5.7 GREENHOUSE GAS EMISSIONS

This section describes effects on climate change and greenhouse gas (GHG) emissions that would be caused by implementation of the General Plan Update. The study area for climate change and the analysis of GHG emissions is broad because climate change is influenced by world-wide emissions and their global effects. However, the study area is also limited by the State CEQA Guidelines Section 15064(d) which directs lead agencies to consider an "indirect physical change" only if that change is a reasonably foreseeable impact that may be caused by the proposed project. This analysis limits discussion to those physical changes to the environment that are not speculative and are reasonably foreseeable. Information used to prepare this section is based upon the *Air Quality & Greenhous Gas Impact Analysis for City of Yorba Linda General Plan Update* (May 2016, Ambient Air Quality and Noise Consulting). The report is summarized in this section and included in Appendix D to this Program EIR.

5.7.1 Regulatory Setting

Federal

Federal Clean Air Act and U.S. EPA

The U.S. Environmental Protection Agency (U.S. EPA) is charged with implementing national air quality programs. U.S. EPA's air quality mandates are drawn primarily from the Federal Clean Air Act (FCAA). The FCAA was passed in 1963 by the U.S. Congress and has been amended several times. The 1970 FCAA amendments strengthened previous legislation and laid the foundation for the regulatory scheme of the 1970s and 1980s. In 1977, Congress again added several provisions, including non-attainment requirements for areas not meeting NAAQS and the Prevention of Significant Deterioration program. The 1990 FCAA amendments represent the latest in a series of federal efforts to regulate the protection of air quality in the U.S. The FCAA allows states to adopt more stringent standards or to include other pollution species.

The United States Supreme Court in *Massachusetts et al. v. Environmental Protection Agency*, 549 U.S. 497 (2007), held that the U.S. EPA has the authority to regulate motor-vehicle GHG emissions under the FCAA. The Court held that the U.S. EPA Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision (Caltrans 2016).

The U.S. EPA publishes an annual GHG inventory (Inventory of U.S. Greenhouse Gas Emissions and Sinks),[1] which tracks the national trend in GHG emissions and removals back to 1990. The report contains total national emissions by source, economic sector, and GHG. The U.S. EPA uses national energy data, data on national agricultural activities, and other national statistics to provide a comprehensive accounting of total GHG emissions for all man-made sources in the country. It also collects GHG emissions data from individual facilities and suppliers of certain fossil fuels and industrial gases through the Greenhouse Gas Reporting Program.[2]

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[1] A greenhouse gas "sink" is a process, activity, or mechanism that absorbs more greenhouse gases than it releases.

[2] https://www.epa.gov/ghgreporting, accessed May 26, 2016.

In May 2010, the U.S. EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) published the final rule-making for a national program that would reduce GHG emissions and improve fuel economy for new cars and trucks sold in the United States. The standards that make up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide (CO_2) per mile, equivalent to 35.5 miles per gallon (mpg), if the automobile industry were to meet this CO_2 level solely through fuel economy improvements.

The final combined U.S. EPA and NHTSA standards that make up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile, (the equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements). Together, these standards are projected to cut GHG emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016). On August 28, 2012, U.S. EPA and NHTSA issued their joint rule to extend this national program of coordinated greenhouse gas and fuel economy standards to model years 2017 through 2025 passenger vehicles (Caltrans 2016).

In October 2012, U.S. EPA and NHTSA published the final rule-making for the second phase of the national program, which covers model years 2017 through 2025. The final standards are projected to result in an average industry fleetwide level of 163 grams of CO_2 per mile, equivalent to 54.5 MPG, if the automobile industry were to meet this CO_2 level solely through fuel economy improvements. U.S. EPA does not regulate residential sources of GHG emissions.

Executive Order 13693

Executive Order (EO) 13693, Planning for Federal Sustainability in the Next Decade, signed in 2015 seeks to maintain federal leadership in sustainability and greenhouse gas emission reductions. Its goal is to reduce agency Scope 1 and 2 GHG emissions[3] by at least 40 percent by 2025, foster innovation, reduce spending, and strengthen communities through increased efficiency and improved environmental performance. Sustainability goals are set for building efficiency and management, energy portfolio, water use efficiency, fleet efficiency, sustainable acquisition and supply chain greenhouse gas management, pollution prevention, and electronic stewardship.

