3.7 Greenhouse Gas Emissions

3.7.1 Introduction

This section discusses the Project setting in relation to greenhouse gas (GHG) emissions. It describes existing conditions, current regulatory setting, and potential impacts from operation and construction of the Build Alternatives, including design options and MSF site options. Information in this section is based on the Eastside Transit Corridor Phase 2 Climate Change and Greenhouse Gases Impacts Report (Appendix H). The study area for climate change and greenhouse gas emissions is the GSA.

3.7.2 Regulatory Framework

3.7.2.1 Federal

A 2007 United States Supreme Court ruling (*Massachusetts et al. v. Environmental Protection Agency et al.* [U.S. Supreme Court No. 05–1120] found that GHGs are air pollutants under the Clean Air Act and can be regulated by the U.S. Environmental Protection Agency (USEPA). Following this decision, the USEPA published its endangerment finding in 2009 which found that six GHGs, taken in combination, endanger both the public health and welfare of current and future generations. The endangerment finding did not impose any requirements on industry or other entities, but it was a prerequisite for implementing GHG emissions standards for vehicles.

3.7.2.1.1 Greenhouse Gas and Fuel Efficiency Standards for Clean Vehicles

The USEPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) has finalized several joint rules to establish programs designed to reduce GHG emission and to improve fuel economy for cars and trucks.

Passenger Cars and Light-Duty Trucks

In April 2010, the USEPA and NHTSA finalized standards for new (model year 2012 through 2016) passenger cars, light-duty trucks, and medium-duty passenger vehicles and in August 2012, issued joint Final Rule for national program standards for future light-duty vehicles (model year 2017 through 2025). In August 2018, the USEPA and NHTSA proposed the "Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks" (SAFE Vehicles Rules) to amend existing Corporate Average Fuel Economy (CAFE) and tailpipe carbon dioxide (CO_2) emissions standards for light-duty vehicles and establish new standards covering model years 2021–2026. On April 30, 2020, the SAFE standards for model year 2021–2026 light-duty vehicles were made final.

The USEPA also proposed to withdraw the waiver previously provided to California under Section 209 of the Clean Air Art for the state's GHG and Zero Emission Vehicle (ZEV) programs by setting nationally applicable fuel economy standards that would preempt those State programs. On September 27, 2019, the USEPA and NHTSA published its Final Rule to revoke California's waiver and establish the federal preemption in the FR (84 FR 51310). California and a coalition of other states has sued both the USEPA and the NHTSA, challenging their decisions that would block states from setting

tougher automobile emissions standards. Litigation was held in abeyance pending review under Presidential Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. In accordance with this order, on April 22, 2021, the NHTSA proposed to repeal the SAFE vehicle rule preemption on state fuel efficiency and GHG standards (86 FR 25980), and on August 10, 2021, new CAFE standards were proposed for 2024-2026 model year light-duty vehicles (86 FR 43726). On March 14, 2022, the USEPA issued a notice of decision rescinding the 2019 action withdrawing California's CAA waiver of preemption for GHG emission standards and ZEV, and on March 28, 2022, proposed an updated clean truck rule to reduce national air pollution from highway heavy-duty vehicles and engines, including ozone, particulate matter, and GHGs (87 FR 14332; 87 FR 17414).

Medium and Heavy-Duty Engines and Vehicles

In October 2010, the USEPA and NHTSA announced a program to reduce GHG emissions and to improve fuel efficiency for medium- and heavy-duty vehicles (model years 2014 through 2018). This program was adopted on August 9, 2011. In October 2016, phase 2 GHG and fuel efficiency standards for medium- and heavy-duty vehicles were adopted.

Fuel Efficiency Standards for Construction Equipment

The regulations, contained in 40 Code of Federal Regulations (CFR) Parts 1039, 1065, and 1068, set fuel efficiency standards for nonroad diesel engines that are used in construction equipment. In 2011, USEPA adopted a comprehensive national program to reduce emissions from nonroad diesel engines. Since 2015, all newly manufactured mobile nonroad diesel engines have been required to meet the strictest Tier 4 emission standards of this program. To meet these Tier 4 emission standards, engine manufacturers have produced new engines with advanced emission control technologies.

3.7.2.2 State

Multiple state laws, regulations, and programs within the state of California govern GHG emissions, primarily through regulating emission standards for vehicles.

3.7.2.2.1 California Advanced Clean Cars Program

California Assembly Bill (AB) 1493 required the California Air Resources Board (CARB) to develop and adopt GHG emission standards for automobiles. In 2012, CARB, in coordination with the USEPA and NHTSA, developed a set of regulations that are collectively known as the Advanced Clean Cars Program. The Low-Emission Vehicle III Regulation for GHG (LEV III GHG) builds upon AB 1493, which established GHG emission standards for 2009 through 2016 model year passenger vehicles, by requiring further reductions in passenger vehicle GHG emissions for 2017 and subsequent model years. The LEV III GHG regulation is projected to reduce GHG emissions by 40 percent in 2025 when compared to 2012 model year vehicles. The ZEV regulation also requires auto manufacturers to offer for sale specific numbers of full battery-electric, hydrogen fuel cell, and plug-in hybrid-electric vehicles. Approximately 8 percent of California new vehicle sales in 2025 are predicted to be ZEVs and plug-in hybrids (CARB 2019a).

3.7.2.2.2 California Advanced Clean Cars II Program

On September 16, 2020, CARB held the first public workshop to solicit input on the development of the Advanced Clean Cars II (ACC II) regulations. These regulations will seek to reduce criteria and GHG emissions from new light- and medium-duty vehicles beyond the 2025 model year and increase the number of zero emission vehicles (ZEV) for sale. The proposed Advanced Clean Cars II regulations establish the next set of LEV and ZEV requirements. The regulations are scheduled to go to the CARB Board in summer of 2022.

3.7.2.2.3 California Executive Order S-3-05, B-30-15, and B-55-18

California Executive Order S-3-05 (signed by Governor Schwarzenegger on June 1, 2005) and California Executive Order B-30-15 (signed by Governor Brown in 2015) established GHG emission reduction targets for California by four milestone timeframes (2010, 2020, 2030, and 2050.) The state has been successful in meeting the first two milestones (CARB 2018b, CARB 2021a).

California Executive Order B-55-18 (signed by Governor Brown. on September 10, 2018) established a directive for California to achieve carbon neutrality no later than 2045, and to achieve and maintain net negative emissions thereafter. The order directed CARB to work with relevant state and local agencies to develop a framework for implementation of the order and ensure that future Scoping Plans identify and recommend measure to achieve the State's carbon neutrality goal.

3.7.2.2.4 Global Warming Solutions Act of 2006 (Assembly Bill 32 and Senate Bill 32)

California AB 32, the Global Warming Solutions Act of 2006, codifies the state's GHG emissions targets by requiring the state's global warming emissions to be reduced to 1990 levels by 2020 and directs CARB to enforce the statewide cap. In 2007, CARB recommended and adopted a 1990 GHG emissions level and 2020 emissions limit of 427 million metric tons (MMT) carbon dioxide equivalent (CO_2e) ($MMTCO_2e$); however, this limit has subsequently been updated to 431 $MMTCO_2e$ using the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report global warming potentials (GWPs) (CARB 2014a). The limit is a statewide limit and does not require individual sectors or facilities to reduce emissions equally. Key AB 32 milestones include developing a Scoping Plan indicating how emissions will be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions and implementing a Cap-and-trade program with an emissions cap that declines over time (CARB 2014a). CARB has been proactive in its implementation of AB 32 and has met each of the milestones identified above that have already passed and is on track to meet the last milestone.

In 2016, California Senate Bill (SB) 32 the Global Warming Solutions Act of 2006: Emissions Limit, was passed as a follow up to AB 32. SB 32 requires the CARB to ensure the state's greenhouse gas (GHG) emissions are reduced to 40 percent below the 1990 levels by 2030. SB further requires CARB to expand on or develop new regulations that are technologically reasonable and cost-effective, while also considering the state's most disadvantaged communities.

3.7.2.2.5 Paris Climate Accord - U.S. Climate Alliance

The Paris Climate Accord, an agreement with 200 nations to reduce GHG emissions worldwide, included the United States as one of its founding nations. The United States announced its intention to withdraw from the accord in March 2017, and officially did so on November 4, 2020. Considering

the United States withdrawal, California, under former California Governor Jerry Brown, along with two other states, formed the U.S. Climate Alliance on June 1, 2017. This alliance is a coalition of states that will adhere to the tenets of the Paris Climate Agreement. The U.S. Climate Alliance has since grown to 25 states or United States territories. The United States officially rejoined the Paris Climate Accord on February 19, 2021.

Implementation of AB 32 requires GHG emission reduction to 1990 level by 2020, which is approximately 0.9 percent of 2005 level (CARB 2007, CARB 2018c). Therefore, implementation of AB 32 would ensure California meets the requirements outlined in the U.S. Climate Alliance.

3.7.2.2.6 Senate Bills

California SB 743, enacted in September 2013, stipulated a variety of GHG reduction strategies, including the encouragement of infill development and diversity of land uses and the development of multi-modal transportation networks, and initiated a change to the assessment of transportation-related impacts under CEQA from congestion-based to VMT-based.

SB 375 requires CARB to set regional targets for 2020 and 2035 to reduce GHG emissions from passenger vehicles. Regional targets were developed for each of the 18 metropolitan planning organizations (MPOs) in the state; the Southern California Association of Governments (SCAG) is the MPO that has jurisdiction over the GSA.

Each MPO is required to develop Sustainable Community Strategies (SCS) through integrated land use and transportation planning and to demonstrate an ability to attain the proposed reduction targets by 2020 and 2035. SCAG adopted the latest 2020 RTP/SCS for the six-county Southern California region (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) on September 3, 2020.

SB 49, approved on May 30, 2017, guides state environmental, public health, and worker safety agencies to take all actions within their authority to ensure standards in effect and being enforced as of January 2017 continue to remain in effect. This policy ensures that even if the federal government rolls back or weakens environmental standards, California will continue to make current federal clean air, clean water, climate, worker safety, and endangered species laws enforceable under state law (California Legislative Information Website 2017).

Signed into law in October 2015, SB 350 increases the State's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. In addition, the State is required to double statewide energy efficiency savings in electricity and natural gas end uses by 2030.

3.7.2.2.7 California Executive Order S-01-07 and the Low Carbon Fuel Standard

California Executive Order S-01-07 establishes a statewide goal to reduce the carbon intensity of transportation fuels sold in California by at least ten percent by 2020 from 2005 levels. The Executive Order also mandated the creation of a low carbon fuel standard (LCFS) for transportation fuels. The LCFS requires that the lifecycle GHG emissions for the mix of fuels sold in California decline on average. In 2018, CARB amended the implementing LCFS regulations to require a 20 percent reduction in the carbon intensity of transportation fuels by 2030.

3.7.2.2.8 Innovative Clean Transit Regulation

CARB adopted the Innovative Clean Transit (ICT) Regulation in December 2018 which requires all public transit agencies to gradually transition to a 100 percent zero emission bus (ZEB) fleet. Beginning in 2029, 100 percent of new purchases by transit agencies are required to be ZEBs, with a goal of fully transitioning all fleets by 2040. The regulation applies to all transit agencies that own, operate, or lease buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds and includes standard, articulated, over-the-road, double-decker, and cutaway bus types. Full implementation of the regulation is expected to reduce GHG emissions by 19 million metric tons from 2020 to 2050 – the equivalent of taking 4 million cars off the road, and it will reduce harmful tailpipe emissions (nitrogen oxides and particulate matter) by about 7,000 tons and 40 tons, respectively, during that same 30-year period (CARB 2018d).

