4.6 GREENHOUSE GAS EMISSIONS

4.6.1 Setting

a. Climate Change and Greenhouse Gases. Climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period of time. The potential effects of climate change are described in more detail below. The term "climate change" is often used interchangeably with the term "global warming," but "climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures. The baseline against which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. The global climate is continuously changing, as evidenced by repeated episodes of substantial warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed acceleration in the rate of warming during the past 150 years. Per the United Nations Intergovernmental Panel on Climate Change (IPCC, 2014), the understanding of anthropogenic warming and cooling influences on climate has led to a high confidence (95 percent or greater chance) that the global average net effect of human activities has been the dominant cause of warming since the mid-20th century (IPCC, 2014).

Gases that absorb and re-emit infrared radiation in the atmosphere are called greenhouse gases (GHGs). The gases that are widely seen as the principal contributors to human-induced climate change include carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

GHGs are emitted by both natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills. Observations of CO_2 concentrations, globally-averaged temperature, and sea level rise are generally well within the range of the extent of the earlier IPCC projections. The recently observed increases in CH_4 and N_2O concentrations are smaller than those assumed in the scenarios in the previous assessments. Each IPCC assessment has used new projections of future climate change that have become more detailed as the models have become more advanced.

Man-made GHGs, many of which have greater heat-absorption potential than CO_2, include fluorinated gases and sulfur hexafluoride (SF_6) (California Environmental Protection Agency [CalEPA], 2006). Different types of GHGs have varying global warming potentials (GWPs). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common

reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emissions, referred to as "carbon dioxide equivalent" (CO_2e), and is the amount of a GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane CH_4 has a GWP of 25, meaning its global warming effect is 25 times greater than carbon dioxide on a molecule per molecule basis (IPCC, 2007).

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without the natural heat trapping effect of GHGs, Earth's surface would be about 34° C cooler (CalEPA, 2015). However, it is believed that emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. The following discusses the primary GHGs of concern.

Carbon Dioxide. The global carbon cycle is made up of large carbon flows and reservoirs. Billions of tons of carbon in the form of CO_2 are absorbed by oceans and living biomass (i.e., sinks) and are emitted to the atmosphere annually through natural processes (i.e., sources). When in equilibrium, carbon fluxes among these various reservoirs are roughly balanced (United States Environmental Protection Agency [U.S. EPA], 2014). CO_2 was the first GHG demonstrated to be increasing in atmospheric concentration, with the first conclusive measurements being made in the second half of the 20th century. Concentrations of CO_2 in the atmosphere have risen approximately 40 percent since the industrial revolution. The global atmospheric concentration of CO_2 has increased from a pre-industrial value of about 280 parts per million (ppm) to 391 ppm in 2011 (IPCC, 2007; Oceanic and Atmospheric Administration [NOAA], 2010). The average annual CO_2 concentration growth rate was larger between 1995 and 2005 (average: 1.9 ppm per year) than it has been since the beginning of continuous direct atmospheric measurements (1960–2005 average: 1.4 ppm per year), although there is year-to-year variability in growth rates (NOAA, 2010). Currently, CO_2 represents an estimated 74 percent of total GHG emissions (IPCC, 2007). The largest source of CO_2 emissions, and of overall GHG emissions, is fossil fuel combustion.

Methane. Methane (CH_4) is an effective absorber of radiation, though its atmospheric concentration is less than that of CO_2 and its lifetime in the atmosphere is limited to 10 to 12 years. It has a GWP approximately 25 times that of CO_2. Over the last 250 years, the concentration of CH_4 in the atmosphere has increased by 148 percent (IPCC, 2007), although emissions have declined from 1990 levels. Anthropogenic sources of CH_4 include enteric fermentation associated with domestic livestock, landfills, natural gas and petroleum systems, agricultural activities, coal mining, wastewater treatment, stationary and mobile combustion, and certain industrial processes (U.S. EPA, 2014).

Nitrous Oxide. Concentrations of nitrous oxide (N_2O) began to rise at the beginning of the industrial revolution and continue to increase at a relatively uniform growth rate (NOAA, 2010). N_2O is produced by microbial processes in soil and water, including those reactions that occur in fertilizers that contain nitrogen, fossil fuel combustion, and other chemical processes. Use of these fertilizers has increased over the last century. Agricultural soil management and mobile source fossil fuel combustion are the major sources of N_2O emissions. The GWP of nitrous oxide is approximately 298 times that of CO_2 (IPCC, 2007).

Fluorinated Gases (HFCS, PFCS and SF_6). Fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfurhexafluoride (SF_6), are powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are used as substitutes for ozone-depleting substances such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and halons, which have been regulated since the mid-1980s because of their ozone-destroying potential and are phased out under the Montreal Protocol (1987) and Clean Air Act Amendments of 1990. Electrical transmission and distribution systems account for most SF_6 emissions, while PFC emissions result from semiconductor manufacturing and as a by-product of primary aluminum production. Fluorinated gases are typically emitted in smaller quantities than CO_2, CH_4, and N_2O, but these compounds have much higher GWPs. SF_6 is the most potent GHG the IPCC has evaluated.

Greenhouse Gas Emissions Inventory. Worldwide anthropogenic emissions of GHGs were approximately 46,000 million metric tons (MMT, or gigatonne) CO_2e in 2010 (IPCC, 2014). CO_2 emissions from fossil fuel combustion and industrial processes contributed about 65 percent of total emissions in 2010. Of anthropogenic GHGs, carbon dioxide was the most abundant accounting for 76 percent of total 2010 emissions. Methane emissions accounted for 16 percent of the 2010 total, while nitrous oxide and fluorinated gases account for 6 and 2 percent respectively (IPCC, 2014).

Total U.S. GHG emissions were 6,870.5 MMT CO_2e in 2014 (U.S. EPA, 2016). Total U.S. emissions have increased by 7.4 percent since 1990; emissions increased by 1.0 percent from 2013 to 2014 (U.S. EPA, 2016). The increase from 2013 to 2014 was due to relatively cool winter conditions, which led to an increase in fuels consumed for heating and cooling for the residential and commercial sectors. Additionally, transportation emissions increased as a result of a small increase in vehicle miles traveled (VMT) and fuel use across on-road transportation modes. There also was an increase in industrial production across multiple sectors resulting in slight increases in industrial sector emissions (U.S. EPA, 2016). Since 1990, U.S. emissions have increased at an average annual rate of 0.3 percent. In 2014, the industrial and transportation end-use sectors accounted for 29.2 percent and 26.4 percent of CO_2 emissions (with electricity-related emissions distributed), respectively. Meanwhile, the residential and commercial end-use sectors accounted for 16.6 percent and 17.1 percent of CO_2 emissions, respectively (U.S. EPA, 2016).