State of California

California Air Resources Board

CARB is responsible for the coordination and oversight of State and local air pollution control programs in California. Various statewide and local initiatives to reduce California's contribution to GHG emissions

[3] In GHG inventories, direction emissions are Scope 1; indirect emissions from consumption of purchased electricity, heat or steam are Scope 2; and other indirect emissions (such as extraction and production of purchases materials and fuels, transport in vehicles not controlled by the reporting entity, outsourced activities) are Scope 3.

have raised awareness about climate change and its potential for severe long-term adverse environmental, social, and economic effects.

Assembly Bill (AB) 1493

AB 1493 (Pavley) of 2002 (Health and Safety Code Sections 42823 and 43018.5) requires the CARB to develop and adopt the nation's first GHG emission standards for automobiles. These standards are also known as Pavley I. The California Legislature declared in AB 1493 that global warming is a matter of increasing concern for public health and the environment. It cites several risks that California faces from climate change, including a reduction in the state's water supply, an increase in air pollution caused by higher temperatures, harm to agriculture, an increase in wildfires, damage to the coastline, and economic losses caused by higher food, water, energy, and insurance prices. The bill also states that technological solutions to reduce GHG emissions would stimulate California's economy and provide jobs. In 2004, the State of California submitted a request for a waiver from federal clean air regulations, as the State is authorized to do under the FCAA, to allow California to require reduced tailpipe emissions of CO_2. In late 2007, the U.S. EPA denied California's waiver request and declined to promulgate adequate federal regulations limiting GHG emissions. In early 2008, the State brought suit against the U.S. EPA related to this denial.

In January 2009, President Obama instructed the U.S. EPA to reconsider the Bush Administration's denial of California's and 13 other states' requests to implement global warming pollution standards for cars and trucks. In June 2009, the U.S. EPA granted California's waiver request, enabling the State to enforce its GHG emissions standards for new motor vehicles beginning with the current model year. California is committed to further strengthening these standards beginning in 2017 to obtain a 45 percent GHG reduction from the 2020 model year vehicles.

Executive Order S-3-05

In 2005, then-Governor Schwarzenegger issued 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 but are not limited to 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.

Executive Order S-6-06

Executive Order S-6-06, signed on April 25, 2006, established two primary goals related to the use of biofuels within California, including: (1) by 2010, 20 percent of its biofuels need to be produced within California; increasing to 40 percent by 2020 and 75 percent by 2050; and (2) by 2010, 20 percent of the renewable electricity should be generated from biomass resources within the State, maintaining this level through 2020.

Assembly Bill (AB) 32

AB 32 (Health and Safety Code §§ 38500, 38501, 28510, 38530, 38550, 38560, 38561–38565, 38570, 38571, 38574, 38580, 38590, 38592–38599) requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. The gases that are regulated by AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride. The reduction to 1990 levels would be accomplished through an enforceable statewide cap on GHG emissions phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap, institute a schedule to meet the emissions cap, and develop tracking, reporting, and enforcement mechanisms to ensure that the State achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Executive Order S-14-08 and Senate Bill 1078

Senate Bill 1078 (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. This Senate Bill will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed EO S-14-08, which set the Renewables Portfolio Standard target to 33 percent by 2020. It directed State government agencies and retail sellers of electricity to take all appropriate actions to implement this target. Superseded by EO S-21-09 in 2009, EO S-21-09 directed the ARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. This Executive Order was superseded by statute SB X1-2 in 2011, which obligates all California electricity providers, including investor-owned utilities and publicly owned utilities, to obtain at least 33 percent of their energy from renewable electrical generation facilities by 2020, with interim targets of 20 percent by 2013 and 25 percent by 2016.

CARB is required to regulate sources of GHGs to meet a State goal of reducing GHG emissions to 1990 levels by 2020 and an 80 percent reduction of 1990 levels by 2050. The California Energy Commission (CEC) and the California Public Utilities Commission (CPUC) serve in advisory roles to help CARB develop the regulations to administer the 33 percent by 2020 requirement. CARB is also authorized to increase the target and accelerate and expand the time frame.

Senate Bill (SB) 375

Senate Bill (SB) 375, signed in August 2008, enhances the State's ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from vehicles for 2020 and 2035. In addition, SB 375 directs each of the State's 18 major Metropolitan Planning Organizations (MPOs) 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, CARB adopted final regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035.