3.7.2.2.9 Potential Amendments to the Diesel Engine Off-Road Emission Standards

CARB is currently in the process of working on potential amendments to the off-road diesel engine standards, which is called the Tier 5 rulemaking. This rulemaking could reduce emissions of nitrogen oxides and particulate matter by up to 90 percent and 75 percent when compared to the current Tier 4 standards. Additionally, first-time CO2 emission standards for off-road engines could be proposed. These new Tier 5 emission standards would be expected to begin in 2028 (CARB 2021c).

3.7.2.3 Regional

GHG emissions are regionally overseen by SCAG and the South Coast Air Quality Management District (SCAQMD). In addition, Metro adopted a Green Construction Policy and published the Metro Climate Action and Adaptation Plan.

SCAG adopted the *Connect SoCal 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* (2020 RTP/SCS) for the six-county (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) Southern California region on September 3, 2020. The 2020 RTP/SCS includes various commitments to reduce emissions from transportation sources in compliance with SB 375, including close integration of land use and transportation planning. SCAQMD provides guidance to lead agencies on determining the significance of GHG emission under CEQA SCAQMD has yet to adopt a GHG significance threshold for transportation land use projects.

Metro's Green Construction Policy committed to using greener, less polluting construction equipment and vehicles on all Metro construction projects performed on Metro properties and rights-of-way than the statewide fleet average. This policy, revised in 2017, requires the use of renewable diesel fuel for projects where on-site bulk fuel storage is necessary. This measure would reduce GHG emissions and is a Metro policy that is required for the Project. The Metro Climate Action and Adaptation Plan, builds on Metro's existing commitments to environmental sustainability and stewardship and establishes a framework to reduce GHG emissions.

3.7.2.4 Local

Los Angeles County and the cities within the DSA have local regulations pertaining to GHG emissions. These regulations include the relevant general plan policies, ordinances, and municipal codes of Los Angeles County, and the cities of Commerce, Montebello, Pico Rivera, Santa Fe Springs, and Whittier.

All the various general plan policies and municipal codes, including the Community Climate Action Plan (CCAP) of the Los Angeles County 2035 General Plan (soon to be replaced by the Los Angeles County Climate Action Plan [CAP]), the Pico Rivera General Plan (2014), the Santa Fe Spring's Re-Imagine Santa Fe Springs 2040 General Plan (2021), and the city of Whittier's *Envision Whittier General Plan* (2021) Resource Management Element identify initiatives and policies to reduce GHG emissions and encourage public transportation and transit, which would support GHG emission reductions.

3.7.3 Methodology

The analysis used protocols established by The Climate Registry (TCR), namely the *General Reporting Protocol* (TCR 2019) and the *Local Government Operations Protocol* (TCR 2010). Generally, GHG impact analyses follow the same quantification methodologies as air quality studies for criteria pollutants.

GHG emissions were calculated for direct and indirect sources of GHG, including engine exhaust and purchased electricity; detailed calculations are provided in Attachment A and Attachment B of Appendix H. Emissions were estimated for three GHG pollutants regulated under California and federal mandatory reporting requirements and voluntary reporting registries, such as TCR: CO_2, methane (CH_4), and nitrous oxide (N_2O). Although the Endangerment Finding also regulates three other GHG pollutants— hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) – these pollutants are not emitted as products of engine exhaust or purchased electricity and were not analyzed.[1]

Emissions were converted to CO_2e using the GWPs[2] in the IPCC's Fourth Assessment Report (AR4) and documented in the *Inventory of U.S. Greenhouse Gas Emissions and Sinks* (USEPA 2021a). Although the IPCC has released the Fifth and Sixth Assessment Reports since the AR4 release in 2007, the international standard is to use the AR4 to maintain consistency with GHG emission inventories already compiled.

3.7.3.1 Construction Emissions

The analysis followed the SCAQMD's recommendation in the Interim CEQA GHG Significance Threshold document (2008) that construction emissions be amortized over 30 years (i.e., defined as life of a project) and added to the operational emissions.

Potential emissions of CO_2, CH_4, and N_2O from construction equipment (e.g., bulldozers, scrapers, graders, off-highway trucks) were calculated using the California Emissions Estimator Model (CalEEMod) version 2020.4.0, developed by the California Air Pollution Control Officers Association (CAPCOA) for land use projects. Emission factors from CARB's Emissions Model for Off-road Equipment (OFFROAD) and EMFAC version 2017[3] models are integrated into CalEEMod and are subsequently used to estimate emissions from construction equipment and construction-related on-road vehicle trips. All phases of construction, including street widening and construction of the

1 Although HFCs may be emitted from mobile sources from leaks in air conditioning systems (e.g., HFC-134a), methods for estimating these emissions are limited and are not included in this evaluation.
2 GWPs are defined by CARB as the radiative forcing impact (i.e., degree of warming to the atmosphere) of one mass-based unit of a given GHG relative to an equivalent unit of CO2. For example, one ton of CH4 is equivalent to approximately 25 tons of CO2 in the atmosphere.
3 The Emission Factors (EMFAC) model is used to calculate emission rates from on-road motor vehicles in California. EMFAC2017 is the most recent version of the model approved by the USEPA for regulatory purposes.

guideway, stations, parking facilities, and an MSF site option, were included in the construction emissions calculations.

The Metro Green Construction Policy requires the use renewable diesel fuel if reasonably available in the vicinity of the Project. Emissions benefits associated with this measure were not included in the analysis due to uncertainty in the availability of renewable diesel fuel in the vicinity of the Project at the time of buildout. Actual construction GHG emissions would be lower than those estimated in this analysis due to the incorporation of renewable diesel fuel, therefore the analysis presented in this section is conservative.

3.7.3.2 Operational Emissions

Vehicle engine exhaust emissions were calculated to quantify the effects of Project-related reductions in highway traffic vehicle miles traveled (VMT) on regional GHG emissions. EMFAC2017[4] was used to develop an aggregated highway traffic emission factor for an average highway network speed of 35 miles per hour under the existing conditions and an average highway network speed of 30 miles per hour under future conditions.[5] These aggregated factors were multiplied by projected regional highway VMT to quantify regional highway traffic emissions. Increased transit rider trips to stations proposed under each alternative were included in the alternative's regional traffic analysis. Regional traffic data, including average network speeds, were obtained from the Project's traffic analysis for each alternative.

Although LRVs do not directly emit GHG, the GHG analysis quantified emissions resulting from the remote generation of electricity to run the LRVs and to power the facilities at the proposed stations. Emissions from power generation for the electricity needed to operate the LRVs were estimated from the route distance, headway between trains, and the average energy intensity for the train operation. The Federal Transit Administration (FTA)'s National Transit Database (NTD) (2019) was used to estimate the average energy intensity for Metro's LRT service. Chester and Horvath (2008) have published various fundamental environmental factors for rail. Electricity usage factors for San Francisco Municipal Railway (Muni) (San Francisco), Massachusetts Bay Transportation Authority (MBTA) Green Line (Boston), and Bay Area Rapid Transit (BART) (San Francisco) were used to estimate emissions from train control. CalEEMod default energy usage factors for surrogate land uses were used to estimate emissions at the LRT stations, an MSF site option, and parking facilities. CalEEMod surrogate land uses are identified by project element in Attachment B of Appendix H.

CalEEMod default CO_2, CH_4, and N_2O emission factors for the Southern California Edison (SCE) utility provider were used for Project electricity demand. The California Public Utilities Code establishes minimum Renewable Portfolio Standard (RPS) targets for electricity retail sellers. According to the 2019 Edison Electric Institute (EEI) ESG/Sustainability Report,[6] the renewable portfolio of SCE, including wind energy, geothermal energy, biomass energy, and solar power, was approximately 44 percent in 2019 (SCE 2019). The California RPS targets are 33 percent by 2020, 60 percent by 2030, and 100 percent by 2045. However, the California RPS excludes non-renewable nuclear power and hydropower which are considered zero-carbon (clean energy) sources. When including these additional energy sources, SCE's 2019 clean energy portfolio was approximately 52 percent of its total generation. Because the emission factors used in this analysis were from 2019, it was necessary to

4 While EMFAC2021 is the current version of the EMFAC model (released in April 2021), EMFAC2017 is the most recent version of the model approved by the USEPA.
5 Traffic modeling performed for the project indicated an aggregate vehicle speed for highway vehicles of 35 miles per hour under the existing conditions or 30 miles per hour under future conditions for all alternatives.
6 ESG refers to environmental, social, and governance factors.

reduce emissions by an amount equivalent to increasing the clean energy mix under future conditions. In SCE's 2020 Integrated Resource Plan, the preferred conforming portfolio indicated an 84 percent clean energy portfolio would be achieved by 2030 (SCE 2020). Therefore, the clean energy mix under future conditions was adjusted from 52 percent under existing conditions to 84 percent under future conditions. Even with this adjustment, the analysis would be conservative, as SCE will continue to integrate renewable resources between the portfolio target year of 2030 and the California 100 percent RPS deadline year of 2045.

3.7.4 Thresholds of Significance

3.7.4.1 South Coast Air Quality Management District Guidance

A tiered approach to evaluating the significance of GHG impacts was adopted by the SCAQMD Governing Board on December 5, 2008. The SCAQMD's *Interim GHG Significance Threshold Staff Proposal* (SCAQMD 2008) states that a project's GHG emissions analysis should include direct, indirect, and if possible, life-cycle emissions during construction and operation. The SCAQMD's recommendations regarding the quantification of emissions was followed for this Project; however, the SCAQMD interim thresholds are largely geared towards industrial, residential, and commercial projects, and do not specifically address transportation projects. Since a transportation-specific threshold of significance for GHG emissions has not been established by the SCAQMD, a quantitative threshold was not used to analyze the GHG emission impacts associated with the Project.

3.7.4.2 Amendments to the CEQA Guidelines

Amendments to the CEQA Guidelines adopted on March 18, 2010 and amended on December 28, 2018 recommend the following criteria for determining the significance of GHG emissions (14 California Code of Regulations [CCR] §15064.4):

- The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; or
- The extent to which the project complies with the regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR § 15183.5(b)). Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project. In determining the significance of impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is not cumulatively considerable.

The plans addressed in the final bullet can include RTPs, regional blueprint plans, and plans for the reduction of GHG emissions (14 CCR §15125).

In 2018, the amendments to the CEQA Guidelines (Section 15064.4), which became effective on December 28, 2018 (OPR 2019) clarified numerous points, including:

- Lead agencies must analyze the GHG emissions of proposed projects (14 CCR § 15064.4 (a)).
- The focus of the lead agency's analysis should be on the project's effect on climate change, rather than simply focusing on the quantity of emissions and how that quantity of emissions compares to statewide or global emissions. (14 CCR § 15064.4 (b)).
- The impacts analysis of GHG emissions is global in nature and thus should be considered in a broader context. A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national or global emissions. (14 CCR § 15064.4 (b)).
- Lead agencies should consider a timeframe for the analysis that is appropriate for the project. (14 CCR § 15064.4 (b)).
- A lead agency's analysis must reasonably reflect evolving scientific knowledge and state regulatory schemes. (14 CCR § 15064.4 (b)).
- Lead agencies may rely on plans prepared pursuant to section 15183.5 (Plans for the Reduction of GHGs) in evaluating a project's GHG emissions. (14 CCR § 15064.4 (b)(3)).
- In determining the significance of a project's impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is consistent with those plans, goals, or strategies. (14 CCR § 15064.4 (b)(3)).
- The lead agency has discretion to select the model or methodology it considers most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change. (14 CCR § 15064.4 (c)).