Based upon the California Air Resources Board (ARB) California Greenhouse Gas Inventory for 2000-2014, California produced 441.5 MMT CO_2E in 2014 (ARB, 2016). The major source of GHG in California is transportation, contributing 37 percent of the State's total GHG emissions. Industrial sources are the second largest source of the State's GHG emissions, contributing 24 percent of the State's GHG emissions (ARB, 2016). California emissions are due in part to its large size and large population compared to other states. However, a factor that reduces California's per capita fuel use and GHG emissions, as compared to other states, is its relatively mild climate. ARB has projected statewide unregulated GHG emissions for the year 2020 will be 509.4 MMT CO_2e (ARB, 2016). These projections represent the emissions that would be expected to occur in the absence of any GHG reduction actions.

In 2009, the City of San Luis Obispo published the *Community and Municipal Operations Baseline Greenhouse Gas Emissions Inventory.* Using 2005 emissions from community-wide activities

within the City's jurisdictional boundary, including municipal government operations, the inventory identifies the major sources of GHG emissions within the City and provides a baseline for the climate action planning process. The City's community-wide emissions in 2005 came to a total of 264,240 $MTCO_2e$ (City of San Luis Obispo, 2009). The major source of GHG emissions in the community were from transportation (50 percent). Other sources identified include commercial and industrial operations (21.9 percent), residential operations (21 percent), and solid waste (7.1 percent) (City of San Luis Obispo, 2009).

Potential Effects of Climate Change. Globally, climate change has the potential to affect numerous environmental resources through potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. According to the CalEPA's *2010 Climate Action Team Biennial Report*, potential impacts of climate change in California may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CalEPA, 2010). A summary of some of the potential effects that could be experienced in California as a result of climate change is provided below.

Long-term trends have found that each of the past three decades has been warmer than all the previous decades in the instrumental record, and the decade from 2000 through 2010 has been the warmest. The global combined land and ocean temperature data show an increase of about 0.89°C (0.69°C–1.08°C) over the period 1901–2012 and about 0.72°C (0.49°C–0.89°C) over the period 1951–2012 when described by a linear trend. Several independently analyzed data records of global and regional Land-Surface Air Temperature (LSAT) obtained from station observations are in agreement that LSAT as well as sea surface temperatures have increased. In addition to these findings, there are identifiable signs that global warming is currently taking place, including substantial ice loss in the Arctic over the past two decades (IPCC, 2014).

Air Quality. Higher temperatures, which are conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thereby ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state (California Energy Commission [CEC], 2009).

Water Supply. Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. Uncertainty remains with respect to the overall impact of climate change on future water supplies in California. However, the average early spring snowpack in the Sierra Nevada decreased by about 10 percent during the last century, a loss of 1.5 million acre-feet of snowpack storage. During the same period, sea level rose eight inches along California's coast.

California's temperature has risen 1°F, mostly at night and during the winter, with higher elevations experiencing the highest increase. Many Southern California cities have experienced their lowest recorded annual precipitation twice within the past decade. In a span of only two years, Los Angeles experienced both its driest and wettest years on record (California Department of Water Resources [DWR], 2008; CCCC, 2009).

This uncertainty complicates the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood. The Sierra snowpack provides the majority of California's water supply by accumulating snow during the state's wet winters and releasing it slowly during the state's dry springs and summers. Based upon historical data and modeling DWR projects that the Sierra snowpack will experience a 25 to 40 percent reduction from its historic average by 2050. Climate change is also anticipated to bring warmer storms that result in less snowfall at lower elevations, reducing the total snowpack (DWR, 2008).

Hydrology and Sea Level Rise. As discussed above, climate change could potentially affect: the amount of snowfall, rainfall, and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. According to The Impacts of Sea-Level Rise on the California Coast, prepared by the California Climate Change Center (CCCC) (CCCC, 2009), climate change has the potential to induce substantial sea level rise in the coming century. The rising sea level increases the likelihood and risk of flooding. The rate of increase of global mean sea levels over the 2001-2010 decade, as observed by satellites, ocean buoys and land gauges, was approximately 3.2 mm per year, which is double the observed 20th century trend of 1.6 mm per year (World Meteorological Organization [WMO], 2013). As a result, sea levels averaged over the last decade were about 8 inches higher than those of 1880 (WMO, 2013). Sea levels are rising faster now than in the previous two millennia, and the rise is expected to accelerate, even with robust GHG emission control measures. The most recent IPCC report (2013) predicts a mean sea–level rise of 11-38 inches by 2100. This prediction is more than 50 percent higher than earlier projections of 7-23 inches, when comparing the same emissions scenarios and time periods. A rise in sea levels could result in coastal flooding and erosion and could jeopardize California's water supply due to salt water intrusion. In addition, *i*ncreased CO_2 emissions can cause oceans to acidify due to the carbonic acid it forms. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

Agriculture. California has a $30 billion annual agricultural industry that produces half of the country's fruits and vegetables. Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase; crop-yield could be threatened by a less reliable water supply; and greater air pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality (CCCC, 2006).

Ecosystems and Wildlife. Climate change and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. Increasing concentrations of

GHGs are likely to accelerate the rate of climate change. Scientists project that the average global surface temperature could rise by 1.0-4.5°F (0.6-2.5°C) in the next 50 years, and 2.2-10°F (1.4-5.8°C) in the next century, with substantial regional variation. Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Rising temperatures could have four major impacts on plants and animals: (1) timing of ecological events; (2) geographic range; (3) species' composition within communities; and (4) ecosystem processes, such as carbon cycling and storage (Parmesan, 2006). In summary, climate change could result in destabilization of the existing distribution of habitat, plants, and animals, potentially resulting in adverse effects to such resources.

b. Regulatory Setting. The following regulations address both climate change and GHG emissions.

International Regulations. The United States is, and has been, a participant in the United Nations Framework Convention on Climate Change (UNFCCC) since it was produced in 1992. The UNFCCC is an international environmental treaty with the objective of, "stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." This is generally understood to be achieved by stabilizing global GHG concentrations between 350 and 400 ppm, in order to limit the global average temperature increases between 2 and 2.4°C above pre-industrial levels (IPCC, 2007). The UNFCCC itself does not set limits on GHG emissions for individual countries or enforcement mechanisms. Instead, the treaty provides for updates, called "protocols," that would identify mandatory emissions limits.