Senate Bill (SB) 2X

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

Senate Bill 1368

Senate Bill (SB) 1368 (codified at Public Utilities Code Chapter 3) is the companion bill of AB 32. SB 1368 required the CPUC to establish a GHG emissions performance standard for baseload generation from investor-owned utilities by February 1, 2007. The bill also required the California Energy Commission (CEC) to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas-fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and the CEC.

Senate Bill 97

SB 97 (2007) acknowledged that climate change was a prominent environmental issue that required analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR), which is part of the State Natural Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions (or the effects of GHG emissions), as required by CEQA. The CEQA Guidelines amendments became effective on March 18, 2010.

Climate Change Scoping Plan

In October 2008, CARB published its Climate Change Proposed Scoping Plan, which is the State's plan to achieve GHG reductions in California as required by AB 32. The Scoping Plan contains the main strategies California will implement to achieve reduction of 169 million metric tons of CO_2e, or approximately 30 percent from the State's projected 2020 emissions level of 596 $MMTCO_2e$ under a business-as-usual scenario (this is a reduction of 42 $MMTCO_2e$, or almost 10 percent, from 2002–2004 average emissions). The Scoping Plan also includes CARB-recommended GHG reductions for each emissions sector of the State's GHG inventory. The largest proposed GHG reduction recommendations are from improving emissions standards for light-duty vehicles (estimated reductions of 31.7 $MMTCO_2e$), implementation of the Low Carbon Fuel Standard (15.0 $MMTCO_2e$) program, energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 $MMTCO_2e$), and a renewable portfolio standard for electricity production (21.3 $MMTCO_2e$). The Scoping Plan identifies the local equivalent of AB 32 targets as a 15 percent reduction below baseline GHG emissions level, with baseline interpreted as GHG emissions levels between 2003 and 2008.

A key component of the Scoping Plan is the Renewable Portfolio Standard, which is intended to increase the percentage of renewables in California's electricity mix to 33 percent by 2020, resulting in a reduction of 21.3 $MMTCO_2e$. Sources of renewable energy include, but are not limited to, biomass, wind, solar, geothermal, hydroelectric, and anaerobic digestion. Increasing the use of renewables will decrease California's reliance on fossil fuels, thus reducing GHG emissions.

The Scoping Plan states that land use planning and urban growth decisions play important roles in the State's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. Meanwhile, CARB is also developing an additional protocol for community emissions. CARB further acknowledges that decisions on how land is used have large impacts on the GHG emissions that result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors. The Scoping Plan states that the ultimate GHG reduction assignment to local government operations is to be determined. With regard to land use planning, the Scoping Plan expects approximately 5.0 $MMTCO_2e$ will be achieved associated with implementation of Senate Bill 375, which is discussed further below. The First Update of the Scoping Plan was approved by the CARB on May 22, 2014, which looks at post-2020 to set mid-term goals (2030-2035) to reach the 2050 goals.

California Building Code

The California Building Code contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Code is adopted every three years by the Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

California Green Building Standards

California's Green Building Standards are contained in the California Building Code and regulate the construction of new buildings and improvements. The focus of green building standards is to improve environmental performance. In recommending a green building strategy as one element of the Climate Change Scoping Plan, CARB estimated that green building standards would reduce GHG emissions by approximately 26 million metric tons of CO_2e ($MMTCO_2e$) by 2020. The 2013 green buildings standards, as amended, are 25 percent more efficient than previous standards for residential construction and 30 percent more efficient for non-residential construction.

2006 Appliance Efficiency Regulations

The California Energy Commission adopted Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608) in 2006. The regulations include standards for both federally regulated appliances and non-federally regulated appliances. While these regulations are now often viewed as "business-as-usual," they exceed the standards imposed by all other states and they reduce GHG emissions by reducing energy demand.

Mandatory Reporting of Greenhouse Gas Emissions

Reporting of GHGs by major sources is required by the California Global Warming Solutions Act. Revisions to the existing CARB mandatory GHG reporting regulation were considered at the board hearing on December 16, 2010. The revised regulation was approved by the California Office of Administrative Law and became effective on January 1, 2012. The revised regulation affects industrial facilities, suppliers of transportation fuels, natural gas, natural gas liquids, liquefied petroleum gas, and carbon dioxide, operators of petroleum and natural gas systems, and electricity retail providers and marketers.

