

5. Environmental Analysis

5.3 GREENHOUSE GAS EMISSIONS

This section of the DSEIR compares the impacts of the Proposed Project's greenhouse gas ("GHG") emissions to the impacts of the 2011 Approved Project and the 2012 Modified Project.

Air quality modeling for the Proposed Project is included as Appendix C to this DSEIR.

Greenhouse Gases and Climate Change

Scientists have concluded that human activities are contributing to global climate change by adding large amounts of heat-trapping gases, known as GHG, to the atmosphere. Climate change is the variation of earth's climate over time, whether due to natural variability or as a result of human activities. The primary source of these GHG is fossil fuel use. The Intergovernmental Panel on Climate Change (IPCC) has identified four major GHG—water vapor,¹ carbon (CO₂), methane (CH₄), and ozone (O₃)—that are the likely cause of an increase in global average temperatures observed within the 20th and 21st centuries. Other GHG identified by the IPCC that contribute to global warming to a lesser extent include nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons, perfluorocarbons, and chlorofluorocarbons (IPCC 2001). Table 5.3-1 lists the GHG applicable to the proposed project and their relative global warming potentials (GWP) compared to CO₂. The majors GHG are briefly described below the table.

*Table 5.3-1
Greenhouse Gases and Their Relative Global Warming Potential Compared to CO₂*

<i>GHG</i>	<i>Atmospheric Lifetime (years)</i>	<i>Global Warming Potential Relative to CO₂¹</i>
Carbon Dioxide (CO ₂)	50 to 200	1
Methane (CH ₄) ²	12 (±3)	21
Nitrous Oxide (N ₂ O)	120	310
Hydrofluorocarbons:		
HFC-23	264	11,700
HFC-32	5.6	650
HFC-125	32.6	2,800
HFC-134a	14.6	1,300
HFC-143a	48.3	3,800
HFC-152a	1.5	140
HFC-227ea	36.5	2,900
HFC-236fa	209	6,300
HFC-4310mee	17.1	1,300
Perfluoromethane: CF ₄	50,000	6,500
Perfluoroethane: C ₂ F ₆	10,000	9,200
Perfluorobutane: C ₄ F ₁₀	2,600	7,000
Perfluoro-2-methylpentane: C ₆ F ₁₄	3,200	7,400
Sulfur Hexafluoride (SF ₆)	3,200	23,900

Source: IPCC 2001.

¹ Based on 100-Year Time Horizon of the Global Warming Potential (GWP) of the air pollutant relative to CO₂.

² The methane GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO₂ is not included.

¹ Water vapor (H₂O) is the strongest GHG and the most variable in its phases (vapor, cloud droplets, ice crystals). However, water vapor is not considered a pollutant.

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Carbon dioxide (CO₂) enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, respiration, and also as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is also removed from the atmosphere (sequestered) when it is absorbed by plants as part of the biological carbon cycle.

Methane (CH₄) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

Nitrous oxide (N₂O) is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

Fluorinated gases are synthetic, strong GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances. These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as high GWP gases.

- **Chlorofluorocarbons (CFCs)** are GHGs covered under the 1987 Montreal Protocol and used for refrigeration, air conditioning, packaging, insulation, solvents, or aerosol propellants. Since they are not destroyed in the lower atmosphere (troposphere, stratosphere), CFCs drift into the upper atmosphere where, given suitable conditions, they break down ozone. These gases are also ozone-depleting gases and are therefore being replaced by other GHG compounds covered under the Kyoto Protocol.
- **Perfluorocarbons (PFCs)** are a group of human-made chemicals composed of carbon and fluorine only. These chemicals (predominantly perfluoromethane [CF₄] and perfluoroethane [C₂F₆]) were introduced as alternatives, along with HFCs, to the ozone-depleting substances. In addition, PFCs are emitted as by-products of industrial processes and are also used in manufacturing. PFCs do not harm the stratospheric ozone layer, but they have a high global warming potential.
- **Sulfur Hexafluoride (SF₆)** is a colorless gas soluble in alcohol and ether, slightly soluble in water. SF₆ is a strong GHG used primarily in electrical transmission and distribution systems as an insulator.
- **Hydrochlorofluorocarbons (HCFCs)** contain hydrogen, fluorine, chlorine, and carbon atoms. Although ozone-depleting substances, they are less potent at destroying stratospheric ozone than CFCs. They have been introduced as temporary replacements for CFCs and are also GHGs.
- **Hydrofluorocarbons (HFCs)** contain only hydrogen, fluorine, and carbon atoms. They were introduced as alternatives to ozone-depleting substances to serve many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are also used in manufacturing. They do not significantly deplete the stratospheric ozone layer, but they are strong GHGs (USEPA 2012).

California's GHG Sources and Relative Contribution

California is the second largest emitter of GHG in the United States, only surpassed by Texas, and the tenth largest GHG emitter in the world. However, California also has over 12 million more people than

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the state of Texas. Because of more stringent air emission regulations, in 2001 California ranked fourth lowest in carbon emissions per capita and fifth lowest among states in CO₂ emissions from fossil fuel consumption per unit of Gross State Product (total economic output of goods and services) (CEC 2006).

CARB's latest update to the statewide GHG emissions inventory was conducted in 2012 for year 2009 emissions.² In 2009, California produced 457 million metric tons (MMT) of CO₂-equivalent (CO₂e) GHG emissions.³ California's transportation sector is the single largest generator of GHG emissions, producing 37.9 percent of the state's total emissions. Electricity consumption is the second largest source, comprising 22.7 percent. Industrial activities are California's third largest source of GHG emissions, comprising 17.8 percent of the state's total emissions. Other major sources of GHG emissions include commercial and residential, recycling and waste, high global warming potential GHGs, agriculture, and forestry (CARB 2012).

