9.7 Greenhouse Gas Emissions Assessment

Greenhouse Gas Emissions Assessment

BNSF Ono Lead Track Extension Project
City of San Bernardino

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Expect More. Experience Better.

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LIST OF ABBREVIATED TERMS

AB	Assembly Bill
BAU	business-as-usual
CARB	California Air Resource Board
CCR	California Code of Regulations
CalEEMod	California Emissions Estimator Model
CEQA	California Environmental Quality Act
CALGreen	California Green Building Standards
CPUC	California Public Utilities Commission
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CFC	chlorofluorocarbon
CPP	Clean Power Plan
CCSP	Climate Change Scoping Plan
cy	cubic yard
EPA	Environmental Protection Agency
EO	Executive Order
FCAA	Federal Clean Air Act
GHG	greenhouse gas
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
LCFS	Low Carbon Fuel Standard
CH_4	methane
mpg	miles per gallon
MP	mile post
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
$MTCO_2e$	metric tons of carbon dioxide equivalent
NHTSA	National Highway Traffic Safety Administration
NF_3	nitrogen trifluoride
N_2O	nitrous oxide
PFC	perfluorocarbon
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RPS	Renewable Portfolio Standard
ROW	right-of-way
SBGP	San Bernardino General Plan
GHGRP	San Bernardino County Regional Greenhouse Gas Reduction Plan
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SCAG	Southern California Association of Government
SF_6	sulfur hexafluoride
TAC	toxic air contaminants

1 INTRODUCTION

This report documents the results of a Greenhouse Gas (GHG) Emissions Assessment completed for the BNSF Ono Lead Track Extension Project (Project). The purpose of this GHG Emissions Assessment is to evaluate the potential construction and operational emissions associated with the Project and determine the level of impact the Project would have on the environment.

1.1 Project Location

BNSF Railway Company (BNSF) proposes the Project, which involves installation of a fourth lead track extension from the existing BNSF San Bernardino Intermodal Facility A Yard (Yard) to connect with two existing Ono Storage Sidings located near the State Street and University Parkway grade separation. The Project is intended to enhance the Yard's train traffic efficiency by reducing congestion along the existing lead tracks servicing BNSF's east-west corridor.

The Project site is at the southwest corner of San Bernardino County, in the southern portion of the City of San Bernardino; see Exhibit 1: Regional Vicinity Map. The Project extends approximately 4.06 linear miles of existing BNSF right-of-way (ROW), generally from the BNSF crossing at State Street and University Parkway on the north to the existing Yard at West 5th Street on the south, between Milepost (MP) 175.14 and MP 80.61. The Yard is immediately south of the Project's southern extent; see Exhibit 2: Local Vicinity Map.

1.2 Project Description

The Project site consists of existing BNSF ROW and adjacent properties where ground disturbances or property acquisitions would occur. The BNSF ROW consists of an existing three and four track railroad system with associated signal poles, electrical poles, and cabinets. The adjacent properties involve industrial, commercial, and single-family residential land uses, vacant lots, and City roadways. Underground and overhead utility lines are present throughout the Project area.

Construction and Phasing

Project construction is proposed to occur in one phase and is anticipated to begin in spring of 2020 and be completed by the second quarter of 2021. Construction phases and approximate durations are:

- Acquisitions/Demolition: 20 months,
- Utility Relocations: 15 months,
- Civil Construction (3 months overlap with utility relocations): 10 months, and
- BNSF Track/Signal Construction: 4 months.

Inclusive of acquisitions/demolition, Project construction would occur over approximately 29 months. However, demolition would occur upon property acquisition, prior to commencing Project construction (i.e., utility relocations, civil construction and BNSF track/signal construction). Exclusive of acquisitions/demolition, Project construction would occur over approximately 19 months. Notwithstanding, to provide a conservative analysis, demolition-related activities are included in the construction emissions assumed and evaluated herein.

[1] The Rail MP feature identifies a given point (i.e. MP) assigned by Caltrans along freight and passenger rail networks.

It is assumed the Project would require the following import/export of soils/materials:

- Approximately 26,900 tons of debris export,
- Approximately 74,200 tons of materials import,
- Approximately 184,300 cubic yards (CY) of subcut/soil export, and
- Approximately 33,400 CY of soil/concrete import.

Import/export of soils/materials would involve approximately 18,100 truck trips. Additionally, several train deliveries are expected to transport rail construction materials (i.e. rail, ties, ballast) to the site.

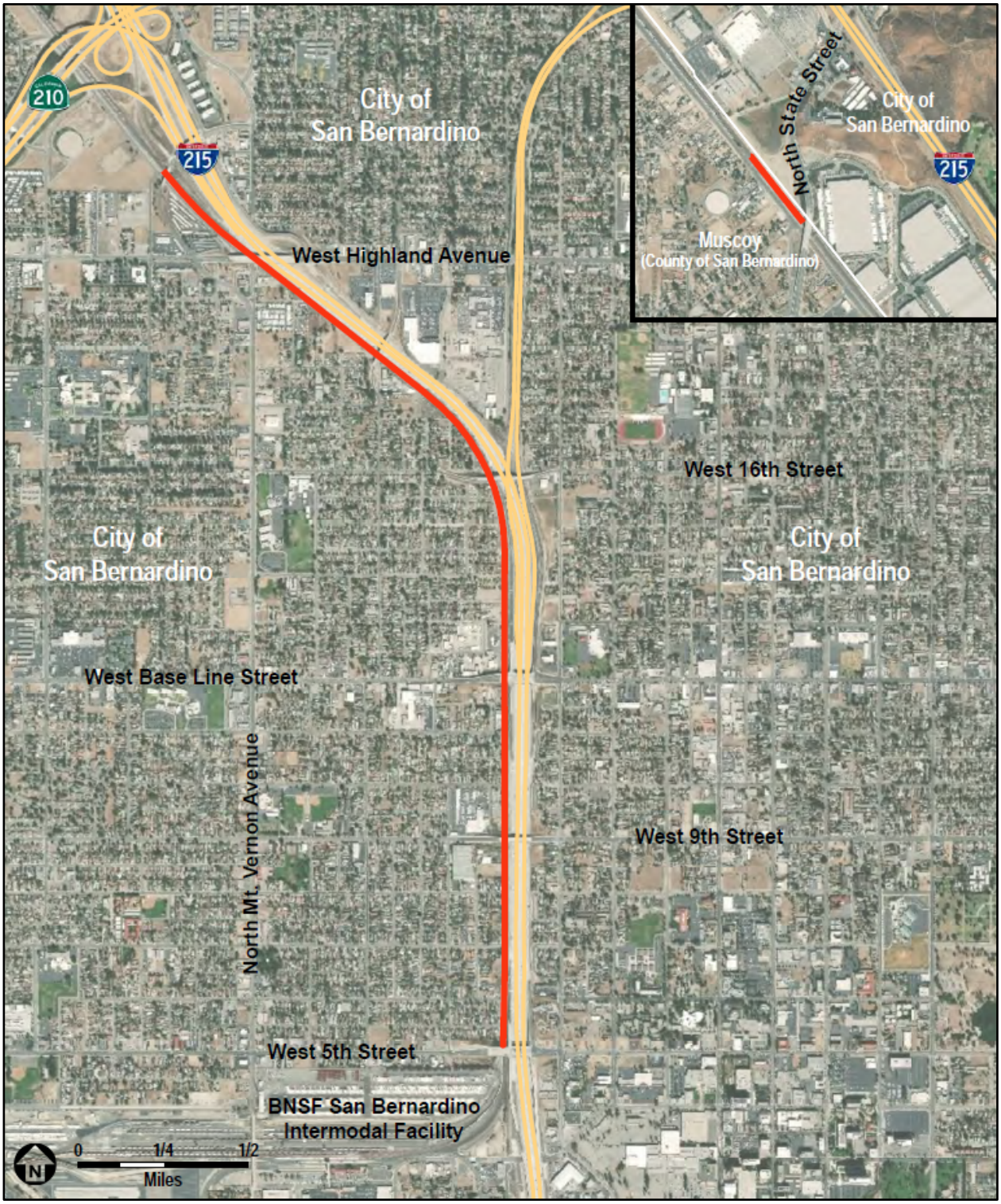
Existing Project Site

The Project site is generally level, with onsite elevations ranging from approximately 1,080 to 1,200 feet above mean sea level. The Project is in a fully urbanized area comprised primarily of BNSF ROW, commercial, industrial, and residential land uses, vacant lots, and roadways. Small patches of disturbed non-native grassland, ornamental, and ruderal vegetation exist in the Project area.

Exhibit 1: Regional Vicinity Map

Source: Google Maps, 2019.

Exhibit 2: Site Vicinity Map



Source: Google Maps, 2019.

2 ENVIRONMENTAL SETTING

2.1 Greenhouse Gases and Climate Change

Certain gases in the earth's atmosphere classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. Because the earth has a much lower temperature than the sun, it emits lower-frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

The primary GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Fluorinated gases also make up a small fraction of the GHGs that contribute to climate change. Examples of fluorinated gases include chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3); however, it is noted that these gases are not associated with typical land use development. Human-caused emissions of GHGs exceeding natural ambient concentrations are believed to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the Earth's climate, known as global climate change or global warming.

GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants (TACs), which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of a GHG molecule is dependent on multiple variables and cannot be pinpointed, more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, or other forms of carbon sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent is sequestered through ocean and land uptakes every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO_2 emissions remains stored in the atmosphere[2]. Table 1: Description of Greenhouse Gases describes the primary GHGs attributed to global climate change, including their physical properties.

[2] Intergovernmental Panel on Climate Change, *Carbon and Other Biogeochemical Cycles. In: Climate Change 2013: The Physical Science Basis*, *Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 2013. http://www.climatechange2013.org/ images/report/WG1AR5_ALL_FINAL.pdf.

Table 1: Description of Greenhouse Gases

Greenhouse Gas	Description
Carbon Dioxide (CO_2)	CO_2 is a colorless, odorless gas that is emitted naturally and through human activities. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources are from burning coal, oil, natural gas, and wood. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, and industrial facilities. The atmospheric lifetime of CO_2 is variable because it is readily exchanged in the atmosphere. CO_2 is the most widely emitted GHG and is the reference gas (Global Warming Potential [GWP] of 1) for determining GWP for other GHGs.
Nitrous Oxide (N_2O)	N_2O is largely attributable to agricultural practices and soil management. Primary human-related sources of N_2O include agricultural soil management, sewage treatment, combustion of fossil fuels, and adipic and nitric acid production. N_2O is produced from biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N_2O is approximately 120 years. The GWP of N_2O is 298.
Methane (CH_4)	CH_4, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. CH_4 is the major component of natural gas, about 87 percent by volume. Human-related sources include fossil fuel production, animal husbandry, rice cultivation, biomass burning, and waste management. Natural sources of CH_4 include wetlands, gas hydrates, termites, oceans, freshwater bodies, non-wetland soils, and wildfires. The atmospheric lifetime of CH_4 is about 12 years and the GWP is 25.
Hydrofluorocarbons (HFCs)	HFCs are typically used as refrigerants for both stationary refrigeration and mobile air conditioning. HFC use for cooling and foam blowing (insulation) is increasing, as the continued phase out of CFCs and HCFCs gains momentum. The 100-year GWP of HFCs range from 124 for HFC-152 to 14,800 for HFC-23.
Perfluorocarbons (PFCs)	PFCs have stable molecular structures and only break down by ultraviolet rays about 60 kilometers above Earth's surface. Because of this, they have long lifetimes, between 10,000 and 50,000 years. Two main sources of PFCs are primary aluminum production and semiconductor manufacturing. GWPs range from 6,500 to 9,200.
Chlorofluorocarbons (CFCs)	CFCs are gases formed synthetically by replacing all hydrogen atoms in CH_4 or ethane with chlorine and/or fluorine atoms. They are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs were synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. The Montreal Protocol on Substances that Deplete the Ozone Layer prohibited their production in 1987. GWPs for CFCs range from 3,800 to 14,400.
Sulfur Hexafluoride (SF_6)	SF_6 is an inorganic, odorless, colorless, and nontoxic, nonflammable gas. It has a lifetime of 3,200 years. This gas is manmade and used for insulation in electric power transmission equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas. The GWP of SF_6 is 23,900.
Hydrochlorofluoro-carbons (HCFCs)	HCFCs are solvents, similar in use and chemical composition to CFCs. The main uses of HCFCs are for refrigerant products and air conditioning systems. As part of the Montreal Protocol, HCFCs are subject to a consumption cap and gradual phase out. The United States is scheduled to achieve a 100 percent reduction to the cap by 2030. The 100-year GWPs of HCFCs range from 90 for HCFC-123 to 1,800 for HCFC-142b.
Nitrogen Trifluoride (NF_3)	NF_3 was added to Health and Safety Code section 38505(g)(7) as a GHG of concern. This gas is used in electronics manufacture for semiconductors and liquid crystal displays. It has a high GWP of 17,200.