Five years later, the UNFCCC brought nations together again to draft the *Kyoto Protocol* (1997). The Kyoto Protocol established commitments for industrialized nations to reduce their collective emissions of six GHGs (CO_2, CH_4, N_2O, SF_6, HFCs, and PFCs) to 5.2 percent below 1990 levels by 2012. The United States is a signatory of the Kyoto Protocol, but Congress has not ratified it and the United States has not bound itself to the Protocol's commitments (UNFCCC, 2007). The first commitment period of the Kyoto Protocol ended in 2012. Governments, including 38 industrialized countries, agreed to a second commitment period of the Kyoto Protocol beginning January 1, 2013 and ending either on December 31, 2017 or December 31, 2020, to be decided by the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its seventeenth session (UNFCCC, 2011).

In Durban (17th session of the Conference of the Parties in Durban, South Africa, 2011), governments decided to adopt a universal legal agreement on climate change. Work began on that task immediately under a new group called the Ad Hoc Working Group on the Durban Platform for Enhanced Action. Progress was also made regarding the creation of a Green Climate Fund (GCF) for which a management framework was adopted (UNFCCC, 2011; United Nations, 2011).

In December 2015, the 21st session of the Conference of the Parties (COP21) adopted the Paris Agreement. The deal requires all countries that ratify it to commit to cutting greenhouse gas emissions, with the goal of peaking greenhouse gas emissions "as soon as possible" (Worland, 2015). The agreement includes commitments to (1) achieve a balance between sources and sinks

of greenhouse gases in the second half of this century; (2) to keep global temperature increase "well below" 2 degrees Celsius (C) or 3.6 degrees Fahrenheit (F) and to pursue efforts to limit it to 1.5 C; (3) to review progress every five years; and (4) to spend $100 billion a year in climate finance for developing countries by 2020 (UNFCCC, 2015). The agreement includes both legally binding measures, like reporting requirements, as well as voluntary or non-binding measures while, such as the setting of emissions targets for any individual country (Worland, 2015).

Federal Regulations. The United States Supreme Court in *Massachusetts et al. v. Environmental Protection Agency et al.* ([2007] 549 U.S. 05-1120) held that the U.S. EPA has the authority to regulate motor-vehicle GHG emissions under the federal Clean Air Act.

The U.S. EPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and vehicle engines, and requires annual reporting of emissions. The first annual reports for these sources were due in March 2011.

On May 13, 2010, the U.S. EPA issued a Final Rule that took effect on January 2, 2011, setting a threshold of 75,000 tons CO_2e per year for GHG emissions. New and existing industrial facilities that meet or exceed that threshold will require a permit after that date. On November 10, 2010, the U.S. EPA published the "PSD and Title V Permitting Guidance for Greenhouse Gases." The U.S. EPA's guidance document is directed at state agencies responsible for air pollution permits under the Federal Clean Air Act to help them understand how to implement GHG reduction requirements while mitigating costs for industry. It is expected that most states will use the U.S. EPA's new guidelines when processing new air pollution permits for power plants, oil refineries, cement manufacturing, and other large pollution point sources.

On January 2, 2011, the U.S. EPA implemented the first phase of the Tailoring Rule for GHG emissions Title V Permitting. Under the first phase of the Tailoring Rule, all new sources of emissions are subject to GHG Title V permitting if they are otherwise subject to Title V for another air pollutant and they emit at least 75,000 tons CO_2e per year. Under Phase 1, no sources were required to obtain a Title V permit solely due to GHG emissions. Phase 2 of the Tailoring Rule went into effect July 1, 2011. At that time new sources were subject to GHG Title V permitting if the source emits 100,000 tons CO_2e per year, or they are otherwise subject to Title V permitting for another pollutant and emit at least 75,000 tons CO_2e per year.

On July 3, 2012 the U.S. EPA issued the final rule that retains the GHG permitting thresholds that were established in Phases 1 and 2 of the GHG Tailoring Rule. These emission thresholds determine when Clean Air Act permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

California Regulations. California Air Resources Board (ARB) is responsible for the coordination and oversight of State and local air pollution control programs in California. California has a numerous regulations aimed at reducing the state's GHG emissions. These initiatives are summarized below.

Assembly Bill (AB) 1493 (2002), California's Advanced Clean Cars program (referred to as "Pavley"), requires ARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, U.S. EPA granted the waiver of Clean Air Act preemption to California for its greenhouse gas emission standards for motor vehicles beginning with the 2009 model year. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG" will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction from 2009 levels by 2012 and 30 percent by 2016. The Advanced Clean Cars program coordinates the goals of the Low Emissions Vehicles (LEV), Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs and would provide major reductions in GHG emissions. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions from their model year 2016 levels (ARB, 2011).

In 2005, the governor issued Executive Order (EO) S-3-05, establishing statewide GHG emissions reduction targets. EO S-3-05 provides that by 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80 percent below 1990 levels (CalEPA, 2006). In response to EO S-3-05, CalEPA created the Climate Action Team (CAT), which in March 2006 published the Climate Action Team Report (the "2006 CAT Report") (CalEPA, 2006). The 2006 CAT Report identified a recommended list of strategies that the state could pursue to reduce GHG emissions. These are strategies that could be implemented by various state agencies to ensure that the emission reduction targets in EO S-3-05 are met and can be met with existing authority of the state agencies. The strategies include the reduction of passenger and light duty truck emissions, the reduction of idling times for diesel trucks, an overhaul of shipping technology/infrastructure, increased use of alternative fuels, increased recycling, and landfill methane capture, etc. In April 2015 the governor issued EO B-30-15, calling for a new target of 40 percent below 1990 levels by 2030.

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "California Global Warming Solutions Act of 2006," signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 (essentially a 15 percent reduction below 2005 emission levels; the same requirement as under S-3-05), and requires ARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires ARB to adopt regulations to require reporting and verification of statewide GHG emissions. California is on track to meet or exceed the current target of reducing GHG emissions to 1990 levels by 2020, as established in AB 32. California's new emissions reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the ultimate goal of reducing emissions 80 percent under 1990 levels by 2050. This is in line with the scientifically established levels needed in the U.S. to limit global warming below 2 degrees Celsius - the warming threshold at which scientists say there will likely be major climate disruptions such as super droughts and rising sea levels.