Human Influence on Climate Change

For approximately 1,000 years before the Industrial Revolution, the amount of GHG in the atmosphere remained relatively constant (IPCC 2007). During the 20th century, however, scientists observed a rapid change in the climate and climate change pollutants that are attributable to human activities. The amount of CO₂ has increased by more than 35 percent since pre-industrial times, and has increased at an average rate of 1.4 parts per million ("ppm") per year since 1960, mainly due to combustion of fossil fuels and deforestation (IPCC 2007). These recent changes in climate change pollutants far exceed the extremes of the ice ages, and the global mean temperature is warming at a rate that cannot be explained by natural causes alone. Human activities are directly altering the chemical composition of the atmosphere through the buildup of climate change pollutants (CAT 2006).

Climate-change scenarios are affected by varying degrees of uncertainty (IPCC 2007). The Intergovernmental Panel on Climate Change's ("IPCC") 2007 *IPCC Fourth Assessment Report* projects that the range of global mean temperature increase from 1990 to 2100, under different climate-change scenarios, will range from 1.4 to 5.8 °C (2.5 to 10.4°F). In the past, gradual changes in the earth's temperature changed the distribution of species, availability of water, etc. However, human activities are accelerating this process so that environmental impacts associated with climate change no longer occur in a geologic timeframe but within a human lifetime (CAT 2006).

Potential Climate Change Impacts for California

Like the variability in the projections of the expected increase in global surface temperatures, the environmental consequences of gradual changes in the Earth's temperature are also hard to predict. In California and western North America, observations of the climate have shown: 1) a trend toward warmer winter and spring temperatures, 2) a smaller fraction of precipitation is falling as snow, 3) a decrease in the amount of spring snow accumulation in the lower and middle elevation mountain zones, 4) an advance snowmelt of 5 to 30 days earlier in spring, and 5) a similar shift (5 to 30 days earlier) in the timing of spring flower blooms (CAT 2006). According to the California Climate Action Team (CAT), even if actions could be taken to immediately curtail climate change emissions, the potency of emissions

² Methodology for determining the statewide GHG inventory is not the same as the methodology used to determine statewide GHG emissions under Assembly Bill 32 (AB 32).

³ CO₂-equivalence is used to show the relative potential that different GHGs have to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. The global warming potential of a GHG is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere.

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that have already built up, their long atmospheric lifetimes (see Table 5.3-2), and the inertia of the Earth's climate system could produce as much as 0.6°C (1.1°F) of additional warming. Consequently, some impacts from climate change are now considered unavoidable. Global climate change risks are shown in Table 5.3-2 and include impacts to public health, water resources, agriculture, sea level, forest and biological resources and electricity. Specific climate change impacts that could affect the project include health impacts from a reduction in air quality, water resources impacts from a reduction in water supply, and increased energy demand.

*Table 5.3-2
Summary of Global Climate Change Risks to California*

<i>Impact Category</i>	<i>Potential Risk</i>
Public Health Impacts	<ul style="list-style-type: none"> • Poor air quality made worse • More severe heat
Water Resources Impacts	<ul style="list-style-type: none"> • Decreasing Sierra Nevada snow pack • Challenges in securing adequate water supply • Potential reduction in hydropower • Loss of winter recreation
Agricultural Impacts	<ul style="list-style-type: none"> • Increasing temperature • Increasing threats from pests and pathogens • Expanded ranges of agricultural weeds • Declining productivity • Irregular blooms and harvests
Coastal Sea Level Impacts	<ul style="list-style-type: none"> • Accelerated sea level rise • Increasing coastal floods • Shrinking beaches • Worsened impacts on infrastructure
Forest and Biological Resource Impacts	<ul style="list-style-type: none"> • Increasing risk and severity of wildfires • Lengthening of the wildfire season • Movement of forest areas • Conversion of forest to grassland • Increasing threats from pest and pathogens • Declining forest productivity • Shifting vegetation and species distribution • Altered timing of migration and mating habits • Loss of sensitive or slow-moving species
Electricity	<ul style="list-style-type: none"> • Potential reduction in hydropower • Increased energy demand

Sources: CEC 2006; CEC 2008.

5.3.1 Regulatory Setting

Regulation of GHG Emissions on a National Level

The United States Environmental Protection Agency (EPA) announced on December 7, 2009, that GHG emissions threaten the public health and welfare of the American people and that GHG emissions from on-road vehicles contribute to that threat. The EPA's final findings respond to the 2007 U.S. Supreme Court decision that GHG emissions fit within the Clean Air Act definition of air pollutants. The findings do not in and of themselves impose any emission reduction requirements, but allow the EPA to finalize

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the GHG standards proposed in 2009 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation (EPA 2009).

The EPA's endangerment finding covers emissions of six key GHGs—CO₂, CH₄, N₂O, hydrofluorocarbons, perfluorocarbons, and SF₆—which have been the subject of scrutiny and intense analysis for decades by scientists in the United States and around the world (the first three are applicable to the proposed project).

In response to the endangerment finding, the EPA issued the Mandatory Reporting of GHG Rule that requires substantial emitters of GHG emissions (large stationary sources, etc.) to report GHG emissions data. Facilities that emit 25,000 metric tons (MTons) or more per year are required to submit an annual report.

Regulation of GHG Emissions on a State Level

Current State of California guidance and goals for reductions in GHG emissions are generally embodied in Executive Order S-03-05, Assembly Bill 32, and Senate Bill 375.

Executive Order S-03-05

Executive Order S-3-05, signed June 1, 2005, set the following GHG reduction targets for the state:

- 2000 levels by 2010
- 1990 levels by 2020
- 80 percent below 1990 levels by 2050

Assembly Bill 32, the Global Warming Solutions Act (2006)

Current State of California guidance and goals for reductions in GHG emissions are generally embodied in Assembly Bill 32 (AB 32), the Global Warming Solutions Act. AB 32 was passed by the California state legislature on August 31, 2006, to place the state on a course toward reducing its contribution of GHG emissions. AB 32 follows the 2020 tier of emissions reduction targets established in Executive Order S-3-05.