Cap and Trade Regulation

The cap-and-trade regulation is a key element in California's climate plan. It sets a statewide limit on sources responsible for 85 percent of California's GHG emissions, and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The cap-and-trade rules came into effect on January 1, 2013 and apply to large electric power plants and large industrial plants. In 2015, they were extended to fuel distributors (including distributors of heating and transportation fuels). Under the cap-and-trade regulation, companies must hold enough emission allowances to cover their emissions, and are free to buy and sell allowances on the open market. California held its first auction of GHG allowances on November 14, 2012. California's GHG cap-and-trade system is projected to reduce GHG emissions from regulated entities by approximately 16 percent or more by 2020.

Regional and Local

2012-2035 Regional Transportation Plan/Sustainable Communities Strategy

California's Sustainable Communities and Climate Protection Act, or Senate Bill (SB) 375, requires SCAG to develop a Sustainable Communities Strategy (SCS) to reduce emissions from automobiles and light trucks through integrated transportation, land use, housing, and environmental planning. The SCS provides a plan for meeting the GHG emission-reduction targets set by the CARB for the SCAG region. The *2012-2035 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS) has been designed to achieve minimum GHG reductions of 8 percent by 2020 and 13 percent by 2035.

The RTP/SCS does not envision a wholesale redevelopment of the Southern California region. The majority of neighborhoods and business districts that will exist in 2035 are already on the ground, and most of them, especially residential neighborhoods, will be unchanged in the next 25 years. Rather, the RTP/SCS envisions a new development pattern for new neighborhoods and revitalized neighborhoods and business districts that builds upon the current pattern to give residents more choices and more opportunities as they consider where to live and work in the future.

Unique to the SCAG region, SB 375 provides for a subregional council of governments and the county transportation commission to work together to propose an SCS for a subregional area. Orange County is one of these subregional areas. The subregional SCS for Orange County was prepared in June 2011 and has been incorporated in its entirety into the Final 2012–2035 RTP/SCS. GHG-reduction strategies contained in the subregional SCS for Orange County include the following:

- Support transit-oriented development.
- Support infill housing development and redevelopment.
- Support mixed-use development and thereby improve walkability of communities.
- Increase regional accessibility in order to reduce vehicle miles traveled.
- Improve jobs-to-housing ratio.
- Promote land use patterns that encourage the use of alternatives to single-occupant automobile use.
- Support retention and/or development of affordable housing.

- Support natural land restoration and conservation and/or protection offering significant carbon mitigation potential via both sequestration and avoidance of increased emissions due to land conversion.
- Eliminate bottlenecks and reduce delay on freeways, toll roads, and arterials.
- Apply Transportation System Management and Complete Street practices to arterials and freeways to maximize efficiency.
- Improve modes through enhanced service, frequency, convenience, and choices.
- Expand and enhance Transportation Demand Management practices to reduce barriers to alternative travel modes and attract commuters away from single occupant vehicle travel.
- Continue existing, and explore expansion of, highway pricing strategies.
- Implement near-term and long-term transportation improvements to provide mobility choices and sustainable transportation options.

City of Yorba Linda General Plan

The 1993 Yorba Linda General Plan includes goals and policies that are intended to help improve local and regional air quality. These policies largely relate to growth management and include efforts to reduce emissions associated with increased vehicle use, energy use, and operational emissions associated with stationary sources. Policies are also included to promote mixed use development and improved coordination between the City and other jurisdictions and agencies within the region to achieve regional air quality attainment planning objectives.

It is also important to note that the adopted Housing Element incorporates policies that would help to reduce local and regional GHG impacts associated with future development including measures to help promote energy and water conservation, waste reduction, and conservation of open space. The Housing Element also establishes a “Sustainability and Green Building Program.”

5.7.2 Environmental Setting

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. Gases that absorb and re-emit infrared radiation in the atmosphere are GHGs. GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. 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 (SF6). 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 CH4 results from off-gassing associated with agricultural practices and landfills. GHGs have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to climate change. Climate change is by definition a cumulative impact because it occurs worldwide. Although emissions of one single project do not cause climate change, GHG emissions from

multiple projects (past, present and future) throughout the world could result in a cumulative impact with respect to climate change.

Man-made GHGs, many of which have greater heat-absorption potential than CO_2, include fluorinated gases and SF6. 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.

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 degrees C cooler. 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.

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e), which weight each gas by its global warming potential (GWP). Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. **Table 5.7-1, Global Warming Potential for Greenhouse Gases** provides a summary of the GWP for GHG emissions of typical concern with regard community development projects, based on a 100-year time horizon. As indicated, methane traps over 25 times more heat per molecule than CO_2, and N_2O absorbs approximately 298 times more heat per molecule than CO_2. Additional GHG with high GWP include Nitrogen trifluoride, Sulfur hexafluoride, Perfluorocarbons, and black carbon.

