3.9 Greenhouse Gas Emissions

3.9.1 Introduction

This section describes the regulatory setting and affected environment for GHG emissions. This section addresses known and potential emissions of GHGs in the GHG RSA and describes the potential impacts related to GHGs during construction and operation of the proposed Project. This section also identifies the potential for cumulative impacts of the proposed Project on GHG when considered in combination with other relevant projects.

3.9.2 Regulatory Setting

This section identifies the federal, state, regional, and local laws, regulations, and orders that are relevant to the analysis of GHG emissions. This section also addresses the proposed Project's consistency with the regulations described herein.

3.9.2.1 Federal

Federal Greenhouse Gas Regulations and Guidance

Several federal executive orders (EOs) have recently been signed by President Joe Biden related to GHG emissions and climate resiliency. EO 13990, signed in January 2021, set a national goal to achieve a 50 to 52 percent reduction from 2005 levels in economy-wide net GHG pollution in 2030. EO 14057, signed in December 2021, requires federal agencies to develop strategic processes for achieving, among other things, carbon-free electricity by 2030 and 100 percent zero-emission vehicle acquisitions by 2035. President Joe Biden has also signed two bills—Infrastructure Investment and Jobs Act (2021) and Inflation Reduction Act (2022)—that provide funding for infrastructure improvements that will reduce GHG emissions and bolster resilience to climate change. Despite these actions, there is currently no federal law or legislatively mandated national GHG reduction target.

NHTSA sets the CAFE standards to improve the average fuel economy and reduce GHG emissions generated by cars and light-duty trucks. NHTSA and United States Environmental Protection Agency (EPA) have proposed amendments to the current fuel efficiency standards for passenger cars and light-duty trucks and new standards covering model years 2021 through 2026. Under the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule, current standards would have been maintained through 2026.

On September 19, 2019, EPA and NHTSA issued a final action on the One National Program Rule, which is considered Part One of the SAFE Vehicles Rule and a precursor to the proposed fuel efficiency standards, withdrawing the State of California's Clean Air Act preemption waiver to set state-specific standards. The EPA reinstated California's authority under the Clean Air Act to implement its own GHG emission standards and zero-emission vehicles (ZEV) sales mandate on March 9, 2022. On March 31, 2022, NHTSA finalized its vehicle efficiency standards rule to reach a projected industry-wide target of 49 miles per gallon by 2026.

3.9.2.2 State

Vehicle Efficiency and Zero-Emissions Standards

With the passage of AB 1493 in 2002, California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the state level. AB 1493 required the California Air Resources Board (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. Additional strengthening of the Pavley standards (referred to previously as Pavley II and now referred to as the Advanced Clean Cars measure) was adopted for vehicle model years 2017–2025 in 2012. Together, the two standards are expected to increase average fuel economy to 54.5 miles per gallon in 2025.

In August 2022, CARB board members voted to approve the Advanced Clean Cars II proposal, which should dramatically reduce emissions from passenger cars in model years 2026 through 2035. This will require an increasing proportion of new vehicles to be zero-emission vehicles, with the goal being to have 100 percent of new vehicles sold by 2035 to be zero-emission vehicles (CARB 2022a).

CARB also adopted the Advanced Clean Truck Regulation to accelerate a large-scale transition to zero-emission medium- and heavy-duty vehicles. The regulation requires zero-emission medium- and heavy-duty vehicles to be an increasing percentage of total annual vehicle sales in California between 2024 and 2035. By 2035, zero-emission truck/chassis sales will need to be 55 percent of Class 2b–3 truck sales, 75 percent of Class 4–8 straight truck sales, and 40 percent of truck-tractor sales. By 2045, every new medium- and heavy-duty truck sold in California will need to be a zero-emission truck. Large employers, including retailers, manufacturers, brokers, and others, are required to report information about shipments and shuttle services to ensure they purchase available zero-emission trucks for their fleets.

Locomotive Emissions Standards

In April 2023, CARB approved the In-Use Locomotive Regulation to further reduce emissions from diesel-powered locomotives and increase use of zero-emission technology. This regulation requires operators to maintain a spending account and pay into the account with an amount of funds corresponding to the emissions generated by the operator's locomotive. The account funds will then be used to purchase or rent Tier 4 or cleaner locomotives. Additionally, new locomotives operated in the state will need to be zero-emissions beginning in 2030 or 2035, depending on whether the locomotive is a switcher or passenger locomotive (2030), or a line-haul locomotive (2035). In 2030, the regulation also prohibits locomotives 23 years or older from operating in the state (CARB 2023a).

As an alternative to the spending account, the In-Use Locomotive Regulation will allow locomotive operators to reduce emissions through other strategies provided that the operator adheres to an alternative fleet milestone option. It is noteworthy to mention that this is the main plan that most passenger rail operators in the State of California will follow. The pathway below is only available as an alternative compliance plan otherwise banned in the main regulatory pathway (spending account):

1. Beginning January 1, 2030, 50 percent of annual fleet usage in California must be from Tier 4 or cleaner locomotives.

2. Beginning January 1, 2035, 100 percent of annual fleet usage in California must be from Tier 4 or cleaner locomotives.
3. Beginning January 1, 2042, 50 percent of annual fleet usage in California must be from zero emissions (ZE) locomotives, ZE capable locomotives, or ZE rail equipment.

Beginning January 1, 2047, 100 percent of annual fleet usage in California must be from ZE locomotives, ZE capable locomotives, or ZE rail equipment.

Executive Order S-01-07, Low Carbon Fuel Standard

With EO S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard (LCFS) for California in 2007. Under this EO, the carbon intensity of California's transportation fuels was set to be reduced by at least 10 percent by 2020. In 2011, CARB approved amendments to the regulation and, in 2015, readopted the LCFS to address procedural issues. In 2018, CARB approved further amendments to the regulation pertaining to the carbon intensity benchmarks through 2030 (CARB 2020). Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 20 percent by 2030.

Assembly Bill 32 and California Climate Change Scoping Plan

In 2006, the California legislature passed AB 32 (Health and Safety Code Division 25.5, § 38500 et seq.), also known as the California Global Warming Solutions Act. AB 32 requires CARB to implement emission limits, regulations, and other feasible and cost-effective measures such that statewide GHG emissions are reduced to 1990 levels by 2020.

Since AB 32 was adopted, CARB, the California Energy Commission (CEC), the CPUC, and the Building Standards Commission have been developing regulations that will help meet the goals of AB 32. Under AB 32, CARB is required to prepare a scoping plan and update it every 5 years. The original Scoping Plan was approved in 2008, the First Scoping Plan Update was approved in 2014, and an additional update was approved in 2017 (see discussion of SB 32 below). CARB's 2017 Climate Change Scoping Plan identifies specific measures to reduce GHG emissions to 1990 levels by 2020 and requires CARB and other state agencies to develop and enforce regulations and other initiatives for reducing GHG (CARB 2017a). Specifically, the 2017 Climate Change Scoping Plan articulates a key role for local governments, recommending they establish GHG reduction goals for both their municipal operations and the community consistent with those of the state. In 2018, CARB announced that inventory year 2016 emissions had dropped below 1990 levels, which would be an achievement of the AB 32 goal if emissions continue on their current trajectory (CARB 2018).