These various points and guidelines for the evaluation of GHG emissions significance can be summarized as presented in Appendix G of the State CEQA Guidelines, in that an Alternative would have a significant impact related to GHG emissions if it would:

- Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Impact GHG-2: Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs

Typically, in a CEQA analysis, project-related impacts are compared to existing (without project) conditions. However, pursuant to CEQA Guidelines section 15125(a)(2), a lead agency has the discretion to exclusively use a future conditions baseline for the purposes of determination of

significance under CEQA in instances where showing an existing conditions analysis would be misleading or without informational value. Use of an existing conditions baseline would be misleading for the Project because it ignores the regional background growth in population, traffic, and transportation infrastructure that would occur between the existing conditions baseline year of 2019 and Project build-out (i.e., the 2019 existing conditions will be substantially altered by regional growth that will occur independent of the Project, which, in turn, would mask the impacts that are attributable to the Project and would not provide the reader with an accurate and meaningful delineation of Project-related impacts). Considering such growth is critical when determining future effects for transit projects designed to reduce traffic congestion and associated air quality impacts over time. Isolating the Project's impacts from ancillary changes in the environment would result in a misleading analysis.

Therefore, for the quantification of GHG emissions, Project emissions will be defined as the difference between a Build Alternative (2042) and the existing conditions in 2019 adjusted for regional growth (i.e., the projected future conditions baseline) that would occur by 2042. In this case, the projected future conditions baseline is 2042 without Project Conditions. The horizon year (2042) of the regional travel demand Corridor Based Model 2018 (CMB18), which incorporates Metro Measure M projects identified in the Measure M Expenditure Plan, roadway improvements, and other transit improvements anticipated to occur throughout the transit corridor, was selected as the Project design year. Use of this 2042 design year represents a characterization of the holistic, long-term benefits of the Project as transit-oriented development expands within the GSA and throughout the region. Additionally, although the Project is projected to open in 2035, emission factors for highway vehicles (the preeminent emission source affected by this Project) decrease as engine technology improves and vehicle manufacturers meet more stringent state and federal engine emission and efficiency standards. Since all alternatives would reduce VMT associated with highway traffic as compared to 2042 without Project Conditions, using 2042 highway traffic emission rates would result in fewer GHG reductions from this emission source as compared to reductions which might be achieved in 2035. Therefore, evaluation of Project impacts during the 2042 design year would conservatively evaluate the impacts of operations.

In 2018 and 2021, the OPR issued technical advisories for the streamlined review of transportation projects under CEQA (OPR 2018; OPR 2021). In these advisories, consistent with Section 15064.3 of the CEQA Guidelines, OPR presumes that certain types of transportation projects (including light rail projects) which would reduce VMT would also result in a less than significant impact on transportation and would align with SB 743 goals to reduce GHG emissions, increase multimodal transportation, and facilitate mixed used development. While OPR does recognize that reducing VMT would be essential to meeting state GHG reduction targets, it does not presume any conclusions relative to GHG emissions impacts specifically for VMT-reducing projects.

The CEQA Guidelines recommend that significance criteria established by the applicable air quality management district, air pollution control district, or lead agency be relied upon to make a determination of significance with respect to GHG impacts. No applicable quantitative threshold of significance has been established by SCAQMD, CARB, OPR, or Metro for the determination of project-level GHG emissions significance under CEQA. CARB and OPR, however, acknowledge that transforming public transit systems and reducing VMT are effective strategies for reducing GHG emissions on a regional scale. OPR recommends the streamlining of GHG emissions impacts analyses for transit and active transportation projects because these projects reduce GHG emissions, improve and increase multimodal transportation networks, and facilitate mixed use development, which are crucial land use planning initiatives for climate adaptation. Therefore, GHG emissions are quantified, and Impact GHG-1 is assessed qualitatively in the context of the predicted annual project-

level emission reductions and consistency with statutory goals and requirements of the applicable statewide, regional, or local plans.

Impact GHG-2 is assessed by evaluating the Project's consistency with the emission reduction strategies of the applicable statewide, regional, or local plans. If the Project would not conflict with or obstruct the strategies and implementation mechanisms of these plans, then the Project impacts would be less than significant

3.7.5 Existing Setting

3.7.5.1 Area of Potential Impact

The area of potential impact is defined as the South Coast Air Basin (SoCAB), which includes all of Orange County and the urban, non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. Although the area of potential impact is extensive, the analysis will focus only on GHG emission sources that are impacted by the Project. Specifically, the analysis will analyze Project impacts within the four-county region to capture the changes in highway traffic-related VMT that could occur as a direct result of each Build Alternative as determined by the Project traffic analysis. The analysis covers emissions from Project-related construction sources (i.e., construction equipment, haul and delivery trucks, and construction worker vehicles) in the SoCAB, as well as operational emissions from the LRVs within the SoCAB and from the proposed MSF site options.

3.7.5.2 Description of Relevant Pollutants

GHGs include CO_2, CH_4, and N_2O, and fluorinated gases. Only emissions of CO_2, CH_4, and N_2O are substantially altered by implementation of the Project. A description of these affected GHGs and their primary sources is presented below.

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

3.7.5.3 Existing Conditions

According to the IPCC, in 2010, worldwide man-made emissions of GHGs were approximately 49,000 $MMTCO_2e$ (IPCC 2007). Total U.S. GHG emissions in 2019 were 6558.3 $MMTCO_2e$, or about 13 percent of worldwide GHG emissions (USEPA 2021a). As mandated by the Global Warming Solutions Act of 2006 (AB 32), CARB has implemented a Scoping Plan to reduce state GHG emissions.

Accordingly, California's GHG emissions have steadily decreased, with emissions in 2019 decreasing by nearly 15 percent since peak levels in 2004 (CARB 2021a).

Transportation is responsible for 39.7 percent of the state's GHG emissions. Passenger vehicles and heavy-duty trucks represent approximately 36 percent of total emissions, with rail contributing less than one percent. Rail is therefore a key element in reducing the state's GHG emissions by providing an alternative to passenger vehicles.

Emissions of CO_2 and N_2O are largely byproducts of fossil fuel combustion. CH_4 results largely from off-gassing associated with agricultural practices and landfills. California GHG emissions in 2019 totaled approximately 418 $MMTCO_2e$ (CARB 2021a).

Climate change has the potential to affect the natural environment in California in a variety of ways, including but not limited to: rising sea levels along the California coastline, extreme heat conditions, increased frequency and severity of wildfires, reduced snow pack and streamflow in the Sierra Nevada mountains, changes in the growing season conditions that could affect agriculture, and changes in the distribution of plant and wildfire species due to climate-related effects. These changes in California's climate and ecosystems would occur over a period when California's population is projected to increase from 39.5 million in 2017 to 44 million by 2042 (SCDF 2020). As such, the number of people that could be affected by climate change, as well as the amount of anthropogenic GHG emissions expected under a No Project Alternative, is expected to increase.

3.7.5.3.1 Regional Highway Traffic Emissions

Existing year 2019 emissions from regional traffic[7] were estimated in the analysis for disclosure purposes; as discussed in **Section 3.7.3**, CEQA significance was determined by comparing future year 2042 Build Alternatives to 2042 without Project Conditions. Data on VMT in the region and emission factors from the EMFAC2017 model were used to estimate emissions of GHG. The emissions calculations were based on the total VMT in the region and the average speed on the highway network. **Table 3.7-1** summarizes the results of the GHG emissions from existing conditions. Detailed calculations are provided in Attachment B of Appendix H.

[7] As described in Section 3.14, Transportation and Traffic, the base year data in Metro's regional travel demand forecasting model (the Corridor Based Model 2018 [CBM18]) is from 2017 and represents the data that was most recently available when the model was created in 2018. This data has been used to represent 2019, the base year in this study.

Table 3.7-1. Existing and 2042 without Project Conditions Annual Regional Highway Traffic GHG Emissions

Source	CO_2	CH_4	N_2O	Total[1]
2019 Existing Conditions VMT	n/a	n/a	n/a	151,291,998,000
2019 Emission Factor (grams per mile)	369	0.021	0.021	n/a
2019 Existing Conditions Emissions (metric tons per year)	55,766,998	3,122	3,219	n/a
2042 without Project Conditions VMT	n/a	n/a	n/a	185,726,628,000
2042 Emission Factor (grams per mile)	252	0.007	0.012	n/a
2042 without Project Conditions Emissions (metric tons per year)	46,845,556	1,387	2,178	n/a
GWP	1	25	298	n/a
2019 Existing Conditions CO_2e Emissions[2] (metric tons per year)	55,766,998	78,051	959,403	56,804,452
2042 without Project Conditions CO_2e Emissions (metric tons per year)	46,845,556	34,685	649,069	47,529,310

Notes:
1 Totals may vary due to rounding.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential N/A = not applicable N2O = nitrous oxide VMT = vehicle miles traveled

3.7.5.3.2 Total Operational Emissions

Total operational emissions for the existing year 2019 conditions, summarized in **Table 3.7-2**, were estimated from regional highway traffic. Emissions from bus operations were not estimated because implementation of a Build Alternative would not include the addition of new bus services or removal of existing services and would include only minor adjustment of existing services to accommodate station access. Emissions from urban rail were not estimated because there are no expected urban rail operations under the existing conditions within the DSA. Emissions from construction-related activities were not quantified because there is no Project-related construction under the existing conditions.

Table 3.7-2. Existing and 2042 without Project Conditions Total Operational GHG Emissions

Source	Emissions (metric tons CO_2e per year)			
	CO_2	CH_4	N_2O	Total[1]
Existing Conditions Regional Traffic	55,766,998	78,051	959,403	56,804,452
Existing Conditions Total Emissions[2]	55,766,998	78,051	959,403	56,804,452
2042 without Project Conditions Regional Traffic	46,845,556	34,685	649,069	47,529,310
2042 without Project Conditions Total Emissions[2]	46,845,556	34,685	649,069	47,529,310

Notes:
1 Totals may vary due to rounding.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane N_2O = nitrous oxide

3.7.6 Impact Evaluation

3.7.6.1 Impact GHG-1: Emission Generation

Impact GHG-1: Would a Build Alternative generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

3.7.6.1.1 Alternative 1 Washington

Operational Impacts

Operational emissions associated with Alternative 1 would include indirect emissions from electricity needed to operate the LRVs, new stations, parking facilities, MSF operations, which are essential in maintaining a reliable light rail system, and direct emissions from highway traffic after construction is completed and the Project is implemented. MSF operations are also discussed in **Section 3.7.6.1.4**.

Regional Highway Traffic Emissions

Direct operational GHG emissions from regional highway traffic were estimated following the methodology described in **Section 3.7.3**. The Project would provide an alternative to automobile transportation in the region; therefore, it was necessary to evaluate highway traffic to assess how the Project would increase or decrease operational emissions from highway vehicles. **Table 3.7-3** provides a summary of estimated direct GHG emissions under Alternative 1.