After completing a comprehensive review and update process, ARB approved a 1990 statewide GHG level and 2020 limit of 427 MMT CO_2e. The Scoping Plan was approved by ARB on December 11, 2008, and included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures.

Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted over the last five years. Implementation activities are ongoing and ARB is currently the process of updating the Scoping Plan.

In May 2014, ARB approved the first update to the AB 32 Scoping Plan. The 2013 Scoping Plan update defines ARB's climate change priorities for the next five years and sets the groundwork to reach post-2020 goals set forth in EO S-3-05. The update highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluates how to align the State's longer-term GHG reduction strategies with other State policy priorities, such as for water, waste, natural resources, clean energy and transportation, and land use (ARB, 2014).

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in California Environmental Quality Act (CEQA) documents. In March 2010, the California Resources Agency (Resources Agency) adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts.

ARB Resolution 07-54 establishes 25,000 MT of GHG emissions as the threshold for identifying the largest stationary emission sources in California for purposes of requiring the annual reporting of emissions. This threshold is just over 0.005 percent of California's total inventory of GHG emissions for 2004.

Senate Bill (SB) 375, signed in August 2008, enhances the state's ability to reach AB 32 goals by directing ARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles for 2020 and 2035. In addition, SB 375 directs each of the state's 18 major Metropolitan Planning Organizations (MPO) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). On September 23, 2010, ARB adopted final regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035. The San Luis Obispo Council of Governments (SLOCOG) was assigned targets of an 8 percent reduction in GHGs from transportation sources by 2020 and an 8 percent reduction in GHGs from transportation sources by 2035. When implemented, the plans in SLOCOG's 2014-2035 RTP/SCS are expected to meet and exceed those targets, achieving a 9.4 percent per capita reduction by 2020, and a 10.9 percent per capita reduction by 2035.

Executive Order S-13-08 indicates that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the order, the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2009) was adopted, which is the "...first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." 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.

In April 2011, the governor signed SB 2X requiring California to generate 33 percent of its electricity from renewable energy by 2020.

On September 8, 2016, the governor signed Senate Bill 32 (SB 32) into law, which requires the State to further reduce GHGs to 40 percent below 1990 levels by 2030. SB 32 is an extension of AB 32. The other provisions of AB 32 remain unchanged. ARB is currently working to update the Scoping Plan to provide a framework for achieving the 2030 target. The updated Scoping Plan is expected to be completed and adopted by ARB in 2016 (ARB 2015).

For more information on the Senate and Assembly Bills, Executive Orders, and reports discussed above, and to view reports and research referenced above, please refer to the following websites: www.climatechange.ca.gov and www.arb.ca.gov/cc/cc.htm.

California Environmental Quality Act. Pursuant to the requirements of SB 97, the Resources Agency has adopted amendments to the *State CEQA Guidelines* for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted *CEQA Guidelines* provide general regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts. To date, a variety of air districts have adopted quantitative significance thresholds for GHGs.

Local Regulations.

City of San Luis Obispo Climate Action Plan. In 2012, the City of San Luis Obispo adopted its Climate Action Plan for reducing greenhouse gas emissions. The plan identifies strategies to guide the development and implementation of GHG reduction measures in the City of San Luis Obispo and quantifies the emissions reductions that result from these strategies. In addition to addressing strategies to reduce GHG emissions, the Climate Action Plan includes adaptation measures to improve the City's ability to address the potential impacts that climate change may have on the City and its residents. The Climate Action Plan enables the City to maintain local control of implementing state direction (AB 32 – the California Global Warming Solutions Act) to reduce GHG emissions to 1990 levels by 2020. GHG reduction strategies align with existing General Plan policies, and adoption of a Climate Action Plan is an Other Important Objective in the City's 2011-13 Financial Plan. Having an adopted Climate Action Plan also allows the City to streamline the CEQA review process of certain development projects.

City of San Luis Obispo General Plan. The City also addresses GHG emissions through adopted General Plan policies and programs. The policies are found in the Land Use Element, the Circulation Element, and the Conservation and Open Space Element.

The following Land Use Element policies define the local regulatory setting related to GHG emissions and climate change:

Policy 1.1.1. Growth Management Objectives. *The City shall manage its growth so that:*

A. The natural environment and air quality will be protected.

Policy 1.5. Jobs/Housing Relationship. *The gap between housing demand (due to more jobs and college enrollment) and supply should not increase.*

Policy 1.7.1 Open Space Protection. *Within the City's planning area and outside the urban reserve line, undeveloped land should be kept open. Prime agricultural land, productive agricultural land, and potentially productive agricultural land should be protected for farming. Scenic lands, sensitive wildlife habitat, and undeveloped prime agricultural land should be permanently protected as open space.*

Policy 2.2.4. Neighborhood Connections. *The City shall provide all areas with a pattern of streets, pedestrian network, and bicycle facilities that promote neighborhood and community cohesiveness. There should be continuous sidewalks or paths of adequate width, connecting neighborhoods with each other and with public and commercial services and public open space to provide continuous pedestrian paths throughout the city. Connectivity to nearby community facilities (such as parks and schools), open space, and supporting commercial areas shall also be enhanced, but shall not be done in a method that would increase cut-through traffic. (See also the Circulation Element.)*

Policy 2.2.6. Neighborhood Characteristics. *The City shall promote livability, quiet enjoyment, and safety for all residents. Characteristics of quality neighborhoods vary from neighborhood to neighborhood, but often include one or more of the following characteristics:*

- *A mix of housing type styles, density, and affordability.*
- *Design and circulation features that create and maintain a pedestrian scale.*
- *Nearby services and facilities including schools, parks, retail (e.g., grocery store, drug store), restaurants and cafes, and community centers or other public facilities.*
- *A tree canopy and well-maintained landscaping.*
- *A sense of personal safety (e.g., low crime rate, short police and emergency response times).*
- *Convenient access to public transportation.*
- *Well-maintained housing and public facilities.*

Policy 2.3.9. Compatible Development. *The City shall require that new housing built within an existing neighborhood be sited and designed to be compatible with the character of the neighborhood. Compatibility for all development shall be evaluated using the following criteria:*

F. Privacy and Solar Access New buildings will respect the privacy and solar access of neighboring buildings and outdoor areas, particularly where multistory buildings or additions may overlook backyards of adjacent dwellings. (See also the City's Conservation and Open Space Element.)