In November 2022, CARB adopted the 2022 Scoping Plan Update, which identifies a technologically feasible and equity-focused pathway for the state to achieve carbon neutrality by 2045. The 2022 update outlines three alternatives for meeting the state's climate goals: two different alternatives would achieve carbon neutrality by 2035, which would require an acceleration of the 2030 and 2045 GHG goals. A third alternative identifies a pathway to attain carbon neutrality by 2045 (CARB 2022b).

Senate Bill 375

Senate Bill (SB) 375, signed into law by Governor Schwarzenegger on September 30, 2008, became effective January 1, 2009. This law requires the state's 18 Metropolitan Planning Organizations (MPOs) to develop sustainable communities strategies (SCS) as part of their Regional

Transportation Plans (RTPs) through integrated land use and transportation planning, and to demonstrate an ability to attain the GHG emissions reduction targets that the CARB established for the region by 2020 and 2035. This would be accomplished through either the financially constrained SCS as part of the RTP or an unconstrained alternative planning strategy. If regions develop integrated land use, housing, and transportation plans that meet the SB 375 targets, new projects in these regions can be relieved of certain CEQA review requirements.

Legislation Associated with Electricity Generation

SB 350, also known as the Clean Energy and Pollution Reduction Act of 2015, was approved by the California Legislature in September 2015 and signed by Governor Brown in October 2015. Its key provisions are to require the following by 2030: (1) a renewables portfolio standard of 50 percent, and (2) a doubling of energy efficiency (electrical and natural gas) by 2030, including improvements to the efficiency of existing buildings. Subsequently, the State passed additional legislation updating some of the SB 350 requirements and increasing use of renewables to produce electricity for consumers. Specifically, California utilities are required to generate 52 percent of their electricity from renewables by 2027 (SB 100), 60 percent by 2030 (SB 100), 90 percent by 2035 (SB 1020), 95 percent by 2040 (SB 1020), and 100 percent by 2045 (SB 100/SB 1020). SB 1020 also requires State agencies to rely on 100 percent renewable energy and zero-carbon resources for their own facilities by 2030.

Senate Bill 32 and Assembly Bill 197

SB 32 requires CARB to ensure that statewide GHG emissions are reduced to at least 40 percent below the 1990 level by 2030, consistent with the target set forth in EO B-30-15. The companion bill to SB 32, AB 197, creates requirements to form a Joint Legislative Committee on Climate Change Policies, requires CARB to prioritize direct emission reductions and consider social costs when adopting regulations to reduce GHG emissions beyond the 2020 statewide limit, requires CARB to prepare reports on sources of GHGs and other pollutants, establishes 6-year terms for voting members of CARB, and adds two legislators as non-voting members of CARB. CARB adopted the 2017 Climate Change Scoping Plan in November 2017 to meet the GHG reduction requirement set forth in SB 32. It proposes continuing the major programs of the previous Scoping Plan, including Cap-and-Trade Regulation, LFCS, more efficient cars, trucks, and freight movement, Renewable Portfolio Standards, and reducing methane (CH_4) emissions from agricultural and other wastes.

Assembly Bill 1279 and Senate Bill 1203

AB 1279 requires California to achieve net-zero GHG emissions (i.e., reach a balance between the GHG emitted and removed from the atmosphere) no later than 2045 and maintain net negative GHG emissions from then on. It also mandates an 85 percent reduction in statewide human-made GHG emissions (from 1990 levels) by 2045. SB 1203 requires State agencies to achieve net-zero GHG emissions resulting from their operations no later than 2035, or as soon as feasible thereafter.

Senate Bill 605 and Senate Bill 1383

SB 605 directed CARB, in coordination with other state agencies and local air districts, to develop a comprehensive Short-Lived Climate Pollutant (SLCP) Reduction Strategy. SB 1383 directed CARB to approve and implement the SLCP Reduction Strategy to achieve the following reductions in SLCPs:

- 40 percent reduction in methane (CH_4) below 2013 levels by 2030.

- 40 percent reduction in hydrofluorocarbon (HFC) gases below 2013 levels by 2030.
- 50 percent reduction in human made black carbon below 2013 levels by 2030.

CARB adopted the SLCP Reduction Strategy in March 2017 as a framework for achieving the CH_4, HFC, and human-made black carbon reduction targets set by SB 1383. The SLCP Reduction Strategy includes 10 measures to reduce SLCPs, which fit within a wide range of ongoing planning efforts throughout the state.

The bill also establishes the following targets for reducing organic waste in landfills and CH_4 emissions from dairy and livestock operations as follows:

- 75 percent reduction in organic waste disposal from the 2014 level by 2020.
- 75 percent reduction in organic waste disposal from the 2014 level by 2025.
- 40 percent reduction in CH_4 emissions from livestock manure management operations and dairy manure management operations below the dairy sector's and livestock sector's 2013 levels by 2030.

CARB and California Department of Resources Recycling and Recovery (CalRecycle) are currently developing regulations to achieve the organic waste reduction goals under SB 1383. In January and June 2019, CalRecycle proposed new and amended regulations in Titles 14 and 27 of the California Code of Regulations. Among other things, the regulations set forth minimum standards for organic waste collection, hauling, and composting. The final regulations took effect in January 2022.

Senate Bill 743

SB 743 requires revisions to the CEQA Guidelines that establish new impact analysis criteria for the assessment of a project's transportation impacts. The intent behind SB 743 and revising the CEQA Guidelines is to integrate and better balance the needs of congestion management, infill development, active transportation, and GHG emissions reduction. The Office of Planning and Research (OPR) recommends that vehicle miles traveled (VMT) serve as the primary analysis metric, replacing the existing criteria of delay and level of service. In 2018, OPR released a technical advisory outlining potential VMT significance thresholds for different project types. For example, it would be reasonable to conclude that residential and office projects demonstrating a VMT level that is 15 percent less than existing (2015-2018 average) conditions are consistent with statewide GHG reduction targets. With respect to retail land uses, any net increase of VMT may indicate a significant transportation impact.

California State Rail Plan

Caltrans is responsible for preparing a State Rail Plan approximately every four years. According to Caltrans, the state rail plan outlines "a long-term vision for an integrated, cohesive statewide rail system that offers efficient passenger and freight service, supports California's economy, and helps achieve critical climate goals."