Table 5.7-1
Global Warming Potential for Greenhouse Gases

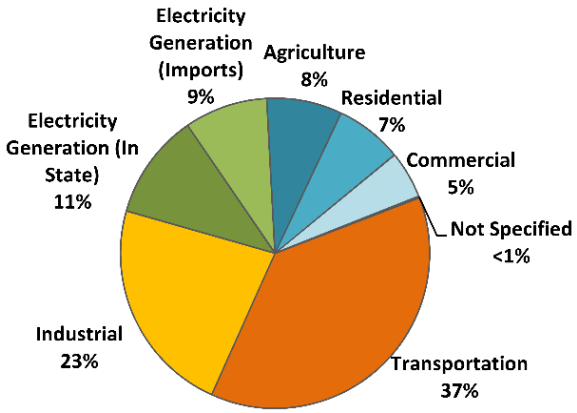
Greenhouse Gas	Global Warming Potential (100-year)
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Dioxide (N_2O)	298
Based on the Intergovernmental Panel on Climate Change (IPCC) GWP values for 100-year time horizon	

Sources of GHG Emissions

On a global scale, GHG emissions are predominantly associated with activities related to energy production; changes in land use, such as deforestation and land clearing; industrial sources; agricultural activities; transportation; waste and wastewater generation; and commercial and residential land uses. World-wide, energy production including the burning of coal, natural gas, and oil for electricity and heat is the largest single source of global GHG emissions.

In 2013, GHG emissions within California totaled 459 million metric tons (MMT) of CO_2e. GHG emissions, by sector, are summarized in **Figure 5.7-1, California Greenhouse Gas Emissions Inventory**. Within California, the transportation sector is the largest contributor, accounting for approximately 37 percent of the total statewide GHG emissions. Emissions associated with industrial uses are the second largest contributor, totaling approximately 23 percent; electricity generation totals approximately 20 percent.

Figure 5.7-1
California Greenhouse Gas Emissions Inventory



Effects of Global Climate Change

There are uncertainties as to exactly what the climate changes will be in various local areas of the earth. There are also uncertainties associated with the magnitude and timing of other consequences of a warmer planet: sea level rise, spread of certain diseases out of their usual geographic range, the effect on agricultural production, water supply, sustainability of ecosystems, increased strength and frequency of storms, extreme heat events, increased air pollution episodes, and the consequence of these effects on the economy.

Within California, climate changes would likely alter the ecological characteristics of many ecosystems throughout the State. Such alterations would likely include increases in surface temperatures and changes in the form, timing, and intensity of precipitation. For instance, historical records are depicting an increasing trend toward earlier snowmelt in the Sierra Nevada. This snow pack is a principal supply of water for the State, providing approximately 50 percent of State's annual runoff. If this trend continues, some areas of the State may experience an increased danger of floods during the winter months and possible exhaustion of the snowpack during spring and summer months. An earlier snowmelt would also impact the State's energy resources. Currently, approximately 20 percent of California's electricity comes from hydropower. An early exhaustion of the Sierra snowpack, may force electricity producers to switch to more costly or non-renewable forms of electricity generation during spring and summer months. A changing climate may also impact agricultural crop yields, coastal structures, and biodiversity. As a result, resultant changes in climate will likely have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry.

Potential Effects of Climate Change

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, April 2010). Below is a summary of some of the potential effects that could be experienced in California as a result of climate change.

Sea Level Rise

According to *The Impacts of Sea-Level Rise on the California Coast*, prepared by the California Climate Change Center (CCCC) (May 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. Sea levels are rising faster now than in the previous two millennia, and the rise is expected to accelerate, even with implementation of robust GHG emission control measures. The most recent IPCC report (2013) predicts a mean sea level rise of 11 to 38 inches by 2100. This prediction is more than 50 percent higher than earlier projections of 7 to23 inches, when comparing the same emissions scenarios and time periods. The previous IPCC report (2007) identified a sea level rise of eight inches on the California coast over the past century. The California Climate Adaptation Strategy (California Natural Resources Agency, December 2009) estimates a sea level rise of up to 55 inches by the end of the 21st century.

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 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.