AB 32 directed the California Air Resources Board (CARB) to adopt discrete early action measures to reduce GHG emissions and outline additional reduction measures to meet the 2020 target. Based on the GHG emissions inventory conducted for the Scoping Plan by CARB, GHG emissions in California by 2020 are anticipated to be approximately 596 MMTCO₂e. In December 2007, CARB approved a 2020 emissions limit of 427 MMTCO₂e (471 million tons) for the state. The 2020 target requires a total emissions reduction of 169 MMTCO₂e, 28.5 percent from the projected emissions of the business-as-usual (BAU) scenario for the year 2020 (i.e., 28.5 percent of 596 MMTCO₂e) (CARB 2008).⁴

In order to effectively implement the emissions cap, AB 32 directed CARB to establish a mandatory reporting system to track and monitor GHG emissions levels for large stationary sources that generate

⁴ CARB defines 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.

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more than 25,000 MT of CO₂e per year, prepare a plan demonstrating how the 2020 deadline can be met, and develop appropriate regulations and programs to implement the plan by 2012. The Climate Action Registry Reporting Online Tool was established through the Climate Action Registry to track GHG emissions.

CARB 2008 Scoping Plan

The final Scoping Plan was adopted by CARB on December 11, 2008. Key elements of CARB's GHG reduction plan that may be applicable to the proposed project include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards (adopted and cycle updates in progress).
- Achieving a mix of 33 percent for energy generation from renewable sources (anticipated by 2020).
- A California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system for large stationary sources (adopted 2011).
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets (several Sustainable Communities Strategies have been adopted).
- Adopting and implementing measures pursuant to state laws and policies, including California's clean car standards (amendments to the Pavley Standards adopted 2009; Advanced Clean Car standard adopted 2012), goods movement measures, and the Low Carbon Fuel Standard (LCFS)(adopted 2009).⁵
- Creating target fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation (in progress).

Table 5.3-3, *Scoping Plan GHG Reduction Measures and Reductions toward 2020 Target*, shows the proposed reductions from regulations and programs outlined in the Scoping Plan. Although local government operations were not accounted for in achieving the 2020 emissions reduction, CARB estimates that land use changes implemented by local governments that integrate jobs, housing, and services result in a reduction of 5 MMTCO₂e, which is approximately 3 percent of the 2020 GHG emissions reduction goal. In recognition of the critical role local governments play in successful implementation of AB 32, in 2008 CARB recommended GHG reduction goals of 15 percent of today's levels by 2020 to ensure that municipal and community-wide emissions match the state's reduction

⁵ On December 29, 2011, the U.S. District Court for the Eastern District of California issued several rulings in the federal lawsuits challenging the LCFS. One of the court's rulings preliminarily enjoins the CARB from enforcing the regulation during the pendency of the litigation. In January 2012, CARB appealed the decision and on April 23, 2012, the Ninth Circuit Court granted CARB's motion for a stay of the injunction while it continued to consider CARB's appeal of the lower court's decision. On July 15, 2013, the State of California Court of Appeal, Fifth Appellate District issued its opinion in *POET, LLC v. California Air Resources Board* (July 15, 2013) 217 Cal.App.4th 1214, --- Cal.Rptr.3d ---, 2013 WL 3821605 (Cal.App. 5 Dist.), 2013 Daily Journal D.A.R. 9223. The court held that the LCFS would remain in effect and that CARB can continue to implement and enforce the 2013 regulatory standards while it corrects certain aspects of the procedures by which the LCFS was originally adopted.

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target.⁶ Pursuant to the Scoping Plan Appendix C, “The Role of Local Government,” and Table C, local governments are encouraged to take a number of potential actions to reduce local GHG emissions, which include shifts in land use patterns to emphasize compact, low-impact growth over development in green fields, resulting in fewer vehicle miles travelled (VMT) (CARB 2008).

*Table 5.3-3
Scoping Plan GHG Reduction Measures and Reductions toward 2020 Target*

<i>Recommended Reduction Measures</i>	<i>Reductions Counted toward 2020 Target of 169 MMT CO₂e</i>	<i>Percentage of Statewide 2020 Target</i>
Cap and Trade Program and Associated Measures		
California Light-Duty Vehicle GHG Standards	31.7	19%
Energy Efficiency	26.3	16%
Renewable Portfolio Standard (33 percent by 2020)	21.3	13%
Low Carbon Fuel Standard	15	9%
Regional Transportation-Related GHG Targets ¹	5	3%
Vehicle Efficiency Measures	4.5	3%
Goods Movement	3.7	2%
Million Solar Roofs	2.1	1%
Medium/Heavy Duty Vehicles	1.4	1%
High Speed Rail	1.0	1%
Industrial Measures	0.3	0%
Additional Reduction Necessary to Achieve Cap	34.4	20%
Total Cap and Trade Program Reductions	146.7	87%
Uncapped Sources/Sectors Measures		
High Global Warming Potential Gas Measures	20.2	12%
Sustainable Forests	5	3%
Industrial Measures (for sources not covered under cap and trade program)	1.1	1%
Recycling and Waste (landfill methane capture)	1	1%
Total Uncapped Sources/Sectors Reductions	27.3	16%
Total Reductions Counted toward 2020 Target	174	100%
Other Recommended Measures – Not Counted toward 2020 Target		
State Government Operations	1.0 to 2.0	1%
Local Government Operations ²	To Be Determined	NA
Green Buildings	26	15%
Recycling and Waste	9	5%
Water Sector Measures	4.8	3%
Methane Capture at Large Dairies	1	1%
Total Other Recommended Measures – Not Counted toward 2020 Target	42.8	NA

Source: CARB 2008.