Table 3.7-3. Alternative 1 Annual Regional Highway Traffic GHG Emissions

Source	CO_2	CH_4	N_2O	Total[1]
VMT	n/a	n/a	n/a	185,723,448,000
Emission Factor (grams per mile)	252	0.007	0.012	n/a
Emissions (metric tons per year)	46,844,754	1,387	2,178	n/a
GWP	1	25	298	n/a
CO_2e Emissions[2] (metric tons per year)	46,844,754	34,684	649,058	47,528,496

Notes:
1 Totals may vary due to rounding.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential N/A = not applicable N_2O = nitrous oxide VMT = vehicle miles traveled

Light Rail, Station, Parking, and Maintenance and Storage Facility Operational Emissions

Indirect operational GHG emissions would occur from the generation of electricity used to operate the LRVs, the lighting, train control, and other functions of the LRV stations, lighting at parking facilities, and lighting and other equipment at the MSF. Emissions associated with electrical generation were estimated using baseline emission factors for the SCE utility provider. Emissions were also estimated assuming that the provider would achieve its preferred 84 percent clean energy portfolio by 2030. A small amount of direct operational GHG emissions would also occur from operation of the MSF and would include natural gas combustion for comfort heating and water use. Operational GHG emissions associated with vehicle trips for workers at the MSF and stations would be accounted for in the regional traffic emissions presented previously. **Table 3.7-4** and **Table 3.7-5** provide a summary of estimated indirect emissions associated with the LRV operation and station operation, respectively. **Table 3.7-6** provides a summary of estimated indirect emissions associated with parking facilities' operations. **Table 3.7-7** presents estimated indirect emissions associated with train control. **Table 3.7-8** and **Table 3.7-9** provide a summary of estimated direct and indirect GHG emissions associated with each of the MSF site options.

Table 3.7-4. Alternative 1 Annual LRV Operations GHG Emissions

Source	CO_2	CH_4	N_2O	Total[1]
Electricity Used (kWh)	n/a	n/a	n/a	4,296,555
Emission Factor (pounds per kWh)	0.39	0.000033	0.000004	n/a
Emissions (metric tons per year)	762	0.064	0.008	n/a
GWP	1	25	298	n/a
CO_2e Emissions[2] (metric tons per year)	762	2	2	766
CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[3]	250	1	1	251

Notes:
1 Totals may vary due to rounding.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
3 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-5. Alternative 1 Annual Station Operations GHG Emissions

Station	Annual Consumption (kWh per year)[1]	Emissions (metric tons per year)			
		CO_2	CH_4	N_2O	Total[2]
Atlantic (relocated/reconfigured)	75,072	13	0.001	<0.001	n/a
Atlantic/Whittier	75,072	13	0.001	<0.001	n/a
Commerce/Citadel	75,072	13	0.001	<0.001	n/a
Greenwood	26,772	5	<0.001	<0.001	n/a
Rosemead	24,150	4	<0.001	<0.001	n/a
Norwalk	24,150	4	<0.001	<0.001	n/a
Lambert	24,150	4	<0.001	<0.001	n/a
GWP		1	25	298	n/a
Total CO_2e Emissions[3] (metric tons per year)		58	<1	<1	58
Total CO_2e Emissions[3] (metric tons per year) (Adjusted for 84% clean energy)[4]		19	<1	<1	19

Notes:
1 Infrastructure energy consumption includes lighting, operation of elevators or escalators for elevated or sub-grade stations, and other station-related operational electrical demands.
2 Totals may vary due to rounding.
3 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-6. Alternative 1 Annual Parking Facility Operations GHG Emissions

Parking Facility	Annual Consumption (kWh per year)[1]	Emissions (metric tons per year)			
		CO_2	CH_4	N_2O	Total[2]
Greenwood	51,800	9	0.001	<0.001	n/a
Rosemead	57,400	10	0.001	<0.001	n/a
Norwalk	54,600	10	0.001	<0.001	n/a
Lambert	91,000	16	0.001	<0.001	n/a
GWP		1	25	298	n/a
Total CO_2e Emissions[3] (metric tons per year)		45	<1	<1	45
Total CO_2e Emissions[3] (metric tons per year) (Adjusted for 84% clean energy)[4]		15	<1	<1	15

Notes:
1 Infrastructure energy consumption includes lighting and other parking facility-related operational electrical demands.
2 Totals may vary due to rounding.
3 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-7. Alternative 1 Annual Train Control Operations GHG Emissions

Infrastructure	Annual Consumption (kWh per year)	Emissions (metric tons per year)			
		CO_2	CH_4	N_2O	Total[1]
Train Control	446,500	79	0.007	0.001	n/a
GWP		1	25	298	n/a
Total CO_2e Emissions[2] (metric tons per year)		79	<1	<1	80
Total CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[3]		26	<1	<1	26

Source: Chester & Horvath, 2008.
Notes:
1 Totals may vary due to rounding.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
3 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-8. Alternative 1 Commerce MSF Site Option Operations GHG Emissions

Source	Emissions (metric tons per year)			
	CO_2	CH_4	N_2O	Total[3]
MSF Natural Gas[1]	8	<0.001	<0.001	n/a
MSF Electricity	134	0.011	0.001	n/a
MSF Water Usage	108	1.342	0.033	n/a
GWP	1	25	298	n/a
Total CO_2e Emissions[2] (metric tons per year)	249	34	10	293
Total CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[4]	159	34	10	203

Notes:
1 Operational emissions from the MSF include natural gas combustion for comfort heating and cooling.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
3 Totals may vary due to rounding.
4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour MSF = maintenance and storage facility
N/A = not applicable N_2O = nitrous oxide

Table 3.7-9. Alternative 1 Montebello MSF Site Option Operations GHG Emissions

Source	Emissions (metric tons per year)			
	CO_2	CH_4	N_2O	Total[3]
MSF Natural Gas[1]	8	<0.001	<0.001	n/a
MSF Electricity	138	0.012	0.001	n/a
MSF Water Usage	108	1.342	0.033	n/a
GWP	1	25	298	n/a
Total CO_2e Emissions[2] (metric tons per year)	253	34	10	297
Total CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[4]	161	34	10	204

Notes:
1 Operational emissions from the MSF include natural gas combustion for comfort heating and landscaping.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
3 Totals may vary due to rounding.
4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour MSF = maintenance and storage facility
N/A = not applicable N_2O = nitrous oxide

Total Operational Emissions

Total operational emissions from Alternative 1, including the LRVs, stations, parking facilities, train control, and the MSF site options, are summarized in **Table 3.7-10** and **Table 3.7-11**. This alternative would reduce highway traffic VMT and the associated GHG emissions as compared to 2042 without Project Conditions; however, the operation of the LRVs, stations, train control, parking facilities, and MSF would increase demand for electricity. Overall, a net decrease in regional operational GHG emissions would be expected as compared to 2042 without Project conditions. Implementation of Alternative 1 would reduce regional VMT by 3,180,000 miles annually. Overall, operation of Alternative 1 was estimated to reduce total GHG emissions by 300 metric tons CO_2e per year with the Commerce MSF site option, or 298 metric tons CO_2e per year with the Montebello MSF site option. Regional traffic emission estimates are based on VMT projections associated only with implementation of Alternative 1, and do not account for increased ridership (VMT reductions) from potential future transportation system improvements, such as those which may occur from improved bus, pedestrian, bike, and other First/Last Mile (FLM) enhancements or from increased mixed-use development in the DSA. Additionally, GHG estimates from electricity generation account for an 84 percent clean energy portfolio anticipated to be achieved by SCE, the local utility provider, by 2030. However, California SB 100 requires public utility providers to achieve 100 percent renewable energy by 2045. Thus, even with the 84 percent clean energy adjustment, the analysis would be conservative, as SCE will continue to integrate renewable electricity sources between the portfolio target year of 2030 and the California 100 percent RPS deadline year of 2045. By 2045, GHG emissions presented for the light rail operation, station operation, train control, and parking facilities project elements, which are associated with electrical generation, would be reduced to zero, and GHG emissions from MSF operations would also be reduced, resulting in additional annual GHG reductions starting in 2045.

As indicated previously, SCAQMD generally recommends that construction emissions be amortized over a period of 30 years. However, the project lifetime would be expected to be considerably longer than 30 years, and therefore the construction contribution to annual emissions would be lower than

presented in this analysis. When amortized over 30 years, construction emissions would contribute 288 metric tons CO_2e per year with the Commerce MSF site option or 297 metric tons CO_2e per year with the Montebello MSF site option, resulting in total annual emission reductions of 11.9 metric tons CO_2e per year for the Commerce MSF site option or 1.4 metric tons CO_2e per year for the Montebello MSF site option. California's RPS sets a target of 100 percent renewable grid power by 2045, three years after the Project horizon year. As discussed previously, as grid power becomes increasingly renewable, additional GHG benefits from operation would be expected.

In addition to emissions decreases on the project level, the Project is a component of the RTP and contributes to California's goal to increase mass transit under the AB 32 Scoping Plan. Implementation of Alternative 1 would enhance regional transportation systems and contribute to planning efforts to reduce VMT and GHG emissions from transportation sources. Thus, operation of Alternative 1 would be consistent with the State's long-term climate strategies and the incremental contribution to climate change from Alternative 1 GHG emissions would be less than significant.

Table 3.7-10. Alternative 1 with Commerce MSF Site Option Total Operational GHG Emissions

Source	Emissions (metric tons CO_2e per year)[1,2]			
	CO_2	CH_4	N_2O	Total[3]
Regional Traffic	46,844,754	34,684	649,058	47,528,496
Light Rail Operation	250	1	1	251
Station Operation	19	<1	<1	19
Train Control	26	<1	<1	26
Parking Facilities	15	<1	<1	15
MSF Operation	159	34	10	203
Total Emissions[3]	46,845,223	34,719	649,069	47,529,010
Increment based on Existing Conditions (2019)[4,5]	(8,921,776)	(43,332)	(310,334)	(9,275,442)
Increment based on 2042 without Project Conditions[4,6]	(333)	34	(<1)	(300)

Notes:
1 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
2 Emissions associated with electrical consumption are adjusted for SCE's preferred clean energy portfolio anticipated to be met by 2030.
3 Totals may vary due to rounding.
4 Emission reductions (beneficial impacts) are shown in parentheses.
5 Increment calculated as the difference between the total emissions for the alternative and the total emissions for the Existing Conditions, presented in **Table 3.7-2**.
6 Increment calculated as the difference between the total emissions for the alternative and the total emissions for 2042 without Project Conditions, presented in Table 9-1 in Appendix H.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
MSF = maintenance and storage facility N_2O = nitrous oxide

Table 3.7-11. Alternative 1 with Montebello MSF Site Option Total Operational GHG Emissions

Source	Emissions (metric tons CO_2e per year)[1,2]			
	CO_2	CH_4	N_2O	Total[3]
Regional Traffic	46,844,754	34,684	649,058	47,528,496
Light Rail Operation	250	1	1	251
Station Operation	19	<1	<1	19
Train Control	26	<1	<1	26
Parking Facilities	15	<1	<1	15
MSF Operation	161	34	10	204
Total Emissions[3]	46,845,224	34,719	649,069	47,529,011
Increment based on Existing Conditions (2019)[4,5]	(8,921,774)	(43,332)	(310,334)	(9,275,441)
Increment based on 2042 without Project Conditions[4,6]	(332)	34	(<1)	(298)

Notes:
1 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
2 Emissions associated with electrical consumption are adjusted for SCE's preferred clean energy portfolio anticipated to be met by 2030.
3 Totals may vary due to rounding.
4 Emission reductions (beneficial impacts) are shown in parentheses.
5 Increment calculated as the difference between the total emissions for the alternative and the total emissions for the Existing Conditions, presented in **Table 3.7-2**.
6 Increment calculated as the difference between the total emissions for the alternative and the total emissions for 2042 without Project Conditions, presented in Table 9-1 in Appendix H.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
MSF = maintenance and storage facility N_2O = nitrous oxide