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 20th century, which represents a loss of 1.5 million acre-feet of snowpack storage. During the same period, the sea level rose eight inches along California's coast. California's temperature has risen one degree F, mostly at night and during the winter, with higher elevations experiencing the highest increase. From 1999 to 2008, Southern California cities experienced their lowest recorded annual precipitation twice within the decade. In a span of only two years, Los Angeles experienced both its driest and wettest years on record.

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, the California Department of Water Resources forecasts 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.

Agriculture

California has a $30 billion annual agricultural industry that produces half of the nation'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.

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 degrees F (0.6-2.5 degrees C) in the next 50 years, and 2.2–10 degrees F (1.4-5.8 degrees C) in the next 100 years, 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: timing of ecological events; geographic range; species' composition within communities; and ecosystem processes, such as carbon cycling and storage.

5.7.3 Significance Threshold Criteria

According to Appendix G of the CEQA Guidelines, 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.

The South Coast Air Quality Management District (SCAQMD) has not adopted GHG thresholds for the assessment of project- or plan-level GHG impacts. SCAQMD is considering a tiered approach to determine the significance of residential and commercial projects. However, SCAQMD has prepared draft thresholds. Based on these draft thresholds, at the plan-level, a project would be considered to have a significant impact if emissions would exceed an efficiency target of 6.6 $MTCO_2e$ per service population (SP) per year. Service population is typically defined as the total population and employment growth associated with the project.

Project-generated increases in GHG emissions were assessed in accordance with the SCAQMD's draft threshold for GHG emissions. Accordingly, the proposed General Plan Update would be considered to have a potentially significant impact if annual net increases of GHG emissions would exceed the threshold of 6.6 $MTCO_2e$/SP. The County of Orange and the City of Yorba Linda have not adopted an applicable plan, policy, or regulation for the purpose of reducing the emissions of GHGs. Therefore, the significance of the General Plan Update's consistency with an applicable plan was evaluated in comparison to the GHG-

reduction strategies contained in the subregional SCS for Orange County, which were incorporated into the 2012-2035 RTP/SCS; as well as CARB's Scoping Plan.

5.7.4 Impacts and Mitigation Measures

Short-term GHG emissions associated with construction activities are largely dependent on the type of development proposed, off-road equipment and on-road vehicles required, and construction schedules. Because much of this information for specific future development projects is unknown at this time, construction-related impacts were qualitatively discussed.

Long-term operational increases of GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod). Modeling was conducted for the proposed General Plan Update based on projected increases and changes development and trip-generation rates identified in the traffic analysis prepared for the General Plan Update.

Impact 5.7-1: GHG emissions generated by future development associated with implementation of the proposed General Plan Update would have a less-than-significant impact on the environment. [Threshold GHG-1]

Impact Analysis

Annual operational emissions associated with future development are summarized in **Table 5.7-2, Annual Operational GHG Emissions at Buildout**. As noted, estimated increases in GHG emissions would be largely associated with increases in motor vehicle use, which would constitute approximately 77 percent of the projected total increase in emissions. Of the remaining emissions, approximately 16 percent would be associated with energy use, 4 percent with water use, 2 percent with waste generation, and 1 percent associated with area sources.

Table 5.7-2
Annual Operational GHG Emissions at Buildout

Source	Emissions ($MTCO_2e$)	Percent Contribution
Area	380	1%
Energy Use	8,830	16%
Mobile	42,736	77%
Waste	1,327	2%
Water	2,036	4%
Total:	55,309	
Removed Emissions:	16,013	
Net Increase:	39,296	
Service Population (SP):	7,584	
$MTCO_2e$/SP:	5.2	

Totals may not sum due to rounding. Emissions were quantified using the CalEEMod computer program based on projected future development associated with implementation of the General Plan Update and trip-generation rates derived from the traffic analysis prepared for this project. Refer to Appendix A for emissions modeling assumptions and results.

For land use plans, service population is typically defined based on the total estimates of population and employment. Future development within the Focus Areas could result in an estimated increase in population of approximately 3,418 persons and net increases in employment of approximately 4,588.

Based on these estimates, the combined service population associated with buildout of the Focus Areas would be 8,006. Based on this service population and the estimated GHG emissions noted in Table 5.7-2, buildout of the proposed General Plan Update would result in an estimated 5.2MTCO_2e/SP. Estimated GHG emissions would not exceed the draft SCAQMD threshold of 6.6 MTCO_2e/SP. Therefore, adoption of the General Plan Update would not generate GHG emissions, either directly or indirectly, that would have a significant impact on the environment.