Source: Compiled from United States Environmental Protection Agency, *Overview of Greenhouse Gases*, April 11, 2018 (https://www.epa.gov/ghgemissions/overview-greenhouse-gases); United States Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016*, 2018; Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis*, 2007; National Research Council, Advancing the Science of Climate Change, 2010; United States Environmental Protection Agency, *Methane and Nitrous Oxide Emission from Natural Sources*, April 2010.

3 REGULATORY SETTING

3.1 Federal

To date, national standards have not been established for nationwide GHG reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and GHG emissions reduction at the project level. Various efforts have been promulgated at the Federal level to improve fuel economy and energy efficiency to address climate change and its associated effects.

The Energy Policy and Conservation Act of 1975 (42 USC Section 6201) was developed to establish energy conservation programs to efficiently and effectively minimize adverse economic or employment impacts of changing patterns of energy use and meet local economic, climatic, geographic, and other unique conditions and requirements of each state. The act established the Strategic Petroleum Reserve, the Energy Conservation Program for Consumer Products, and Corporate Average Fuel Economy regulations.

The National Climate Program Act of 1978 (95th Congress H.R. 6669) requires the Secretary of Commerce to establish a National Climate Program Office enabling the United States and other nations to understand and respond to natural and man-induced climate processes and their implications. The program includes: (1) procedures for assessing effects of climate on agriculture, energy supply and demand, land and water resources, transportation, human health, and national security; (2) basic and applied research to improve understanding of climate processes; (3) methods of improving climate forecasts; (4) global data collection and climate monitoring and analysis activities to provide reliable, useful, and available information on a continuing basis; (5) systems for the management and active dissemination of climatological data and information; (6) measures for increasing international cooperation in climate research, monitoring, analysis, and data dissemination; (7) mechanisms for intergovernmental climate-related research and services, including participation from universities and private sector; (8) experimental climate forecast centers; and (9) biennial revisions for final five-year plan.

In 1979, the National Research Council released *Strategy for the National Climate Program*, the first of a number of reviews and advisory documents prepared by the National Research Council on the program. The Global Change Research Act of 1990 as amended is the currently mandated framework within which climate and global change research is implemented among U.S. Federal departments and agencies.

The Energy Policy Act of 1992 (102nd Congress H.R. 776 ENR) set goals, created mandates, and amended utility laws to increase clean energy use and improve overall energy efficiency in the United States. The act consists of twenty-seven titles detailing various measures designed to lessen the nation's dependence on imported energy, provide incentives for clean and renewable energy, and promote energy conservation in buildings. Title XVI (Global Climate Change) requires the Secretary of Energy to report to the Congress on specified implications of global climate change policies, including the generation of GHGs and CO_2, and U.S. compliance with its international obligations.

The Energy Policy Act of 2005 (109th Congress H.R. 6) sets forth a research and development program covering: (1) energy efficiency; (2) renewable energy; (3) oil and gas; (4) coal; (5) Tribal energy resource development; (6) nuclear matters and security; (7) vehicles and motor fuels, including ethanol; (8) hydrogen; (9) electricity; (10) energy tax incentives; (11) hydropower and geothermal energy; and (12) climate change technology.

The Energy Independence and Security Act (110th Congress H.R. 6), enacted in December 2007, among other key measures, requires the following, which would aid in the reduction of national GHG emissions:

- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
- Set a target of 35 miles per gallon (mpg) for the combined fleet of cars and light trucks by model year 2020 and direct the National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.
- Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

***Massachusetts v. Environmental Protection* Agency**, a U.S. Supreme Court case in 2007 (127 S.Ct. 1438), ruled that CO_2 and other GHGs are pollutants under the Federal Clean Air Act (FCAA), which the U.S. Environmental Protection Agency (EPA) must regulate if it determines they pose an endangerment to public health or welfare. The Court's opinion also referenced a Council on Environmental Quality report issued in 1970 that concluded that "man may be changing his weather"[3] and a 1979 Climate Research Board investigation that determined "If CO_2 continues to increase, the study group finds no reason to doubt that climate changes will result and no reason to believe that these changes will be negligible… A wait-and-see policy may mean waiting until it is too late."[4]

United States Environmental Protection Agency Endangerment Finding

The EPA's authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. Environmental Protection Agency* (2007). As noted above, the Supreme Court ruled that GHGs meet the definition of air pollutants. Responding to the Court's ruling, the EPA finalized an endangerment finding in December 2009. Based on scientific evidence it found that six GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) constitute a threat to public health and welfare. Thus, it is the Supreme Court's interpretation of the existing FCAA and the EPA's assessment of the scientific evidence that form the basis for the EPA's regulatory actions.

Federal Vehicle Standards

In response to the U.S. Supreme Court ruling discussed above, Executive Order (EO) 13432 was issued in 2007 directing the EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the NHTSA issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011, and in 2010, the EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, an Executive Memorandum was issued directing the Department of Transportation, Department of Energy, EPA, and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the EPA and NHTSA proposed stringent, coordinated Federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The fuel efficiency standards are projected to achieve 163 grams per mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 mpg if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–

[3] Council on Environmental Quality, *Environmental Quality: The First Annual Report*, August 1970.
[4] Climate Research Board, *Carbon Dioxide and Climate: A Scientific Assessment*, 1979.

2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking. On January 12, 2017, the EPA finalized its decision to maintain the current GHG emissions standards for model years 2022–2025 cars and light trucks. It should be noted that the EPA is currently proposing to freeze the vehicle fuel efficiency standards at their planned 2020 level (37 mpg), canceling any future strengthening (currently 54.5 mpg by 2026).

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the EPA, this regulatory program would reduce GHG emissions and fuel consumption for the affected vehicles by 6 to 23 percent over the 2010 baselines.

In August 2016, the EPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program would apply to vehicles with model years 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks. The final standards are expected to lower CO_2 emissions by approximately 1.1 billion metric tons and reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program.

Recent Changes in Federal Greenhouse Gas Policy

In 2018, President Trump and the EPA have stated their intent to halt various Federal regulatory activities to reduce GHG emission, including the phase two program. California and other states have stated their intent to challenge Federal actions that would delay or eliminate GHG reduction measures and have committed to cooperating with other countries to implement global climate change initiatives. The timing and consequences of these types of Federal decisions and potential responses from California and other states are speculative at this time.

On March 28, 2017, President Donald Trump signed EO 13783, with the intent to reduce GHG regulations at the Federal level. The Order rescinded EO 13653, as well as former President Obama's Climate Action Plan and the Council on Environmental Quality's "*Final Guidance for Federal Departments and Agencies on Consideration of GHG Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*" (August 5, 2016). The order also calls for review, suspension and/or rescission of various Federal regulations and policies related to climate change and GHG emissions. Following issuance of EO 13783, the EPA proposed to repeal the *Clean Power Plan* (CPP) and issued an *Energy Independence Report* (October 25, 2017) to implement EO 13783[5]. These current and potential future changes in Federal GHG regulations and policies would not affect the Project's requirements under various local and state climate change policies and regulations, which are discussed further below.

3.2 State

California Air Resources Board

The California Air Resources Board (CARB) is responsible for the coordination and oversight of state and local air pollution control programs in California. Various statewide and local initiatives to reduce California's contribution to GHG emissions have raised awareness about climate change and its potential for severe long-term adverse environmental, social, and economic effects. California is a significant emitter of CO_2 equivalents (CO_2e) in the world and produced 459 million gross metric tons of CO_2e in 2013.

[5] United States Environmental Protection Agency, *Energy Independence, epa.gov/energy*-independence, March 21, 2018.

In the State, the transportation sector is the largest emitter of GHGs, followed by industrial operations such as manufacturing and oil and gas extraction.

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce GHGs of any state in the nation. Some legislation, such as the landmark Assembly Bill (AB) 32, California Global Warming Solutions Act of 2006, was specifically enacted to address GHG emissions. Other legislation, such as Title 24 building efficiency standards and Title 20 appliance energy standards, were originally adopted for other purposes such as energy and water conservation, but also provide GHG reductions. This section describes the major provisions of the legislation.

Assembly Bill 32 (California Global Warming Solutions Act of 2006) instructs the CARB to develop and enforce regulations for the reporting and verification of Statewide GHG emissions. AB 32 also directed CARB to set a GHG emissions limit based on 1990 levels, to be achieved by 2020. It set a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.

California Air Resources Board Scoping Plan was adopted to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that would be adopted to reduce California's GHG emissions. CARB determined that achieving the 1990 emissions level would require a reduction of GHG emissions of approximately 29 percent below what would otherwise occur in 2020 in the absence of new laws and regulations (referred to as "business-as-usual")[6]. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates early actions and additional GHG reduction measures by both CARB and the State's Climate Action Team, identifies additional measures to be pursued as regulations, and outlines the adopted role of a cap-and-trade program[7]. Additional development of these measures and adoption of the appropriate regulations occurred through the end of 2013. Key elements of the Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs, as well as building and appliance standards.
- Achieving a Statewide renewables energy mix of 33 percent by 2020.
- Developing a California cap-and-trade program that links with other programs to create a regional market system and caps sources contributing 85 percent of California's GHG emissions (adopted in 2011).
- Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets (several sustainable community strategies have been adopted).
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, heavy-duty truck measures, the LCFS (amendments to the Pavley

[6] CARB defines business-as-usual (BAU) in its Scoping Plan as emissions levels that would occur if California continued to grow and add new GHG emissions but did not adopt any measures to reduce emissions. Projections for each emission-generating sector were compiled and used to estimate emissions for 2020 based on 2002–2004 emissions intensities. Under CARB's definition of BAU, new growth is assumed to have the same carbon intensities as was typical from 2002 through 2004.

[7] The Climate Action Team, led by the secretary of the California EPA, is a group of State agency secretaries and heads of agencies, boards, and departments. Team members work to coordinate statewide efforts to implement global warming emissions reduction programs and the State's Climate Adaptation Strategy.

Standard adopted 2009; Advanced Clean Car standard adopted 2012), goods movement measures, and the LCFS (adopted 2009).

- Creating targeted fees, including a public goods charge on water use, fees on gasses with high global warming potential, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation.

In 2012, CARB released revised estimates of the expected 2020 emissions reductions. The revised analysis relied on emissions projections updated in light of current economic forecasts that accounted for the economic downturn since 2008, reduction measures already approved and put in place relating to future fuel and energy demand, and other factors. This update reduced the projected 2020 emissions from 596 million metric tons of carbon dioxide equivalent (CO_2e) ($MMTCO_2e$) to 545 $MMTCO_2e$. The reduction in forecasted 2020 emissions means that the revised business-as-usual reduction necessary to achieve AB 32's goal of reaching 1990 levels by 2020 is now 21.7 percent, down from 29 percent. CARB also provided a lower 2020 inventory forecast that incorporated State-led GHG emissions reduction measures already in place. When this lower forecast is considered, the necessary reduction from business-as-usual needed to achieve the goals of AB 32 is approximately 16 percent.

CARB adopted the first major update to the Scoping Plan on May 22, 2014. The updated Scoping Plan summarizes the most recent science related to climate change, including anticipated impacts to California and the levels of GHG emissions reductions necessary to likely avoid risking irreparable damage. It identifies the actions California has already taken to reduce GHG emissions and focuses on areas where further reductions could be achieved to help meet the 2020 target established by AB 32.

In 2016, the Legislature passed Senate Bill (SB) 32, which codifies a 2030 GHG emissions reduction target of 40 percent below 1990 levels. With SB 32, the Legislature passed companion legislation, AB 197, which provides additional direction for developing the Scoping Plan. On December 14, 2017 CARB adopted a second update to the Scoping Plan[8]. The 2017 Scoping Plan details how the State will reduce GHG emissions to meet the 2030 target set by EO B-30-15 and codified by SB 32. Other objectives listed in the 2017 Scoping plan are to provide direct GHG emissions reductions; support climate investment in disadvantaged communities; and, support the CPP and other Federal actions.