Notes: The percentages in the right-hand column add up to more than 100 percent because the emissions reduction goal is 169 MMTCO₂e and the Scoping Plan identifies 174 MTCO₂e of emissions reductions strategies.

MMTCO₂e: million metric tons of CO₂e

¹ Reductions represent an estimate of what may be achieved from local land use changes. It is not the SB 375 regional target.

² According to the Measure Documentation Supplement to the Scoping Plan, local government actions and targets are anticipated to reduce vehicle miles by approximately 2 percent through land use planning, resulting in a potential GHG reduction of 2 million metric tons of CO₂e (or approximately 1.2 percent of the GHG reduction target). However, these reductions were not included in the Scoping Plan reductions to achieve the 2020 target.

⁶ Though the Scoping Plan references a goal for local governments to reduce community GHG emissions by 15 percent from current (interpreted as 2008) levels by 2020, it does not rely on local GHG reduction targets established by local governments to meet the state’s GHG reduction target of AB 32. Table 5.3-3 lists the recommended reduction measures, which do not include additional reductions from local measures.

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Since the Scoping Plan was adopted, CARB implemented and continues to implement of the reduction measures. The legislature has also passed legislation implementing the reduction measures. For example, the cap-and-trade regulations became effective January 2, 2012, and the compliance obligation for GHG emissions began on January 1, 2013. The legislature also passed Senate Bill X1-2 (SBX1-2) in 2011, increasing the amount of electricity generated from eligible renewable energy resources to at least 33 percent per year by December 31, 2020.

Senate Bill 375

In 2008, SB 375 was adopted and was intended to represent the implementation mechanism necessary to achieve the GHG emissions reductions targets established in the Scoping Plan for the transportation sector as it relates to local land use decisions that affect travel behavior. Implementation is intended to reduce GHG emissions from light-duty trucks and automobiles (excludes emissions associated with goods movement) by aligning regional long-range transportation plans, investments, and housing allocations with local land use planning to reduce VMT and vehicle trips. Specifically, SB 375 requires CARB to establish GHG emissions reduction targets for each of the 17 regions in California managed by a metropolitan planning organization (MPO). Pursuant to the recommendations of the Regional Transportation Advisory Committee, CARB adopted per capita reduction targets for each of the MPOs rather than a total magnitude reduction target.

Southern California Association of Governments (SCAG) is the MPO for the southern California region, which includes the counties of Los Angeles, Orange, San Bernardino County, Riverside, Ventura, and Imperial. SCAG's targets are an 8 percent per capita reduction from 2005 GHG emission levels by 2020 and a 13 percent per capita reduction from 2005 GHG emission levels by 2035. The 2020 targets are smaller than the 2035 targets because a significant portion of the built environment in 2020 has been defined by decisions that have already been made. In general, the 2020 scenarios reflect that more time is needed for large land use and transportation infrastructure changes. Most of the reductions in the interim are anticipated to come from improving the efficiency of the region's existing transportation network. The proposed targets would result in 3 MMTCO₂e of reductions by 2020 and 15 MMTCO₂e of reductions by 2035. Based on these reductions, the passenger vehicle target in CARB's Scoping Plan (for AB 32) would be met (CARB 2010).

SB 375 requires the MPOs to prepare a Sustainable Communities Strategy (SCS) in their regional transportation plan. For the SCAG region, the 2012 RTP/SCS was adopted in April 2012 (SCAG 2012). The SCS sets forth a development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, would reduce GHG emissions from transportation (excluding goods movement). The SCS is meant to provide growth strategies that will achieve the regional GHG emissions reduction targets. However, the SCS does not require that local general plans, specific plans, or zoning be consistent with the SCS, but provides incentives for consistency for governments and developers.

Assembly Bill 1493

California vehicle GHG emission standards were enacted under AB 1493 (Pavley I). Pavley I is a clean-car standard that reduces GHG emissions from new passenger vehicles (light-duty auto to medium-duty vehicles) from 2009 through 2016 and is anticipated to reduce GHG emissions from new passenger vehicles by 30 percent in 2016. California implements the Pavley I standards through a waiver granted to California by the EPA. In 2012, the EPA issued a Final Rulemaking that sets even more stringent fuel economy and GHG emissions standards for model year 2017 through 2025 light-duty vehicles.

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Executive Order S-01-07

On January 18, 2007, the state set a new Low Carbon Fuel Standard for transportation fuels sold within the state. Executive Order S-1-07 sets a declining standard for GHG emissions measured in CO₂e gram per unit of fuel energy sold in California. The LCFS requires a reduction of 2.5 percent in the carbon intensity of California's transportation fuels by 2015 and a reduction of at least 10 percent by 2020. The LCFS applies to refiners, blenders, producers, and importers of transportation fuels and would use market-based mechanisms to allow these providers to choose how they reduce emissions during the fuel cycle using the most economically feasible methods.

Senate Bills 1078 and 107, and Executive Order S-14-08

A major component of California's Renewable Energy Program is the renewable portfolio standard (RPS) established under Senate Bills 1078 (Sher) and 107 (Simitian). Under the RPS, certain retail sellers of electricity were required to increase the amount of renewable energy each year by at least 1 percent in order to reach at least 20 percent by December 30, 2010. Executive Order S-14-08 was signed in November 2008, which expands the state's renewable energy standard to 33 percent renewable power by 2020. In 2011, the state legislature adopted this higher standard in SBX1-2. Renewable sources of electricity include wind, small hydropower, solar, geothermal, biomass, and biogas. The increase in renewable sources for electricity production will decrease indirect GHG emissions from development projects, because electricity production from renewable sources is generally considered carbon neutral.