Policy 2.9. Reduced Automobile Dependence in Downtown. *The City shall encourage the development of Downtown housing that minimizes the need for automobile use and minimizes the storage of vehicles in surrounding neighborhoods.*

The following Circulation Element policies define the local regulatory setting related to GHG emissions and climate change:

> ***Policy 4.1.1. Bicycle Use.*** *The City shall expand the bicycle network and provide end-of-trip facilities to encourage bicycle use and to make bicycling safe, convenient and enjoyable.*
>
> ***Policy 4.1.3. Continuous Network.*** *The City shall collaborate with SLO County to coordinate planning and development of county bikeways to support a regional bike network and identify and acquire additional rights of way in the City as they become available.*
>
> ***Policy 4.1.4. New Development.*** *The City shall require that new development provide bikeways, secure bicycle storage, parking facilities and showers consistent with City plans and development standards. When evaluating transportation impacts, the City shall use a Multimodal Level of Service analysis.*
>
> ***Policy 6.1.1. Complete Streets.*** *The City shall design and operate city streets to enable safe, comfortable, and convenient access and travel for users of all abilities including pedestrians, bicyclists, transit users, and motorists.*

The following Conservation and Open Space Element policies define the local regulatory setting related to GHG emissions and climate change:

> ***Policy 4.3.1. Use of best available practices.*** *The City will employ the best available practices in energy conservation, procurement, use and production, and will encourage individuals, organizations and other agencies to do likewise. "Best available practices" means behavior and technologies that reflect recommendations of specialists and that use the least energy for a desired outcome, considering available equipment, life-cycle costs, social and environmental side effects, and the regulations of other agencies. Best available practices include use of sustainable sources. Sustainable sources are naturally renewed in a relatively short time and avoid substantial undesirable side effects.*
>
> ***Policy 4.3.4. Use of energy efficient, renewable energy sources.*** *The City will promote the use of cost effective, renewable, non-depleting energy sources wherever possible, both in new construction projects and in existing buildings and facilities.*
>
> ***Policy 4.3.6. Energy efficiency and Green Building in new development.*** *The City shall encourage energy-efficient "green buildings" as certified by the U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) Program or equivalent certification, as further described in Chapter 5.5.7.*
>
> ***Policy 4.4.3. Compact, high-density housing.*** *The City will promote higher-density, compact housing to achieve more efficient use of public facilities and services, land resources, and to improve the jobs/housing balance.*
>
> ***Goal 4.4.4. Solar access.*** *Encourage the provision for and protection of solar access.*

4.6.2 Previous Program-Level Environmental Review

The 2014 Land Use and Circulation Elements Update EIR (LUCE Update EIR) analyzed GHG impacts for the City of San Luis Obispo related to the adoption of the updated General Plan

Land Use and Circulation Elements. The LUCE Update EIR determined that project-level and cumulative impacts would be less than significant because the Land Use and Circulation Element updates included policies that would be consistent with the City's Climate Action Plan and would minimize cumulative GHG emissions resulting from buildout of the City.

4.6.3 Impact Analysis

a. Methodology and Significance Thresholds. Based on Appendix G of the *State CEQA Guidelines*, impacts related to GHG emissions from the project would be significant if the project would:

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

The vast majority of individual projects do not generate sufficient GHG emissions to directly influence climate change. However, physical changes caused by a project can contribute incrementally to cumulative effects that are significant, even if individual changes resulting from a project are limited. The issue of climate change typically involves an analysis of whether a project's contribution towards an impact would be cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (*State CEQA Guidelines*, Section 15355).

City of San Luis Obispo Climate Action Plan. For future projects, the significance of GHG emissions may be evaluated based on locally adopted quantitative thresholds, or consistency with a regional GHG reduction plan, such as the City's Climate Action Plan. The Climate Action Plan, adopted in 2012, serves as the City's qualified GHG reduction plan, because it contains the following required plan elements:

- Community-wide GHG emissions inventory and "business-as-usual" forecast of 2020 community-wide GHG emissions;
- GHG reduction targets consistent with AB 32 (i.e. a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable);
- Analysis of local and state policies and actions that may impact GHG emissions within the jurisdiction;
- Quantification of GHG reduction measures demonstrating that, if implemented, the GHG reduction targets will be met;
- Implementation and monitoring strategy and timeline; and
- Adequate environmental review of the Climate Action Plan.

Incorporation of these plan elements allows the Climate Action Plan to be used in the cumulative impacts analysis of later projects. As described in the Climate Action Plan, to analyze a project's consistency with the Climate Action Plan, "the environmental document for each project must identify those requirements specified in the Climate Action Plan that apply to

the project, and if those requirements are not otherwise binding or enforceable, should be incorporated as mitigation measures applicable to the project" (*State CEQA Guidelines*, Section 15183.5b). The City is in the process of developing a mitigation matrix for projects that exceed specified GHG thresholds. The matrix will include quantifiable Climate Action Plan reduction measures consistent with SB 97 direction. For this analysis, the project's consistency with the Climate Action Plan is analyzed qualitatively against the applicable implementation strategies contained in the Climate Action Plan.

SLOAPCD CEQA Thresholds. The City of San Luis Obispo has not adopted GHG emissions thresholds for use in CEQA documents. In March 2012, the SLOAPCD adopted CEQA thresholds for GHG emissions. Based on the adopted SLOAPCD guidance, the following three quantitative thresholds may be used to evaluate the level of significance of GHG emissions impacts for residential and commercial projects:

1. *Qualified GHG Reductions Strategies. A project would have a significant impact if it is not consistent with a qualified GHG reduction strategy that meets the requirements of the State CEQA Guidelines. If a project is consistent with a qualified GHG reduction strategy, it would not have a significant impact; OR,*
2. *Bright-Line Threshold. A project would have a significant impact if it exceeds the "bright-line threshold" of 1,150 metric tons CO_2E/year; OR,*
3. *Efficiency Threshold. A project would have a significant impact if the efficiency threshold exceeds 4.9 metric tons of CO_2E/service population/year. The service population is defined as the number of residents plus employees for a given project.*

The efficiency threshold is specifically intended to avoid penalizing large-scale plans or projects that incorporate emissions-reducing features and/or that are located in a manner that results in relatively low vehicle miles traveled. The City of San Luis Obispo Climate Action Plan, adopted in 2012, serves as the City's qualified GHG reduction plan. Therefore, the project's contribution to cumulative GHG impacts would be cumulatively considerable if it is inconsistent with the Climate Action Plan. For informational purposes, the project's GHG emissions per service population are also quantified.

