. PM_{10} and $PM_{2.5}$ concentration increases due to the HMF operation would be minimal and would not exceed the SJVAPCD-recommended significant impact levels. The NAAQS and CAAQS for NO_2 would not be exceeded. CO analysis for the worst-case intersections near the HMF facility demonstrates that no CO NAAQS or CAAQS violations are expected from nearby traffic volume increase.

Health risk analysis indicated that the receptors located within approximately 1,300 feet of the HMF facility may be exposed to cancer risks greater than 10 in a million from TACs. Cancer risks at a distance of approximately more than 1,300 feet from the facility are estimated to be below 10 in a million. The worst-case acute and chronic hazard indices are both estimated to be less than 1 at any locations outside the HMF boundary.

NEPA Impacts: Only one HMF site will be selected for implementation, and such selection will be made as part of a future EIR/EIS. Based on the prototypical HMF analysis, PM_{10} and $PM_{2.5}$ emissions from HMF and the subsequent ground-level concentration increases are minimal and would not exceed the SJVAPCD-recommended significant impact levels. All the HMF sites would have impacts of negligible intensity for PM_{10} and NO_x under NEPA because the HMF emissions would not cause or substantially contribute to exceedances of the PM_{10} or NO_2 NAAQS.

All five HMF sites, the Fresno Works–Fresno, Kings County–Hanford, Kern Council of Governments–Wasco, Kern Council of Governments–Shafter East, and Kern Council of Governments–Shafter West HMF sites, may have sensitive receptors located in areas where the cancer risk exceeds 10 in a million. Therefore, operation of HMF at these five sites can potentially cause impacts of moderate intensity under NEPA.

CEQA Impacts: The incremental increase in PM_{10} and $PM_{2.5}$ concentrations would not exceed the SJVAPCD-recommended significant impact levels, and impacts under CEQA would be less than significant. All the HMF sites would have a less-than-significant impact for NO_2 under CEQA because the HMF would not cause an exceedance of the NO_2 CAAQS.

Due to the proximity of sensitive receptors to all the HMF sites, the HMF operations at these sites may have the potential to expose sensitive receptors to higher concentrations of TACs from both stationary sources and mobile sources, and this may result in higher health risks, especially cancer risks, which exceed CEQA health thresholds. Therefore, all HMF site operations could potentially cause significant health impacts under CEQA.

The health risk analysis is conservative because all stationary sources at the HMF site would be required to go through the SJVAPCD permitting process and compliance with AB 2588 to ensure that the risk due to project operation is below the SJVAPCD health risk significance thresholds. Implementation of mitigation measure AQ-MM#6 and of required regulatory permitting requirements will ensure that the nearest sensitive receptor has health impacts less than the applicable threshold.

The analysis in the Revised DEIR/Supplemental DEIS previously concluded that localized PM10 and PM2.5 impacts would be significant because current background concentrations in the SJVAPCD already exceed the ambient air quality standards, and any minimal increases in concentration would exacerbate these exceedances. This effectively set a significance threshold of zero, which was extremely conservative. This conservative zero threshold was used because no other threshold was known at the time. The Revised DEIR/Supplemental DEIS included

Mitigation Measure AQ-MM#7 to reduce these impacts to less than significant levels. Since the Revised DEIR/Supplemental DEIS, the significance thresholds recommended by SJVAPCD became know (Villavazo 2014, personal communication). Accordingly, in this FEIR/EIS, the incremental increases in PM10 and PM 2.5 concentrations from project emissions were compared to the SJVAPCD recommended significant impact levels (see Section 3.3.4.11). Because the incremental increase in PM10 and PM2.5 concentrations would not exceed these levels, localized PM10 and PM2.5 impacts would be less than significant. Mitigation Measure AQ-MM#7 is therefore no longer applicable.

Impact AQ#17–Localized Air Quality Impacts to Sensitive Receptors Including Schools

As described in the section above, annual MSAT emissions impacts to sensitive receptors at schools around the stations would be reduced by 83% from 2010 to 2050 due to recent regulatory requirements. Emergency generators will be located at the HST stations and emit DPM which is a TAC. Emergency generators are subject to SJVAPCD permitting requirements, which ensure that stationary sources do not exceed SJVAPCD's thresholds of significance (SJVAPCD 2012a). Consistent with SJVAPCD CEQA guidance, a health risk assessment was not conducted, as this will be done at the time of permitting with permit conditions provided to ensure that sensitive receptors, including schools, are not exposed to concentrations of TACs exceeding significance thresholds.

NEPA Impacts: Therefore, by the time the station is operational in 2020, the HST alternatives would have an impact of negligible intensity on MSAT under NEPA for school in the vicinity.