It is also important to note that recommended General Plan policies and Mitigation Measures AQ-1 and AQ-2 for reducing short-term and long-term air quality impacts would also reduce GHG emissions associated with future development. Mitigation Measure AQ-1 includes measures to reduce mobile-source emissions from both on-road vehicles and off-road equipment, which would help to reduce GHG emissions, such as black carbon. The General Plan Update policies and Mitigation Measure AQ-2 would help to promote the use of alternative means of transportation, energy and water conservation, and waste reduction, which would help to reduce long-term operational GHG emissions associated with future development. For these reasons, this impact is considered less than significant.

Proposed General Plan Update Goals and Policies

Land Use Element

Goal LU-3 – Land use compatibility.

Policy LU-3.1 – Consider and mitigate the impacts on surrounding land uses and infrastructure when reviewing proposals for new development.

Conservation Element

Goal CN-5 – Responsible management of designated areas for petroleum and mineral extraction

Policy CN-5.6 – Ensure reclamation projects comply with State, federal, and local standards and attainment programs with respect to air quality, watersheds and basins, and erosion potential.

Circulation Element

Goal CR-3 – An efficient circulation system that utilizes transportation system management and demand management strategies.

Policy CR-3.4 - Promote employers to provide transit subsidies, bicycle facilities, alternative work schedules, ridesharing, telecommuting and work-at-home programs, employee education, and preferential parking for carpools/vanpools.

Policy CR-3.6 - Promote the reduction of single occupant vehicle trips, through transportation demand management programs, such as ridesharing, telecommuting, and parking management.

Policy CR-3.7 - Ensure the circulation system promotes a wide variety of travel modes to serve the greatest cross section of residents, employees and businesses.

Policy CR-3.8 - Encourage new development to provide access to transit, bicycle, pedestrians, and other non-vehicular modes of transportation.

Mitigation Measures

Mitigation Measure AQ-1 (see Section 4.3, *Air Quality*).

Level of Significance After Mitigation

Less than significant.

Impact 5.7-2: Implementation of the proposed General Plan Update would not conflict with an applicable GHG-reduction plan, policy or regulation. [Threshold GHG-2]

The proposed General Plan Update's consistency with the GHG-reduction strategies contained in the subregional SCS for Orange County is summarized in **Table 5.7-3, Consistency with the Orange County Subregional Sustainable Communities Strategy**. Proposed General Plan Update policies that correspond to the sustainability strategies identified in the SCS are also identified. As shown, the proposed General Plan Update would be consistent with the subregional SCS for Orange County, as incorporated into SCAG's *2012-2035 RTP/SCS*. It is also important to note that the adopted Housing Element incorporates policies that would be consistent with, and help implement AB 32 GHG-reduction goals, including those related to energy and water conservation, waste reduction, and conservation of open space. The Housing Element also establishes a "Sustainability and Green Building Program." Furthermore, the General Plan Update policies and Mitigation Measure AQ-2 would help to promote the use of alternative means of transportation, energy and water conservation, and waste reduction, which would help to reduce long-term operational GHG emissions associated with future development. For these reasons, the proposed General Plan Update would not conflict with applicable GHG-reduction plans, policies, or regulations. This impact is considered less than significant.

Table 5.7-3
Consistency with the Orange County Subregional Sustainable Communities Strategy

Sustainability Strategies	Project Consistency
Support transit-oriented development.	**Consistent:** The proposed General Plan Update includes policies that would directly or indirectly support transit-oriented development. The proposed General Plan Update policies that demonstrate consistency with this strategy include, but are not limited to, the following: CR-3.1, CR-3.4, CR-3.6, CR-3.7, CR-3.8, CR-5.1, CR-5.2, CR-5.3, CR-10.10
Support infill housing development and redevelopment.	**Consistent:** The City is largely built out. The proposed General Plan Update includes infill within areas identified as "focus areas." The proposed General Plan Update is consistent with this strategy.
Support mixed-use development and thereby improve walkability of communities.	**Consistent:** The proposed General Plan Update includes development of a mix of residential and commercial land uses within the designated focus areas. In addition, proposed General Plan Update policies have also been included that demonstrate consistency with this strategy include, but are not limited to, the following: LU-4.3, CR-6.1, CR-6.2, CR-6.3
Improve jobs-to-house ratio.	**Consistent:** The Planning Area is largely built out. However, the proposed General Plan Update includes development of a mix of residential and commercial land uses within the proposed "focus areas", which would help to improve the jobs-to-housing ratio.
Promote land use patterns that encourage the use of alternatives to single-occupant automobile use.	**Consistent:** The following policies in the General Plan Update would support the promotion of land use patterns that encourage the use of alternatives to single-occupant automobile use. The proposed General Plan Update includes policies that encourage the use of alternative means of transportation, including, but not limited to,