Methodology. Calculations of CO_2, CH_4, and N_2O emissions are provided to identify the magnitude of potential project effects. The analysis focuses on CO_2, CH_4, and N_2O because these make up 98.9 percent of all GHG emissions by volume (IPCC, 2007) and are the GHG emissions that the project would emit in the largest quantities. Fluorinated gases, such as HFCs, PFCs, CFCs, and SF_6, which are primarily associated with industrial processes, were also considered for the analysis. However, because the project is a residential/commercial development, the quantity of fluorinated gases would not be significant. Emissions of all GHGs are converted into their equivalent GWP in terms of CO_2 (CO_2e). Calculations are based on the methodologies discussed in the California Air Pollution Control Officers Association (CAPCOA) *CEQA and Climate Change* white paper (January 2008) and included the use of the California Climate Action Registry (CCAR) General Reporting Protocol (January 2009).

GHG emissions associated with the project were calculated using the California Emissions Estimator Model (CalEEMod) version 2016.3.1 (see Appendix D for calculations).

Operational Emissions. CalEEMod provides operational emissions of CO_2, N_2O, and CH_4. Emissions from energy use include electricity and natural gas use. The emissions factors for natural gas combustion are based on EPA's AP-42 (*Compilation of Air Pollutant Emissions Factors*) and CCAR. Electricity emissions are calculated by multiplying the energy use times the carbon intensity of the utility district per kilowatt hour (CalEEMod User Guide, 2016). The default electricity consumption values in CalEEMod include the CEC-sponsored California Commercial End Use Survey (CEUS) and Residential Appliance Saturation Survey (RASS) studies.

Emissions associated with area sources, including consumer products, landscape maintenance, and architectural coating were calculated in CalEEMod and utilize standard emission rates from ARB, U.S. EPA, and emission factor values provided by the local air district (CalEEMod User Guide, 2016).

Emissions from waste generation were also calculated in CalEEMod and are based on the IPCC's methods for quantifying GHG emissions from solid waste using the degradable organic content of waste (CalEEMod User Guide, 2016). Waste disposal rates by land use and overall composition of municipal solid waste in California was primarily based on data provided by the California Department of Resources Recycling and Recovery (CalRecycle).

Emissions from water and wastewater usage calculated in CalEEMod were based on the default electricity intensity from the CEC's 2006 Refining Estimates of Water-Related Energy Use in California using the average values for Northern and Southern California.

For mobile sources, CO_2 and CH_4 emissions were quantified in CalEEMod. Because CalEEMod does not calculate N_2O emissions from mobile sources, N_2O emissions were quantified using the California Climate Action Registry General Reporting Protocol (January 2009) direct emissions factors for mobile combustion (see Appendix D for calculations). Estimates of vehicle trips associated with the proposed development are based on peak hour trip generation rates from the project Traffic Impact Study (refer to Section 4.12, *Transportation/Traffic* and Appendix L). The trip generation rates in the TIS are based on the Institute of Transportation Engineers 9th Edition *Trip Generation Manual*, and also account for reductions expected from the mixed use and pedestrian-oriented characteristics of the project (see Appendix L), including internal capture and pass-by trips. The estimate of total daily trips associated with the proposed project was based on the standard Institute of Transportation Engineers (ITE) vehicle trip rates and was calculated and extrapolated to derive total annual mileage in CalEEMod. Emission rates for N_2O emissions were based on the vehicle mix output generated by CalEEMod and the emission factors found in the California Climate Action Registry General Reporting Protocol.

Construction Emissions. Although construction activity is addressed in this analysis, CAPCOA does not discuss whether any of the suggested threshold approaches adequately address impacts from temporary construction activity. As stated in the *CEQA and Climate Change* white paper, "more study is needed to make this assessment or to develop separate thresholds for construction activity" (CAPCOA, 2008). Nevertheless, air districts such as the SLOAPCD (2012) have recommended amortizing construction-related emissions over the life of the project; SLOAPCD suggests the life of a project is typically 50 years for residential projects and 25 years for commercial projects. The project includes both commercial and residential uses; therefore, to

provide a conservative estimate of construction emissions, emissions were amortized over the shorter lifetime duration of 25 years.

Construction of the project would generate temporary GHG emissions primarily as a result of operation of construction equipment on-site, as well as from vehicles transporting construction workers to and from the project site and heavy trucks to export earth materials offsite. Site preparation and grading typically generate the greatest amount of emissions due to the use of grading equipment and soil hauling. Re-grading of the project site would require approximately 248,000 cubic yards (cy) of import. Off-site hauling of import materials was included in the emissions modeling. This analysis assumes that soil would be imported to the site during each phase and, as exact import volumes per phase are unknown, total import was divided between phases proportionally by phase acreage. CalEEMod provides an estimate of emissions associated with the construction period, based on parameters such as the duration of construction activity, area of disturbance, and anticipated equipment use during construction.

Service Population. The service population is defined as the number of residents plus employees for a given project. Development of the project would add an estimated 1,293 residents to the City (546 new single family and multi-family dwelling units x 2.29 people/unit and 34 new affordable units x 1.25 people/unit).[1] In addition, based on employment generation rates for retail, hotel, and office uses from the SLOAPCD's *CEQA Air Quality Handbook* (SLOAPCD 2012), the project would result in a net increase of approximately 842 new employees.[2] Therefore, the total service population would be 2,135 persons.

b. Project Impacts and Mitigation Measures.

Threshold 1:	*Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*
Threshold 2:	*Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

Impact GHG-1 **The San Luis Ranch Specific Plan is consistent with the City's Climate Action Plan. This impact would be Class III, *less than significant.***

As described in Section 4.6.3(a), the project's GHG emissions per service population are quantified to provide an estimate of the scale of future GHG emissions. In addition to this quantitative analysis, the project's consistency with the Climate Action Plan is evaluated below.

[1] Persons per household from City's Land Use and Circulation Element Appendix I Water Supply Assessment (page 9), as referred to in SB610 Water Supply Assessment – San Luis Ranch prepared by Cannon (2016; Appendix M).
[2] Based on the following rates: 0.64 employees per 1,000 square feet for proposed 200 room hotel (290,400 square feet from CalEEMod results, see Appendix D); 2.52 employees per 1,000 square feet for proposed 150,000 square feet of office space; and 1.39 employees per 1,000 square feet for proposed 200,000 square feet regional retail (SLOAPCD 2012).

GHG Emissions Estimate.