The 2018 State Rail Plan[1] identifies projects that benefit rail operators and presents a vision for 2040 to divert 88 million daily passenger miles from highways to rail and increase passenger rail travel by 92 million passenger miles per day. With respect to freight rail, the plan includes six key

[1] The draft 2023 State Rail Plan was released by Caltrans in March 2023, but a final version has not yet been published.

elements: having a (1) premier, (2) customer-focused, and (3) integrated system; and developing a rail network that (4) moves both people and products, (5) achieves economic growth, and (6) supports improvements in California's quality of life (Caltrans 2018).

3.9.2.3 Regional

Bay Area Air Quality Management District

The Project falls under the jurisdiction of the BAAQMD. The BAAQMD has local air quality jurisdiction over projects in the San Francisco Bay Area Air Basin (SFBAAB) including Alameda County. BAAQMD has adopted advisory emission thresholds to assist CEQA lead agencies in determining the level of significance of a project's emissions, which are outlined in its California Environmental Quality Act Air Quality Guidelines (CEQA Guidelines) (BAAQMD 2017). BAAQMD has also adopted air quality plans to improve air quality, protect public health, and protect the climate, including the 2017 Clean Air Plan: Spare the Air, Cool the Climate (2017 Clean Air Plan) (BAAQMD 2017b).

The 2017 Clean Air Plan was adopted by the BAAQMD on April 19, 2017. The 2017 Clean Air Plan updates the prior 2010 Bay Area ozone plan and outlines feasible measures to reduce ozone; provides a control strategy to reduce particulate matter, air toxics, and GHGs in a single, integrated plan; and establishes emission control measures to be adopted or implemented. The 2017 Clean Air Plan contains the following primary goal as it relates to GHG:

- **Protect the Climate:** Reduce Bay Area GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. The 2017 Clean Air Plan is the most current applicable air quality plan for the air basin. Consistency with this plan is the basis for determining whether the proposed Project would conflict with or obstruct implementation of an air quality plan.

In April 2023, BAAQMD adopted the 2022 CEQA Air Quality Guidelines, which include new climate impact thresholds that address the statewide GHG target established by SB 32 and the eventual goal of carbon neutrality by 2045 (e.g., EO B-55-18). The guidelines also look at how project and plan-level CEQA analyses should evaluate the significance of climate impacts, based on evolving case law. The BAAQMD 2022 CEQA Air Quality Guidelines update the CEQA GHG thresholds from the 2017 CEQA Air Quality Guidelines, which were not consistent with the statewide GHG target established by SB 32. In summary, the updated thresholds emphasize the following:

1. Avoiding wasteful electricity usage and developing fossil fuel infrastructure in new buildings that will be in place for decades and thus conflict with carbon-neutrality goals by 2045;
2. Compliance with the California Green Building Standards (CALGreen) Tier 2 electric-vehicle (EV) requirements and per capita reductions in VMT consistent with SB 743; and
3. Consistency with a qualified GHG emissions reduction strategy (also known as a Climate Action Plan [CAP]).

BAAQMD also provided an appendix to the 2022 CEQA Air Quality Guidelines, Justification Report: CEQA Thresholds for Evaluating the Significance of Climate Impacts from Land Use Projects and Plans that explains why its thresholds and approach to analysis for project-level impacts under CEQA are supported by substantial evidence.

Metropolitan Transportation Commission

The Metropolitan Transportation Commission (MTC) is the MPO for the nine counties that make up the San Francisco Bay Area and the SFBAAB. The first per capita GHG emissions reduction targets for the SFBAAB were 7 percent by 2020 and 15 percent by 2035 relative to 2005 levels. In 2013, MTC adopted a SCS as part of its RTP for the SFBAAB. This was known as Plan Bay Area. The plan goes beyond regional per capita targets and calls for 10 and 16 percent reductions in per capita GHG emissions by 2020 and 2035, respectively (MTC and Associated of Bay Area Governments [ABAG] 2013). On July 26, 2017, the strategic update to this plan, known as Plan Bay Area 2040, was adopted by the ABAG and the MTC. As a limited and focused update, Plan Bay Area 2040 builds upon the growth pattern and strategies developed in the original Plan Bay Area but with updated planning assumptions that incorporate key economic, demographic, and financial trends since 2013 (MTC and ABAG 2017). As required by SB 375, CARB updated the per capita GHG emissions reduction targets in 2018. The new targets (i.e., reductions in per capita GHG emissions of 10 percent by 2020 and 19 percent by 2035 relative to 2005 levels) are addressed in the latest update to Plan Bay Area, Plan Bay Area 2050, which was approved by ABAG and the MTC in October 2021. Plan Bay Area 2050 carries forward many of the development and funding strategies of Plan Bay Area 2040 (MTC and ABAG 2021).

3.9.2.4 Local

Local Government Climate Action Plans

Several jurisdictions in the proposed Project area have adopted CAPs, GHG reduction plans, or equivalent documents aimed at reducing local GHG emissions. Jurisdictions with adopted or in-development climate action plans or GHG reduction plans include the County of Alameda, the City of Oakland, the City of Fremont, the City of Hayward, the City of San Leandro, the City of Newark, and the City of Union City. These plans call for reductions in GHG emissions below current levels and actions to reduce VMT and associated transportation emissions. Improving transit service, a primary goal of the proposed Project, is a key strategy in reducing local GHG emissions.

3.9.2.5 Consistency with Plans, Policies, and Regulations

Section 15125(d) of the CEQA Guidelines requires an environmental impact report (EIR) to discuss "any inconsistencies between the proposed Project and applicable general plans, specific plans, and regional plans." Applicable plans, policies, and regulations were considered during the preparation of this analysis and were reviewed to assess whether the proposed Project would be consistent with the plans of relevant jurisdictions. A detailed evaluation of consistency with applicable plans, policies, and regulations is provided in Section 3.9.6.2.

3.9.3 Methods for Evaluating Environmental Impacts

This section defines the GHG RSA and describes the methods used to analyze the impacts on GHG within the RSA.

3.9.3.1 Resource Study Area

As defined in Section 3.1, Introduction, RSAs are the geographic boundaries within which the environmental investigations specific to each resource topic were conducted. For GHG, the RSA comprises the entire state and global atmosphere, for both construction and operations.

3.9.3.2 Data Sources

Impacts of the proposed Project on GHG emissions from construction and operations were assessed and quantified using standard and accepted software tools, techniques, and emission factors. This chapter describes the primary assumptions and methods used to quantify emissions and estimate potential impacts. Model inputs and calculation files can be found in Appendix B.

Construction

Construction of the proposed Project would generate emissions of carbon dioxide (CO_2), CH_4, and nitrous oxide (N_2O) in the RSA. It is expected that construction would occur in three calendar years at the Coast and Niles Subdivisions. Emissions would originate from off-road equipment exhaust, employee and haul truck vehicle exhaust (on-road vehicles), and locomotive exhaust. These emissions would be temporary (i.e., limited to the construction period) and would cease when construction activities are complete.