CEQA Impacts: By the time the station is operational in 2020, the HST alternatives would be less than significant under CEQA for schools in the vicinity.

In addition, there would be no CO or PM hot spots around the stations and HMFs as described in sections above. Impacts from CO or PM emissions from vehicles would be less than significant under CEQA and of negligible intensity under NEPA.

NEPA Impacts: Since the modeled CO concentrations would be below NAAQS for the worst-case intersections near the proposed Fresno station, the proposed Kings/Tulare Regional station, the proposed Bakersfield station, these impacts on schools in the vicinity would be of negligible intensity under NEPA.

CEQA Impacts: Since the modeled CO concentrations would be below CAAQS for the worst-case intersections near the proposed Fresno station, the proposed Kings/Tulare Regional station, the proposed Bakersfield station, these impacts on schools in the vicinity would less than significant under CEQA.

The health risk assessment conducted for prototypical HMF facilities indicates that receptors at schools more than 1,300 feet from the HMF would not be significantly impacted by air toxics emissions from the facility. There are no schools located within 1,300 feet of the HMF sites. Health risks from the HMF facility for other sensitive receptors are addressed in the previous impact.

NEPA Impacts: Therefore the localized health risk impacts from HMF/MOWF site operations to sensitive receptors at schools would be of negligible intensity under NEPA.

CEQA Impacts: The localized health risk impacts from HMF/MOWF site operations to sensitive receptors at schools would be less than significant under CEQA.

Impact AQ#18–Odor Impacts from Operations

General Operations

No potentially odorous emissions would be associated with the train operation because the high-speed trains would be powered using electricity from the regional power grid. However, 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 might potentially be odorous sources to sensitive receptors in areas where the stations are located.

Nearby sensitive land uses would be exposed daily to potential odors from sources, such as natural-gas combustion for space and water heating, landscaping equipment emissions, and minor solvent and paint use, when the stations are operational. The sensitive receptors would be exposed to some odors, but the exposure to odors is not as severe as it would be from other industrial activities that take place near stations under the No Project Alternative.

NEPA Impacts: The project would likely not create objectionable odors; therefore, there would be no impact under NEPA.

CEQA Impacts: The project would likely not create objectionable odors, therefore, a less-than-significant impact would occur under CEQA.

HMF Operations

HMF operations would be a source of potentially odorous emissions from paints, solvents, and a small wastewater treatment plant. Except for the Fresno Works–Fresno and Kern Council of Governments–Wasco HMF site options, the other three HMF site options are far from urbanized areas with residential and business land uses and are not expected to cause odor nuisance to the nearby public.

In addition, the HMF would be permitted through the SJVAPCD, with controls on operations generating odorous emissions to meet the public-nuisance requirements. There would be operating conditions and controls on the potential sources of odors, such as the spray booth and the wastewater treatment plant at the HMF.

NEPA Impacts: The associated odor impacts from the HMF would be of negligible intensity under NEPA, since the HMF would be permitted with controls on operational odors per SJVAPCD regulations.

CEQA Impacts: The associated odor impacts from the HMF would be less than significant under CEQA, since the HMF would be permitted with controls on operational odors per SJVAPCD regulations.

Impact AQ#19–Compliance with Air Quality Plans

During operation, the project would reduce the amount of vehicle miles traveled 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 would be consistent with the SJVAPCD 8-hour Ozone Plan (SJVAPCD 2007a), the 2004 Extreme Ozone 1-

hour Attainment Demonstration Plan[17] (SJVAPCD 2004), the 2007 PM_{10} Maintenance Plan, the 2008 $PM_{2.5}$ Plan (SJVAPCD 2008) and the RTPs for Fresno, Kings, Kern, and Tulare counties (CFCG 2010a; KCAG 2010a; Kern COG 2010a; TCAG 2010). Therefore, operation of the project would not conflict with or obstruct implementation of applicable air quality plans.

NEPA Impacts: The VOC, NO_x, PM_{10}, and $PM_{2.5}$ emissions would not exceed the SJVAPCD thresholds, and would therefore not conflict with or impede the implementation of the respective air quality plans for attainment of federal ambient air quality standards. The effect would be of negligible intensity for VOC, NO_x, PM_{10}, and $PM_{2.5}$ under NEPA.

CEQA Impacts: VOC, NO_x, PM_{10}, and $PM_{2.5}$ emissions would be less than applicable significance thresholds, and therefore would not impede implementation of the 8-hour SJVAPCD 2007 Ozone Plan, the 2004 Extreme Ozone 1-hour Attainment Demonstration Plan,[18] the 2007 PM_{10} Maintenance Plan, and 2008 $PM_{2.5}$ Plan. Therefore, this impact would be less than significant under CEQA.