Cap-and-Trade Program. Pursuant to the recommendations in the initial CARB Scoping Plan, California developed a Cap-and-Trade Program that links with other Western Climate Initiative partner programs to create a regional market system. The California Cap-and-Trade Program caps GHG emissions and requires the purchase of emission allowances for covered activities. The Cap-and-Trade Program is designed to reduce GHG emissions from major sources (deemed "covered entities") by setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve AB 32's emission-reduction mandate of returning to 1990 levels of emissions by 2020. The statewide cap for GHG emissions from the capped sectors (i.e., electricity generation, industrial sources, petroleum refining, and cement production) commenced in 2013 and will decline over time, achieving GHG emission reductions throughout the program's duration. The passage of AB 398 in July 2017 extended the duration of the Cap-and-Trade Program from 2020 to 2030.

The 2017 Scoping Plan sets forth measures to reduce GHG emissions to achieve State GHG emission reduction targets for 2030 as prescribed by statute, as well as 2050 targets set forth in Eos issued by the

[8] California Air Resources Board, *California's 2017 Climate Change Scoping Plan*, arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf, accessed May 9, 2018.

California Governor's office. The Cap-and-Trade Program is included in the 2017 Scoping Plan, without a termination date of 2030. Based on CARB's expert opinion that specific statutory authorization for a Cap-and-Trade Program is not required, the inclusion of a Cap-and-Trade Program through 2050 in the 2017 Scoping Plan, and other relevant climate laws, regulations, and policies, it is likely the Cap-and-Trade Program would continue beyond 2030.

Under the Cap-and-Trade Program, covered entities that emit more than 25,000 metric tons CO_2e per year must comply with Program requirements. Triggering of the 25,000 metric tons CO_2e per year "inclusion threshold" is measured against a subset of emissions reported and verified under the California Regulation for the Mandatory Reporting of GHG Emissions (Mandatory Reporting Rule or "MRR"). CARB issues allowances equal to the total amount of allowable emissions over a given compliance period and distributes these to regulated entities. Covered entities are allocated free allowances in whole or part (if eligible), and may buy allowances at auction, purchase allowances from others, or purchase offset credits.

The Cap-and-Trade Program works with other direct regulatory measures and provides an economic incentive to reduce emissions. If California's direct regulatory measures reduce GHG emissions more than expected, then the Cap-and-Trade Program would be responsible for relatively fewer emissions reductions. If California's direct regulatory Cap-and-Trade Program

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The 2017 Scoping Plan sets forth measures to reduce GHG emissions to achieve State GHG emission reduction targets for 2030 as prescribed by statute, as well as 2050 targets set forth in Eos issued by the California Governor's office. The Cap-and-Trade Program is included in the 2017 Scoping Plan, without a termination date of 2030. Based on CARB's expert opinion that specific statutory authorization for a Cap-and-Trade Program is not required, the inclusion of a Cap-and-Trade Program through 2050 in the 2017 Scoping Plan, and other relevant climate laws, regulations, and policies, it is likely the Cap-and-Trade Program would continue beyond 2030.

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distributes these to regulated entities. Covered entities are allocated free allowances in whole or part (if eligible), and may buy allowances at auction, purchase allowances from others, or purchase offset credits.

The Cap-and-Trade Program works with other direct regulatory measures and provides an economic incentive to reduce emissions. If California's direct regulatory measures reduce GHG emissions more than expected, then the Cap-and-Trade Program would be responsible for relatively fewer emissions reductions. If California's direct regulatory measures reduce GHG emissions less than expected, then the Cap-and-Trade Program would be responsible for relatively more emissions reductions. Therefore, the Cap-and-Trade Program assures that California would meet its 2020 GHG emissions reduction mandate.

The Cap-and-Trade Program is intended to achieve aggregate, rather than site-specific or project-level, GHG emissions reductions. Also, due to the regulatory framework adopted by CARB in AB 32, the reductions attributed to the Cap-and-Trade Program can change over time depending on the State's emissions forecasts and the effectiveness of direct regulatory measures. As of January 1, 2015, the Cap-and-Trade Program covered approximately 85 percent of California's GHG emissions. The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported. The Cap-and-Trade Program was extended in 2015 to cover the combustion of fossil fuels including transportation fuels used in California. Accordingly, GHG emissions associated with the electricity usage and mobile sources of most projects that are subject to CEQA are covered by the Cap-and-Trade Program measures reduce GHG emissions less than expected, then the Cap-and-Trade Program would be responsible for relatively more emissions reductions. Therefore, the Cap-and-Trade Program assures that California would meet its 2020 GHG emissions reduction mandate.

The Cap-and-Trade Program is intended to achieve aggregate, rather than site-specific or project-level, GHG emissions reductions. Also, due to the regulatory framework adopted by CARB in AB 32, the reductions attributed to the Cap-and-Trade Program can change over time depending on the State's emissions forecasts and the effectiveness of direct regulatory measures. As of January 1, 2015, the Cap-and-Trade Program covered approximately 85 percent of California's GHG emissions. The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported. The Cap-and-Trade Program was extended in 2015 to cover the combustion of fossil fuels including transportation fuels used in California. Accordingly, GHG emissions associated with the electricity usage and mobile sources of most projects that are subject to CEQA are covered by the Cap-and-Trade Program.

Senate Bill 32 (California Global Warming Solutions Act of 2006: Emissions Limit), signed into law in September 2016, codifies the 2030 GHG reduction target in EO B-30-15 (40 percent below 1990 levels by 2030). The bill authorizes CARB to adopt an interim GHG emissions level target to be achieved by 2030. CARB also must adopt rules and regulations in an open public process to achieve the maximum, technologically feasible, and cost-effective GHG reductions.

Senate Bill 375 (The Sustainable Communities and Climate Protection Act of 2008), signed into law on September 30, 2008, provides a process to coordinate land use planning, regional transportation plans, and funding priorities to help California meet the GHG reduction goals established by AB 32. SB 375 requires metropolitan planning organizations to include sustainable community strategies in their

regional transportation plans for reducing GHG emissions, aligns planning for transportation and housing, and creates specified incentives for the implementation of the strategies.

Assembly Bill 1493 (Pavley Regulations and Fuel Efficiency Standards), enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the EPA's denial of an implementation waiver. The EPA subsequently granted the requested waiver in 2009, which was upheld by the by the U.S. District Court for the District of Columbia in 2011. The regulations establish one set of emission standards for model years 2009–2016 and a second set of emissions standards for model years 2017 to 2025. By 2025, when all rules are fully implemented, new automobiles are forecast to emit 34 percent fewer CO_2e emissions and 75 percent fewer smog-forming emissions.

Senate Bill 1368 (Emission Performance Standards) (2007) is the companion bill of AB 32, which directs the California Public Utilities Commission (CPUC) to adopt a performance standard for GHG emissions for the future power purchases of California utilities. SB 1368 limits carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than 5 years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. SB 1368 effectively prevents California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. The regulations implementing SB 1368 establish a standard for baseload generation owned by, or under long-term contract to publicly owned utilities, for 1,100 pounds of CO_2 per megawatt-hour.

Senate Bills 1078 and X1-2 (Renewable Electricity Standards) requires California to generate 20 percent of its electricity from renewable energy by 2017. SB 107 changed the due date to 2010 instead of 2017. On November 17, 2008, then Governor Schwarzenegger signed EO S-14-08, which established a Renewable Portfolio Standard (RPS) target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020. EO S-21-09 also directed CARB to adopt a regulation by July 31, 2010, requiring the State's load serving entities to meet a 33 percent renewable energy target by 2020. CARB approved the Renewable Electricity Standard on September 23, 2010 by Resolution 10-23. SBX1-2, which codified the 33 percent by 2020 goal.

Senate Bill 350 (Clean Energy and Pollution Reduction Act of 2015) implements the goals of EO B-30-15 (2015). The objectives of SB 350 are to increase the procurement of electricity from renewable sources from 33 percent to 50 percent (with interim targets of 40 percent by 2024, and 25 percent by 2027) and to double the energy efficiency savings in electricity and natural gas end uses of retail customers through energy efficiency and conservation. SB 350 also reorganizes the Independent System Operator to develop more regional electricity transmission markets and improve accessibility in these markets, which would facilitate the growth of renewable energy markets in the western United States.

Assembly Bill 398 (Market-Based Compliance Mechanisms). Signed on July 25, 2017, AB 398 extended the duration of the Cap-and-Trade Program from 2020 to 2030. AB 398 required CARB to update the Scoping Plan and all GHG rules and regulations adopted by the State. It also designated CARB as the statewide regulatory body responsible for ensuring that California meets its statewide carbon pollution reduction targets, while retaining local air districts' responsibility and authority to curb toxic air contaminants and criteria pollutants from local sources that severely impact public health. AB 398 also decreased free carbon allowances over 40 percent by 2030 and prioritized Cap-and-Trade spending to various programs including reducing diesel emissions in impacted communities.

Senate Bill 150 (Regional Transportation Plans). Signed on October 10, 2017, SB 150 aligns local and regional GHG reduction targets with State targets (i.e., 40 percent below their 1990 levels by 2030). SB 150 created a process to include communities in discussions on how to monitor their regions' progress on meeting these goals. The bill also requires the CARB to regularly report on that progress, as well as on the successes and the challenges regions experience associated with achieving their targets. SB 150 provides for accounting of climate change efforts and GHG reductions and identifies effective reduction strategies.

Senate Bill 100 (California Renewables Portfolio Standard Program: Emissions of Greenhouse Gases). Signed into Law in September 2018, SB 100 increased California's renewable electricity portfolio from 50 to 60 percent by 2030. SB 100 also established a further goal to have an electric grid that is entirely powered by clean energy by 2045.

Executive Orders Related to GHG Emissions

California's Executive Branch has taken several actions to reduce GHGs using EOs. Although not regulatory, they set the tone for the State and guide the actions of State agencies.

Executive Order S-3-05 was issued on June 1, 2005, which established the following GHG emissions reduction targets:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an EO, the goals are not legally enforceable for local governments or the private sector.

Executive Order S-01-07, issued on January 18, 2007, mandates that a Statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. The EO established a Low Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, CARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. CARB adopted the LCFS on April 23, 2009.

Executive Order S-13-08, issued on November 14, 2008, facilitated the California Natural Resources Agency development of the 2009 California Climate Adaptation Strategy. Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Executive Order S-14-08, **i**ssued on November 17, 2008, expands the State's Renewable Energy Standard to 33 percent renewable power by 2020. Additionally, EO S-21-09 (signed on September 15, 2009) directs CARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. CARB adopted the Renewable Electricity Standard on September 23, 2010, which requires 33 percent renewable energy by 2020 for most publicly owned electricity retailers.

Executive Order S-21-09, issued on July 17, 2009, directs CARB to adopt regulations to increase California's RPS to 33 percent by 2020. This builds upon SB 1078 (2002), which established the California RPS program, requiring 20 percent renewable energy by 2017, and SB 107 (2006), which advanced the 20

percent deadline to 2010, a goal which was expanded to 33 percent by 2020 in the 2005 Energy Action Plan II.

Executive Order B-30-15, issued on April 29, 2015, established a California GHG reduction target of 40 percent below 1990 levels by 2030 and directs CARB to update the Climate Change Scoping Plan (CCSP) to express the 2030 target in terms of $MMTCO_2e$. The 2030 target acts as an interim goal on the way to achieving reductions of 80 percent below 1990 levels by 2050, a goal set by EO S-3-05. The EO also requires the State's climate adaptation plan to be updated every three years and for the State to continue its climate change research program, among other provisions. With the enactment of SB 32 in 2016, the Legislature codified the goal of reducing GHG emissions by 2030 to 40 percent below 1990 levels.

Executive Order B-55-18, issued on September 10, 2018, establishes a goal to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter. This goal is in addition to the existing statewide targets of reducing GHG emissions. The executive order requires CARB to work with relevant state agencies to develop a framework for implementing this goal. It also requires CARB to update the Scoping Plan to identify and recommend measures to achieve carbon neutrality. The executive order also requires state agencies to develop sequestration targets in *the Natural and Working Lands Climate Change Implementation Plan*.