Emissions estimates for construction of the proposed Project were based on engineering inputs. Total emissions from construction of the proposed Project are presented at the average daily time scale and are compared with BAAQMD construction thresholds.

- **Off-Road Equipment**: Emission factors for off-road construction equipment (e.g., loaders, graders, bulldozers) were obtained from the CalEEMod (version 2022.1) User's Guide appendix, which provides values per unit of activity (in grams per horsepower-hour) by calendar year (Appendix B). GHG emissions were estimated by multiplying the CalEEMod emission factors by the equipment inventory provided by the proposed Project engineers.
- **On-Road Vehicles:** On-road vehicles (e.g., pickup trucks, flatbed trucks) would be required for material and equipment hauling, onsite crew and material movement, and employee commuting. Exhaust emissions from on-road vehicles were estimated using the EMFAC2021 emissions model and activity data provided by the proposed Project engineers (Berger pers. comm.; Abi-Hanna pers. comm.). Emission factors for haul, concrete, and water trucks are based on aggregated-speed emission rates for EMFAC's "MHDT" and "HHDT" vehicle categories.[2] Factors for employee commute vehicles are based on a weighted average for all vehicle speeds for EMFAC's "LDA," "LDT1," and "LDT2" vehicle categories.[3]
- **Locomotives:** Emissions from diesel-powered locomotives used to transport rail materials were quantified using the EPA's locomotive engine emission standards (EPA 2009) and activity data provided by the project engineers (Berger pers. comm.; Abi-Hanna pers. comm.). The load factors for the locomotives were calculated using the duty cycle weighting factors defined by the EPA used to calculate cycle-weighted average emission rates[4]. These duty cycle weighting

[2] These categories represent medium-heavy duty and heavy-duty trucks.

[3] These categories represent light-duty autos, and two different sizes of light-duty trucks.

4 Most locomotives have eight engine notch settings, which correspond to power output. In lower notch settings, which are used for acceleration, the engines run less efficiently and produce more emissions per output unit.

factors represent the time spent in each mode (i.e. throttle notches 1-8, idle, and dynamic brake) (CARB 2016). The duty cycle weighting factors for line haul locomotives were used to calculate the load factor for locomotives hauling ballast to and from the site (i.e. off-site locomotives), while the factors for switch locomotives were used to calculate the load factor for locomotives operating on-site and within the proposed Project alignment. The approximate horsepower values for each mode of operation were estimated using power values by notch setting from EPA's *Locomotive Emission Standards Regulatory Support Document* (EPA 1998). All locomotives were assumed to utilize a 4,400 horsepower, Tier 3 engine.

Operations

Displaced Vehicle Miles Traveled

Operation of the proposed Project would improve Capitol Corridor passenger rail service between Oakland and San Jose. The resulting reduction in automobile vehicle usage is quantified by year and scenario as part of this analysis. The VMT data were estimated using a regional travel demand model that covers the geographic extent of the Bay Area region.[5] Data have been provided for 2025 and 2040, and for two scenarios (No Project Alternative and Proposed Project). The VMT was separated into 5-mph speed groupings, or "speed bins." The GHG emissions reductions achieved by displaced VMT were estimated using emission factors from EMFAC2021. In 2025, the proposed Project would reduce VMT by approximately 24,000 miles per day relative to the No Project Alternative, and, in 2040, the VMT reduced would be approximately 33,000 miles per day. Appendix B contains additional details regarding the calculations for quantifying emissions from displaced VMT.

Ardenwood Station Operational Emissions

The new Ardenwood Station would generate GHG emissions from the use of landscaping equipment (i.e. area sources), consumption of electricity (i.e. energy sources), and combustion emissions from the occasional use of a diesel-powered emergency generator (i.e. stationary sources).

The area and stationary source emissions at the Ardenwood Station were estimated in CalEEMod Version 2022.1 based on the estimated size of the station platform and parking garage. The CalEEMod model includes standard land use categories that can be used to represent a project (e.g. residential, commercial, industrial, parking, etc.), and these land use categories have corresponding emissions rates for landscaping equipment and electricity use. Although a train station is not a land use category option in CalEEMod, similar and representative land use categories can be used for comparison. For example, a train boarding platform is a flat, paved surface and can be represented by a land use category that also has those characteristics (e.g., a parking lot). As such, the station platform was modeled using the "parking lot" land use category, while the parking garage was modeled using the "enclosed parking with elevator" land use category.

GHG emissions from the emergency generator were quantified based on the anticipated operating characteristics of the emergency generator at the station and emission factors from CalEEMod. The generator would require testing periodically to ensure that it is functioning properly and would also require operation during power outages. Thus, it was assumed that the generator would operate for 150 hours per year, based on the recommendation of BAAQMD, which accounts for both routine testing (50 hours) and emergency operations (100 hours) (BAAQMD 2023).

[5] For more details on how VMT has been estimated, please refer to Section 3.18 *Transportation*.

On-road vehicle trips to and from the station would also result in emissions from vehicle exhaust pipes because passengers would travel in their vehicles to and from the station to use the train. These emissions are reflected in the changes in VMT resulting from proposed Project implementation, and the methods for calculating those emissions are presented above in *Displaced Vehicle Miles Traveled* discussion.

It should also be noted that implementation of the proposed Project would result in two existing Capitol Corridor stations no longer being used for Capitol Corridor service. The Fremont-Centerville station would continue to be serviced by ACE commuter rail, while the Hayward station would not have any rail service. The removal of service at these two stations may result in GHG emissions reductions; however, emissions reductions are likely to be minor, because train station operations are not major sources of emissions. Regardless, this analysis does not account for any potential reduction in emissions from the removal of Capitol Corridor service. The analysis is thus conservative, because it includes operational emissions from the new Ardenwood Station but does not take credit for reduced operational emissions from the two existing stations.

Changes to Locomotive Emissions

Capitol Corridor Locomotives

The proposed Project would reduce rail travel time between Oakland and San Jose. This would be accomplished by shortening the route that Capitol Corridor trains would travel between the two cities. Although the proposed Project would not increase the number of passenger trains on the route, the exhaust emissions from locomotives may be affected by the change in route. Most locomotives have eight engine notch settings, which correspond to power output. In lower notch settings, which are used for acceleration, the engines run less efficiently and produce more emissions per output unit. Since the Coast subdivision would only have one station stop instead of two under the existing route, the proposed Project would result in less locomotive acceleration time, and thus fewer emissions would be produced.

Additionally, the Coast Subdivision is a comparatively straighter route with fewer turns than the Niles Subdivision. This would result in higher speeds and higher fuel consumption, which could partially offset the benefit from the reduced acceleration. However, trains on the Coast Subdivision would also travel a shorter distance than on the Niles Subdivision, which would lower fuel consumption. Overall, it is anticipated that emissions levels from use of the Coast Subdivision would be similar or slightly less compared to use of the Niles Subdivision.