Design Options

Atlantic/Pomona Station Option

As described above, the operation of the base Alternative 1 would result in a decrease in GHG emissions at the project level. The Project would be consistent with state and regional climate strategies to increase mass transit, and would thus result in an incremental contribution to climate change that would be less than significant. While the Atlantic/Pomona Station option would slightly alter the configuration of Alternative 1, it would not be expected to increase or decrease ridership of the light rail system, nor would it be expected to appreciably increase or decrease VMT relative to the base Alternative 1. Therefore, operation of Alternative 1 with the Atlantic/Pomona Station Option would not result in a meaningful difference in operational GHG emissions as compared to the base Alternative 1, nor would it alter the Project's contribution to the state and regional mass transit climate strategies. Therefore, operation of Alternative 1 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Montebello At-Grade Option

As described above, the operation of the base Alternative 1 would result in a decrease in GHG emissions at the project level. The Project would be consistent with state and regional climate strategies to increase mass transit, and would thus result in an incremental contribution to climate change which would be less than significant. While the Montebello At-Grade option would slightly alter the configuration of Alternative 1, it would not be expected to increase or decrease ridership of the light rail system, nor would it be expected to appreciably increase or decrease VMT relative to the base Alternative 1. Therefore, implementation of Alternative 1 with the Montebello At-Grade Option would result in no meaningful difference in operational GHG emissions as compared to the base alternative, nor would it alter the Project's contribution to the state and regional mass transit climate strategies. Therefore, operation of Alternative 1 with the Montebello At-Grade Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Construction Impacts

Construction GHG emission sources under Alternative 1 include exhaust from construction worker motor vehicles traveling to and from the project site, exhaust from delivery and hauling trucks traveling to and from the project site, and exhaust from heavy-duty construction equipment operating on-site. **Table 3.7-12** details the annual GHG emissions associated with construction of Alternative 1 and the MSF site options. Consistent with SCAQMD guidance, construction GHG emissions are amortized over the project lifetime, assumed to be 30 years, to be combined with annual operational emissions. When amortized over 30 years, construction emissions would contribute 288 metric tons CO_2e per year with the Commerce MSF site option or 297 metric tons CO_2e per year with the Montebello MSF site option. The incremental contribution to climate change from construction of Alternative 1, including amortized construction emissions, would be less than significant.

Table 3.7-12. Alternative 1 Annual Construction GHG Emissions

Project Element[1]	Emissions of CO_2e (metric tons per year)[2]					
	Year 1	Year 2	Year 3	Year 4	Year 5	Project
Guideway Construction[3,4]	570	1,067	660	1,222	172	3,690
Base Alternative Atlantic Station (Relocated/Reconfigured)	129	322	212	0	0	663
Design Option Atlantic/Pomona Station Option	129	322	212	0	0	663
Base Alternative Montebello Aerial	0	64	334	0	0	399
Design Option Montebello At-Grade	0	72	139	0	0	211
MSF Construction[5]	0	249	401	440	284	1,374
Commerce MSF Site Option	0	321	423	354	0	1,099
Montebello MSF Site Option	0	249	401	440	284	1,374
Station Construction	339	969	796	383	116	2,601
Parking Construction	0	0	0	48	39	86
Street Widening and TPSS	0	39	204	482	436	1,162
Maximum Total Emissions[3,4,5]	908	2,324	2,061	2,575	1,046	8,914
30-Year Amortized Emissions (Commerce MSF Site Option)						**288**
30-Year Amortized Emissions (Montebello MSF Site Option)						**297**

Note:
1 Emissions from hauling and vendor trips and construction worker commuting included in project element emission totals.
2 Construction of Alternative 1 would occur over 5 years. Emissions are calculated from calendar year 2022 emission factors. Emissions for project construction stated on or after January 1, 2022 would be less than or equal to the emissions presented.
3 Only the aerial alignment in Montebello (base alternative) or the at-grade alignment (Montebello At-Grade Option) would be constructed. Total emissions assume the base alternative construction as emissions would be higher.
4 Only the Atlantic station (relocated/reconfigured) (base alternative) or the Atlantic/Pomona station (design option) would be constructed. Because comparable excavation for the Atlantic/Pomona Station Option would already be required under the base alternative for the TBM receiving pit, there would not be a material difference in overall construction GHG emissions.
5 Only one MSF site option would be constructed. Total emissions assume the Montebello MSF site option construction as emissions would be higher.
Key:
CO_2e = carbon dioxide equivalent MSF = maintenance and storage facility N/A = not applicable
TPSS = transportation power substation

Design Options

Atlantic/Pomona Station Option

As presented in **Table 3.7-12**, GHG emissions associated with construction of the Atlantic/Pomona Station Option would be the same as those of the base Alternative 1 Atlantic Station (relocated/reconfigured). While the Atlantic/Pomona Station Option, the TBM receiving pit, and the alignment north of the proposed Atlantic/Whittier station would be located at a different position, the magnitude of excavation activity which would be required to implement the Atlantic/Pomona Station Option would be essentially the same as that required under the base Alternative 1 for the excavation of the TBM receiving pit and underground-to-at-grade transition of the alignment. Substantial additional construction is not anticipated for the Atlantic/Pomona Station Option and construction GHG

emissions would not materially differ from the base Alternative 1. Therefore, construction of Alternative 1 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Montebello At-Grade Option

As presented in **Table 3.7-12**, GHG emissions associated with construction of the Montebello At-Grade Option would be less than those of the base alternative, and implementation of this design option would result in no meaningful change to the Project's incremental contribution to climate change. Therefore, construction of Alternative 1 with the Montebello At-Grade Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

3.7.6.1.2 Alternative 2 Atlantic to Commerce/Citadel IOS

Operational Impacts

Base Alternative and Design Option

Operational emissions associated with the base Alternative 2 would include indirect emissions from electricity needed to operate the LRVs, new stations, and an MSF, as well as direct emissions from highway traffic after construction is completed and the Project is implemented.

Regional Highway Traffic Emissions

Direct operational GHG emissions from regional highway traffic were estimated following the methodology described in **Section 3.7.3**. The Project would provide an alternative to automobile transportation in the region; therefore, it was necessary to evaluate highway traffic to assess how the Project would increase or decrease operational emissions from highway vehicles. **Table 3.7-13** provides a summary of estimated direct GHG emissions under Alternative 2.

Table 3.7-13. Alternative 2 Annual Regional Highway Traffic GHG Emissions

Source	CO_2	CH_4	N_2O	Total[1]
VMT	n/a	n/a	n/a	185,725,038,000
Emission Factor (grams per mile)	252	0.007	0.012	n/a
Emissions (metric tons per year)	46,845,155	1,387	2,178	n/a
GWP	1	25	298	n/a
CO_2e Emissions[2] (metric tons per year)	46,845,155	34,685	649,063	47,528,903

Notes:
1 Totals may vary due to rounding.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential N/A = not applicable N_2O = nitrous oxide VMT = vehicle miles traveled

Light Rail, Station, Parking, and Maintenance and Storage Facility Operational Emissions

Indirect operational GHG emissions would occur from the generation of electricity used to operate the LRVs, the lighting, train control, and other functions of the LRV stations, and lighting and other equipment at the MSF. There would be no new project parking facilities under the base Alternative 2. Emissions associated with electrical generation were estimated using baseline emission factors for the SCE utility provider. Emissions were also estimated assuming that the provider would achieve its preferred 84 percent clean energy portfolio by 2030. A small amount of direct operational GHG emissions would also occur from operation of the MSF and would include natural gas combustion for comfort heating and water use. Operational GHG emissions associated with vehicle trips for workers at the MSF and stations would be accounted for in the regional traffic emissions presented previously. **Table 3.7-14** and **Table 3.7-15** provide a summary of estimated indirect emissions associated with the LRV operation and station operation, respectively. **Table 3.7-16** presents estimated indirect emissions associated with train control. **Table 3.7-17** provides a summary of estimated direct and indirect GHG emissions associated with the Commerce MSF site option.

Table 3.7-14. Alternative 2 Annual LRV Operations GHG Emissions

Source	CO_2	CH_4	N_2O	Total[1]
Electricity Used (kWh)	n/a	n/a	n/a	1,130,672
Emission Factor (pounds per kWh)	0.39	0.000033	0.000004	n/a
Emissions (metric tons per year)	201	0.017	0.002	n/a
GWP	1	25	298	n/a
CO_2e Emissions[2] (metric tons per year)	201	<1	1	202
CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[3]	66	<1	<1	66

Notes:
1 Totals may vary due to rounding.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
3 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-15. Alternative 2 Annual Station Operations GHG Emissions

Station	Annual Consumption (kWh per year)[1]	Emissions (metric tons per year)			
		CO_2	CH_4	N_2O	Total[2]
Atlantic (relocated/reconfigured)	75,072	13	0.001	<0.001	n/a
Atlantic/Whittier	75,072	13	0.001	<0.001	n/a
Commerce/Citadel	75,072	13	0.001	<0.001	n/a
GWP		1	25	298	n/a
Total CO_2e Emissions[3] (metric tons per year)		40	<1	<1	40
Total CO_2e Emissions[3] (metric tons per year) (Adjusted for 84% clean energy)[4]		13	<1	<1	13

Notes:
1 Infrastructure energy consumption includes lighting, operation of elevators or escalators for elevated or sub-grade stations, and other station-related operational electrical demands.
2 Totals may vary due to rounding.
3 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-16. Alternative 2 Annual Train Control Operations GHG Emissions

Infrastructure	Annual Consumption (kWh per year)	Emissions (metric tons per year)			
		CO_2	CH_4	N_2O	Total[1]
Train Control	117,500	21	0.002	<0.001	n/a
GWP		1	25	298	n/a
Total CO_2e Emissions[2] (metric tons per year)		21	<1	<1	21
Total CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[3]		7	<1	<1	7

Source: Chester & Horvath, 2008.
Notes:
1 Totals may vary due to rounding.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
3 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-17. Alternative 2 Commerce MSF Site Option Operations GHG Emissions

Source	Emissions (metric tons per year)			
	CO_2	CH_4	N_2O	Total[3]
MSF Natural Gas[1]	8	<0.001	<0.001	n/a
MSF Electricity	134	0.011	0.001	n/a
MSF Water Usage	108	1.342	0.033	n/a
GWP	1	25	298	n/a
Total CO_2e Emissions[2] (metric tons per year)	249	34	10	293
Total CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[4]	159	34	10	203

Notes:
1 Operational emissions from the MSF include natural gas combustion for comfort heating and cooling.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
3 Totals may vary due to rounding.
4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour MSF = maintenance and storage facility
N/A = not applicable N_2O = nitrous oxide

Total Operational Emissions

Total operational emissions from the base Alternative 2, including the LRVs, stations, train control, and the Commerce MSF site option, are summarized in **Table 3.7-18**. This alternative would reduce highway traffic VMT and the associated GHG emissions as compared to 2042 without Project Conditions; however, the operation of the LRVs, stations, train control, and MSF would increase demand for electricity. Overall, a net decrease in regional operational GHG emissions would be expected as compared to 2042 without Project Conditions. Implementation of Alternative 2 would reduce regional VMT by 1,590,000 miles annually. Overall, operation of the base Alternative 2 with the Commerce MSF site option was estimated to reduce total GHG emissions by 118 metric tons CO_2e per year. Regional traffic emission estimates are based on VMT projections associated only with implementation of the base Alternative 2, and do not account for increased ridership (VMT reductions) from potential future transportation system improvements, such as those which may occur from improved bus, pedestrian, bike, and other FLM enhancements or from increased mixed-use development in the DSA. Additionally, GHG estimates from electricity generation account for an 84 percent clean energy portfolio anticipated to be achieved by SCE, the local utility provider, by 2030. However, California SB 100 requires public utility providers to achieve 100 percent renewable energy by 2045. Thus, even with the 84 percent clean energy adjustment, the analysis would be conservative, as SCE will continue to integrate renewable electricity sources between the portfolio target year of 2030 and the California 100 percent RPS deadline year of 2045. By 2045, GHG emissions presented for the light rail operation, station operation, train control, and parking facilities project elements, which are associated with electrical generation, would be reduced to zero, and GHG emissions from MSF operations would also be reduced, resulting in additional annual GHG reductions starting in 2045.