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 U.S. EPA's Conformity Rule. The two types of federal conformity are general conformity, which applies to the HST project 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.

3.3.7.1 General Conformity

To determine whether projects are subject to the GC determination requirements, U.S. EPA has established GC applicability 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 area-wide basis) are less than these 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 values, compliance with the GC Rule must be demonstrated.

The applicable project area is in an area designated as extreme nonattainment for the 8-hour O_3 standard, nonattainment for the $PM_{2.5}$ standard and maintenance for the PM_{10} and CO standards. The GC threshold values for this area, according to 40 C.F.R. Part 93, are 10 tons per year for VOC, 10 tons per year for NO_x, and 100 tons per year for SO_2, $PM_{2.5}$, PM_{10}, and CO.

Because the regional emissions for the applicable pollutants are lower under the operational phase of the HST alternatives 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 GC Rule is applicable.

[17] The 1-hour ozone standard was revoked by the U.S. EPA, effective June 15, 2005, for areas including the SJVAB. However, the U.S. EPA still approved the 2004 Extreme Ozone Attainment Demonstration Plan for 1-hour ozone on March 8, 2010 (SJVAPCD 2010).

[18] The 1-hour ozone standard was revoked by the U.S. EPA, effective June 15, 2005, for areas including the SJVAB. However, the U.S. EPA still approved the 2004 Extreme Ozone Attainment Plan for 1-hour ozone on March 8, 2010 (SJVAPCD 2010).

As shown in Tables 3.3-7, construction-phase emissions in the SJVAB are greater than the GC threshold values for:

- VOC for the years 2014–2016.
- NO_x for the years 2014–2018 and 2021.

As such, the project must demonstrate compliance with the GC Rule before construction begins. Compliance with the GC 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 GC thresholds. For example, if the VOC threshold will be exceeded in 2015, 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 GC Rule for the Preferred Alternative is required prior to the construction of the HST project and would be demonstrated through one, or more, of the methods listed above. Demonstration of compliance with the GC rule will not change the results of the analysis described in this section.

Construction-phase emissions associated with material-hauling outside the SJVAB are greater than the applicable GC thresholds for NO_x in the South Coast Air Basin, Mojave Desert Air Basin, and the Salton Sea Air Basin for certain hauling scenarios.

3.3.7.2 Transportation Conformity

Transportation conformity is an analytical process required for all federally funded highway and transit transportation projects but 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 Fresno to Bakersfield Section of the HST project is 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 Project Design Features

The Authority and FRA have considered avoidance and minimization measures consistent with the 2005 Statewide Program EIR/EIS commitments. During project design and construction, the Authority and FRA would implement measures to reduce impacts on air quality. Applicable design standards that would be used for the project are provided in Appendix 2-D. These measures are considered to be part of the project and are summarized below:

- Trucks will be covered to reduce significant fugitive dust emissions while hauling soil and other similar material.
- All trucks and equipment will be washed before exiting the construction site.
- Exposed surfaces and unpaved roads will be watered three times daily.

- Vehicle travel speed on unpaved roads will be reduced to 15 miles per hour.
- Any dust-generating activities will be suspended when wind speed exceeds 25 mph.
- All disturbed areas, including storage piles that are not being actively used for construction purposes, will 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. In areas adjacent to organic farms, the Authority will use non-chemical means of dust suppression.
- All onsite unpaved roads and offsite unpaved access roads will be effectively stabilized for dust emissions using water or a chemical stabilizer/suppressant. In areas adjacent to organic farms, the Authority will use non-chemical means of dust suppression.
- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities will be effectively controlled for fugitive dust emissions by an application of water or by presoaking. With the demolition of buildings up to six stories in height, all exterior surfaces of the buildings will be wetted during demolition.
- All materials transported offsite will be covered or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container will be maintained.
- All operations will 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 will be effectively stabilized for fugitive dust emissions using sufficient water or a chemical stabilizer/suppressant. In areas adjacent to organic farms, the Authority will use non-chemical means of dust suppression.
- Within urban areas, trackout will 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 will take actions specified in SJVAPCD's Rule 8041 to prevent carryout and trackout.
- Low- or super-compliant VOC (Clean Air) paints, coatings, and industrial coatings that meet the regulatory limits in the SCAQMD Rule 1113 will be used.