California Building Code

Energy conservation standards for new residential and nonresidential buildings were adopted by the California Energy Resources Conservation and Development Commission in June 1977 and updated triannually (Title 24, Part 6, of the California Code of Regulations [CCR]). Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. On May 31, 2012, the California Energy Commission adopted the 2013 Building and Energy Efficiency Standards, which go into effect on January 1, 2014. Buildings that are constructed in accordance with the 2013 Building and Energy Efficiency Standards are 25 percent (residential) to 30 percent (nonresidential) more energy efficient than the 2008 standards as a result of better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses.

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (CALGreen) was adopted as part of the California Building Standards Code (Part 11, Title 24, California Code of Regulations). CALGreen established planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. The mandatory provisions of the CALGreen became effective January 1, 2011.

2006 Appliance Efficiency Regulations

The 2006 Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608) were adopted by the California Energy Commission on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non-federally regulated appliances.

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5.3.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the City of Irvine has determined that a project would normally have a significant effect on the environment if the project would:

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

Neither SCAQMD nor the City has adopted a significance threshold for the GHG emissions from residential/commercial projects. Consequently, the City has determined for this DSEIR, pursuant to the discretion afforded by CEQA Guidelines section 15064.4(a) and (b), respectively, to quantify the GHG emissions from the Proposed Project and the 2011 Approved Project based on the methodologies proposed by SCAQMD. In addition, as outlined below, the City has determined to assess the significance of the Proposed Project's GHG emissions using the SCAQMD's draft target efficiency threshold of 4.8 MTCO₂e per service population ("MTCO₂e/SP") per year, and to analyze the Proposed Project's consistency with plans, policies and regulations adopted for the purpose of reducing GHG emissions.

South Coast Air Quality Management District

SCAQMD has adopted a significance threshold of 10,000 Mton per year for permitted (stationary) sources of GHG emissions for which SCAQMD is the designated lead agency. To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, SCAQMD has convened a GHG CEQA Significance Threshold Working Group (Working Group). Based on the last Working Group meeting (Meeting No. 15) held in September 2010, SCAQMD is proposing to adopt a tiered approach for evaluating GHG emissions for development projects where SCAQMD is not the lead agency:

- Tier 1 If a project is exempt from CEQA, project-level and cumulative GHG emissions are less than significant.
- Tier 2 If the project complies with a GHG emissions reduction plan or mitigation program that avoids or substantially reduces GHG emissions in the project's geographic area (i.e., city or county), project-level and cumulative GHG emissions are less than significant.

For projects that are not exempt or where no qualifying GHG reduction plans are directly applicable, SCAQMD requires an assessment of GHG emissions. SCAQMD is proposing a "bright-line" screening-level threshold of 3,000 MTCO₂e annually for all land use types or the following land-use-specific thresholds: 1,400 MTCO₂e for commercial projects, 3,500 MTCO₂e for residential projects, or 3,000 MTCO₂e for mixed-use projects. This bright-line threshold is based on a review of the Governor's Office of Planning and Research database of CEQA projects. Based on their review of 711 CEQA projects, 90 percent of CEQA projects would exceed the bright-line thresholds identified above. Therefore, projects that do not exceed the bright-line threshold would have a nominal, and therefore, less than cumulatively considerable impact on GHG emissions:

- Tier 3 If GHG emissions are less than the screening-level threshold, project-level and cumulative GHG emissions are less than significant.

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- Tier 4 If emissions exceed the screening threshold, a more detailed review of the project's GHG emissions is warranted.

SCAQMD has proposed an efficiency target for projects that exceed the screening threshold. The current recommended approach is per capita efficiency targets. SCAQMD is not recommending use of a percent emissions reduction target. Instead, SCAQMD proposes a 2020 efficiency target of 4.8 MTCO₂e per year per service population (MTCO₂e/year/SP) for project-level analyses and 6.6 MTCO₂e/year/SP for plan level projects (e.g., program-level projects such as general plans). The per capita efficiency targets are based on the AB 32 GHG reduction target and 2020 GHG emissions inventory prepared for CARB's 2008 Scoping Plan.⁷ A traditional definition of service population that only includes residents and employees is not always applicable for projects that may have different "users" of the site. Therefore, for the purpose of evaluating GHG emissions from school projects, a definition of service population has been expanded to include students. Student population is the primary generator of GHG emissions from school projects (e.g., trips are primarily generated by the students who drive/are driven to the school). It is the lead agency's independent judgment, that there is substantial evidence to support the definition of service population cited above for the proposed school project, which is consistent with past methodology developed by air districts in California for evaluating CEQA impacts. If project-related emissions exceed the screening threshold of 3,000 MTCO₂e per year, project emissions would be compared to the per capita target of 4.8 MTCO₂e per year per service population.

5.3.3 2011 Approved Project

The Certified EIR determined that the 2011 Approved Project would result in both one-time and annual GHG emissions associated with the construction and operation of the development. However, the 2011 Certified EIR found that the 2011 Approved Project would not result in significant impacts related to GHG emissions.

5.3.4 2012 Modified Project

The 2012 Modified Project's DSSEIR determined that GHG emissions would result in less than significant impacts looking at either operational emissions alone or construction and operational emissions together. Like the 2011 Approved Project, GHG emissions impacts would remain less than significant even with implementation of the modifications proposed by the 2012 Modified Project.

5.3.5 Environmental Impacts of High School No. 5

Construction and operational phase emissions for the Proposed Project were calculated using the California Emission Estimator Model (CalEEMod) Version 2013.2. The analysis includes the following emission sources (see Appendix C for additional details regarding modeling methodology and assumptions)

⁷ SCAQMD took the 2020 statewide GHG reduction target for land use only GHG emissions sectors and divided it by the 2020 statewide employment for the land use sectors to derive a per capita GHG efficiency metric that coincides with the GHG reduction targets of AB 32 for year 2020.