3.3 Regional

Southern California Association of Governments

With the goal of ensuring that the Southern California Association of Governments (SCAG) region can meet its regional GHG reduction targets set by CARB, the SCAG Regional Council adopted the *2016-2040 Regional Transportation Plan/ Sustainable Communities Strategy* (RTP/SCS) on April 7, 2016.On September 3, 2020, SCAG's Regional Council adopted Connect SoCal (2020 - 2045 Regional Transportation Plan/Sustainable Communities Strategy [2020 RTP/SCS]). The RTP/SCS charts a course for closely integrating land use and transportation so that the region can grow smartly and sustainably. The strategy was prepared through a collaborative, continuous, and comprehensive process with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. The RTP/SCS is a long-range vision plan that balances future mobility and housing needs with economic, environmental, and public health goals. The SCAG region strives toward sustainability through integrated land use and transportation planning. The SCAG region must achieve specific Federal air quality standards and is required by State law to lower regional GHG emissions. The RTP is a long-range transportation plan that provides a vision for regional transportation investments over 20 years or more. The SCS is an RTP element that demonstrates the integration of the RTP's land use, transportation strategies, and transportation investments. The SCS would result in an 8.0 percent reduction in GHG emissions per capita by 2020, 18 percent by 2035, and 21 percent by 2040, which would meet or exceeds CARB's targets of 8.0 percent reduction by 2020 and 13 percent by 2035.

3.4 Local

City of San Bernardino General Plan

Safety Element

Goal 10.1: Protect the environment, public health, safety, and welfare from hazardous wastes.

Policy 10.1.2: Ensure the protection of surface and groundwater quality, land resources, air quality, and environmentally sensitive areas through safe transportation of waste through the City and comprehensive planning of hazardous materials, wastes, and sites.

Natural Resources and Conservation Element

This Element is intended to maintain, improve, or preserve the quality and supply of the City's natural resources. The following topics are addressed in this element:

- Biological Resources
- Natural Features
- Mineral Resources
- Air Quality

Goal 12.5: Promote air quality that is compatible with the health, wellbeing, and enjoyment of life.

Policy 12.5.1: Reduce the emission of pollutants including carbon monoxide, oxides of nitrogen, photochemical smog, and sulfate in accordance with SCAQMD standards.

Goal 12.5.2: Prohibit the development of land uses (e.g. heavy manufacturing) that will contribute significantly to air quality degradation, unless sufficient mitigation measures are undertaken according SCAQMD standards.

Policy 12.5.3: Require dust abatement measures during grading and construction operations.

Policy 12.5.4: Evaluate the air emissions of industrial land uses to ensure that they will not impact adjacent uses.

Goal 12.7: Participate in regional initiatives and programs to improve the SCAB's air quality.

Policy 12.7.1: Cooperate with the SCAQMD and incorporate pertinent local implementation provisions of the AQMP.

Policy 12.7.2: Work with the SCAQMD to establish controls and monitor uses in the City that could add to the SCAB's degradation (e.g. auto repair, manufacturers).

Policy 12.7.3: Coordinate with SCAQMD to ensure that all elements of air quality plans regarding reduction of air pollutants emissions are being enforced.

Policy 12.7.4: Work with the other cities in the SCAB to implement regional mechanisms to reduce air emissions and improve air quality.

4 SIGNIFICANCE CRITERIA AND METHODOLOGY

4.1 Thresholds and Significance Criteria

Addressing GHG emissions generation impacts requires an agency to determine what constitutes a significant impact. The amendments to the State CEQA Guidelines specifically allow lead agencies to determine thresholds of significance that illustrate the extent of an impact and are a basis from which to apply mitigation measures. This means that each agency is left to determine whether a project's GHG emissions will have a "significant" impact on the environment. The guidelines direct that agencies are to use "careful judgment" and "make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate" the project's GHG emissions[9].

State CEQA Guidelines Appendix G, *Environmental Checklist Form*, includes questions concerning GHGs. The issues presented in the Environmental Checklist have been utilized as thresholds of significance in this section. Accordingly, the Project would have a significant environmental impact if it would:

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

The amendments to State CEQA Guidelines § 15064.4(b) that resulted from SB 97 indicate that a lead agency should consider the following factors when assessing the significance of impacts from GHG emissions on the environment:

- 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.
- The extent to which the Project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

South Coast Air Quality Management District Thresholds

The SCAQMD has not announced when staff is expecting to present a finalized version of its GHG thresholds to the governing board. On September 28, 2010, the SCAQMD recommended an interim screening level numeric "bright-line" threshold of 10,000 metric tons per year of CO_2e for industrial land uses. These efficiency-based thresholds were developed as part of the SCAQMD GHG CEQA Significance Threshold Working Group. This working group was formed to assist SCAQMD's efforts to develop a GHG significance threshold and is composed of a wide variety of stakeholders including the State Office of Planning and Research, CARB, the Attorney General's Office, a variety of city and county planning departments in the SCAB, various utilities such as sanitation and power companies throughout the SCAB, industry groups, and environmental and professional organizations. The numeric "bright line" was developed to be consistent with CEQA requirements for developing significance thresholds, are supported by substantial evidence, and provides guidance to CEQA practitioners in determining whether GHG emissions from a project are significant.

[9] California Code of Regulations, Section 15064.4a

4.2 Methodology

Construction Sources and Emissions

The Project's construction and operational emissions were calculated using the California Emissions Estimator Model version 2016.3.2 (CalEEMod). Details of the modeling assumptions and emission factors are provided in **Appendix A: Greenhouse Gas Emissions Data**. For construction, CalEEMod calculates emissions from off-road equipment usage and on-road vehicle travel associated with haul, delivery, and construction worker trips. GHG emissions during construction were forecasted based on the proposed construction schedule and applying the mobile-source and fugitive dust emissions factors derived from CalEEMod. The Project's construction-related GHG emissions would be generated from off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. The Project's operations-related GHG emissions would be generated by vehicular traffic, area sources (e.g. landscaping maintenance, consumer products), electrical generation, natural gas consumption, water supply and wastewater treatment, and solid waste.

The GHG modeling assumes Project construction would occur in one phase, beginning in the fourth quarter of 2020 and completed by the fourth quarter of 2022; see also Construction Sources and Emissions – Updates to Modeling Assumptions below. The assumed construction Project subphases and approximate durations are:

- Pre-approval/pre-construction Property Demolitions: 19.5 months,
- Utility Relocations: 12 months (three months would overlap with Civil Improvements),
- Civil Improvements (i.e., street relocations/modifications, track corridor, soundwalls, and infiltration basins): 10 months (three months would overlap with Utility Relocations), and
- Track and Signal Construction: 3.5 months.

Inclusive of property demolitions, Project construction would occur over approximately 42 months. It is noted, property acquisitions were underway concurrent with preparation of this EIR, and their demolition could occur as soon as required by a governmental entity (e.g. release of liens/abatement of nuisance) or as soon as possible upon property acquisition, prior to Project approval or commencement of Project construction. Exclusive of property demolitions and accounting for the three-month overlap of Civil Improvements with Utility Relocations, Project construction would occur over approximately 23 months. Notwithstanding, to provide a conservative analysis, demolition-related activities are included in the assumed construction activities and evaluated in this EIR.

The Project's site preparation phase would occur simultaneous with demolition and prior to grading. Upon completion of property acquisitions and grading, municipal improvements (i.e., utility relocation and paving) would commence simultaneous with rail construction. Train trips are assumed would deliver rail construction materials (i.e., rail, ties, and ballasts) during the Project's rail construction phase. Railroad ties are anticipated to be pre-cast concrete, therefore, a concrete batch plant would not be required.

Construction Sources and Emissions – Updates to Modeling Assumptions

The minor Project refinements discussed below occurred subsequent to completion of the GHG modeling.

Construction Schedule. As discussed above, the GHG modeling assumes Project construction would begin in the fourth quarter of 2020 and be completed by the fourth quarter of 2022. However, the current Project construction schedule assumes Project construction would begin in the fourth quarter of 2021 and be completed by the fourth quarter of 2023, or one year later than assumed in the GHG modeling.

However, the GHG modeling concerning the construction schedule is considered conservative because CalEEMod emissions factors for future years decline given advancements in construction equipment technology and fleet turnover.

Basin Construction. The current Project design for stormwater runoff and water quality assumes seven potential basin sites (totaling approximately 5.3 acres and providing a storage volume of approximately 13 acre-feet) would be constructed. The GHG modeling assumed nine basins would be constructed, when likely less than one-half of the soils/materials import/export quantities assumed in the modeling would occur. Therefore, the GHG modeling concerning basin construction is considered conservative.

Displaced Commercial Uses. Construction emissions modeling assumed 31,000 square feet (SF) of displaced (i.e., demolished) commercial land uses, and not 46,000 SF, as proposed under the current Project design; see Table 2-2: Summary of Existing Land Uses. This change in demolition assumptions is attributed to full acquisition (as opposed to partial acquisition) of an additional property. Because the construction emissions modeling conservatively assumed an earlier construction schedule and that all nine basin sites would be constructed, any additional construction emissions associated with demolition of the additional 15,000 SF of commercial floor area are considered nominal and would be more than offset by the already conservative construction emissions. Even if the construction emissions associated with an additional 15,000 SF of demolished floor area were added, the analysis conclusions based on modeling would not change.

Operational Sources and Emissions

Rail Operations Existing Conditions. Currently, two trains (Trains A and B) idle on siding tracks between two and three hours per day, while waiting for access into the A Yard. An additional train (Train C) idles on storage tracks for eight hours two to three times per week. Additionally, Train D is detained at the A Yard, because Main 1 (i.e., the existing lead track within BNSF corridor) is congested with haul line traffic; therefore, Train D idles within the A Yard until Main 1 is cleared. As discussed above, per the Statewide Rail Agreement, locomotives are required to be equipped with Automatic Engine Start Stop systems, which shut off engines after 15 minutes of idling. Thus, after 15 minutes of idling, only a single engine remains idling, while the other engines shut off. The existing average idling time is calculated, as follows:

- Average number of locomotives per train: 4 locomotives (4,400 horsepower each).
- Trains A and B (3 hours of idling per day each): 0.25 hour of idling x 4 locomotives = 1 hour of locomotive idling, 2.75 hours of idling x 1 locomotive = 2.75 hours of locomotive idling.
    - 1 hour + 2.75 hours = 3.75 hours of locomotive idling per day, per train.
    - 3.75 hours of idling per train x 2 trains = 7.5 hours of locomotive idling total for Train A and B per day.
- Train C (8 hours of idling per day, 3 days per week): 0.25 hour of idling x 4 locomotives = 1 hours of locomotive idling. 7.75 hours of idling x 1 locomotive = 7.75 hours of locomotive idling.
    - 1 hour + 7.75 hours = 8.75 hours of locomotive idling per day, 3 times per week.
    - 8.75 hours per day x 3 days / 7 days per week = 3.75 hours per day on average for Train C.
- Train D: 3 hours of idling per day: 0.25 hour of idling x 4 locomotives = 1 hour of locomotive idling, 2.75 hours of idling x 1 locomotive = 2.75 hours of locomotive idling.
    - 1 hour + 2.75 hours = 3.75 hours of locomotive idling per day.

Based on the above operating factors, existing rail operations at the Project site result in approximately 15 hours of daily locomotive diesel engine idling (3.75 hours per day each from Trains A, B, and D, and an average of 3.75 hours per day from Train C).

Rail Operations With Proposed Project Condition. The Project would not generate new motor vehicle trips or require other locomotive activity within the yard, such as switching operations (i.e., moving rail cars). Under the Project, Train C and Train D would no longer idle. The Project's operational emissions calculations assume the following daily locomotive diesel engine idling:

- Average number of locomotives per train: 4 locomotives (4,400 horsepower each).
- Trains A and B (3 hours of idling per day each): 0.25 hour of idling x 4 locomotives = 1 hour of locomotive idling, 2.75 hours of idling x 1 locomotive = 2.75 hours of locomotive idling.
    - 1 hour + 2.75 hours = 3.75 hours of locomotive idling per day, per train.
    - 3.75 hours of idling per train x 2 trains = 7.5 hours of locomotive idling total for Train A and B.
- Train C: no idling would occur under the Project.
- Train D: 15 minutes of idling per day: 0.25 hour of idling x 4 locomotives = 1 hour of locomotive idling.

Based on the above operating factors, with-Project rail operations would result in approximately 8.5 hours of daily locomotive diesel engine idling, an approximately 43 percent reduction from existing operating conditions (15 hours of daily locomotive diesel engine idling).

Displaced Commercial Uses. To accommodate the proposed rail and ancillary improvements, Project implementation requires removal of as many as 43 dwelling units (DU) and approximately 78,000 SF of non-residential (commercial and industrial) land uses. Because the Project would remove these existing land uses, and result in a traffic decrease of approximately 672 average daily trips (ADT), a decrease in both stationary and mobile source operational emissions would occur. However, the operational emissions modeling did not apply any emissions credits for the existing land uses that would be removed. Therefore, the Project's operational/idling emissions estimates are conservative.