3.3.9 Mitigation Measures

Operation of the HST project would, in general, improve air quality because of the reduction in regional emissions. Construction of the project, however, would temporarily increase regional emissions and possibly cause or exacerbate an exceedance of an air quality standard. As such, mitigation measures designed to minimize potential air quality impacts focused on the construction phase of the project. These mitigation measures would go beyond the control measures listed in Section 3.3.8, Project Design Features, and the controls required by the SJVAPCD rules. The mitigation measures would be the same regardless of whether the project is compared to the Existing Conditions as baseline or to the No Project as baseline. None of these mitigation measures will result in adverse secondary effects.

The FRA and Authority will take the following approach to mitigating the project's construction regional emissions impacts for NO_x, PM_{10}, $PM_{2.5}$, and VOCs: First, FRA and the Authority will require the construction contractor to comply with AQ-MM#1 and AQ-MM#2. These measures essentially require the contractor to use the cleanest/newest construction and truck-hauling fleet mix that is reasonably available, and to document efforts to locate and secure such equipment. The availability of a clean fleet equipment, however, was not assumed in the emissions reported for the project in this Final EIR/EIS, given availability uncertainty. Accordingly, AQ-MM#1 and AQ-MM#2, if successful, will reduce project emissions below those reported in this FEIR/ EIS. Secondly, AQ-MM#4 would be used to ensure emissions—either amounts reported in this EIR/EIS or a lesser amount if AQ-MM#1 and AQ-MM#2 are successful—are fully mitigated to less-than-significant levels. In other words, the project will attempt to reduce emissions directly onsite first (AQ-MM#1 and AQ-MM#2) before using emissions offsets (AQ-MM#4).

AQ-MM#1: Reduce Criteria Exhaust Emissions from Construction Equipment. 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 CARB's OFFROAD 2011 database, and no less than a 40% reduction compared to a Tier 2 engine standard for 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 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.

Impacts of Mitigation: The methodologies used to reduce emissions may result in increased fuel or energy consumption associated with emissions control equipment. The change in fuel consumption would likely be small on a per-equipment basis; however, given the number of equipment pieces and the construction duration, the total fuel consumption would result in a moderate increase in volume, but still a small percentage of the total volume. If aftermarket control devices are used, such as diesel particulate filters, additional waste would be generated associated with the disposal of spent filters. In comparison to the scope of the project, these additional increases would be small in comparison. Therefore, the impacts of mitigation would be less than significant under CEQA and the impact would have negligible intensity under NEPA.

AQ-MM#2: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment. 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 EMFAC 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.

Impacts of Mitigation: The mitigation measure would have no impacts.

AQ-MM#3: Reduce the Potential Impact of Concrete Batch Plants. 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 the 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. EPA AP-42 controlled emission factors for concrete batch plants.

Impacts of Mitigation: The control measures utilized at the batch plant may increase water usage and energy consumption, and may generate additional waste from consumables used by the control devices. These impacts would be minor in comparison to the operations as a whole. Therefore, the impacts of mitigation would be less than significant under CEQA and the impact would have negligible intensity under NEPA.

With AQ-MM#1 and AQ-MM#2, regional construction phase emissions of NO_x, VOCs, PM_{10}, and $PM_{2.5}$ for certain years could still be greater than applicable thresholds. As such, construction phase emissions would be offset as follows:

AQ-MM#4: Offset Project Construction Emissions Through an SJVAPCD VERA. This mitigation measure would address AQ Impact #1 (Common Regional Air Quality Impacts During Construction) that would exceed the GC applicability and CEQA emissions thresholds for VOC and NO_x, and the CEQA emission thresholds for PM_{10} and $PM_{2.5}$. The Authority and SJVAPCD will enter into a contractual agreement to mitigate (by offsetting) to net zero the project's actual emissions from construction equipment and vehicle exhaust emissions of VOC, NO_x, PM_{10}, and $PM_{2.5}$. The agreement will provide funds for the district's Emission Reduction Incentive Program[19] (SJVAPCD 2011) to fund grants for projects that achieve emission reductions, with preference given to highly impacted communities, thus offsetting project-related impacts on air quality. Projects funded in the past include electrification of stationary internal combustion engines (such as agricultural irrigation pumps), replacing old heavy-duty trucks with new, cleaner, more efficient heavy-duty trucks, and replacement of old farm tractors. The mitigation is the offsets, but the VERA is one mechanism to accomplish the offsets. 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.

Impacts of Mitigation: 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 likely 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. In comparison to the scope of the project, these additional increases would be small. Therefore the impacts of mitigation would be less than significant under CEQA and the impact would have negligible intensity under NEPA.

AQ-MM#5: Purchase Offsets and Offsite Emission Mitigation for Emissions Associated with Hauling Ballast Material in Certain Air Districts. This mitigation measure will apply to scenarios where the ballast material is hauled from quarries outside the SJVAB. NO_x offsets will be purchased from the appropriate air districts. At a minimum, mitigation/offsets will occur in the year of impact or as otherwise permitted by 40 C.F.R. Part 93 Section 93.163.