Freight Locomotives

The proposed Project would not change freight operations. Therefore, it is assumed that there would be no change in freight locomotive emissions as a result of the proposed Project. Freight locomotives would continue to use the subdivisions within the Project Study Area and it is expected that such train traffic would grow each year. The 2018 California State Rail Plan anticipates rail traffic in California will increase at a compound annual growth rate of 2.9 percent through 2040, and rail carload traffic will increase at a compound annual growth rate of 1.7 percent through 2040 (Caltrans 2018).

3.9.3.3 CEQA Thresholds

To satisfy CEQA requirements, GHG emissions impacts were analyzed in accordance with Appendix G of the CEQA Guidelines. According to the CEQA Guidelines, CCR, Title 14, Section 15002(g), "a significant effect on the environment is defined as a substantial adverse change in the physical conditions which exist in the area affected by the proposed project." As stated in CEQA Guidelines Section 15064(b)(1), the significance of an activity may vary with the setting. The impact analysis identifies and analyzes construction (short-term) and operation (long-term) impacts, as well as direct and indirect impacts (see PRC Section 21065). The proposed Project would have significant GHG emissions impacts under CEQA if it would:

a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The CEQA Guidelines Section 15125 indicate that existing conditions at the time a notice of preparation is released or when environmental review begins "normally" represent the baseline for environmental analysis. 2010, the California Supreme Court issued an opinion holding that while lead agencies have some flexibility in determining what constitutes the baseline, relying on "hypothetical allowable conditions" when those conditions are not a realistic description of the conditions without the proposed Project, would be an illusory basis for a finding of no significant impact from the proposed Project and, therefore, a violation of CEQA (*Communities for a Better Environment v. South Coast Air Quality Management District* [2010] 48 Cal. 4th 310).

On August 5, 2013, the California Supreme Court issued a decision on *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (57 Cal. 4th 439) which clarified that, under certain circumstances, a baseline may reflect future, rather than existing, conditions. The ruling specifies that factual circumstances can justify an agency departing from that norm in the following circumstances when such reasons are supported by substantial evidence.

When necessary to prevent misinforming or misleading the public and decision makers.

When the use of future conditions in place of existing conditions is justified by unusual aspects of the project or surrounding conditions. With respect to the proposed Project, using existing conditions to evaluate GHG impacts would misrepresent and mislead the public and decision makers with respect to potential GHG impacts, for the following reasons:

1. On-road vehicle emissions rates are anticipated to lessen in the future due to continuing engine advancements and more stringent air quality regulations. Evaluating the VMT displacement for existing conditions (2019) and quantifying emissions utilizing 2019 vehicle emissions rates would represent a fictitious scenario and would overestimate emissions reductions and potential GHG benefits achieved by the proposed Project.
2. Using the relatively higher "existing conditions" emissions factors to quantify emissions reduction benefits associated with proposed Project-related VMT reductions in 2025 and 2040 would overstate the proposed Project's emissions reduction benefits.

These facts represent substantial evidence in support of using a future conditions analysis, rather than existing conditions, to evaluate GHG impacts. Accordingly, this analysis evaluates the proposed Project emissions in the opening year (2025) and horizon year (2040) conditions, compared to the No Project Alternative in these same years. This approach reflects appropriate vehicle fleet characteristics and emission factors. Using future year conditions as the basis for the CEQA analysis avoids misinforming and misleading the public and decision-makers with respect to GHG impacts, consistent with current CEQA case law.

Supplemental Thresholds

GHG emissions and global climate change represent cumulative impacts of human activities and development projects locally, regionally, nationally, and worldwide. GHG emissions cumulatively contribute to the significant adverse environmental impacts of global climate change. No single project could generate enough GHG emissions to noticeably change the global average temperature; instead, the combination of GHG emissions from past, present, and future projects and activities have contributed and will contribute to global climate change and its associated environmental impacts.

BAAQMD does not have an adopted significance threshold for construction-related GHG emissions. However, GHG emissions that would occur during construction have been quantified, and a determination is made for the significance of these construction generated GHG emissions impacts in relation to meeting the state's GHG reduction goals.

With respect to operational GHG significance thresholds, BAAQMD released *CEQA Thresholds for Evaluating the Significance of Climate Impacts from Land Use Projects and Plans* in April 2022 and incorporated this report into the 2022 CEQA Guidelines. The BAAQMD report introduces proposed updates to the CEQA GHG thresholds from the 2017 CEQA Guidelines, which were not consistent with the statewide GHG target established by SB 32. These proposed GHG thresholds of significance were updated to consider newer state reduction targets (e.g., SB 32) and eventual carbon neutrality by 2045 (e.g., EO B-55-18), as well as evolving case law. In summary updated thresholds emphasize:

- Avoiding wasting electricity and developing fossil fuel infrastructure in new buildings that will be in place for decades and thus conflict with carbon neutrality by 2045;
- Compliance with CALGreen Tier 2 electric vehicle requirements and per capita VMT reductions consistent with SB 743; and
- Consistency with a qualified greenhouse reduction strategy (also known as a CAP).

These thresholds are applicable to typical land use development projects, such as residential, office, retail, or industrial projects. Because the proposed Project is a rail infrastructure improvement project, the BAAQMD thresholds for operations are not used. Therefore, direct and indirect GHG emissions are discussed with respect to larger statewide GHG emission reduction goals, where a significant impact would occur if emissions would obstruct attainment of the targets outlined under SB 32, or AB 1279. Additionally, the BAAQMD has adopted air quality plans to protect the climate, including the 2017 Clean Air Plan, which is also used to inform the proposed Project's impacts. The 2017 Clean Air Plan outlines feasible measures to reduce GHG to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050.

3.9.4 Affected Environment

3.9.4.1 Environmental Setting

Global Climate Change

The process known as the greenhouse effect keeps the atmosphere near Earth's surface warm. The greenhouse effect is created by sunlight that passes through the atmosphere. Some of the sunlight striking Earth is absorbed and converted to heat, which warms the surface. The surface emits a portion of this heat as infrared radiation, some of which is re-emitted toward the surface by GHG. Human activities that generate GHG increase the amount of infrared radiation absorbed by the atmosphere, thus enhancing the greenhouse effect and amplifying the warming of Earth.

Increases in fossil fuel combustion and deforestation have exponentially increased concentrations of GHGs in the atmosphere since the Industrial Revolution (Intergovernmental Panel on Climate Change [IPCC] 2007). Rising atmospheric concentrations of GHG in excess of natural levels result in increasing global surface temperatures; a process commonly referred to as global warming. Higher global surface temperatures, in turn, result in changes to Earth's climate system, including increased ocean temperature and acidity, reduced sea ice, variable precipitation, and increased frequency and intensity of extreme weather events (IPCC 2018a). Large-scale changes to Earth's system are collectively referred to as climate change.