Additionally, although partial acquisition of some properties would create remnant parcels not required for the Project, the Project does not propose their redevelopment or any zone change. The remnant parcel's underlying/existing zoning would be retained making them available for reuse/redevelopment in the future consistent with their existing zoning. However, there is no known proposal for reuse of these parcels as of this writing. Therefore, because assumptions concerning long-term operations from redevelopment of the remnant parcels would be speculative, no further analysis has been conducted.

5 POTENTIAL IMPACTS AND MITIGATION

5.1 Greenhouse Gas Emissions

Threshold 5.1 Would the Project generate GHG emissions, either directly or indirectly, that could have a significant impact on the environment?

Construction

The *Methodology* section above provides details concerning the assumed Project construction activities. Because train deliveries are not accounted for using typical land use emissions models, U.S. EPA guidance (EPA-420-F-09-025)[10] was used to calculate construction-related locomotive emissions. All other construction-related emissions were calculated using CalEEMod, which is designed to model emissions based on typical construction requirements. The approximate daily GHG emissions generated by the Project's construction-related train trips and construction equipment are included in Table 2: Construction-Related Greenhouse Gas Emissions.

Table 2: Construction-Related Greenhouse Gas Emissions

Category	Annual $MTCO_2e$
Construction Emissions	*4,518*
Locomotive Emissions	*12*
Total Emissions	4,530
30-Year Amortized Construction	151

$MTCO_2e$ = metric tons of carbon dioxide equivalent
Source: CalEEMod version 2016.3.2 and EPA-420-F-09-025. See Appendix A: Greenhouse Gas Emissions Data for model outputs.

As shown in Table 2, Project construction-related activities would generate approximately 4,530 $MTCO_2e$ of GHG emissions during construction. Construction GHG emissions are typically summed and amortized over the Project's lifetime (assumed to be 30 years), then added to the operational emissions;[11] see below. It is noted that a 30-year project lifetime assumption is likely overly conservative for rail infrastructure and provides a worst-case estimate of one-time emissions from construction activities. The Project's amortized construction-related GHG emissions would be 56 $MTCO_2e$ per year. Once construction is complete, the Project's construction-related GHG emissions would cease.

Operations

Long-term operational emissions would occur over the Project's lifetime. The *Methodology* section above provides details concerning the assumed Project operations. The Project's estimated operational GHG

[10] U.S. EPA, *Emissions Factors for Locomotives*, 2009.

[11] The project lifetime is based on the standard 30-year assumption of the South Coast Air Quality Management District (South Coast Air Quality Management District, *Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #13,* August 26, 2009).

emissions would reflect the change in train operations (i.e., reduced idling) and motor vehicle use associated with vehicle trip decrease and redistribution.

By improving train traffic efficiency, the Project would also reduce the average idle time of trains, reducing locomotive emissions along the corridor. The Project's proposed rail improvements would not increase the number of train trips and there would be no permanent increase in the number of employees or traffic in/out of the A Yard. Rail improvements would not increase the number of train trips and there would be no permanent increase in the number of employees or traffic in/out of the A Yard. The Project would enhance the train traffic efficiency by reducing congestion along the existing lead tracks. Based on the existing and with proposed Project operating factors detailed in the *Methodology* section above, with-Project rail operations would result in approximately 8.5 hours of daily locomotive diesel engine idling, an approximately 43 percent reduction from existing operating conditions (15 hours of daily locomotive diesel engine idling). Therefore, locomotive idling time would decrease resulting in a net improvement in GHG emissions.

The Project does not propose any new land uses, thus, would not generate additional operational vehicle trips. Additionally, reassignment of vehicle trips resulting from the proposed transportation improvements would be nominal and localized. As such, Project implementation would not generate additional vehicle emissions. It is noted, the Project's idling emissions estimates are conservative because emissions credits have not been applied for the existing land uses that would be removed, as detailed in the *Methodology* section above. Existing and post-Project operational GHG emissions are summarized in Table 3: Project Greenhouse Gas Emissions

Table 3: Project Greenhouse Gas Emissions

Emissions Source	Annual $MTCO_2e$
Existing Condition	
Locomotive Idling	*280*
Existing with Project Condition	
With Project Locomotive Idling	*159*
Net Idling	-121
Construction Amortized Over 30 Years	*151*
Net Total	**30**

$MTCO_2e$ = metric tons of carbon dioxide equivalent
Notes: Additional locomotive hauling emissions are conservatively higher based on normal growth of rail operations. Idling emissions reductions based on the Project cutting current locomotive idling times in half.

Source: CalEEMod version 2016.3.2 and EPA-420-F-09-025. See Appendix A: Greenhouse Gas Emissions Data for model outputs.

As shown in Table 3, Project operational GHG emissions, combined with construction-related GHG emissions, would generate approximately 30 $MTCO_2e$ on an annual basis as compared to existing conditions. It is noted that Project implementation would reduce operational emissions by 121 $MTCO_2e$ per year. The GHG emissions estimates are conservative because emissions credits have not been applied for the existing land uses that would be removed. Removal of the existing land uses would further decrease the Project's GHG emissions. It is noted: rail projects tend to have a much longer project lifetime than other development projects and, after 30 years, it is assumed the Project would continue to reduce

GHG emissions due to changing regulatory framework and advanced technologies. The Project's annual emissions with amortized construction of 30 $MTCO_2e$ would reduce annual GHG emissions, thus, would not exceed any SCAQMD GHG thresholds. Therefore, Project-related GHG emissions would be less than significant, thus, no mitigation is required.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 5.2 Would the Project conflict with an applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions?

San Bernardino County Regional Greenhouse Gas Reduction Plan Consistency

In March 2014, the San Bernardino Associated Governments adopted the *San Bernardino County Regional Greenhouse Gas Reduction Plan* (GHGRP) with the goal of inventorying municipal GHG emissions and establishing GHG reduction targets for the 21 Partnership Cities of San Bernardino County. The City of San Bernardino currently follows the GHGRP to identify opportunities for a cleaner city.

The GHGRP has served as a long-term vision for how the City can be more environmentally friendly and provides guidance for the City's residents, staff, and decision makers on how to achieve future sustainability goals. The GHGRP goals target 2020 GHG emissions. The GHGRP also outlines City-specific SBGP goals. GHGRP Table 2-1 states one of the "Off-Road Transportation" emissions sector goals by setting idling limitations and increasing the fuel economy of all vehicles and equipment. Given the Project's objective to improve the existing rail operations efficiency and reduce train congestion, the resulting locomotive emissions decrease would be consistent with the GHGRP goals.

Regional Transportation Plan/Sustainable Communities Strategy Consistency

Adopted on April 7, 2016, the RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The RTP/SCS embodies a collective vision for the region's future and is developed with input from local governments, county transportation commissions, tribal governments, nonprofit organizations, businesses, and local stakeholders in the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. SCAG's RTP/SCS establishes GHG emissions goals for automobiles and light-duty trucks for 2020 and 2035, and an overall GHG target for the Project region consistent with the AB 32 target and the post-2020 GHG reduction goals of EO 5-03-05 and EO B-30-15.

The RTP/SCS contains over 4,000 transportation projects, ranging from highway improvements, railroad grade separations, bicycle lanes, new transit hubs and replacement bridges. These future investments were included in county plans developed by the six county transportation commissions and seek to reduce traffic bottlenecks, improve the efficiency of the region's network, and expand mobility choices for everyone. The RTP/SCS is an important planning document for the region, allowing project sponsors to qualify for Federal funding.

The plan accounts for operations and maintenance costs to ensure reliability, longevity, and cost effectiveness. The RTP/SCS is also supported by a combination of transportation and land use strategies that help the region achieve State GHG emissions reduction goals and FCAA requirements, preserve open space areas, improve public health and roadway safety, support our vital goods movement industry, and utilize resources more efficiently. GHG emissions resulting from development-related mobile sources are the most potent source of emissions, and therefore analyzing the Project's consistency with the RTP/SCS

is an appropriate indicator of whether the Project would prevent achieving the State's post-2020 GHG reduction goals. The Project's consistency with the RTP/SCS goals is analyzed in detail in Table 4: Regional Transportation Plan/Sustainable Communities Strategy Consistency. As noted above, the 2020 RTP/SCS (Connect SoCal), has been adopted for conformity purposes only. The SCAG Regional Council will consider approval of the 2020 RTP/SCS in its entirety and for all other purposes within 120 days from May 7, 2020. As there is no federal nexus for the Project, conformity does not apply, and the 2016 RTP/SCS is still the regional plan most applicable to the proposed Project.

Table 4: Regional Transportation Plan/Sustainable Communities Strategy Consistency

SCAG Goals		Compliance	
Goal 1:	Align the plan investments and policies with improving regional economic development and competitiveness.	N/A:	This is not a Project-specific policy and is therefore not applicable. However, improved rail operations efficiency resulting from the Project implementation may benefit economic development.
Goal 2:	Maximize mobility and accessibility for all people and goods in the region.	Consistent:	Improved rail operations efficiency resulting from Project implementation would benefit the accessibility of goods transported by rail.
Goal 3:	Ensure travel safety and reliability for all people and goods in the region.	Consistent:	Improved rail operations efficiency resulting from Project implementation would benefit the reliability of goods transported by rail.
Goal 4:	Preserve and ensure a sustainable regional transportation system.	Consistent:	Improved rail operations efficiency resulting from Project implementation would lead to more sustainable transport of goods. Less fuel would be used during locomotive idling and fuel energy resources would be conserved.
Goal 5:	Maximize the productivity of our transportation system.	Consistent:	The Project would improve the efficiency of existing rail operations.
Goal 6:	Protect the environment and health of our residents by improving air quality and encouraging active transportation (e.g. bicycling and walking).	Consistent:	The Project's objective is to improve the efficiency of existing rail operations and reduce train congestion. The Project would result in less operational locomotive idling, thus, fewer emissions. The Project's emissions reduction is expected to improve overall air quality, in turn protecting the environment and nearby residents' health.
Goal 7:	Actively encourage and create incentives for energy efficiency, where possible.	N/A:	This is not a Project-specific policy and is therefore not applicable.
Goal 8:	Encourage land use and growth patterns that facilitate transit as well as non-motorized transportation.	N/A:	This is not a Project-specific policy and is therefore not applicable.
Goal 9:	Maximize the security of our transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies.	N/A:	This is not a Project-specific policy and is therefore not applicable.

Source: Southern California Association of Governments, *Regional Transportation Plan/Sustainable Communities Strategy*, 2016.

The SBGP determined that implementation of GHG policies as well as compliance with applicable State standards would ensure consistency with state and regional GHG reduction planning efforts. The goals stated in the GHGRP and the RTP/SCS were used to determine consistency with the planning efforts previously stated. As shown in Table 4, the Project would comply with the RTP/SCS goals.

CARB Scoping Plan Consistency

As previously noted, CARB adopted the CCSP pursuant to AB 32. The CCSP provides a range of GHG reduction actions that include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as the cap-and-trade program, and an AB 32 implementation fee to fund the program.

As updated in 2017, the CCSP identifies additional GHG reduction measures necessary to achieve the 2030 target. These measures build upon those identified in the first update to the CCSP in 2013. Although a number of these measures are currently established as policies, some measures have not yet been formally proposed or adopted. It is expected that these actions intended to reduce GHG emissions would be adopted as required to achieve Statewide GHG emissions targets. As concluded in **Table 5**, the Project is consistent with the Scoping Plan's applicable strategies. As such, the Project's impacts concerning Scoping Plan consistency would be less than significant.