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Existing Plans, Programs, and Policies

The following measures are existing plans, programs, or policies ("PPPs") and Project Design Features (PDFs) that apply to both the 2011 Approved Project and the 2012 Modified Project that will help to reduce and avoid impacts related to GHG emissions. The PPPs have been separated between Citywide GHG reduction strategies and Statewide and Federal GHG reduction strategies. These measures do not apply directly to the Proposed Project. The Mitigation Agreement between the District and Heritage Fields provides for the site to be delivered to the District in a master pad condition, mass-graded and compacted, with backbone infrastructure installed (roadway, storm drains, sanitary sewer, water, etc.) and stubbed wet and dry utilities.

Statewide and Federal Operational Strategies

PPP 4-3 Building and Energy Efficiency Standards (CCR Title 24): Prior to the issuance of a building permit for residential, commercial, or office structures in the Proposed Project Site, development plans for these structures shall be required to demonstrate that the project meets the 2008 Building and Energy Efficiency Standards. Commonly known as Title 24, these standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The 2008 standards are approximately 15 percent more energy efficient than the 2005 Building and Energy Efficiency Standards. Plans submitted for building permits shall include written notes demonstrating compliance with the 2008 energy standards and shall be reviewed and approved by the Public Utilities Department prior to issuance of building permits. Design strategies to meet this standard may include maximizing solar orientation for daylighting and passive heating/cooling, installing appropriate shading devices and landscaping, utilizing natural ventilation, and installing cool roofs. Other techniques include installing insulation (high R value) and radiant heat barriers, low-e window glazing, or double-paned windows. On May 31, 2012, the California Energy Commission adopted the 2013 Building and Energy Efficiency Standards, which go into effect on January 1, 2014. Buildings that are constructed in accordance with the 2013 Building and Energy Efficiency Standards are 25 percent (residential) to 30 percent (nonresidential) more energy efficient than the 2008 standards as a result of better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses. The 2013 Building and Energy Efficiency Standards would be applicable to the Proposed Project.

PPP 4-4 Title 24 Code Cycles: Net-Zero Buildings (Residential & Non-Residential): The California Public Utilities Commission adopted its Long-Term Energy Efficiency Strategic Plan on September 18, 2008, presenting a roadmap for all new residential and commercial construction to achieve a zero-net energy standard. This Plan outlines the goal of reaching zero net energy in residential construction by 2020 and in commercial construction by 2030. Achieving this goal will require increased stringency in each code cycle of California's Energy Code (Title 24).

PPP 4-5 California Renewable Portfolio Standard: CARB's Renewable Portfolio Standard (RPS) is a foundational element of the State's emissions reduction plan. In 2002, Senate Bill 1078 established the California RPS program, requiring 20 percent renewable energy by 2017. In 2006, Senate Bill 107 advanced the 20 percent deadline to 2010, a goal which was expanded to 33 percent by 2020 in the 2005 Energy Action Plan II. On September 15, 2009, Governor

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- Arnold Schwarzenegger signed Executive Order S-21-09 directing CARB to adopt regulations increasing RPS to 33 percent by 2020. These mandates apply directly to investor-owned utilities, which in the case of the Proposed Project is Southern California Edison ("SCE").
- PDF 4-3 **Low-Flow Fixtures:** The Proposed Project incorporates low-flow water fixtures that will meet the requirements of the California Green Building Standards Code standards. Prior to issuance of building permit, the District or its successor shall submit evidence to the satisfaction of the Department of the State Architect that toilets, urinals, sinks, showers, and other water fixtures installed on-site are low-flow water fixtures that meet the California Green Building Standards Code standards.
- PDF 4-4 **Landscaping and Irrigation Systems:** The Proposed Project incorporates automated, high-efficiency landscaping irrigation systems on all master landscaped areas that reduce water use, such as evapotranspiration "smart" weather-based irrigation controllers, and bubbler irrigation; low-angle, low-flow spray heads; moisture sensors; and use of a California-friendly landscape palette. Prior to approval of landscape plans, the Irvine Unified School District shall submit evidence to the satisfaction of the Department of the State Architect that such landscaping irrigation systems will be installed so as to make the Proposed Project consistent with the intent of the California Water Conservation in Landscaping Act of 2006 ("AB 1881"), including provisions to reduce the wasteful, uneconomic, inefficient, and unnecessary consumption of water.
- PDF 4-5 **Use of Reclaimed Water on All Master Landscaped Areas:** Prior to approval of landscape plans, the Irvine Unified School District shall submit evidence to the satisfaction of the Irvine Unified School District and the Irvine Ranch Water District ("IRWD") that the landscape plans incorporate the use of reclaimed water in all master landscaped areas, including master landscaped commercial, multifamily, common, roadways, and park areas. Master landscapes shall also incorporate weather-based controllers and efficient irrigation system designs to reduce overwatering, combined with the application of a California-friendly landscape palette.
- PDF 4-6 **Material Recovery:** The Proposed Project incorporates measures to reduce waste generated by Proposed Project Site occupants and visitors, and to encourage recycling of solid wastes, utilizing the Orange County Integrated Waste Management Department's material recovery facilities to recycle glass, plastic, cans, junk mail, paper, cardboard, greenwaste (e.g., grass, weeds, leaves, branches, yard trimmings, and scrap wood), and scrap metal. Future employees, residents, and customers would participate in these programs.
- PDF 4-8 **Building Energy Efficiency:** Residential dwellings and non-residential buildings will be constructed so that they achieve 20 percent higher energy efficiency than the applicable standards set forth in the 2008 California Building and Energy Efficiency Standards (Title 24, Part 6 of the California Building Code) or meet the standards in effect at the time of issuance of building permit. The Energy Commission's 2013 Building Energy Efficiency Standards are 25 percent more efficient than the 2008 standards for residential construction and 30 percent more efficient for nonresidential construction. The 2013 Energy Efficiency Standards, which take effect on January 1, 2014, offer builders more efficient windows, insulation, lighting, ventilation systems and other options that would reduce energy consumption in homes and businesses.