Construction Emissions. Construction of the project would generate temporary GHG emissions, primarily resulting from the operation of construction equipment and on- and off-site truck trips, including soil hauling trips. Site preparation and grading typically generate the greatest amount of GHG emissions due to the use of grading equipment and other large diesel-powered construction equipment. Total and annualized construction emissions are shown in Table 4.6-1.

Table 4.6-1
Estimated Construction Emissions of GHGs

Source	Annual Emissions
Total Estimated Construction Emissions	**6,073 metric tons CO_2e**
Amortized over 25 years	243 metric tons CO_2e per year

See Appendix D for CalEEMod results.

As shown in Table 4.6-1, construction activity associated with the project would generate an estimated 6,073 MT of CO_2e. SLOAPCD has recommended amortizing construction-related emissions over the life of a project. Over this lifetime for the project (conservatively assumed to be 25 years), the construction emissions would amount to 243 MT of CO_2e per year.

Combined Annual Construction, Operational, and Mobile GHG Emissions. The project's operational emissions from energy use (electricity and natural gas use) were estimated using CalEEMod. Table 4.6-2 combines the construction and operational GHG emissions associated with development for the project. As shown in Table 4.6-2, the combined annual emissions from the project would total approximately ~~10,801~~ 10,839 MT per year of CO_2e or 5.1 MT CO_2e/SP/year.

Table 4.6-2
Combined Annual Emissions of GHGs

Emission Source	Annual Emissions
Construction	243 metric tons CO_2e
Operational	
Area	13 metric tons CO_2e
Energy	4,426 metric tons CO_2e
Solid Waste	423 metric tons CO_2e
Water	262 metric tons CO_2e
Mobile	
CO_2 and CH_4	5,143 metric tons CO_2e
N_2O only	~~292~~ 329 metric tons CO_2e
Total	**~~10,801~~ 10,839 metric tons CO_2e**
Project Total MT CO_2e/SP/year	**5.1 MT CO_2e/SP/year[1]**

Sources: See Appendix D for calculations and for GHG emission factor assumptions.
[1] ~~10,801~~ 10,839 MT CO_2e/2,135 Service Population = 5.1 MT CO_2e/SP/year

Climate Action Plan Consistency. As discussed in Section 4.6.3(a), in 2012 the City of San Luis Obispo adopted the Climate Action Plan, which serves as a Qualified GHG Reduction Strategy consistent with *State CEQA Guidelines*. The GHG-reducing policy provisions contained in the Climate Action Plan were prepared with the purpose of complying with the requirements of AB 32 and achieving the goals of the AB 32 Scoping Plan. As a result, the Climate Action Plan is consistent with statewide efforts established in ARB's Climate Change Scoping Plan to reduce statewide GHG emissions to 1990 levels by 2020. The Climate Action Plan outlines a course of action to improve environmental, social, and economic sustainability and includes six emission reductions strategies: 1) buildings, 2) renewable energy, 3) transportation and land use, 4) water, 5) solid waste, and 6) parks and open space. The project would be consistent with the City's Climate Action Plan if it includes provisions to further the emissions reduction goals in the Plan. Table 4.6-3 shows the project's consistency with applicable Climate Action Plan measures. The CAP's renewable energy measure requires the City to "incentivize renewable energy generation in new and existing development." As the measure is a requirement for the City and not for private development, it is not directly applicable to the project and not included in the consistency analysis. As shown, the project would be consistent with the Climate Action Plan.

Table 4.6-3
Project Consistency with Applicable Climate Action Plan Measures

Climate Action Plan Control Measure	Project Consistency
Buildings	
BLD 2: New Construction Energy Conservation Encourage and incentivize new development to exceed minimum Cal Green requirements.	**Consistent** As indicated in the Specific Plan, one of the goals of the Specific Plan is to meet leading technology standards in building design and construction. New structures, renovated buildings, and new infrastructure facilities would be designed to minimize energy consumption and maximize renewable energy generation. Energy conservation construction techniques include: • Meeting or Exceeding Title 24 Standards • Natural Lighting and Ventilation • High R-Value Insulation • Energy Efficient HVAC Systems and Appliances • Noise Reduction • Water Usage Reduction
Transportation and Land Use	
TLU 1: Transit Services Maintain and expand transit services consistent with the City's Short Range Transit Plan.	**Consistent** The project would maintain and expand transit services consistent with the City's Short Range Transit Plan because the Specific Plan includes a transit center that would provide direct transit access between the project site and downtown San Luis Obispo. The location of the proposed transit center would be coordinated with SLO Transit and the Regional Transit Authority upon submittal of individual project plans. If transit ridership meets specified demand thresholds, direct Regional Transit Authority access will be considered at this future transit center.

Table 4.6-3
Project Consistency with Applicable Climate Action Plan Measures

Climate Action Plan Control Measure	Project Consistency
TLU 2: Alternative Vehicles Promote clean air vehicles (CAV), and expand the network of electric car charging stations and car-sharing parking spaces.	**Consistent** A percentage of the project's parking would be outfitted with electric vehicle charging stations. These parking spaces would be reserved for electric vehicles, along with the area's multimodal transportation network, to encourage energy conscience transportation.
TLU 3: Bike Travel Increase the percentage of non-recreational trips that are made by bicycle.	**Consistent** The project would increase the percentage of non-recreational trips that are made by bike by establishing links within the City's Bicycle Transportation Plan. Specifically, the project would include construction of a segment of the Bob Jones Bike Trail and provide a connection from Laguna Lake area neighborhoods and businesses along Madonna Road to the southern portion of the City Limit at Froom Ranch Way. The project would also include interior bicycle trails and lanes, including a Class I bike trail and Class II bike lanes.
TLU 5: Land Use Diversity and Density Encourage compact urban form and mixed-use developments.	**Consistent** The project is a mixed-use project that includes residential, commercial, office, hotel, agriculture, and open space uses. Therefore, the project development would encourage compact urban form and mixed-use development.
TLU 6: Parking Management Motivate Downtown visitors to park once and walk or ride to multiple destinations, or use transit to get to and from downtown.	**Consistent** The project would include a transit center that would provide direct transit access between the project site and downtown San Luis Obispo, motivating downtown visitors to park once and walk or ride to multiple destinations or use transit to get to and from downtown. The location of the proposed transit center would be coordinated with SLO Transit and the Regional Transit Authority upon submittal of individual project plans. If transit ridership meets specified demand thresholds, direct Regional Transit Authority access will be considered at this future transit center.
TLU 8: Reduce the Need for Commuting Increase local housing options for workers in the community that include variety in location, type, size, tenure and style of dwellings.	**Consistent** The project includes workforce housing, including 34 affordable units. There would be a range of housing options such as attached compact housing, detached compact housing, 40' single-family, 30' single family and multifamily units.