Table 5: Project Consistency with Applicable CARB Scoping Plan Measures

Scoping Plan Measure	Implementing Regulations	Project Consistency
California Cap-and-Trade Program Linked to Western Climate Initiative	Regulation for the California Cap on GHG Emissions and Market-Based Compliance Mechanism October 20, 2015 (CCR 95800)	**Consistent:** The Cap-and-Trade Program applies to large industrial sources such as power plants, refineries, and cement manufacturers. However, the regulation indirectly affects people who use the products and services produced by these industrial sources when increased cost of products or services (such as electricity and fuel) are transferred to the consumers. Accordingly, GHG emissions associated with CEQA projects' fuel usage are covered by the Cap-and-Trade Program. The Cap-and-Trade Program covers fuel suppliers (natural gas, propane fuel, and transportation fuel providers) to address emissions from such fuels and combustion of other fossil fuels not directly covered at large sources in the Program's first compliance period.
California Light-Duty Vehicle GHG Standards	Pavley I 2005 Regulations to Control GHG Emissions from Motor Vehicles	**Consistent:** This measure applies to all new vehicles starting with model year 2012. The Project would not conflict with its implementation. All vehicles, model year 2012 and later are required to meet these standards. Therefore, passenger vehicles associated with the Project construction and operations would be required to comply with the Pavley emissions standards.
	2012 LEV III California GHG and Criteria Pollutant Exhaust and Evaporative Emission Standards	**Consistent:** The LEV III amendments provide reductions from new vehicles sold in California between 2017 and 2025. All passenger vehicles are required to meet these standards. Therefore, passenger vehicles associated with the Project would comply with LEV III standards.
LCFS Standard	2009 Readopted 2015 Regulations to Achieve GHG Reductions Sub Article 7 LCFS Standard CCR 95480	**Consistent:** This measure applies to transportation fuels used by vehicles in California. The Project would not conflict with implementation of this measure. Construction-related motor vehicles would be required to use fuels that meet these standards. The Project would not generate new operational vehicle trips.

Table 5: Project Consistency with Applicable CARB Scoping Plan Measures		
Scoping Plan Measure	**Implementing Regulations**	**Project Consistency**
Regional Transportation-Related GHG Targets	SB 375 Public Resources Code §§ 21155, 21155.1, 21155.2, 21159.28	**Consistent**: The Project involves rail improvements to reduce idling and would not result in development that would generate growth. The Project would not conflict with RTP/SCS projections.
Goods Movement	Goods Movement Action Plan, January 2007	**Consistent:** The Project would improve rail operations and goods movement by increasing operational efficiency/decreasing idling which fulfills the Goods Movement Action Plan goal of improved efficiency.
Medium/Heavy-Duty Vehicle	2010 Amendments to the Truck and Bus Regulation, the Drayage Truck Regulation and the Tractor-Trailer GHG Regulation	**Consistent**: This measure applies to medium and heavy-duty vehicles that operate in the State. The Project would not conflict with implementation of this measure. All construction-related medium- and heavy-duty vehicles associated with the Project would be required to comply with these regulatory requirements. The Project would not generate new operational vehicle trips.
High Speed Rail	Funded Under SB 862	**N/A:** This is a Statewide measure that cannot be implemented at the project level by the Applicant or Lead Agency. Therefore, this measure does not apply to the Project.
Energy Efficiency	Title 20 Appliance Efficiency Regulation	**Consistent:** The Project proposes new street lighting that would be subject to compliance with Title 24 standards.
	Title 24 Part 6 Energy Efficiency Standards for Residential and Non-Residential Building	
	Title 24 Part 11 CALGreen Standards	
RPS/Renewable Electricity Standard	2010 Regulation to Implement the Renewable Electricity Standard (33% 2020)	**N/A:** The Project would not place new demands on the electric utility, Southern California Edison (SCE). Therefore, this measure does not apply to the Project.
Million Solar Roofs Program	SB 350 Clean Energy and Pollution Reduction Act of 2015 (50% 2030)	
	Tax Incentive Program	**N/A:** This measure is to increase solar throughout California, which is being implemented by various electricity providers and solar programs. The program provides incentives that are in place at the time of construction. However, since the Project does not propose development of additional land uses, this measure does not apply to the Project.
Water	Title 24 Part 11 CALGreen Standards	**N/A:** CALGreen requires a 20 percent reduction in indoor water use. The Project would not generate additional indoor water demand. Concerning landscaping, the Project would install additional landscaping within the proposed infiltration basins. Therefore, this measure does not apply to the Project.
	SBX 7-7 The Water Conservation Act of 2009	
	Model Water Efficient Landscape Ordinance	
Green Building Strategy	Title 24 Part 11 CALGreen Standards	**N/A:** The State intends to increase the use of green building practices. However, the Project does not propose additional buildings or structures. Therefore, this measure does not apply to the Project.
Industrial Emissions	2010 CARB Mandatory Reporting Regulation	**N/A:** The Mandatory Reporting Regulation requires facilities and entities with more than 10,000 $MTCO_2e$ of combustion and process emissions, all facilities belonging to certain industries, and all electric power entities to submit an annual GHG emissions data report directly to CARB. The total Project GHG emissions would not exceed 10,000 $MTCO_2e$. Therefore, this regulation does not apply to the Project.

Table 5: Project Consistency with Applicable CARB Scoping Plan Measures		
Scoping Plan Measure	**Implementing Regulations**	**Project Consistency**
Recycling and Waste	Title 24 Part 11 CALGreen Standards AB 341 Statewide 75 Percent Diversion Goal	**Consistent:** The Project would not conflict with implementation of these measures. The Project is required to achieve the recycling mandates through compliance with the CALGreen. The City has consistently achieved its recycling mandates.
Sustainable Forests	Cap and Trade Offset Projects	**N/A:** The Project site is in an area designated for urban uses. No forested lands exist on or near the Project site. Therefore, this measure does not apply to the Project
High Global Warming Potential Gases	CARB Refrigerant Management Program CCR 95380	**N/A:** The regulations are applicable to refrigerants used by large air conditioning systems and large commercial and industrial refrigerators and cold storage system. The Project does not involve machinery, thus, would not conflict with CARB's refrigerant management regulations.
Agriculture	Cap and Trade Offset Projects for Livestock and Rice Cultivation	**N/A:** The Project site is designated for urban development. No grazing, feedlot, or other agricultural activities generating manure exist on-site or are proposed by the Project. Therefore, this measure does not apply to the Project.
Source: California Air Resources Board, *California's 2017 Climate Change Scoping Plan*, November 2017 and CARB, *Climate Change Scoping Plan*, December 2008.		

The Project is estimated to result in 30 $MTCO_2e$ annually, directly from reduced train idling and congestion; see Table 5. As discussed above, the emissions estimates are conservative because emissions credits have not been applied for the existing land uses that would be removed. The Project's long-term operational GHG emissions are nominal, and would not exceed any SCAQMND proposal thresholds, and would be less than significant.

Concerning EO S-3-05 2050 goals, at this time it is not possible to quantify the emissions savings from future regulatory measures, as they have not yet been developed. Nevertheless, it can be anticipated that Project operations would benefit from current and potential future regulations (e.g., improvements in vehicle emissions, SB 100/renewable electricity portfolio improvements, etc.) all applicable measures that are enacted to meet an 80 percent reduction below 1990 levels by 2050.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

5.2 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and TACs, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (approximately one day), GHGs have much longer atmospheric lifetimes of one year to several thousand years that allow them to be dispersed around the globe.

Cumulative Impacts and Mitigation Measures

For purposes of greenhouse gas emissions analysis, cumulative impacts are considered for cumulative development within the City's planning area, according to SBGP.

As concluded above, the Project would result in a less than significant impact concerning generation of GHG emissions. Concerning applicable plans, policy or regulation adopted for reducing GHG emissions, the Project would have a less than significant impact.

The City of San Bernardino General Plan EIR analyzed the expected environmental effects of buildout concerning greenhouse gas emissions in SBGP EIR Section 5.3, *Air Quality*. The following is a summary of the expected environmental effects:

- Build-out could generate short-term emissions and operations could generate long-term emissions associated with additional vehicle trips. This impact was concluded to be significant.

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (approximately one day), GHGs have much longer atmospheric lifetimes of one year to several thousand years that allow them to be dispersed around the world.

It is generally the case that an individual project and nature, including development within the City's planning area, is of insufficient magnitude by itself to influence climate change or result in a substantial contribution to the global GHG inventory. GHG impacts are recognized as exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective. Project-related GHG emissions would decrease, thus, the Project would not result in a reasonably foreseeable cumulatively considerable contribution to global climate change. In addition, the Project and other cumulative related projects, would be subject to all applicable regulatory requirements, which would further reduce GHG emissions. Table 4.6-4 shows the Project's GHG emissions would be less than significant. As discussed above, the Project would reduce the annual GHG emissions from rail operations. The Project would not conflict with any GHG reduction plans. Therefore, the Project's cumulative contribution of GHG emissions would be less than significant and the Project's cumulative GHG impacts would also be less than cumulatively considerable.

Therefore, the combined cumulative impacts to GHG emissions associated with the Project's incremental effects and those of cumulative projects would be less than significant following compliance with the established regulatory framework and with Project-specific mitigation incorporated.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Significant Unavoidable Impacts

No significant unavoidable impacts concerning GHG have been identified

6 REFERENCES

1. California Air Resources Board, *California's 2017 Climate Change Scoping Plan,* 2017.
2. Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis*, 2007.
3. Intergovernmental Panel on Climate Change, *Climate Change 2013: The Physical Science Basis, Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 2013.
4. National Research Council, *Advancing the Science of Climate Change*, 2010.
5. San Bernardino, *General Plan*, 2005.
6. San Bernardino County, *Regional Greenhouse Gas Reduction Plan*, 2010.
7. State of California, *Code of Regulations Section 15065.5a*, 2018.
8. Southern California Association of Governments, *Regional Transportation Plan/Sustainable Communities Strategy*, 2016.
9. South Coast Air Quality Management District, *Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #13*, 2009.
10. United States Environmental Protection Agency, *Emissions Factors for Locomotives*, 2009.
11. United States Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016*, 2018.
12. United States Environmental Protection Agency, *Methane and Nitrous Oxide Emission from Natural Sources*, 2010.
13. United States Environmental Protection Agency, *Overview of Greenhouse Gases*, 2018.

Appendix A

Greenhouse Gas Emissions Data

BNSF Ono Realignment

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.40		73.83	3,216,034.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2021
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - anticipated land use (user defined unit is miles of rail), acreage of existing BNSF ROW and property takes

Construction Phase - anticipated construction schedule

Off-road Equipment - anticipated hours per day of construction

Off-road Equipment - anticipated hours per day of construction

Off-road Equipment - anticipated construction equipment; anticipated hours per day of construction

Off-road Equipment - anticipated construction equipment (swingloaders, offroad forklift, welder, rail tamper); anticipated hours per day of construction

Off-road Equipment - anticipated hours per day of construction

Trips and VMT - anticipated trips; rail construction and paving trips consistent with haul trip assumptions

Demolition -

Grading - anticipated earthwork

Construction Off-road Equipment Mitigation - Mitigation per Rule 403

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	6
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim

tblConstructionPhase	NumDays	70.00	130.00
tblConstructionPhase	NumDays	40.00	262.00
tblConstructionPhase	NumDays	110.00	131.00
tblConstructionPhase	NumDays	1,110.00	80.00
tblConstructionPhase	NumDays	75.00	91.00
tblGrading	AcresOfGrading	532.19	275.00
tblGrading	MaterialExported	0.00	184,300.00
tblGrading	MaterialImported	0.00	33,400.00
tblOffRoadEquipment	HorsePower	89.00	132.00
tblOffRoadEquipment	HorsePower	172.00	250.00
tblOffRoadEquipment	HorsePower	203.00	140.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	8.00	13.00
tblOffRoadEquipment	UsageHours	7.00	13.00
tblOffRoadEquipment	UsageHours	8.00	13.00
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tblOffRoadEquipment	UsageHours	8.00	13.00
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tblOffRoadEquipment	UsageHours	8.00	13.00
tblTripsAndVMT	HaulingTripNumber	2,654.00	2,159.00
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tblTripsAndVMT	HaulingTripNumber	27,213.00	22,256.00
tblTripsAndVMT	HaulingTripNumber	0.00	395.00
tblTripsAndVMT	HaulingTripNumber	0.00	206.00
tblTripsAndVMT	VendorTripNumber	527.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.3682	3.8526	2.4129	5.1000e-003	0.3477	0.1796	0.5273	0.0680	0.1670	0.2350	0.0000	454.6010	454.6010	0.1080	0.0000	457.3006
2021	1.0946	12.3919	6.4467	0.0161	4.5005	0.5423	5.0428	2.3463	0.4990	2.8454	0.0000	1,450.1204	1,450.1204	0.3476	0.0000	1,458.8100
2022	0.7536	6.1157	7.0133	0.0184	1.2635	0.2291	1.4926	0.4010	0.2115	0.6125	0.0000	1,663.2458	1,663.2458	0.2726	0.0000	1,670.0598
Maximum	**1.0946**	**12.3919**	**7.0133**	**0.0184**	**4.5005**	**0.5423**	**5.0428**	**2.3463**	**0.4990**	**2.8454**	**0.0000**	**1,663.2458**	**1,663.2458**	**0.3476**	**0.0000**	**1,670.0598**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1069	1.8425	2.7055	5.1000e-003	0.1649	0.0277	0.1927	0.0335	0.0277	0.0612	0.0000	454.6006	454.6006	0.1080	0.0000	457.3002
2021	0.2779	5.0802	7.1221	0.0161	2.0297	0.0479	2.0776	1.0310	0.0456	1.0766	0.0000	1,450.1192	1,450.1192	0.3476	0.0000	1,458.8088
2022	0.5319	4.9476	7.6653	0.0184	0.9501	0.0917	1.0417	0.2808	0.0859	0.3667	0.0000	1,663.2449	1,663.2449	0.2726	0.0000	1,670.0589
Maximum	**0.5319**	**5.0802**	**7.6653**	**0.0184**	**2.0297**	**0.0917**	**2.0776**	**1.0310**	**0.0859**	**1.0766**	**0.0000**	**1,663.2449**	**1,663.2449**	**0.3476**	**0.0000**	**1,670.0589**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**58.64**	**46.91**	**-10.21**	**0.00**	**48.55**	**82.41**	**53.11**	**52.21**	**81.87**	**59.26**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
2	**5-12-2020**	**8-11-2020**	0.9549	0.4430
3	**8-12-2020**	**11-11-2020**	2.0922	0.9709
4	**11-12-2020**	**2-11-2021**	2.2336	0.8582
5	**2-12-2021**	**5-11-2021**	2.3045	0.7101
6	**5-12-2021**	**8-11-2021**	2.3821	0.7339
7	**8-12-2021**	**11-11-2021**	4.2171	1.8382
8	**11-12-2021**	**2-11-2022**	5.0397	2.7563
9	**2-12-2022**	**5-11-2022**	2.4288	1.7607
10	**5-12-2022**	**8-11-2022**	1.3280	1.2298
11	**8-12-2022**	**9-30-2022**	0.7032	0.6622
		Highest	5.0397	2.7563