The Mojave Desert AQMD's emission bank has 2,061 tons of NO_x credits (MDAQMD 2012); therefore, there should be enough NO_x credits to offset approximately 6 tons per year from this project in the Mojave Desert AQMD. The exact number of NO_x credits in the SCAQMD RECLAIM program is unknown, but 1,199 tons of NO_x credits were traded in 2011 and 235 tons of NO_x credits were traded in 2012 (SCAQMD 2012). Therefore, there should be enough available NO_x

[19] See www.valleyair.org/Grant_Programs/GrantPrograms.htm.

credits in the program to offset approximately 75 tons of NO_x per year from this project in the SCAQMD.

In the Bay Area AQMD, any material emissions above the district's significance threshold will be mitigated through an offsite emission mitigation program to achieve emission reduction due to material hauling in the Bay Area AQMD. Potential offsite 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 of NO_x credits.

Impacts of Mitigation: This mitigation measure would have no impacts.

The following operational phase measures would be implemented to reduce emissions from HMF/MOWF operations:

AQ-MM#6: Reduce the Potential Impact of Air Toxics. This mitigation measure will apply to HMF/MOWF operation for all site options to ensure that the nearest sensitive receptor has a health risk less than the applicable threshold of 10 in a million cancer risk and a hazard index of one, with final decisions on the range of mitigation measures to achieve emission reductions to meet this standard to be selected before the issuance of the authority to construct permit for the HMF facility; these measures may include the following options:

- Use of electric or hybrid trucks to serve the facility.
- Use of electric or Clean Switcher Locomotive to minimize the emissions from HMF operation.
- When advertising for a train set vendor, a preference for the use of highly polished external manufactured aluminum for train sets will be stated in the proposal.
- Adjustment of the facility operation and orientation to move emission activities to areas where impacts on the surrounding sensitive areas are lessened, thus reducing localized impacts on surrounding sensitive receptors.
- A minimum buffer distance of 1,300 feet from sensitive receptors for diesel vehicles (if HMF design meets or does not exceed the assumptions in Section 3.3.4.8), or preparation of a detailed health risk assessment that shows cancer risk to be less than 10 in a million when the site design is refined.

Impacts of Mitigation: 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 likely be small on a per-equipment basis. Consumables used by the emissions control equipment could result in additional waste that would be generated from disposal of spent consumables. Some emissions control equipment may require water, which may result in increased water consumption and may increase the amount of water that needs treatment. This increase in water consumption and water treatment will be incorporated into the design assumptions and therefore will be addressed, resulting in a small impact. Some emissions control equipment may require additional hazardous chemicals to be used and stored onsite. However, any hazardous chemicals would be subject to applicable hazard control plans and therefore are unlikely to be a significant concern compared to material that may already be used at the facility. In comparison to the scope of the project, these additional increases would be small in comparison. Therefore, the impacts of mitigation would be less than significant under CEQA, and the impact would have negligible intensity under NEPA.

AQ-MM#7: Reduce the Potential Impact of Stationary Sources. This mitigation measure will apply to criteria pollutant sources at the HMF sites. Large stationary equipment (combustion equipment, paint booths, wastewater treatment, etc.) will use best industry practices, or alternative equipment will be used, to the extent practicable, to reduce emissions of criteria pollutants.

Impacts of Mitigation: 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 likely be small on a per-equipment basis. Consumables used by the emissions control equipment could result in additional waste that would be generated from disposal of spent consumables. Some emissions control equipment may require water, which may result in increased water consumption and may increase the amount of water that needs treatment. This increase in water consumption and water treatment will be incorporated into the design assumptions and therefore will be addressed, resulting in a small impact. Some emissions control equipment may require additional hazardous chemicals to be used and stored onsite. However, any hazardous chemicals would be subject to applicable hazard control plans, and therefore is unlikely to be a significant concern compared to materials that may already be in use at the facility. These additional increases would be small in comparison to the scope of the project. Therefore, the impacts of mitigation would be less than significant under CEQA, and the impact would have negligible intensity under NEPA.

This mitigation is no longer necessary for the reasons explained at the end of Impact AQ#16 analysis.

AQ-MM#8: Reduce the Potential Impact of Air Toxics at Schools around Bakersfield Station: The following mitigation measure will reduce the cancer risk impacts to the 2 schools located within 1,400 feet of the Bakersfield station. One or more of the following methods would be used to the extent practicable:

- Use of at least Tier 4-compliant engines, or use of any add-on control technology, such as diesel particulate filters, that could achieve the emission reductions.
- Adjusted work hour, so that construction operations do not overlap with school hours.
- Longer construction work hours when schools are not in session, such as during summer vacation.
- Work with the schools on temporary relocation until the Bakersfield station construction has been completed.