Table 4.6-3
Project Consistency with Applicable Climate Action Plan Measures

Climate Action Plan Control Measure	Project Consistency
Water	
WTR 2: Water Conservation: New Development Implement CALGreen standards, Water Reuse Master Plan, and Water Efficient Landscape Standards to reduce potable water use in new development.	**Consistent** As described in Chapter 7 of the Specific Plan, the project would incorporate water reduction methods and infrastructure to minimize water use at the site, such as drought tolerant landscaping, use of recycled water for exterior landscaped areas, low-flow water features, onsite rainwater harvesting, and indoor gray water re-use. The project would include a combination of bio-swales, detention and retention facilities, and cisterns that will manage on-site drainage and recharge the aquifer onsite. Open Space areas along the creek, parks, and portions of the commercial and office areas would be irrigated using recycled water sourced from an extension of the City's Recycled Water System. Proposed water infrastructure improvements include a 6-inch Recycled Water Main from Madonna Road through the project site. The existing onsite wells would continue to be used for irrigation of ongoing agricultural uses on the project site. Onsite landscaping would be drought tolerant and require minimum water use.
Parks and Open Space	
PKS 2: Parks & Open Space Development Continue to develop and acquire parks and open space resources.	**Consistent** The project would provide public parks and open space. A key goal of the project is to connect the City's park and open space system and improve Prefumo Creek.

Senate Bill 32. In late 2015, the California Supreme Court's Newhall Ranch decision confirmed that there are multiple potential pathways for evaluating GHG emissions consistent with CEQA, depending on the circumstances of a given project (Center for Biological Diversity v. Department of Fish and Wildlife (2015) 62 Cal. 4th 204). The decision also identified the need to analyze both near term and post-2020 emissions, as applicable, stating that an "EIR taking a goal-consistency approach to CEQA significance may in the near future need to consider the project's effects on meeting longer term emissions reduction targets." While not legally binding on local land use agencies, SB 32 extends the statewide AB 32 reduction goal, requiring the State to further reduce GHGs to 40 percent below 1990 levels by 2030, and Executive Order S-03-05 has set forth a long-term reduction target to reduce GHG emissions in California by 80 percent below 1990 level by the year 2050.

While the State has adopted the AB 32 Scoping Plan and multiple regulations to achieve the AB 32 year 2020 target, there is no currently adopted State plan to meet post-2020 GHG reduction goals. ARB is currently working to update the Scoping Plan to provide a framework for achieving the 2030 target set forth by SB 32 (ARB 2015). As a result, State reduction strategies cannot be applied to the project to achieve long-term reductions. Achieving these long-term GHG reduction policies will require State and federal plans and policies for achieving post-2020 reduction goals. Placing the entire burden of meeting long-term reduction targets on local government or individual new development projects would be disproportionate and likely ineffective.

Given the recent legislative attention and judicial action regarding post-2020 goals and the scientific evidence that additional GHG reductions are needed through the year 2050, the Association of Environmental Professionals' (AEP) Climate Change Committee published a white paper in 2015 recommending that CEQA analyses for most land use development projects may continue to rely on current adopted thresholds for the immediate future (AEP, *Beyond 2020: The Challenges of Greenhouse Gas Reduction Planning by Local Governments in California*, 2015). As such, for the GHG impacts resulting from development under the San Luis Ranch Specific Plan, this analysis evaluates future conditions in the year 2020 based on the City's adopted Climate Action Plan.

Mitigative Components of the Specific Plan and Impact Conclusion. As described in Table 4.6-3, the project is a compact community including mixed uses and workforce housing to balance jobs and housing. The project also emphasizes bikeways, pedestrian, and transit connections, all of which contribute to reduced VMT and correspondingly reduced GHG emissions. Therefore, the project would be consistent with the City of San Luis Obispo Climate Action Plan.

Mitigation Measures. No mitigation is required. However, implementation of SLOAPCD requirements in Mitigation Measure AQ-3(a) would also reduce the project's GHG emissions.

Significance After Mitigation. Impacts would be less than significant without mitigation. Although mitigation is not required, implementation of SLOAPCD requirements in Mitigation Measure AQ-3(a) would further reduce the project's GHG emissions. For informational purposes, Table 4.6-4 shows emissions with implementation of Mitigation Measure AQ-3(a), which includes exceedance of Title 24 energy efficiency requirements by 20 percent. As shown in Table 4.6-4, exceeding Title 24 energy efficiency requirements by 20 percent would reduce per service population emissions from 5.1 MT CO_2e per year (see Table 4.6-2) to 4.89 MT CO_2e per year, which would not exceed SLOAPCD's efficiency threshold of 4.9 MT CO_2e per year.

Table 4.6-4
Combined Mitigated Annual Emissions of GHGs

Emission Source	Annual Emissions
Construction	243 metric tons CO_2e
Operational	
Area	13 metric tons CO_2e
Energy	4,080 metric tons CO_2e
Solid Waste	423 metric tons CO_2e
Water	262 metric tons CO_2e
Mobile	
CO_2 and CH_4	5,143 metric tons CO_2e
N_2O only	292 metric tons CO_2e
Total[1]	**10,455 metric tons CO_2e**
Project Total MT CO_2e/SP/year	**4.89 MT CO_2e/SP/year[1]**

Sources: Totals are from CalEEMod Mitigated results, plus See Appendix D for calculations and for GHG emission factor assumptions.

1 10,455 MT CO_2e/2,135 Service Population = 4.89 MT CO_2e/SP/year

c. Cumulative Impacts. Table 3 in Section 3.0, *Environmental Setting*, lists future development capacity within the Planning Subarea under the General Plan Land Use Element. Such development would increase overall GHG emissions generated within the City. Analyses of GHG emissions and climate change are cumulative in nature, as they affect the accumulation of GHGs in the atmosphere. Projects that exceed the thresholds discussed above would have a significant impact on GHG emissions and climate change, both individually and cumulatively. As indicated in Impact GHG-1, GHG emissions associated with the project would be less than significant, and further reduced with implementation of Mitigation Measure AQ-3. As a result, the project's contribution to cumulative levels of GHGs would not be cumulatively considerable and cumulative impacts to climate change would be less than significant.