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/1/2020	12/29/2020	5	130	
2	Site Preparation	Site Preparation	12/30/2020	12/30/2021	5	262	
3	Grading	Grading	10/1/2021	4/1/2022	5	131	
4	Paving	Paving	4/2/2022	8/8/2022	5	91	
5	Rail Construction	Building Construction	8/9/2022	11/28/2022	5	80	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 275

Acres of Paving: 73.83

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	13.00	81	0.73
Demolition	Excavators	3	13.00	158	0.38
Demolition	Rubber Tired Dozers	2	13.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	13.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	13.00	97	0.37
Grading	Excavators	2	13.00	158	0.38
Grading	Graders	1	13.00	187	0.41
Grading	Rubber Tired Dozers	1	13.00	247	0.40
Grading	Scrapers	2	13.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	13.00	97	0.37
Rail Construction	Cranes	0	13.00	231	0.29
Rail Construction	Forklifts	4	13.00	132	0.20
Rail Construction	Generator Sets	0	13.00	84	0.74
Rail Construction	Other Construction Equipment	1	13.00	250	0.42

Rail Construction	Rubber Tired Loaders	2	13.00	140	0.36
Rail Construction	Tractors/Loaders/Backhoes	2	13.00	97	0.37
Rail Construction	Welders	2	13.00	46	0.45
Paving	Pavers	4	13.00	130	0.42
Paving	Paving Equipment	4	13.00	132	0.36
Paving	Rollers	4	13.00	80	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	2,159.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	250.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	22,256.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rail Construction	11	1,351.00	0.00	395.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	12	30.00	0.00	206.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.2872	0.0000	0.2872	0.0435	0.0000	0.0435	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3498	3.5069	2.2977	4.1000e-003		0.1752	0.1752		0.1629	0.1629	0.0000	359.1103	359.1103	0.1014	0.0000	361.6446
Total	**0.3498**	**3.5069**	**2.2977**	**4.1000e-003**	**0.2872**	**0.1752**	**0.4624**	**0.0435**	**0.1629**	**0.2064**	**0.0000**	**359.1103**	**359.1103**	**0.1014**	**0.0000**	**361.6446**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.8400e-003	0.2727	0.0417	8.4000e-004	0.0186	8.0000e-004	0.0194	5.1000e-003	7.6000e-004	5.8700e-003	0.0000	80.6546	80.6546	4.5700e-003	0.0000	80.7687
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8200e-003	3.7900e-003	0.0378	1.0000e-004	0.0107	7.0000e-005	0.0108	2.8400e-003	7.0000e-005	2.9100e-003	0.0000	9.1633	9.1633	2.8000e-004	0.0000	9.1701
Total	**0.0117**	**0.2765**	**0.0796**	**9.4000e-004**	**0.0293**	**8.7000e-004**	**0.0301**	**7.9400e-003**	**8.3000e-004**	**8.7800e-003**	**0.0000**	**89.8178**	**89.8178**	**4.8500e-003**	**0.0000**	**89.9389**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1228	0.0000	0.1228	0.0186	0.0000	0.0186	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0938	1.5447	2.5880	4.1000e-003		0.0266	0.0266		0.0266	0.0266	0.0000	359.1099	359.1099	0.1014	0.0000	361.6442

Total	**0.0938**	**1.5447**	**2.5880**	**4.1000e-003**	**0.1228**	**0.0266**	**0.1494**	**0.0186**	**0.0266**	**0.0452**	**0.0000**	**359.1099**	**359.1099**	**0.1014**	**0.0000**	**361.6442**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.8400e-003	0.2727	0.0417	8.4000e-004	0.0177	8.0000e-004	0.0185	4.9000e-003	7.6000e-004	5.6600e-003	0.0000	80.6546	80.6546	4.5700e-003	0.0000	80.7687
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8200e-003	3.7900e-003	0.0378	1.0000e-004	0.0101	7.0000e-005	0.0102	2.7000e-003	7.0000e-005	2.7700e-003	0.0000	9.1633	9.1633	2.8000e-004	0.0000	9.1701
Total	**0.0117**	**0.2765**	**0.0796**	**9.4000e-004**	**0.0279**	**8.7000e-004**	**0.0288**	**7.6000e-003**	**8.3000e-004**	**8.4300e-003**	**0.0000**	**89.8178**	**89.8178**	**4.8500e-003**	**0.0000**	**89.9389**

3.3 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0294	0.0000	0.0294	0.0161	0.0000	0.0161	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.6200e-003	0.0689	0.0350	6.0000e-005		3.5700e-003	3.5700e-003		3.2900e-003	3.2900e-003	0.0000	5.4325	5.4325	1.7600e-003	0.0000	5.4764
Total	**6.6200e-003**	**0.0689**	**0.0350**	**6.0000e-005**	**0.0294**	**3.5700e-003**	**0.0329**	**0.0161**	**3.2900e-003**	**0.0194**	**0.0000**	**5.4325**	**5.4325**	**1.7600e-003**	**0.0000**	**5.4764**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	2.4000e-004	4.0000e-005	0.0000	1.6200e-003	0.0000	1.6200e-003	4.0000e-004	0.0000	4.0000e-004	0.0000	0.0713	0.0713	0.0000	0.0000	0.0714
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	7.0000e-005	7.0000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1692	0.1692	1.0000e-005	0.0000	0.1693
Total	**1.0000e-004**	**3.1000e-004**	**7.4000e-004**	**0.0000**	**1.8200e-003**	**0.0000**	**1.8200e-003**	**4.5000e-004**	**0.0000**	**4.5000e-004**	**0.0000**	**0.2405**	**0.2405**	**1.0000e-005**	**0.0000**	**0.2407**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0126	0.0000	0.0126	6.9000e-003	0.0000	6.9000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3600e-003	0.0210	0.0372	6.0000e-005		3.1000e-004	3.1000e-004		2.9000e-004	2.9000e-004	0.0000	5.4325	5.4325	1.7600e-003	0.0000	5.4764
Total	**1.3600e-003**	**0.0210**	**0.0372**	**6.0000e-005**	**0.0126**	**3.1000e-004**	**0.0129**	**6.9000e-003**	**2.9000e-004**	**7.1900e-003**	**0.0000**	**5.4325**	**5.4325**	**1.7600e-003**	**0.0000**	**5.4764**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	1.0000e-005	2.4000e-004	4.0000e-005	0.0000	1.5200e-003	0.0000	1.5200e-003	3.7000e-004	0.0000	3.8000e-004	0.0000	0.0713	0.0713	0.0000	0.0000	0.0714
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	7.0000e-005	7.0000e-004	0.0000	1.9000e-004	0.0000	1.9000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1692	0.1692	1.0000e-005	0.0000	0.1693
Total	**1.0000e-004**	**3.1000e-004**	**7.4000e-004**	**0.0000**	**1.7100e-003**	**0.0000**	**1.7100e-003**	**4.2000e-004**	**0.0000**	**4.3000e-004**	**0.0000**	**0.2405**	**0.2405**	**1.0000e-005**	**0.0000**	**0.2407**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.8165	0.0000	3.8165	2.0979	0.0000	2.0979	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.8214	8.5550	4.4688	8.0300e-003		0.4319	0.4319		0.3973	0.3973	0.0000	706.3295	706.3295	0.2284	0.0000	712.0406
Total	**0.8214**	**8.5550**	**4.4688**	**8.0300e-003**	**3.8165**	**0.4319**	**4.2484**	**2.0979**	**0.3973**	**2.4952**	**0.0000**	**706.3295**	**706.3295**	**0.2284**	**0.0000**	**712.0406**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.5000e-004	0.0290	4.6600e-003	1.0000e-004	2.1500e-003	8.0000e-005	2.2300e-003	5.9000e-004	8.0000e-005	6.7000e-004	0.0000	9.1839	9.1839	5.2000e-004	0.0000	9.1968
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0108	8.1400e-003	0.0834	2.4000e-004	0.0257	1.7000e-004	0.0258	6.8100e-003	1.5000e-004	6.9700e-003	0.0000	21.2917	21.2917	6.0000e-004	0.0000	21.3066