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Additional Plans, Programs, and Policies

The following plans, programs, or policies ("PPPs") are directly applicable to the Proposed Project.

- IUSD 2-1 **Building Energy Efficiency:** Buildings will be constructed with the goal of achieving a 20 percent higher energy efficiency than the applicable standards set forth in the 2008 California Building and Energy Efficiency Standards (Title 24, Part 6 of the California Building Code) or meet the standards in effect at the time of issuance of building permit. (from Section 5.2, *Air Quality*).
- IUSD 3-1 **Title 24 Code Cycles: Net-Zero Buildings:** The California Public Utilities Commission adopted its Long-Term Energy Efficiency Strategic Plan on September 18, 2008, presenting a roadmap for all new residential and commercial construction to achieve a zero-net energy standard. This Plan outlines the goal of reaching zero net energy in residential construction by 2020 and in commercial construction by 2030. Achieving this goal will require increased stringency in each code cycle of California's Energy Code (Title 24).
- IUSD 3-2 **Low-Flow Fixtures:** The Proposed Project incorporates low-flow water fixtures that will meet the requirements of the California Green Building Standards Code standards. Prior to issuance of building permit, the District or its successor shall submit evidence to the satisfaction of the Division of the State Architect that toilets, urinals, sinks, showers, and other water fixtures installed on-site are low-flow water fixtures that meet the California Green Building Standards Code standards.
- IUSD 3-3 **Landscaping and Irrigation Systems:** The Proposed Project incorporates automated, high-efficiency landscaping irrigation systems on all master landscaped areas that reduce water use, such as evapotranspiration "smart" weather-based irrigation controllers, and bubbler irrigation; low-angle, low-flow spray heads; moisture sensors; and use of a California-friendly landscape palette. Prior to approval of landscape plans, the Irvine Unified School District (IUSD) shall submit evidence to the satisfaction of the Division of the State Architect (DSA) that such landscaping irrigation systems will be installed so as to make the Proposed Project consistent with the intent of the California Water Conservation in Landscaping Act of 2006 ("AB 1881"), including provisions to reduce the wasteful, uneconomic, inefficient, and unnecessary consumption of water.
- IUSD 3-4 **Use of Reclaimed Water on All Master Landscaped Areas:** Prior to approval of landscape plans, the Irvine Unified School District (IUSD) shall submit evidence to the satisfaction of the IUSD and the Irvine Ranch Water District (IRWD) that the landscape plans incorporate the use of reclaimed water in all master landscaped areas, including master landscaped commercial, multifamily, common, roadways, and park areas. Master landscapes shall also incorporate weather-based controllers and efficient irrigation system designs to reduce overwatering, combined with the application of a California-friendly landscape palette.
- IUSD 3-5 **Material Recovery:** The Proposed Project incorporates measures to reduce waste generated by Project Site occupants and visitors, and to encourage recycling of solid wastes, utilizing the Orange County Integrated Waste Management Department's material recovery facilities to recycle glass, plastic, cans, junk mail, paper, cardboard, greenwaste (e.g., grass, weeds,

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leaves, branches, yard trimmings, and scrap wood), and scrap metal. Future employees, residents, and customers would participate in these programs.

Impact Threshold Analysis

The following analysis compares the potential GHG emissions associated with implementation of the Proposed Project to the GHG emissions associated with implementation of the 2011 Approved Project, and assesses the significance of the Proposed Project's emissions.

IMPACT 5.3-1: THE PROPOSED PROJECT, LIKE THE 2011APPROVED PROJECT, WOULD NOT GENERATE GHG EMISSIONS, EITHER DIRECTLY OR INDIRECTLY, THAT WOULD HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT. [IMPACT GHG-1]

Impact Analysis:

2011 Approved Project

In accordance with the amendments to the CEQA Guidelines, emissions inventories were compiled to project GHG emissions generated by the 2011 Approved Project and the Proposed Project. The Proposed Project's GHG emissions were compared to the 2011 Approved Project's emissions, which constitute the CEQA baseline. In addition, the significance of the Proposed Project's emissions was assessed using the SCAQMD's draft target efficiency threshold of 4.8 MTCO₂e per service population ("SP") per year, discussed above.

The significance of the GHG emissions resulting from the Proposed Project have been analyzed by using the SCAQMD's draft target efficiency metric threshold for 2020 of 4.8 MT CO₂e per SP per year. This efficiency metric is derived from average reductions in GHG emissions needed in order to be consistent with AB 32. Table 5.3-4, *Proposed Project GHG Emissions Inventories – Total Emissions*, reports the efficiency of the Proposed Project in terms of its GHG emissions for two scenarios: one scenario includes its annual operational emissions only, and the other scenario includes both operational and construction emissions together. For the second scenario, one-time emissions, such as construction emissions, were amortized over 30 years and then combined with annual operational emissions. The estimated service population total for the Proposed Project has been calculated to be 2,600 students.

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Table 5.3-4

Proposed Project GHG Emissions Inventories – Total Emissions

<i>Category</i>	<i>Proposed Project MTCO₂e/Year</i>
Area	<1
Energy	638
Water Use	37
Waste Disposal	157
Traffic	4,499
Total Annual Emissions (without Amortized One-Time Emissions)	5,331
Amortized Construction	80
Total Annual w/Amortized One-Time Emissions	5,411
Service Population	2,600
Emissions Per Service Population (SP)	2.08
Exceeds SCAQMD's Draft Efficiency Threshold	No

¹ Construction emissions associated with the proposed project modeled using CalEEMod, Version 2013.2.

As shown in Table 5.3-4, dividing the total operational GHG emissions for the Proposed Project by the service population results in an efficiency metric of 2.08 MTCO₂e per SP per year. Based on the 4.8 MTCO₂e per SP threshold, this means that the Proposed Project would have a less than significant impact on GHG emissions.