As indicated previously, SCAQMD generally recommends that construction emissions be amortized over a period of 30 years. However, the project lifetime would be expected to be considerably longer than 30 years, and therefore the construction contribution to annual emissions would be lower than presented in this analysis. When amortized over 30 years, construction emissions would contribute

157 metric tons CO_2e per year, resulting in total annual emissions of 39 metric tons CO_2e per year. California's RPS sets a target of 100 percent renewable grid power by 2045, three years after the Project horizon year. As discussed previously, as grid power becomes increasingly renewable, additional GHG benefits from operation would be expected.

While annual emissions including amortized construction would increase on the project level, the Project is a component of the RTP and contributes to California's goal to increase mass transit under the AB 32 Scoping Plan. Implementation of Alternative 2 would enhance regional transportation systems and contribute to planning efforts to reduce VMT and GHG emissions from transportation sources. Thus, operation of the base Alternative 2 would be consistent with the State's long-term climate strategies and the Project's incremental contribution to climate change would be less than significant.

Operation of Alternative 2 with the Atlantic/Pomona Station Option would result in no meaningful difference in operational GHG emissions as compared to the base Alternative 2, nor would it alter the Project's contribution to the state and regional mass transit climate strategies. Therefore, operation Alternative 2 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Table 3.7-18. Alternative 2 with Commerce MSF Site Option Total Operational GHG Emissions

Source	Emissions (metric tons CO_2e per year)[1,2]			
	CO_2	CH_4	N_2O	Total[3]
Regional Traffic	46,845,155	34,685	649,063	47,528,903
Light Rail Operation	66	<1	<1	66
Station Operation	13	<1	<1	13
Train Control	7	<1	<1	7
MSF Operation	159	34	10	203
Total Emissions[3]	46,845,400	34,718	649,074	47,529,192
Increment based on Existing Conditions (2019)[4,5]	(8,921,598)	(43,332)	(310,329)	(9,275,260)
Increment based on 2042 without Project Conditions[4,6]	(156)	34	5	(118)

Notes:
1 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
2 Emissions associated with electrical consumption are adjusted for SCE's preferred clean energy portfolio anticipated to be met by 2030
3 Totals may vary due to rounding.
4 Emission reductions (beneficial impacts) are shown in parentheses.
5 Increment calculated as the difference between the total emissions for the alternative and the total emissions for the Existing Conditions, presented in **Table 3.7-2**.
6 Increment calculated as the difference between the total emissions for the alternative and the total emissions for the 2402 without Project Conditions, presented in Table 9-1 in Appendix H.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
MSF = maintenance and storage facility N_2O = nitrous oxide

Construction Impacts

Construction GHG emission sources under Alternative 2 include exhaust from construction worker motor vehicles traveling to and from the project site, exhaust from delivery and hauling trucks traveling to and from the project site, and exhaust from heavy-duty construction equipment operating on-site. **Table 3.7-19** details the annual GHG emissions associated with construction of Alternative 2 and the Commerce MSF site option. Consistent with SCAQMD guidance, construction GHG emissions are amortized over the project lifetime, assumed to be 30 years, to be combined with annual operational emissions. When amortized over 30 years, construction emissions would contribute 157 metric tons CO_2e per year. The Project's incremental contribution to climate change, including amortized construction emissions, would be less than significant.

Design Option

Atlantic/Pomona Station Option

As presented in **Table 3.7-19**, GHG emissions associated with construction of the Atlantic/Pomona Station Option would be the same as those of the base Alternative 2 Atlantic Station (relocated/reconfigured). While the Atlantic/Pomona Station Option, the TBM receiving pit, and the alignment north of the proposed Atlantic/Whittier station would be located at a different position along the alignment, the magnitude of excavation activity which would be required to implement the Atlantic/Pomona Station Option would be essentially the same as that required under the base Alternative 2 for the excavation of the TBM receiving pit and underground-to-at-grade transition of the alignment. Substantial additional construction is not anticipated under the Atlantic/Pomona Station Option and construction GHG emissions would not be expected to materially differ as compared to the base Alternative 2. Therefore, construction of Alternative 2 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Table 3.7-19. Alternative 2 Annual Construction GHG Emissions

Project Element[1]	Emissions of CO_2e (metric tons per year)[2]					
	Year 1	Year 2	Year 3	Year 4	Year 5	Project
Guideway Construction[3]	570	1,002	31	0	0	1,602
Base Alternative Atlantic Station (Relocated/Reconfigured)	129	322	212	0	0	663
Design Option Atlantic/Pomona Station Option	129	322	212	0	0	663
MSF Construction	0	321	423	354	0	1,099
Station Construction	339	969	647	0	0	1,955
Street Widening and TPSS	0	39	0	0	0	39
Maximum Total Emissions[3]	908	2,331	1,102	354	0	4,696
30-Year Amortized Emissions						157

Note:
1 Emissions from hauling and vendor trips and construction worker commuting included in project element emission totals.
2 Construction of Alternative 2 would occur over 4 years. Emissions are calculated from calendar year 2022 emission factors. Emissions for project construction stated on or after January 1, 2022 would be less than or equal to the emissions presented.
3 Only the Atlantic (relocated/reconfigured) (base alternative) or the Atlantic/Pomona (design option) station would be constructed. Because comparable excavation for the Atlantic/Pomona Station Option would already be required under the base alternative for the TBM receiving pit, there would not be a material difference in overall construction GHG emissions.
Key:
CO_2e = carbon dioxide equivalent MSF = maintenance and storage facility N/A = not applicable
TPSS = transportation power substation

3.7.6.1.3 Alternative 3 Atlantic to Greenwood IOS

Operational Impacts

Base Alternative and Design Options

Operational emissions associated with the base Alternative 3 would include indirect emissions from electricity needed to operate the LRVs, new stations, an MSF site option, and parking facilities, as well as direct emissions from highway traffic after construction is completed and the Project is implemented.

Regional Highway Traffic Emissions

Direct operational GHG emissions from regional highway traffic were estimated following the methodology described in **Section 3.7.3**. The Project would provide an alternative to automobile transportation in the region; therefore, it was necessary to evaluate highway traffic to assess how the Project would increase or decrease operational emissions from highway vehicles. **Table 3.7-20** provides a summary of estimated direct GHG emissions under the base Alternative 3.

Table 3.7-20. Alternative 3 Annual Regional Highway Traffic GHG Emissions

Source	CO_2	CH_4	N_2O	Total[1]
VMT	n/a	n/a	n/a	185,724,084,000
Emission Factor (grams per mile)	252	0.007	0.012	n/a
Emissions (metric tons per year)	46,844,914	1,387	2,178	n/a
GWP	1	25	298	n/a
CO_2e Emissions[2] (metric tons per year)	46,844,914	34,684	649,060	47,528,659

Notes:
1 Totals may vary due to rounding.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential N/A = not applicable N_2O = nitrous oxide VMT = vehicle miles traveled

Light Rail, Station, Parking, and Maintenance and Storage Facility Operational Emissions

Indirect operational GHG emissions would occur from the generation of electricity used to operate the LRVs, the lighting, train control, and other functions of the LRV stations, lighting at parking facilities, and lighting and other equipment at the MSF. Emissions associated with electrical generation were estimated using baseline emission factors for the SCE utility provider. Emissions were also estimated assuming that the provider would achieve its preferred 84 percent clean energy portfolio by 2030. A small amount of direct operational GHG emissions would also occur from operation of the MSF and would include natural gas combustion for comfort heating and water use. Operational GHG emissions associated with vehicle trips for workers at the MSF and stations would be accounted for in the regional traffic emissions presented previously. **Table 3.7-21** and **Table 3.7-22** provide a summary of estimated indirect emissions associated with the LRV operation and station operation, respectively. **Table 3.7-23** provides a summary of estimated indirect emissions associated with parking facilities' operations. **Table 3.7-24** presents estimated indirect emissions associated with train control. **Table 3.7-25** and **Table 3.7-26** provide a summary of estimated direct and indirect GHG emissions associated with each of the MSF site options.

Table 3.7-21. Alternative 3 Annual LRV Operations GHG Emissions

Source	CO_2	CH_4	N_2O	Total[1]
Electricity Used (kWh)	n/a	n/a	n/a	2,035,210
Emission Factor (pounds per kWh)	0.39	0.000033	0.000004	n/a
Emissions (metric tons per year)	361	0.030	0.004	n/a
GWP	1	25	298	n/a
CO_2e Emissions[2] (metric tons per year)	361	1	1	363
CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[3]	118	<1	<1	119

Notes:
1 Totals may vary due to rounding.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
3 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-22. Alternative 3 Annual Station Operations GHG Emissions

Station	Annual Consumption (kWh per year)[1]	Emissions (metric tons per year)			
		CO_2	CH_4	N_2O	Total[2]
Atlantic (relocated/reconfigured)	75,072	13	0.001	<0.001	n/a
Atlantic/Whittier	75,072	13	0.001	<0.001	n/a
Commerce/Citadel	75,072	13	0.001	<0.001	n/a
Greenwood	26,772	5	<0.001	<0.001	n/a
GWP		1	25	298	n/a
Total CO_2e Emissions[3] (metric tons per year)		45	<1	<1	45
Total CO_2e Emissions[3] (metric tons per year) (Adjusted for 84% clean energy)[4]		15	<1	<1	15

Notes:
1 Infrastructure energy consumption includes lighting, operation of elevators or escalators for elevated or sub-grade stations, and other station-related operational electrical demands.
2 Totals may vary due to rounding.
3 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-23. Alternative 3 Annual Parking Facility Operations GHG Emissions

Parking Facility	Annual Consumption (kWh per year)[1]	Emissions (metric tons per year)			
		CO_2	CH_4	N_2O	Total[2]
Greenwood Ave	51,800	9	0.001	<0.001	n/a
GWP		1	25	298	n/a
Total CO_2e Emissions[3] (metric tons per year)		9	<1	<1	9
Total CO_2e Emissions[3] (metric tons per year) (Adjusted for 84% clean energy)[4]		3	<1	<1	3

Notes:
1 Infrastructure energy consumption includes lighting and other parking facility-related operational electrical demands.
2 Totals may vary due to rounding.
3 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-24. Alternative 3 Annual Train Control Operations GHG Emissions

Infrastructure	Annual Consumption (kWh per year)	Emissions (metric tons per year)			
		CO_2	CH_4	N_2O	Total[1]
Train Control	211,500	38	0.003	<0.001	n/a
GWP		1	25	298	n/a
Total CO_2e Emissions[2] (metric tons per year)		38	<1	<1	38
Total CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[3]		12	<1	<1	12

Source: Chester & Horvath, 2008.
Notes:
1 Totals may vary due to rounding.
2 CO2e emissions are weighted by the GWP for each non-CO2 pollutant (i.e., CO2e equals emissions of non-CO2 pollutant multiplied by its GWP).
3 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour N/A = not applicable N_2O = nitrous oxide