Total	**0.0115**	**0.0371**	**0.0880**	**3.4000e-004**	**0.0278**	**2.5000e-004**	**0.0281**	**7.4000e-003**	**2.3000e-004**	**7.6400e-003**	**0.0000**	**30.4755**	**30.4755**	**1.1200e-003**	**0.0000**	**30.5033**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.6316	0.0000	1.6316	0.8968	0.0000	0.8968	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1720	2.6836	4.8330	8.0300e-003		0.0357	0.0357		0.0338	0.0338	0.0000	706.3287	706.3287	0.2284	0.0000	712.0397
Total	**0.1720**	**2.6836**	**4.8330**	**8.0300e-003**	**1.6316**	**0.0357**	**1.6672**	**0.8968**	**0.0338**	**0.9306**	**0.0000**	**706.3287**	**706.3287**	**0.2284**	**0.0000**	**712.0397**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.5000e-004	0.0290	4.6600e-003	1.0000e-004	2.0500e-003	8.0000e-005	2.1300e-003	5.7000e-004	8.0000e-005	6.4000e-004	0.0000	9.1839	9.1839	5.2000e-004	0.0000	9.1968
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0108	8.1400e-003	0.0834	2.4000e-004	0.0243	1.7000e-004	0.0245	6.4900e-003	1.5000e-004	6.6400e-003	0.0000	21.2917	21.2917	6.0000e-004	0.0000	21.3066
Total	**0.0115**	**0.0371**	**0.0880**	**3.4000e-004**	**0.0264**	**2.5000e-004**	**0.0266**	**7.0600e-003**	**2.3000e-004**	**7.2800e-003**	**0.0000**	**30.4755**	**30.4755**	**1.1200e-003**	**0.0000**	**30.5033**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4811	0.0000	0.4811	0.1951	0.0000	0.1951	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2248	2.4882	1.6559	3.3300e-003		0.1065	0.1065		0.0980	0.0980	0.0000	292.2293	292.2293	0.0945	0.0000	294.5922
Total	**0.2248**	**2.4882**	**1.6559**	**3.3300e-003**	**0.4811**	**0.1065**	**0.5875**	**0.1951**	**0.0980**	**0.2931**	**0.0000**	**292.2293**	**292.2293**	**0.0945**	**0.0000**	**294.5922**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0340	1.3093	0.2105	4.3100e-003	0.1679	3.6400e-003	0.1715	0.0440	3.4800e-003	0.0475	0.0000	415.0806	415.0806	0.0234	0.0000	415.6644
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0400e-003	2.3000e-003	0.0235	7.0000e-005	7.2400e-003	5.0000e-005	7.2800e-003	1.9200e-003	4.0000e-005	1.9700e-003	0.0000	6.0053	6.0053	1.7000e-004	0.0000	6.0096
Total	**0.0370**	**1.3116**	**0.2340**	**4.3800e-003**	**0.1751**	**3.6900e-003**	**0.1788**	**0.0460**	**3.5200e-003**	**0.0495**	**0.0000**	**421.0860**	**421.0860**	**0.0235**	**0.0000**	**421.6740**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					0.2057	0.0000	0.2057	0.0834	0.0000	0.0834	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0574	1.0479	1.9671	3.3300e-003		8.3100e-003	8.3100e-003		8.0700e-003	8.0700e-003	0.0000	292.2290	292.2290	0.0945	0.0000	294.5918
Total	**0.0574**	**1.0479**	**1.9671**	**3.3300e-003**	**0.2057**	**8.3100e-003**	**0.2140**	**0.0834**	**8.0700e-003**	**0.0915**	**0.0000**	**292.2290**	**292.2290**	**0.0945**	**0.0000**	**294.5918**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0340	1.3093	0.2105	4.3100e-003	0.1593	3.6400e-003	0.1629	0.0419	3.4800e-003	0.0454	0.0000	415.0806	415.0806	0.0234	0.0000	415.6644
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0400e-003	2.3000e-003	0.0235	7.0000e-005	6.8600e-003	5.0000e-005	6.9100e-003	1.8300e-003	4.0000e-005	1.8700e-003	0.0000	6.0053	6.0053	1.7000e-004	0.0000	6.0096
Total	**0.0370**	**1.3116**	**0.2340**	**4.3800e-003**	**0.1661**	**3.6900e-003**	**0.1698**	**0.0437**	**3.5200e-003**	**0.0473**	**0.0000**	**421.0860**	**421.0860**	**0.0235**	**0.0000**	**421.6740**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4762	0.0000	0.4762	0.1924	0.0000	0.1924	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1914	2.0514	1.5338	3.2800e-003		0.0863	0.0863		0.0794	0.0794	0.0000	288.0109	288.0109	0.0932	0.0000	290.3396
Total	**0.1914**	**2.0514**	**1.5338**	**3.2800e-003**	**0.4762**	**0.0863**	**0.5625**	**0.1924**	**0.0794**	**0.2719**	**0.0000**	**288.0109**	**288.0109**	**0.0932**	**0.0000**	**290.3396**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0316	1.1804	0.2008	4.1900e-003	0.1675	2.9700e-003	0.1705	0.0439	2.8400e-003	0.0467	0.0000	404.2013	404.2013	0.0225	0.0000	404.7625
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-003	2.0300e-003	0.0212	6.0000e-005	7.1300e-003	5.0000e-005	7.1700e-003	1.8900e-003	4.0000e-005	1.9300e-003	0.0000	5.7012	5.7012	1.5000e-004	0.0000	5.7050
Total	**0.0344**	**1.1824**	**0.2220**	**4.2500e-003**	**0.1747**	**3.0200e-003**	**0.1777**	**0.0458**	**2.8800e-003**	**0.0487**	**0.0000**	**409.9026**	**409.9026**	**0.0226**	**0.0000**	**410.4675**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2036	0.0000	0.2036	0.0823	0.0000	0.0823	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0559	1.0262	1.9367	3.2800e-003		7.6100e-003	7.6100e-003		7.4200e-003	7.4200e-003	0.0000	288.0105	288.0105	0.0932	0.0000	290.3392
Total	**0.0559**	**1.0262**	**1.9367**	**3.2800e-003**	**0.2036**	**7.6100e-003**	**0.2112**	**0.0823**	**7.4200e-003**	**0.0897**	**0.0000**	**288.0105**	**288.0105**	**0.0932**	**0.0000**	**290.3392**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0316	1.1804	0.2008	4.1900e-003	0.1589	2.9700e-003	0.1619	0.0418	2.8400e-003	0.0446	0.0000	404.2013	404.2013	0.0225	0.0000	404.7625
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-003	2.0300e-003	0.0212	6.0000e-005	6.7600e-003	5.0000e-005	6.8000e-003	1.8000e-003	4.0000e-005	1.8400e-003	0.0000	5.7012	5.7012	1.5000e-004	0.0000	5.7050
Total	**0.0344**	**1.1824**	**0.2220**	**4.2500e-003**	**0.1657**	**3.0200e-003**	**0.1687**	**0.0436**	**2.8800e-003**	**0.0465**	**0.0000**	**409.9026**	**409.9026**	**0.0226**	**0.0000**	**410.4675**

3.5 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1631	1.6451	2.1561	3.3700e-003		0.0840	0.0840		0.0773	0.0773	0.0000	296.1575	296.1575	0.0958	0.0000	298.5521
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1631**	**1.6451**	**2.1561**	**3.3700e-003**		**0.0840**	**0.0840**		**0.0773**	**0.0773**	**0.0000**	**296.1575**	**296.1575**	**0.0958**	**0.0000**	**298.5521**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9000e-004	0.0220	3.7500e-003	8.0000e-005	1.7700e-003	6.0000e-005	1.8300e-003	4.9000e-004	5.0000e-005	5.4000e-004	0.0000	7.5401	7.5401	4.2000e-004	0.0000	7.5506

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8700e-003	4.2700e-003	0.0446	1.3000e-004	0.0150	9.0000e-005	0.0151	3.9700e-003	9.0000e-005	4.0600e-003	0.0000	11.9726	11.9726	3.1000e-004	0.0000	11.9804
Total	**6.4600e-003**	**0.0263**	**0.0484**	**2.1000e-004**	**0.0167**	**1.5000e-004**	**0.0169**	**4.4600e-003**	**1.4000e-004**	**4.6000e-003**	**0.0000**	**19.5127**	**19.5127**	**7.3000e-004**	**0.0000**	**19.5310**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1062	1.5648	2.3568	3.3700e-003		0.0448	0.0448		0.0414	0.0414	0.0000	296.1572	296.1572	0.0958	0.0000	298.5517
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1062**	**1.5648**	**2.3568**	**3.3700e-003**		**0.0448**	**0.0448**		**0.0414**	**0.0414**	**0.0000**	**296.1572**	**296.1572**	**0.0958**	**0.0000**	**298.5517**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9000e-004	0.0220	3.7500e-003	8.0000e-005	1.6900e-003	6.0000e-005	1.7500e-003	4.7000e-004	5.0000e-005	5.2000e-004	0.0000	7.5401	7.5401	4.2000e-004	0.0000	7.5506
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8700e-003	4.2700e-003	0.0446	1.3000e-004	0.0142	9.0000e-005	0.0143	3.7800e-003	9.0000e-005	3.8700e-003	0.0000	11.9726	11.9726	3.1000e-004	0.0000	11.9804
Total	**6.4600e-003**	**0.0263**	**0.0484**	**2.1000e-004**	**0.0159**	**1.5000e-004**	**0.0160**	**4.2500e-003**	**1.4000e-004**	**4.3900e-003**	**0.0000**	**19.5127**	**19.5127**	**7.3000e-004**	**0.0000**	**19.5310**

3.6 Rail Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1245	0.9992	1.2801	1.8900e-003		0.0517	0.0517		0.0483	0.0483	0.0000	161.2119	161.2119	0.0472	0.0000	162.3907
Total	**0.1245**	**0.9992**	**1.2801**	**1.8900e-003**		**0.0517**	**0.0517**		**0.0483**	**0.0483**	**0.0000**	**161.2119**	**161.2119**	**0.0472**	**0.0000**	**162.3907**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1300e-003	0.0422	7.1800e-003	1.5000e-004	3.4000e-003	1.1000e-004	3.5100e-003	9.3000e-004	1.0000e-004	1.0400e-003	0.0000	14.4579	14.4579	8.0000e-004	0.0000	14.4780
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.2326	0.1690	1.7658	5.2400e-003	0.5925	3.7500e-003	0.5963	0.1574	3.4500e-003	0.1608	0.0000	473.9924	473.9924	0.0124	0.0000	474.3011
Total	**0.2337**	**0.2112**	**1.7730**	**5.3900e-003**	**0.5959**	**3.8600e-003**	**0.5998**	**0.1583**	**3.5500e-003**	**0.1619**	**0.0000**	**488.4503**	**488.4503**	**0.0132**	**0.0000**	**488.7790**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0952	0.9367	1.3284	1.8900e-003		0.0323	0.0323		0.0305	0.0305	0.0000	161.2117	161.2117	0.0472	0.0000	162.3905
Total	**0.0952**	**0.9367**	**1.3284**	**1.8900e-003**		**0.0323**	**0.0323**		**0.0305**	**0.0305**	**0.0000**	**161.2117**	**161.2117**	**0.0472**	**0.0000**	**162.3905**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1300e-003	0.0422	7.1800e-003	1.5000e-004	3.2500e-003	1.1000e-004	3.3500e-003	9.0000e-004	1.0000e-004	1.0000e-003	0.0000	14.4579	14.4579	8.0000e-004	0.0000	14.4780
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.2326	0.1690	1.7658	5.2400e-003	0.5617	3.7500e-003	0.5655	0.1498	3.4500e-003	0.1533	0.0000	473.9924	473.9924	0.0124	0.0000	474.3011
Total	**0.2337**	**0.2112**	**1.7730**	**5.3900e-003**	**0.5650**	**3.8600e-003**	**0.5688**	**0.1507**	**3.5500e-003**	**0.1543**	**0.0000**	**488.4503**	**488.4503**	**0.0132**	**0.0000**	**488.7790**

BNSF Ono Realignment - Locomotive Emissions Assumptions and Emissions

Locomotive GHG Emissions Calculations

	GHG (metric ton/yr)			
	CO_2	N_2O	CH_4	CO_2e
Existing Idle	656.53	0.02	0.05	662.85
Project Idle	273.55	0.01	0.02	276.19
	-383	0	0	-387

	GHG (metric ton/yr)			
	CO_2	N_2O	CH_4	CO_2e
Construction Haul	5.3147	0.0001	0.0004	5.3656
Construction Idle	6.4818	0.0002	0.0005	6.5442
Construction Total	**12**	**0**	**0**	**12**

	Operations		Construction Delivery Activity		
	Existing	**Project**	**Idling**	**Hauling**	
Rail Owner	BNSF				
Analysis Year	2021				
Rail Use Type	Large Line-Haul				
Train Activity[11]	Idling		Idling	Hauling	
Power Setting	Low Idle		Low Idle	Notch 3	
Length of Track	2.7	2.7	2.7	2.7	mi
Annual Train Days	365	365	8	8	days/yr
Daily Trains	3	2	1	1	trains
Locomotives per Train	3.7	3.7	4	4	locomotives/trai
Daily Locomotives	11.1	7.4	4	4	locomotives
Train Speed	0.84375	1.35	0.675	35	mi/hr
Train Idle time	3.2	2	4	0	hr
Train Weight	4798	4798	4798	4798	tons
Locomotive Power	4400	4400	4400	4400	bhp
Density of Diesel Fuel	3172	3172	3172	3172	g/gal
Sulfur Content of Fuel	8.1	8.1	8.1	8.1	ppm
Sulfur Conversion in Fuel	0.95	0.95	0.95	0.95	unitless
Carbon Content of Fuel	0.87	0.87	0.87	0.87	unitless
Conversions & Calculations					
Trip Travel Time	3.2	2	4	0.0771429	hr/locomotive
Daily Travel Time	35.52	14.8	16	0.3085714	hr/day
Annual Travel Time	12964.8	5402	128	2.4685714	hr/yr
Trip Fuel Use	676.92308	423.076923	846.15385	16.318681	gal/locomotive
Daily Fuel Use	7513.8462	3130.76923	3384.6154	65.274725	gal/day
Annual Fuel Use	2742553.8	1142730.77	27076.923	522.1978	gal/yr
Trip Load	14080	8800	17600	339.42857	bhp-hr/locomoti
Daily Load	156288	65120	70400	1357.7143	bhp-hr/day
Annual Load	57045120	23768800	563200	10861.714	bhp-hr/yr
Trip Work	12954.6	12954.6	12954.6	12954.6	ton-mi/locomoti
Daily Work	143796.06	95864.04	51818.4	51818.4	ton-mi/day
Annual Work	52485562	34990374.6	414547.2	414547.2	ton-mi/yr
ERTAC Fuel Consumption	883.14	883.14	883.14	883.14	ton-mi/gal
ERTAC Daily Fuel Consumption	162.82363	108.549086	58.675182	58.675182	gal/day
Hauling Load Factor	0	0	0	0.052	unitless
Idling Fuel Consumption	5	5	5	0	gal/hr