Impacts of Mitigation: The methodologies used to reduce emissions may result in increased fuel or energy consumption associated with emissions control equipment. The change in fuel consumption would likely be small on a per-equipment basis; however, given the number of pieces of equipment and the construction duration, the total fuel consumption would result in a moderate increase in volume, but still a small percentage of the total volume. If aftermarket control devices are utilized, such as diesel particulate filters, additional waste would be generated associated with the disposal of spent filters. These additional increases would be small in comparison to the scope of the project. Therefore, the impacts of mitigation would be less than significant under CEQA, and the impact would have negligible intensity under NEPA.

AQ-MM#8 was included in the Revised DEIR/Supplemental DEIS, but is no longer necessary. This mitigation measure was included to reduce the localized impacts of station construction to less-than-significant levels. However, as explained earlier under Impact AQ#7, based on the more exacting and realistic analysis described in Section 3.3.4.10 and the Fresno to Bakersfield

Section: Air Quality Technical Report (Authority and FRA 2014), the impact is less than significant without mitigation. Therefore, AQ-MM#8 is no longer applicable.

3.3.9.1 CEQA and NEPA Level of Impact after Mitigation/Impacts Summary

Construction Phase

NEPA Impacts: NO_x emissions would exceed the GC applicability thresholds for most of the construction phase, while VOC emissions would exceed the GC applicability threshold for 4 years, with or without onsite mitigation (such as AQ-MM#1). PM_{10}, $PM_{2.5}$, CO, and SO_2 emissions would be below the GC threshold with the application of mitigation measures and control measures for all years. As such, with implementation of AQ-MM#4, which will offset construction phase VOC and NO_x emissions through the VERA program, the project would have impacts of negligible intensity for all pollutants.

Material hauling outside the SJVAB may have impacts of substantial intensity in the South Coast Air Basin, Mojave Desert Air Basin, and the Salton Sea Air Basin.[20] Mitigation measures AQ-MM#2 and AQ-MM#5 would be implemented to reduce NO_x impacts in these air basins to negligible intensity under NEPA. Other pollutants in these air basins would have impacts of negligible intensity. Material hauling in other air basins for all pollutants would be of negligible intensity under NEPA.

CEQA Impacts: NO_x emissions would exceed the mass emission SJVAPCD CEQA significance thresholds for most of the construction phase, while VOC, PM_{10}, and $PM_{2.5}$ emissions would exceed the mass emission SJVAPCD CEQA significance thresholds for some of the construction phase. Therefore, the project may violate an air quality standard and/or contribute substantially to an existing or projected air quality violation for NO_x, VOC, PM_{10}, and $PM_{2.5,}$ and, as such, has the potential to result in a significant impact under CEQA. Air dispersion modeling showed that the incremental increase of PM_{10} and $PM_{2.5}$ concentrations is less than the applicable threshold to exacerbate the existing exceedances of the ambient air quality standards, and would be considered less than significant after mitigation of the concrete batch plants. These emissions would only last through the HST construction period and would be offset through the VERA program (AQ-MM#4), and the project would result in emission reductions of VOC, NO_x, PM_{10}, and $PM_{2.5}$ throughout the project operations. After mitigation, these impacts would be less than significant.

There is no mass emission SO_2 threshold from SJVAPCD CEQA guidance. However, through the use of air dispersion modeling of construction work areas, SO_2 impacts were shown to be less than the ambient air quality standards and would be less than significant. No CO hot spots are expected to occur during project construction as demonstrated by the absence of exceedances of ambient air quality standards for CO at the construction work areas modeled. CO impacts are expected to be less than significant.

Material hauling in SCAQMD, BAAQMD, and Mojave Desert AQMD would have significant impacts for NO_x. Mitigation measure AQ-MM#5 would be implemented to reduce NO_x emissions in these regions (as described above in Section 3.3.9, Mitigation Measures). The CEQA impacts after reducing on-road truck exhaust, purchasing NO_x offsets, and implementing offsite mitigation programs would make the material-hauling emissions less than significant.

[20] Both the South Coast and Salton Sea air basins are under the jurisdiction of the SCAQMD; therefore, NO_x credits would be purchased from the SCAQMD RECLAIM program.

The localized air quality impacts near construction work areas were evaluated through an ambient air quality analysis and a health risk assessment. The localized impacts on sensitive receptors would be below the applicable significance thresholds, except for concrete batch plants. The localized impacts from construction emissions related to concrete batch plants would be less than significant after mitigation.