Taking in to account the annualized construction emissions for the Proposed Project, the Proposed Project's annualized construction and operational emissions together yields an efficiency metric for the 2012 Modified Project of 2.08 MTCO₂e per SP per year. These are also both below the SCAQMD's efficiency metric of 4.8 MTCO₂e per SP per year.

Therefore, under both scenarios, the Proposed Project's efficiency metrics are below the SCAQMD's draft threshold, meaning that like the 2011 Approved Project, the Proposed Project would have a less than significant impact on GHG emissions.

Mitigation Program and Net Impact

As demonstrated above, based on SCAQMD's most recent draft target efficiency threshold, the Proposed Project's GHG emissions would result in less than significant impacts looking at either operational emissions alone or construction and operational emissions together. Like the 2011 Approved Project, GHG emissions impacts would remain less than significant and no mitigation measures are introduced here in this DSEIR.

2012 Modified Project

Under the 2012 Modified Project, the Project Site is designated as a 2,600–student high school. The Proposed Project would be compatible with the uses proposed under the 2012 Modified Project. The 2012 SSEIR found the GHG impacts to be less than significant. The traffic analysis conducted for the Proposed Project did not find any substantial differences. Hence, the impact of the high school under the 2012 Modified Project would be less than significant.

Mitigation Program and Net Impact

No mitigation measures are introduced here in this DSEIR as net impacts on GHG would be less than significant.

IMPACT 5.3-2: *LIKE THE 2011 APPROVED PROJECT, THE PROPOSED PROJECT WOULD NOT CONFLICT WITH AN APPLICABLE PLAN, POLICY OR REGULATION ADOPTED FOR THE PURPOSE OF REDUCING GHG EMISSIONS. [IMPACT GHG-2]*

Impact Analysis:

2011 Approved Project

A project would normally have a significant effect on the environment if it would conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. While actions taken in California alone cannot stabilize the climate, the state's actions set an example and help to drive the global progress toward reduction of GHG. If the industrialized world were to follow the emission reduction targets established by California, and industrializing nations reduced emissions according to the lower emissions path (lower emissions IPPC), medium or higher warming ranges of global temperature increases might be avoided, along with the most severe consequences of global warming (IPCC 2007). In 2007, the CEC published *The Role of Land Use in Meeting California's Energy and Climate Change Goals* (CEC 2007). In this publication, the CEC acknowledged that California's land use patterns shape energy use and the production of GHG. Transportation contributes a large percentage of the state's GHG emissions, and research shows that increasing a community or development's density and accessibility to job centers are the two most significant factors for reducing VMT through design (CEC 2007).

In accordance with AB 32, CARB developed the Scoping Plan to outline the state's strategy to achieve 1990 level emissions by year 2020. To estimate the reductions necessary, CARB projected statewide year 2020 BAU GHG emissions (i.e., GHG emissions in the absence of statewide emission reduction measures). CARB identified that the state as a whole would be required to reduce GHG emissions by 28.5 percent from year 2020 BAU. The SCAQMD's most recent draft efficiency threshold for 2020 of 4.8 MT CO₂e per SP per year is derived from average reductions needed to be consistent with AB 32; therefore, this efficiency metric also serves to indicate whether a development project would or would not conflict with AB 32's reduction mandate and the plans, policies and regulations adopted to achieve that reduction. As shown previously in Table 5.3-4, the Proposed Project's annual operational GHG emissions, and its aggregated annualized construction and annual operational emissions result in efficiency metrics that are lower than the SCAQMD's draft efficiency threshold. Accordingly, the Proposed Project would be consistent with plans, policies, and regulations concerning GHG emissions.

Additionally, compliance with the federal and statewide GHG emissions reduction measures that are being implemented over the next 10 years would reduce the Proposed Project's GHG emissions (see PPPs 4-3 through 4-9). The Proposed Project involves the construction and operation of a high school and it is in addition to the project analyzed in the 2011 Approved Project. However, the Proposed Project would result in reduced school trip lengths, as there would be a neighborhood high school, and without which, the students would have to travel to a remote site. The Proposed Project, therefore, would not conflict with any applicable plan, policy or regulation adopted for the purpose of reducing GHG emissions, and

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for this reason the Proposed Project would have a less than significant impact under regarding conflict with a plan, policy or regulation adopted for the purpose of reducing GHG emissions.

Mitigation Program and Net Impact

No mitigation measures are introduced here in this DSEIR as net impacts on GHG plans, policies, and regulations would be less than significant.

2012 Modified Project

Under the 2012 Modified Project, the Project Site is designated as a 2,600–student high school. The Proposed Project would be compatible with the uses proposed under the 2012 Modified Project. The 2012 SSEIR found the GHG impacts to be less than significant. The traffic analysis conducted for the Proposed Project did not find any substantial differences. Hence, the impact of the high school within the 2012 plan is less than significant.

Mitigation Program and Net Impact

No mitigation measures are introduced here in this DSEIR as net impacts on GHG plans, policies, and regulations would be less than significant.

5.3.6 *Level of Significance Before Mitigation*

Upon implementation of regulatory requirements, standard conditions of approval, and PPPs, Impacts 5.3-1 and 5.3-4 would be less than significant.

5.3.7 *Applicable Mitigation Measures from the 2011 Approved Project and 2012 Modified Project*

There are no mitigation measures included in the 2011 Approved Project and the 2012 Modified Project.

5.3.8 *Additional Mitigation Measures for the Proposed Project*

No significant impacts related to GHG emissions have been identified for the Proposed Project, as compared to the 2011 Approved Project, and therefore, no additional mitigation measures have been identified.

5.3.9 *Level of Significance After Additional Mitigation*

The Proposed Project's impacts concerning GHG emissions are less than significant without mitigation.