IPCC was established by the World Meteorological Organization and United Nations Environment Programme to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC estimates that human-induced warming reached approximately 1°C above pre-industrial levels in 2017, increasing at 0.2°C per decade. Under the current nationally determined contributions of mitigation from each country until 2030, global warming is expected to rise to 3°C by 2100, with warming to continue afterwards (IPCC 2018b). Large increases in global temperatures could have substantial adverse effects on the natural and human environments worldwide and in California.

Greenhouse Gas Emission Inventories

A GHG inventory is a quantification of all GHG emissions and sinks[6] within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (e.g., for global and national entities) or on a small scale (e.g., for a building or person). Although many processes are difficult to evaluate, several agencies have developed tools to quantify emissions from certain sources. Table 3.9-1 outlines the most recent global, national, statewide, and local GHG inventories to help contextualize the magnitude of potential Project-related emissions. At the local level, all municipalities in the proximity of the RSA that have prepared a GHG inventory are included in Table 3.9-1.

[6] A GHG sink is a process, activity, or mechanism that removes a GHG from the atmosphere.

Table 3.9-1. Global, National, and State GHG Emissions Inventories

Emissions Inventory	CO_2e (metric tons)
2017 IPCC Global GHG Emissions Inventory	53,500,000,000
2021 EPA National GHG Emissions Inventory	5,586,000,000
2020 CARB State GHG Emissions Inventory	369,200,000
2011 BAAQMD GHG Emissions Inventory	86,600,000
2017 City of Oakland GHG Emissions Inventory	2,643,884
2010 City of Fremont GHG Emissions Inventory	1,516,500
2005 City of Hayward GHG Emissions Inventory	1,183,274
2019 Unincorporated Alameda County GHG Emissions Inventory	43,372
2015 City of San Leandro GHG Emissions Inventory	636,172
2005 City of Newark GHG Emissions Inventory	433,857
2005 City of Union City GHG Emissions Inventory	342,297

Sources: IPCC 2018b.; EPA 2023; CARB 2023b; BAAQMD 2011; City of Oakland 2020; City of Fremont 2014; City of Hayward 2009; Alameda County 2021; City of San Leandro 2017; City of Newark 2010; City of Union City 2010.
Note: Emissions in the table are presented in terms of carbon dioxide equivalent (CO_2e)

Potential Climate Change Effects

Climate change is a complex process that has the potential to alter local climatic patterns and meteorology. Although modeling indicates that climate change will result in sea level rise (both globally and regionally) as well as changes in climate and rainfall, among other effects, there remains uncertainty about characterizing precise local climate characteristics and predicting precisely how various ecological and social systems will react to any changes in the existing climate at the local level. Regardless of this uncertainty, it is widely understood that substantial climate change is expected to occur in the future, although the precise extent will take further research to define. With respect to central-western California, including the Project Study Area, climate change effects are expected to include the following conditions (PRBO Conservation Science 2011):

- Hotter and drier climate, with average annual temperatures increasing 1.6 to 1.9°F by 2070 and mean annual rainfall decreasing by 2.4 to 7.4 inches.

- Sea level rise by 3.4 to 5 inches by 2020 to 2050 and by 7.6 to 16 inches by 2070 to 2099, potentially affecting or flooding coastal development.
- More frequent and intense wildfires, with the area burned projected to increase by an estimated 10 to 50 percent by 2070 to 2090.
- Decreases in chaparral/coastal scrub (19 to 43 percent by 2070) and blue oak woodland/ foothill pine (44 to 55 percent by 2070); increases in grassland (85 to 140 percent by 2070).
- Increased salinity in the San Francisco Bay, especially during dry years.
- Increase in estuarine flows into the San Francisco Bay, with winter gains approximately balancing spring-summer losses.

Increased heat and decreased air quality, with the result that public health will be placed at risk, native plant and animal species may be lost, and there will be an estimated 60 percent growth in electricity consumption.

Pollutants of Concern

The principal human-made GHGs contributing to global warming are CO_2, CH_4, N_2O, and fluorinated compounds, including sulfur hexafluoride (SF_6), HFCs, and perfluorocarbons (PFCs). Water vapor, the most abundant GHG, is not included in this list because its natural concentrations and fluctuations far outweigh its human-made sources.

The primary GHGs of concern generated by the proposed Project are CO_2, CH_4, and N_2O. Principal characteristics of these pollutants are discussed below.

- CO_2 enters the atmosphere through fossil fuels (oil, natural gas, and coal) combustion, solid waste decomposition, plant and animal respiration, and chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere when it is absorbed by plants as part of the biological carbon cycle.
- CH_4 is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal solid waste landfills.
- N_2O is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

GHGs are described in terms of a single gas to simplify reporting and analysis. The most commonly accepted method to compare GHG emissions is the global warming potential (GWP) that calculates all GHG emissions in terms of carbon dioxide equivalent (CO_2e), which compares the gas in question to that of the same mass of CO_2.

Table 3.9-2 lists the global warming potential of CO_2, CH_4, and N_2O and their lifetimes in the atmosphere.

Table 3.9-2. Global Warming Potentials and Lifetimes of Key GHG

Greenhouse Gas	Global Warming Potential (100 years)	Lifetime (years)
CO_2	1	50–200
CH_4	25	9–15
N_2O	298	121

Source: CARB 2022c.

3.9.5 Best Management Practices

As noted in Chapter 2, Project Alternatives, CCJPA would incorporate a range of BMPs to avoid and minimize adverse effects on the environment that could result from implementation of the proposed Project. BMPs are included in the proposed Project description, and the impact analyses were conducted assuming application of these practices. The BMPs relevant to GHG are listed below. Full descriptions of the BMPs are provided in Chapter 2, Project Alternatives.**BMP GHG-1. Implement BAAQMD Construction Measures.**

3.9.6 Environmental Impacts

This section describes the potential environmental impacts on GHG as a result of implementation of the proposed Project. Lettering shown within title for each environmental factor below correlates with CEQA Statute and Guidelines, Appendix G table lettering and numbering.

3.9.6.1 (a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

No Project Alternative

No Impact. Under the No Project Alternative, the Capitol Corridor passenger rail service between Oakland and San Jose would not be relocated from the Niles Subdivision to the Coast Subdivision. Capitol Corridor passenger trains and UPRR freight trains would continue to operate based on current routes with no changes to connectivity or rail efficiency. The 2018 California State Rail Plan forecasts that rail intermodal traffic in California will increase at a compound annual growth rate of 2.9 percent through 2040 while rail carload traffic will increase at a compound annual growth rate of 1.7 percent through 2040. The projected annual growth rate for rail traffic would result in the generation of additional GHG emissions, causing the level of emissions associated with the existing conditions to increase annually. However, the forecast projected growth along the rail corridor would still occur with or without Project implementation. The No Project Alternative would not result in the implementation of the proposed Project. Therefore, under the No Project Alternative, no additional GHG emissions beyond existing conditions associated with the proposed Project would be generated and there would be no impact.