Table 3.7-25. Alternative 3 Commerce MSF Site Option Operations GHG Emissions

Source	Emissions (metric tons per year)			
	CO_2	CH_4	N_2O	Total[3]
MSF Natural Gas[1]	8	0.000	0.000	n/a
MSF Electricity	134	0.011	0.001	n/a
MSF Water Usage	108	1.342	0.033	n/a
GWP	1	25	298	n/a
Total CO_2e Emissions[2] (metric tons per year)	249	34	10	293
Total CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[4]	159	34	10	203

Notes:
1 Operational emissions from the MSF include natural gas combustion for comfort heating and cooling.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
3 Totals may vary due to rounding.
4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour MSF = maintenance and storage facility
N/A = not applicable N_2O = nitrous oxide

Table 3.7-26. Alternative 3 Montebello MSF Site Option Operations GHG Emissions

Source	Emissions (metric tons per year)			
	CO_2	CH_4	N_2O	Total[3]
MSF Natural Gas[1]	8	0.000	0.000	n/a
MSF Electricity	138	0.012	0.001	n/a
MSF Water Usage	108	1.342	0.033	n/a
GWP	1	25	298	n/a
Total CO_2e Emissions[2] (metric tons per year)	253	34	10	297
Total CO_2e Emissions[2] (metric tons per year) (Adjusted for 84% clean energy)[4]	161	34	10	204

Notes:
1 Operational emissions from the MSF include natural gas combustion for comfort heating and landscaping.
2 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
3 Totals may vary due to rounding.
4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
GWP = Global Warming Potential kWh = kilowatt-hour MSF = maintenance and storage facility
N/A = not applicable N2O = nitrous oxide

Total Operational Emissions

Total operational emissions from the base Alternative 3, including the LRVs, stations, parking facilities, train control, and the MSF site options, are summarized in **Table 3.7-27** and **Table 3.7-28**. This alternative would reduce highway traffic VMT and the associated GHG emissions as compared to 2042 without Project Conditions; however, the operation of the LRVs, stations, train control, parking facilities, and MSF would increase demand for electricity. Overall, a net decrease in regional operational GHG emissions would be expected as compared to 2042 without Project Conditions. Implementation of Alternative 3 would reduce regional VMT by 2,544,000 miles annually. Overall, operation of the base Alternative 3 was estimated to reduce total GHG emissions by 299 metric tons CO_2e per year with the Commerce MSF site option, or 298 metric tons CO_2e per year with the Montebello MSF site option. Regional traffic emission estimates are based on VMT projections associated only with implementation of Alternative 3, and do not account for increased ridership (VMT reductions) from potential future transportation system improvements, such as those which may occur from improved bus, pedestrian, bike, and other FLM enhancements or from increased mixed-use development in the DSA. Additionally, GHG estimates from electricity generation account for an 84 percent clean energy portfolio anticipated to be achieved by SCE by 2030. However, California SB 100 requires public utility providers to achieve 100 percent renewable energy by 2045. Thus, even with the 84 percent clean energy adjustment, the analysis would be conservative, as SCE will continue to integrate renewable electricity sources between the portfolio target year of 2030 and the California 100 percent RPS deadline year of 2045. By 2045, GHG emissions presented for the light rail operation, station operation, train control, and parking facilities project elements, which are associated with electrical generation, would be reduced to zero, and GHG emissions from MSF operations would also be reduced, resulting in additional annual GHG reductions starting in 2045.

As indicated previously, SCAQMD generally recommends that construction emissions be amortized over a period of 30 years. However, the project lifetime would be expected to be considerably longer than 30 years, and therefore the construction contribution to annual emissions would be lower than presented in this analysis. When amortized over 30 years, construction emissions would contribute an additional 183 metric tons CO_2e per year with the Commerce MSF site option or 192 metric tons CO_2e per year with the Montebello MSF site option, resulting in total annual emission reductions of 116 metric tons CO_2e per year for the Commerce MSF site option or 106 metric tons CO_2e per year for the Montebello MSF site option. California's RPS sets a target of 100 percent renewable grid power by 2045, three years after the Project horizon year. As discussed previously, as grid power becomes increasingly renewable, additional GHG benefits from operation would be expected.

Table 3.7-27. Alternative 3 with Commerce MSF Site Option Total Operational GHG Emissions

Source	Emissions (metric tons CO_2e per year)[1,2]			
	CO_2	CH_4	N_2O	Total[3]
Regional Traffic	46,844,914	34,684	649,060	47,528,659
Light Rail Operation	118	<1	<1	119
Station Operation	15	<1	<1	15
Train Control	12	<1	<1	12
Parking Facilities	3	<1	<1	3
MSF Operation	159	34	10	203
Total Emissions[3]	46,845,222	34,718	649,070	47,529,011
Increment based on Existing Conditions (2019)[4,5]	(8,921,776)	(43,332)	(310,332)	(9,275,441)
Increment based on 2042 without Project Conditions[4,6]	(334)	33	1	(299)

Notes:
1 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
2 Emissions associated with electrical consumption are adjusted for SCE's preferred clean energy portfolio anticipated to be met by 2030.
3 Totals may vary due to rounding.
4 Emission reductions (beneficial impacts) are shown in parentheses.
5 Increment calculated as the difference between the total emissions for the alternative and the total emissions for the Existing Conditions, presented in **Table 3.7-2**.
6 Increment calculated as the difference between the total emissions for the alternative and the total emissions for 2042 without Project Conditions, presented in Table 9-1 in Appendix H.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
MSF = maintenance and storage facility N_2O = nitrous oxide

Table 3.7-28. Alternative 3 with Montebello MSF Site Option Total Operational GHG Emissions

Source	Emissions (metric tons CO_2e per year)[1,2]			
	CO_2	CH_4	N_2O	Total[3]
Regional Traffic	46,844,914	34,684	649,060	47,528,659
Light Rail Operation	118	<1	<1	119
Station Operation	15	<1	<1	15
Train Control	12	<1	<1	12
Parking Facilities	3	<1	<1	3
MSF Operation	161	34	10	204
Total Emissions[3]	46,845,223	34,718	649,070	47,529,012
Increment based on Existing Conditions (2019)[4,5]	(8,921,775)	(43,332)	(310,332)	(9,275,440)
Increment based on 2042 without Project Conditions [4,6]	(333)	33	1	(298)

Notes:
1 CO_2e emissions are weighted by the GWP for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant multiplied by its GWP).
2 Emissions associated with electrical consumption are adjusted for SCE's preferred clean energy portfolio anticipated to be met by 2030.
3 Totals may vary due to rounding.
4 Emission reductions (beneficial impacts) are shown in parentheses.
5 Increment calculated as the difference between the total emissions for the alternative and the total emissions for the Existing Conditions, presented in **Table 3.7-2**.
6 Increment calculated as the difference between the total emissions for the alternative and the total emissions for 2042 without Project Conditions, presented in Table 9-1 in Appendix H.
Key:
CO_2 = carbon dioxide CO_2e = carbon dioxide equivalent CH_4 = methane
MSF = maintenance and storage facility N_2O = nitrous oxide

In addition to emissions decreases on the project level, the Project is a component of the RTP and contributes to California's goal to increase mass transit under the AB 32 Scoping Plan. Implementation of Alternative 1 would enhance regional transportation systems and contribute to planning efforts to reduce VMT and GHG emissions from transportation sources. Thus, operation of the base Alternative 3 would be consistent with the State's long-term climate strategies and the incremental contribution to climate change from the base Alternative 3 would be less than significant.

Similar to the base Alternative 3, operation of Alternative 3 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option would result in no meaningful difference in operational GHG emissions as compared to the base Alternative 3, nor would it alter the Project's contribution to the state and regional mass transit climate strategies. Therefore, operation Alternative 3 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Construction Impacts

Construction GHG emission sources under Alternative 3 include exhaust from construction worker motor vehicles traveling to and from the project site, exhaust from delivery and hauling trucks traveling to and from the project site, and exhaust from heavy-duty construction equipment operating on-site. **Table 3.7-29** details the annual GHG emissions associated with construction of Alternative 3 and the MSF site options. Consistent with SCAQMD guidance, construction GHG emissions are amortized over the project lifetime, assumed to be 30 years, to be combined with annual operational emissions. When amortized over 30 years, construction emissions would contribute an additional 183 metric tons CO_2e per year with the Commerce MSF site option or 192 metric tons CO_2e per year with the Montebello MSF site option. The Project's incremental contribution to climate change from construction of Alternative 3, including amortized construction emissions, would be less than significant.

Design Options

Atlantic/Pomona Station Option

As presented in **Table 3.7-29**, GHG emissions associated with construction of the Atlantic/Pomona Station Option would be the same as those of the base Alternative 3 Atlantic Station (relocated/reconfigured). While the Atlantic/Pomona Station Option, the TBM receiving pit, and the alignment north of the proposed Atlantic/Whittier station would be located at a different position along the alignment, the magnitude of excavation activity which would be required to implement the Atlantic/Pomona Station Option would be essentially the same as that required under the base Alternative 3 for the excavation of the TBM receiving pit and underground-to-at-grade transition of the alignment. Substantial additional construction is not anticipated under the Atlantic/Pomona Station Option and construction GHG emissions would not be expected to materially differ as compared to the base Alternative 3. Therefore, construction of Alternative 3 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Montebello At-Grade Option

As presented in **Table 3.7-29**, GHG emissions associated with construction of Alternative 3 with the Montebello At-Grade Option would be less than those of the base Alternative 3, and implementation of this design option would result in no meaningful change to the Project's incremental contribution to climate change. Therefore, construction of Alternative 3 with the Montebello At-Grade Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Table 3.7-29. Alternative 3 Annual Construction GHG Emissions

Project Element[1]	Emissions of CO_2e (metric tons per year)[2]					
	Year 1	Year 2	Year 3	Year 4	Year 5	Project
Guideway Construction[3,4]	570	1,067	365	0	0	2,001
Base Alternative Atlantic (Relocated/Reconfigured)	129	322	212	0	0	663
Design Option Atlantic/Pomona Station Option	129	322	212	0	0	663
Base Alternative Montebello Aerial	0	64	334	0	0	399
Design Option Montebello At-Grade	0	72	139	0	0	211
MSF Construction[5]	0	249	401	440	284	1,374
Commerce MSF Site Option	0	321	423	354	0	1,099
Montebello MSF Site Option	0	249	401	440	284	1,374
Station Construction	339	969	796	75	0	2,178
Parking Construction	0	0	0	17	0	17
Street Widening and TPSS	0	39	142	0	0	182
Maximum Total Emissions[3,4,5]	908	2,324	1,704	532	284	5,752
30-Year Amortized Emissions (Commerce MSF Site Option)						**183**
30-Year Amortized Emissions (Montebello MSF Site Option)						**192**

Note:
1 Emissions from hauling and vendor trips and construction worker commuting included in project element emission totals.
2 Construction of Alternative 3 would occur over 5 years. Emissions are calculated from calendar year 2022 emission factors. Emissions for project construction stated on or after January 1, 2022 would be less than or equal to the emissions presented.
3 Only the aerial alignment in Montebello (base Alternative) or the at-grade alignment (Montebello At-Grade Option) would be constructed. Total emissions assume the base Alternative construction as emissions would be higher.
4 Only the Atlantic (relocated/reconfigured) (base alternative) or the Atlantic/Pomona (design option) station would be constructed. Because comparable excavation for the Atlantic/Pomona Station Option would already be required under the base alternative for the TBM receiving pit, there would not be a material difference in overall construction GHG emissions.
5 Only one MSF site option would be constructed. Total emissions assume the Montebello MSF site option construction as emissions would be higher.
Key:
CO_2e = carbon dioxide equivalent MSF = maintenance and storage facility N/A = not applicable
TPSS = transportation power substation

3.7.6.1.4 Maintenance and Storage Facilities

Operational Impacts

MSF Site Options and Design Option

As detailed in **Section 3.7.6.1.1**, **Section 3.7.6.1.2**, and **Section 3.7.6.1.3**, the operation of the Project would contribute to the state and regional mass transit climate strategies and would result in a less than significant incremental contribution to climate change. An MSF is an essential element of maintaining a reliable light rail system and was included in the assessment of Project operations GHG emissions impacts.