Project/Operational Phase

At the regional level, the HST alternatives would result in a net benefit on regional air quality because the HST project would result in lower MSATs, GHG, VOC, NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$ emissions than the No Project Alternative. Therefore, the project would not have a significant regional impact under CEQA or an impact with substantial intensity under NEPA. Mitigation is not required for regional emissions from HST operation.

Sensitive receptors near all HMF sites may have the potential to be exposed to significant toxic emissions and cancer risks. The adverse localized health impact would be reduced to less than significant under CEQA and of negligible intensity under NEPA by implementing AQ-MM#6.

The localized impacts resulting from changes in traffic patterns would be of negligible intensity, as demonstrated by the results of the CO and PM hot-spot analyses. Localized PM_{10} and $PM_{2.5}$ emissions from HMF/MOWF would result in incremental increases in the PM_{10} and $PM_{2.5}$ concentrations that would not exceed the SJVAPCD-recommended significant impact levels, and would be less than significant under CEQA and of negligible intensity under NEPA. CO impacts would remain insignificant under CEQA and of negligible intensity under NEPA.

3.3.10 NEPA Impacts Summary

3.3.10.1 Construction Period Impacts

The No Project Alternative would perpetuate existing dependency on automotive and air travel. Low-density land use patterns would continue to result in increases in pollutant emissions under the No Project Alternative. However, SJVAPCD plans to bring the San Joaquin Valley into compliance with NAAQS and CAAQS, which would reduce emissions to a moderate to negligible intensity for the air basin context and would not be significant under NEPA.

The SJVAB is in federal nonattainment for O_3 and $PM_{2.5}$, and is in maintenance for PM_{10}. Portions of the SJVAB are also in maintenance for CO. Effects due to project emissions of VOCs and NO_x during construction are of substantial intensity within the regional context of the SJVAB because the emissions would exceed the GC applicability thresholds in the SJVAB, in which the entire Fresno to Bakersfield Section is located. Mitigation measures, including emission offsets through a VERA to reduce emissions during the construction period, will be implemented for construction emissions of VOC and NO_x. The impacts from construction emissions would only last through the HST construction period, and would facilitate emission reductions of VOC, CO, NO_x, SO_2, PM_{10}, and $PM_{2.5}$ during project operations throughout the lifetime of the project. Construction air quality impacts will be mitigated to negligible intensity under NEPA and therefore the impacts would not be significant under NEPA. PM_{10}, $PM_{2.5}$, CO, and SO_2 impacts would not exceed thresholds, and therefore these pollutant impacts would be of negligible intensity. GHG emissions during construction would be offset within 12 months of project operation; therefore, the construction GHG emissions would have impacts of negligible intensity under NEPA.

The hauling of ballast material from outside of the SJVAB to the project site could result in emissions in other air basins. These other air basins are in federal nonattainment for various air quality standards, including O_3, PM_{10}, and $PM_{2.5}$ standards. At least one material-hauling scenario exists where emissions in air basins outside the SJVAPCD would be less than the GC thresholds for all pollutants. However, under other scenarios the material hauling may exceed the GC thresholds for NOx in the South Coast Air Basin, Mojave Desert Air Basin, and the Salton Sea Air Basin. In those cases, this would result in impacts of substantial intensity. Other pollutants in these three air basins and all pollutants in other air basins would have air quality impacts of negligible intensity for the respective regional contexts and would not be significant under NEPA.

Localized impacts on sensitive receptors from asbestos and lead-based paint exposure in the vicinity would be of negligible intensity under NEPA because of existing asbestos regulations. Localized impacts on sensitive receptors near the guideway/alignment construction would be of negligible intensity under NEPA since the health risk assessment determined health impacts were below the applicable threshold. Localized impacts on sensitive receptors near station construction areas would be of negligible intensity because the increase in cancer risk would be less than 10 in a million. Localized impacts on sensitive receptors from concrete batch plant operations would be of negligible intensity under NEPA because the increase in cancer risk would be less than 10 in a million and the increase in non-cancer hazard index would be less than 1 when appropriate fugitive dust control devices and mitigation measures are implemented. Localized impacts on sensitive receptors from HMF/MOWF construction would be of negligible intensity under NEPA because the health risk assessment determined that the construction of the HMF/MOWF would not have health impacts greater than the applicable threshold of 10 in a million excess cancer risk threshold.

3.3.10.2 Project/Operational Phase Impacts

The statewide and regional impact on air quality from operation of the HST would be beneficial. The HST alternatives would result in a net benefit to air quality because the HST project would result in lower MSATs, GHG, VOC, NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$ emissions than the No Project Alternative. Localized impacts resulting from changes in traffic patterns would be of negligible intensity as demonstrated by the CO and PM hot-spot analyses.