Proposed Project

Construction

Less Than Significant Impact. Construction of the proposed Project has the potential to create GHG impacts through the use of heavy-duty construction equipment, construction worker vehicle trips, truck hauling trips, and locomotive trips. Table 3.9-3 summarizes estimated construction-related GHG emissions in the BAAQMD in metric tons (MT) per year. Refer to Appendix B for more detailed inputs on the emissions calculations.

Table 3.9-3. Estimated Project Construction GHGs

Construction Year	Annual Emissions (Metric Tons per Year)			
	CO_2	CH_4	N_2O	CO_2e
Year 1	3,498	<1	<1	3,557
Year 2	3,969	<1	<1	4,033
Year 3	666	<1	<1	675
Total	**8,133**	**—**	**—**	**8,266**

Source: Appendix B

As shown in Table 3.9-3, the proposed Project would result in 8,266 MT CO_2e. Construction emissions would cease once construction of the project is complete and are considered short term.

BAAQMD CEQA Guidelines do not identify a GHG emissions threshold for construction-related emissions; however, they do recommend that GHG emissions from construction be quantified and disclosed and a determination regarding the significance of the GHG emissions be made with respect to whether the project in question is consistent with state goals regarding reductions in GHG emissions. **BMP GHG-1: Implement BAAQMD Construction Measures** minimizes GHG emissions during construction. This measure would reduce GHG emissions by encouraging alternative-fueled construction vehicles and equipment, use of local building materials, and recycling or reuse of construction debris. Implementation of BMP GHG-1 would ensure that GHG emissions during construction would be minimized, which would avoid conflict with statewide emissions reduction goals.

Operations

Less than Significant. Operation of proposed Project has the potential to create GHG emissions impacts through operation of the new Ardenwood Station. However, proposed Project operations would also improve existing passenger rail services, which would reduce single-occupancy VMT in the region. GHG emissions and reductions generated by these sources were quantified for 2025 and 2040 conditions to evaluate the changes in regional emission as a result of the proposed Project. As noted above in Section 3.9.3, Methods for Evaluating Impacts, emissions from the station operations include combustion emissions from landscaping equipment and an emergency generator.

Additionally, the analysis is conservative, because it does not account for any emissions reductions that may occur from the removal of Capitol Corridor service at the two existing stations.

Table 3.9-4 summarizes the difference in operational emissions for two years between the No Project Alternative and the proposed Project.

Table 3.9-4. Estimated Project Operational GHGs

Operational Year, Scenario, and Emissions Source	Annual Emissions (Metric Tons per Year)			
	CO_2	CH_4	N_2O	CO_2e
2025				
No Project Alternative Total	18,003,675	154	307	18,098,939
On-Road Vehicle Emissions	18,003,675	154	307	18,098,939
Proposed Project Total	18,001,772	154	307	18,097,027
On-Road Vehicle Emissions	18,001,772	154	307	18,097,027
Station Operations	32	<0.01	<0.01	32
Net Change 2025[1]	**-1,870**	**-0.01**	**-0.03**	**-1,880**
2040				
No Project Alternative Total	16,089,841	81	223	16,158,291
On-Road Vehicle Emissions	16,089,841	81	223	16,158,291
Proposed Project Total	16,087,802	81	223	16,156,243
On-Road Vehicle Emissions	16,087,770	81	223	16,156,211
Station Operations	32	<0.01	<0.01	32
Net Change 2040[1]	**-2,039**	**-0.01**	**-0.03**	**-2,048**

Source: Appendix B
Notes: 1. Negative values represent a net reduction in GHG emissions.

As shown in Table 3.9-4, the proposed Project would result in a net reduction in vehicle-related emissions even though there is a minor increase in emissions from station operations. The overall net effect in 2025 and 2040 would be a GHG emissions decrease of 1,880 and 2,048 MT CO_2e, respectively. In general, the effect from reducing VMT becomes less beneficial per mile reduced in future years, because vehicles will become lower emitting in future years from improved technology, more stringent standards and regulations, and turnover of the existing vehicle fleet. As such, there is a lesser beneficial effect in 2040 for each mile reduced; however, more miles would be reduced in 2040 and thus the reduction would be greater in 2040 than in 2025.

As noted in Table 3.9-3, construction of the proposed Project would result in GHG emissions of 8,266 MT CO_2e. Conversely, the operational period would result in a net decrease in GHG emissions of 1,880 MT (in 2025) and 2,048 MT (in 2040) relative to the No Project Alternative each year. As such, the emissions generated during the construction period would be offset in approximately 2 to 5 years of operation and, after that, the proposed Project would further decrease emissions relative to the No Project Alternative each year. Although there are no applicable operational GHG significance thresholds for this type of project, it is clear that the proposed Project would not result in GHG emissions that would directly or indirectly have a significant impact on the environment, because the net negative emissions help achieve and are thus consistent with state and local GHG goals. Because the proposed Project would have net negative GHG emissions, the impact would be less than significant.

3.9.6.2 (b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases

No Project

No Impact. Under the No Project Alternative, the Capitol Corridor passenger rail service between Oakland and San Jose would not be relocated from the Niles Subdivision to the Coast Subdivision. Capitol Corridor passenger trains and UPRR freight trains would continue to operate based on current routes with no changes to connectivity or rail efficiency. As discussed above, the projected annual growth rate for rail traffic would result in the generation of additional GHG emissions, causing the level of emissions associated with the existing conditions to increase annually. However, the forecast projected growth along the rail corridor would still occur with or without Project implementation. Therefore, the No Project Alternative would not result in additional GHG emissions beyond the existing conditions and would thus not conflict with any plans, policies, or regulations adopted for the purpose of reducing GHG emissions. There would be no impact.

Proposed Project

Construction and Operations.

Less Than Significant Impact. CARB adopted the 2017 Climate Change Scoping Plan to meet the GHG reduction requirement set forth in SB 32 and the 2022 Scoping Plan to meet the GHG reduction requirement set forth in AB 1279. In addition, the MTC and ABAG have adopted their RTP/SCS to reduce transportation-related emissions throughout the region. Further, one of the primary goals of BAAQMD's 2017 Clean Air Plan is to protect the climate and reduce Bay Area GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. This analysis also considers the long-range (2045) reduction target outlined in SB 1279. Consistency with these plans

is the basis for determining whether the proposed Project would conflict with an applicable plan, policy, or regulation for the purposes of reducing the emissions of GHG.