Operation of the Commerce MSF site option would emit 203 metric tons CO_2e annually, representing approximately less than one percent of Project-related emissions under any Build Alternative. Operation of the Montebello MSF site option would emit 204 metric tons CO_2e annually, representing approximately less than one percent of Project-related emissions under Alternatives 1 and 3. While the Montebello MSF At-Grade Option would slightly alter the configuration of the Montebello MSF site option, it would not be expected to increase or decrease ridership of the light rail system, nor would it be expected to appreciably increase or decrease VMT relative to the Montebello MSF site option. Thus, implementation of the Montebello MSF At-Grade Option would result in no meaningful difference in operational GHG emissions as compared to the Montebello MSF site option, nor would it alter the Project's contribution to the state and regional mass transit climate strategies.

Therefore, operation of an MSF would contribute to the state and regional mass transit climate strategies and would result in a less than significant incremental contribution to climate change.

Construction Impacts

MSF Site Options and Design Option

As detailed in **Section 3.7.6.1.1**, **Section 3.7.6.1.2**, and **Section 3.7.6.1.3**, construction of the Project would contribute to the state and regional mass transit climate strategies and would result in a less than significant incremental contribution to climate change. An MSF is an essential element of maintaining a reliable light rail system and was included in the assessment of Project construction GHG emissions impacts.

Construction of the Commerce MSF site option would emit 1,099 metric tons CO_2e in total, or 37 metric tons CO_2e amortized over the Project lifetime. When added to Project operational emissions, construction emissions of the Commerce MSF site option represent less than one percent of Project-related GHG emissions under any Build Alternative. Operation of the Montebello MSF site option would emit 1,374 metric tons CO_2e in total, or 46 metric tons CO_2e amortized over the Project lifetime. When added to Project operational emissions, construction emissions of the Montebello MSF site option represent less than one percent of Project-related GHG emissions under Alternatives 1 and 3. GHG emissions associated with construction of the Montebello MSF At-Grade Option would be less than those of the base Montebello MSF site option, and implementation of this design option would result in no meaningful change to the Project's incremental contribution to climate change.

Therefore, construction of an MSF would contribute to the state and regional mass transit climate strategies and would result in a less than significant incremental contribution to climate change.

3.7.6.2 Impact GHG-2: Conflicts

Impact GHG-2: Would a Build Alternative conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

A universal GHG emission reduction focus of the 2017 Climate Change Scoping Plan Update, 2020 RTP/SCS, and Metro and City of Los Angeles Climate Action Plans is the reduction of GHG emissions associated with passenger vehicle VMT. In the 2017 Climate Change Scoping Plan Update, three key means of reducing these emissions are identified: increasing vehicle efficiency; reducing fuel carbon content; and reducing VMT. CARB has specifically identified VMT reduction as a key measure in

ensuring SB 375 targets are achieved acknowledging that State emission targets would be unachievable without stymieing statewide VMT growth.

3.7.6.2.1 Alternative 1 Washington

Construction and Operational Impacts

The implementation of Alternative 1 would support a larger regional effort to facilitate and enhance mass transit in the SoCAB. The Project is identified in the 2020 RTP/SCS as a major transit capital project and is included in the plan's regional growth and transportation projections.

At the project-level, the implementation of Alternative 1 would reduce regional VMT by 3,180,000 miles annually. Alternative 1 would be consistent with the 2020 RTP/SCS and other relevant GHG reduction plans in that it would support the VMT reduction strategies of those plans. Additionally, the Project, alongside other transit improvement projects planned to be implemented throughout the region, would facilitate broader adoption of mass transit and contribute to regional VMT reductions, and the associated GHG emission reductions, as projected in the 2020 RTP/SCS. Therefore, implementation of Alternative 1 would result in a less than significant impact with respect to GHG emission reduction plans.

Design Options

Atlantic/Pomona Station Option

As detailed previously, the Project would be consistent with the GHG reduction strategies of applicable plans, policies, and regulations by facilitating regional adoption of mass transit and reducing regional VMT. Implementation of Alternative 1 with the Atlantic/Pomona Station Option would result in no change to VMT reduction projections as compared to the base Alternative 1, nor would it alter the Project's consistency with the GHG reduction strategies of applicable plans, policies, and regulations. Therefore, implementation of Alternative 1 with the Atlantic/Pomona Station Option would result in a less than significant impact with respect to GHG emission reduction plans.

Montebello At-Grade Option

As detailed previously, the Project would be consistent with the GHG reduction strategies of applicable plans, policies, and regulations by facilitating regional adoption of mass transit and reducing regional VMT. Implementation of Alternative 1 with the Montebello At-Grade Option would result in no change to VMT reduction projections as compared to the base Alternative 1, nor would it alter the Project's consistency with the GHG reduction strategies of applicable plans, policies, and regulations. Therefore, implementation of Alternative 1 with the Montebello At-Grade Option would result in a less than significant impact with respect to GHG emission reduction plans.

3.7.6.2.2 Alternative 2 Atlantic to Commerce/Citadel IOS

Construction and Operational Impacts

Base Alternative with Design Option

The implementation of the base Alternative 2 or Alternative 2 with the Atlantic/Pomona Station Option would support a larger regional effort to facilitate and enhance mass transit in the SoCAB. The Project is identified in the 2020 RTP/SCS as a major transit capital project and is included in the plan's regional growth and transportation projections.

At the project-level, the implementation of the base Alternative 2 or Alternative 2 with the Atlantic/Pomona Station Option would reduce regional VMT by 1,590,000 miles annually. The Project would be consistent with the 2020 RTP/SCS and other relevant GHG reduction plans in that it would support the VMT reduction strategies of those plans. Additionally, the Project, alongside other transit improvement projects planned to be implemented throughout the region, would facilitate broader adoption of mass transit and contribute to regional VMT reductions, and the associated GHG emission reductions, as projected in the 2020 RTP/SCS. Therefore, implementation of the base Alternative 2 or Alternative 2 with the Atlantic/Pomona Station Option would result in a less than significant impact with respect to GHG emission reduction plans.

3.7.6.2.3 Alternative 3 Atlantic to Greenwood IOS

Construction and Operational Impacts

Base Alternative with Design Options

The implementation of the base Alternative 3 or Alternative 3 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option would support a larger regional effort to facilitate and enhance mass transit in the SoCAB. The Project is identified in the 2020 RTP/SCS as a major transit capital project and is included in the plan's regional growth and transportation projections.

At the project-level, the implementation of base Alternative 3 or Alternative 3 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option would reduce regional VMT by 2,544,000 miles annually. The Project would be consistent with the 2020 RTP/SCS and other relevant GHG reduction plans in that it would support the VMT reduction strategies of those plans. Additionally, the Project, alongside other transit improvement projects planned to be implemented throughout the region, would facilitate broader adoption of mass transit and contribute to regional VMT reductions, and the associated GHG emission reductions, as projected in the 2020 RTP/SCS. Therefore, implementation of base Alternative 3 or Alternative 3 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option would result in a less than significant impact with respect to GHG emission reduction plans.

3.7.6.2.4 Maintenance and Storage Facilities

Construction and Operational Impacts

MSF Site Options and Design Option

As stated in **Section 3.7.6.2.1**, **Section 3.7.6.2.2**, and **Section 3.7.6.2.3**, implementation of the Project would be consistent with the GHG emission reduction strategies of the 2020 RTP/SCS and other applicable plans, policies, and regulations. Further, the Commerce and Montebello MSF site options would be designed and constructed in compliance with Title 24 and CALGreen Building Code regulatory requirements for energy efficiency and sustainability.

The Commerce MSF site option would generate approximately 1,099 metric tons CO_2e during construction (37 metric tons per year when amortized over the project lifespan) and 203 metric tons CO_2e annually from operation. The Montebello MSF site option would generate approximately 1,374 metric tons CO_2e during construction (46 metric tons per year when amortized over the project lifespan) and 204 metric tons CO_2e annually from operation. However, an MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of the Project. Therefore, implementation of the Commerce MSF site option, Montebello MSF site option, or Montebello MSF At-Grade Option would result in a less than significant impact with respect to GHG emission reduction plans.

3.7.7 Project Measures and Mitigation Measures

As identified in **Section 3.7.6**, the Build Alternatives and Build Alternatives with the design option(s) and MSF site option would have less than significant impacts relative to greenhouse gases under Impact GHG-1 (Emission Generation) and Impact GHG-2 (Conflicts). No project measures or mitigation measures would be required for operation or construction. **Table 3.7-30 i**dentifies the combined impact of the base alternatives with the associated MSF site option(s), and the alternatives with one or both design options (as applicable) with the associated MSF site option(s). All impacts would be less than significant for all alternatives and design options.

3.7.8 Significance After Mitigation

As identified in **Table 3.7-30,** no mitigation is required for the Build Alternatives and Build Alternatives with the design option(s) and MSF site option. **The impacts are less than significant**.

Table 3.7-30. Summary of Mitigation Measures and Impacts After Mitigation

CEQA Impact Topic		Alternative 1: Washington Boulevard								Alternative 2: Commerce/Citadel IOS		Alternative 3: Washington/Greenwood IOS							
		Base Alternative 1[1]		Alternative 1 + Atlantic/Pomona Station Option		Alternative 1 + Montebello At-Grade Option		Alternative 1 + Atlantic/Pomona Station Option + Montebello At-Grade Option		Base Alternative 2[2]	Alternative 2 + Atlantic/ Pomona Station Option	Base Alternative 3[3]		Alternative 3 + Atlantic/Pomona Station Option		Alternative 3 + Montebello At-Grade Option		Alternative 3 + Atlantic/Pomona Station Option + Montebello At-Grade Option	
		Commerce MSF	Montebello MSF	Commerce MSF	Montebello MSF	Commerce MSF	Montebello MSF At-Grade Option	Commerce MSF	Montebello MSF At-Grade Option	Commerce MSF		Commerce MSF	Montebello MSF	Commerce MSF	Montebello MSF	Commerce MSF	Montebello MSF At-Grade Option	Commerce MSF	Montebello MSF At-Grade Option
GHG-1 Emission Generation	Applicable Mitigation	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
	Impacts After Mitigation	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
GHG-2 Conflicts	Applicable Mitigation	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
	Impacts After Mitigation	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS

Source: CDM Smith/AECOM JV, 2022.

Notes:
The Base Alternatives are shaded in light yellow. Design options are not shaded.
1 The Base Alternative 1 includes the Atlantic station (reconfigured/relocated) and aerial Greenwood station.
2 The Base Alternative 2 includes the Atlantic station (reconfigured/relocated).
3 The Base Alternative 3 includes the Atlantic station (reconfigured/relocated) and aerial Greenwood station.
Key:
NI = No Impact LTS = Less Than Significant SU = Significant and Unavoidable

This page intentionally left blank.