As a result of HMF/MOWF operations near urbanized areas, impacts on sensitive receptors near all the HMF sites from localized increases in TAC emissions at and near the facility would have the potential to be of substantial intensity. However, implementing the mitigation measures would reduce the potential adverse localized health impact to negligible intensity.

Localized PM_{10} and $PM_{2.5}$ emissions from the HMF/MOWF would result in incremental increases in the PM_{10} and $PM_{2.5}$ concentrations that would not exceed the SJVAPCD-recommended significant impact levels and would be less than significant under CEQA and of negligible intensity in the local context and would not be significant under NEPA.

3.3.11 CEQA Significance Conclusions

Table 3.3-21 presents the level of significance for the CEQA criteria thresholds before mitigation and after implementation of mitigation measures for the HST alternatives.

Table 3.3-21
Summary of Significant Air Quality and Global Climate Change Impacts and Mitigation Measures

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Construction			
Regional Impacts **AQ #1:** Construction of the HST alternatives would exceed the CEQA emissions thresholds for VOCs, NO_x, PM_{10}, and $PM_{2.5}$. Therefore, it could potentially cause violations of NO_2, O_3, PM_{10}, and $PM_{2.5}$ air quality standards or contribute substantially to NO_2 O_3, PM_{10}, and $PM_{2.5}$ existing or projected air quality violations.	Significant for VOCs NO_x, PM_{10}, and $PM_{2.5}$	**AQ-MM#1:** Reduce Criteria Exhaust Emissions from Construction Equipment **AQ-MM#2:** Reduce Criteria Exhaust Emissions from On-Road Construction Equipment **AQ-MM#4**: Offset Emissions Through the VERA Program	Less than significant
Compliance with Air Quality Plans **AQ #2:** Construction of the HST alternatives would exceed the CEQA emissions thresholds for VOC, NO_x, PM_{10}, and $PM_{2.5}$. Therefore, it would conflict with the 1-hour Ozone Attainment Plan, the 8-hour Ozone Attainment Plan, and the PM_{10} and $PM_{2.5}$ Attainment Plans.	Significant for O_3 precursors (VOCs and NO_x), PM_{10}, and $PM_{2.5}$	**AQ-MM#1:** Reduce Criteria Exhaust Emissions from Construction Equipment **AQ-MM#2:** Reduce Criteria Exhaust Emissions from On-Road Construction Equipment **AQ-MM#4**: Offset Emissions Through the VERA Program	Less than significant
Regional Impacts **AQ #3:** Material hauling outside the SJVAB would exceed CEQA emission thresholds for NO_x in the BAAQMD, Mojave Desert AQMD and the South Coast AQMD for certain hauling scenarios. Therefore, it could potentially cause violations of NO_2 and O_3 air quality standards or contribute substantially to NO_2 and O_3 existing or projected air quality violations in those air districts.	Significant for NO_x in the BAAQMD, Mojave Desert AQMD, and the South Coast AQMD	**AQ-MM#2:** Reduce Criteria Exhaust Emissions from On-Road Construction Equipment **AQ-MM#5:** Purchase Offsets for Emissions Associated with Hauling Ballast Material in Certain Air Districts (i.e., Mojave Desert AQMD, BAAQMD, and the South Coast AQMD)	Less than significant
Localized Impacts **AQ #8:** Construction of the alignment may expose sensitive receptors to temporary substantial pollutant concentrations from concrete batch plants.	Significant	**AQ-MM#3:** Reduce the Potential Impact of Concrete Batch Plants	Less than significant
Project			
Localized Impacts Local Impacts: Localized Hot-Spot Analysis of HMF **AQ#16**: Operation of all the HMF sites may expose sensitive receptors to substantial TAC pollutant concentrations.	Significant for TAC	**AQ-MM#6:** Reduce the Potential Impact of Toxics.	Less than significant

Table 3.3-21
Summary of Significant Air Quality and Global Climate Change Impacts and Mitigation Measures

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation

Acronyms:

AQ	Air Quality
CAAQS	California Ambient Air Quality Standards
CEQA	California Environmental Quality Act
CO	carbon monoxide
GC	general conformity
HMF	heavy maintenance facility
HST	high-speed train
MM	Mitigation Measure
NO_2	nitrogen dioxide
NO_x	nitrogen oxide(s)
O	ozone
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
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	sulfur dioxide
TAC	toxic air contaminant
VMT	vehicle mile(s) travelled
VOC	volatile organic compound