The proposed Project proposes to reroute Capitol Corridor passenger rail service to the UPRR Coast Subdivision from the UPRR Niles Subdivision between Oakland Coliseum and Newark Junction and to construct a new intermodal train station along the Coast Subdivision. The purpose and need of the proposed Project support the primary goals of the current Scoping Plan, RTP/SCS, and 2017 Clean Air Plan by reducing passenger rail travel time between Oakland and San Jose and throughout the larger region to increase ridership on transit, ease congestion on roadways, and reduce auto commute times. Increasing transit ridership, easing congestion, and reducing commute time will reduce GHG, thus helping the region and state reach its GHG goals. The proposed Project will also enhance connections between high-demand destinations, overcoming existing geographic service gaps between job centers and affordable housing on the San Francisco Peninsula and the Capitol Corridor route. Access to affordable housing is one of the multi-layered issues that affect GHG, and the proposed Project will help bridge the gap and help the state and region reach their GHG reduction goals.

The proposed Project would improve existing passenger rail and thus encourage and induce increased ridership through improved system operations. The Scoping Plan includes strategies to reduce single-occupancy vehicle usage and to increase alternative transportation. One of the strategies for success listed in CARB's 2022 Scoping Plan Update is to "Invest in making public transit a viable alternative to driving by increasing affordability, reliability, coverage, service frequency, and consumer experience" (CARB 2022b). The proposed Project supports this strategy by improving the efficiency of public transit, making it a more viable alternative to driving in the proposed Project region. The proposed Project would support implementation of Plan Bay Area 2050 by reducing VMT.

Additionally, the proposed Project is mentioned in the 2018 California State Rail Plan, which has a service goal to "improve service speeds and frequencies between San Jose and Oakland with track and ROW improvements, and by introducing an optimized rail schedule that better uses capacity available under existing and enhanced railroad agreements across all intercity and regional rail service providers" (Caltrans 2018). Thus, the proposed Project helps to support that service goal from the State Rail Plan.

Because the proposed Project will facilitate more auto-competitive travel times for intercity passenger rail trips and create new connections to Transbay transit services and destinations on the San Francisco Peninsula, it directly supports and advances measure TR4: Local and Regional Rail Service from the BAAQMD's 2017 Clean Air Plan. Support and advancement of this measure contributes to the BAAQMD efforts to achieve a primary goal of the 2017 Clean Air Plan, which is to reduce Bay Area GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. These GHG goals are consistent with the State's effort to reduce GHG emissions in accordance with SB 32.

Operation of the proposed Project would result in a net reduction in GHG emissions relative to the No Project Alternative (Table 3.9-4), and the emission reductions would facilitate attainment of state and regional GHG reduction goals, including SB 32, AB 1279, and the BAAQMD's 2017 Clean Air Plan goals. Additionally, a net reduction in annual GHG emissions from the proposed Project would also be consistent with the most recent long-term trajectory of statewide climate change planning, as represented by the long-term goal of carbon neutrality by 2045 per SB 1279. The proposed

Project would be consistent with both the 2030 reduction goal and 2045 carbon neutral target. Therefore, this impact would be less than significant.

3.9.7 Mitigation Measures

No mitigation measures associated with GHG are required for the proposed Project.

3.9.8 Cumulative Impact Analysis

Cumulative impacts can result from individually minor but collectively substantial impacts from past, present, and reasonably foreseeable future projects (those actions that are likely or probable, versus actions that are merely possible) taking place over a period of time. A cumulatively considerable impact to GHGs would occur if the proposed Project when combined with past, present, and reasonably foreseeable projects, results in cumulatively considerable contribution to global climate change. The cumulative RSA for GHGs comprises the entire state and global atmosphere. The cumulative RSA captures potential construction and operational impacts on GHG emissions generated from the combined effects of planned projects and the proposed Project.

During construction, all planned projects in the Project Study Area and within the entire state would emit GHGs from either construction and/or during operational activities. Although there may be planned projects occurring near the proposed Project, climate change is a global phenomenon, and has countless individual contributions from past, present, and future sources. Emissions of GHGs, regardless of the location, contribute to climate change. As noted above, the RSA for GHGs is the entire atmosphere, and, as such, discussing individual planned projects in the RSA does not yield useful information. The project-level analysis above is inherently cumulative.

Construction and operation of other planned projects would result in GHG emissions. In general, projects involving public transit would provide alternatives to vehicular travel and usually result in a net reduction in GHG emissions relative to vehicular travel. If cumulative transportation projects result in a net decrease in VMT, they would reduce GHG emissions. Operation of land development projects would increase GHG pollutant emissions from increased vehicular travel, as well as building energy consumption, waste generation, water and waste treatment, and other sources. The cumulative emission of GHGs from all other planned projects could constitute a significant cumulative impact.

Construction of the proposed Project would generate GHG emissions from the use of heavy-duty construction equipment, construction worker vehicle trips, truck hauling trips, and locomotive trips. Although there is no threshold for construction-period emissions for either project- or cumulative-level impacts, BMP GHG-1 would also reduce GHG emissions during construction. As noted above, construction GHG emissions would be offset within 2 to 5 years of commencing proposed Project operations. Thus, the proposed Project's contribution to cumulative GHG emissions during construction would be less than significant, because operational GHG emissions reductions would more than offset construction emissions in approximately 2 to 5 years.

As discussed above, operation of the proposed Project would result in a net reduction in GHG emissions, relative to the No Project Alternative. Operational GHG reduction benefits from the proposed Project would offset the short-term construction increase in GHG emissions in a few years. Emissions savings achieved thereafter would contribute to reductions in GHG emissions and more than offset the construction period GHG emissions. This reduction would be an environmental

benefit and as a result, the proposed Project's contribution to cumulative GHG emissions during operations would be less than considerable. Additionally, over time, local, state, and federal plans, such as those discussed above, are seeking to dramatically reduce GHG emissions overall.

Based on these factors, the proposed Project would not result in cumulative impacts on GHG emissions when considered with other planned projects. The impacts of the proposed Project therefore would not be cumulatively considerable and therefore the Project would not have a significant cumulative impact associated with GHG emissions.

3.9.9 CEQA Significance Findings Table

Table 3.9-5 summarizes the GHG impacts of the proposed Project.

Table 3.9-5. GHG Impacts Summary

Impact	Level of Significance Before Mitigation	Incremental Project Contribution to Cumulative Impacts	Mitigation	Level of Significance with Mitigation Incorporated	Incremental Project Cumulative Impact after Mitigation
Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment	LTS	NCC	N/A	LTS	NCC
Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases	LTS	NCC	N/A	LTS	NCC

Notes: LTS = Less than Significant Impact, NI = No Impact, N/A = Not Applicable, SI = Significant Impact, S/M = Significant Impact but Mitigable to a Less than Significant Level, CC = Cumulatively Considerable, NCC = Not Cumulatively Considerable.

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