Table 5.7-3 Consistency with the Orange County Subregional Sustainable Communities Strategy	
Sustainability Strategies	**Project Consistency**
	the following: LU-4.3, CR-3.7, CR-3.8, GM-2.5, CR-6.1 through CR-6.4, and CR-10.1 through CR-10.11.
Support retention and/or development of affordable housing.	**Consistent:** The City's Housing Element includes policies that support the retention and development of affordable housing.
Support natural land restoration and conservation and/or protection offering significant carbon mitigation potential via both sequestration and avoidance of increased emissions due to land conversion.	**Consistent:** The following policies in the proposed General Plan Update would be consistent with this strategy. Proposed General Plan Update policies that demonstrate consistency with this strategy include, but are not limited to, the following: LU-9.1, LU-11.2
Eliminate bottlenecks and reduce delay on freeways, toll roads, and arterials.	**Consistent:** The following policies in the proposed General Plan Update would support a more efficient operation of roadways. Proposed General Plan Update policies that demonstrate consistency with this strategy include, but are not limited to, the following: CR-1.1, CR-1.2, CR-1.3, CR-1.4, CR-1.8, CR-3.1, CR-3.2, CR-3.3, CR-3.5, GM-2.5
Apply Transportation System Management and Complete Street practices to arterials and freeways to maximize efficiency.	**Consistent:** The following policies in the proposed General Plan Update would provide support in maximizing the efficiency of arterials and freeways. Proposed General Plan Update policies that demonstrate consistency with this strategy include, but are not limited to, the following: CR-6.1, CR-6.2, CR-6.3, CR-6.4, and CR-10.1 through CR-11.
Improve modes through enhanced service, frequency, convenience, and choices.	**Consistent:** The following policies in the proposed General Plan Update would support this strategy. Proposed General Plan Update policies that demonstrate consistency with this strategy include, but are not limited to, the following: CR-5.1, CR-5.2, CR-5.3
Expand and enhance Transportation Demand Management practices to reduce barriers to alternative travel modes and attract commuters away from single occupant vehicle travel.	**Consistent:** The proposed General Plan Update includes policies that would support Transportation Demand Management practices. Proposed General Plan Update policies that demonstrate consistency with this strategy include, but are not limited to, the following: CR-3.1 through CR-3.8
Implement near-term (Transportation Improvement Program and Measure M2 Early Capital Action Plan) and long-term (LRTP 2035 Preferred Plan) transportation improvements to provide mobility choices and sustainable transportation options.	**Consistent:** The proposed General Plan Update would be consistent with this strategy. Proposed General Plan Update policies that demonstrate consistency with this strategy include, but are not limited to, the following: LU-4.3, CR-3.7, CR-3.8, GM-2.5, CR-6.1 through CR-6.4, and CR-10.1 through CR-10.11.
Acknowledge current sustainability strategies practiced by Orange County jurisdictions and continue to implement strategies that will result in or support the reduction of GHG emissions.	**Consistent:** The proposed General Plan Update has incorporated numerous policies, as noted in this table, to promote sustainability and the implementation of strategies to reduce GHG emissions.

<u>Proposed General Plan Update Goals and Policies</u>

Land Use Element

Goal LU-3 – Land use compatibility.

Policy LU-3.1 - Consider and mitigate the impacts on surrounding land uses and infrastructure when reviewing proposals for new development.

Policy LU-3.2 - Manage the development of industrial and other uses which use, store, produce or transport toxic materials, air emissions, and other pollutants to provide proper mitigation measures.

Policy LU-3.3 - Promote efforts to mitigate oil operations for compatibility with other types of land uses during phasing out of operations.

Goal LU-4 – Community design that contributes to the preservation and enhancement of character and identity in Yorba Linda

Policy LU-4.3 - Promote the establishment of physical and functional connections between various land uses, while preserving parkland and designated open space.

Goal LU-7 – Management of future large scale development opportunities.

Policy LU-7.1 - Ensure the health, safety, and welfare of current and future residents within the City's Sphere-of-Influence areas.

Goal LU-9 – Preservation and enhancement of natural landscape and topography of the City.

Policy LU-9.1 – Preserve areas within the City that provide scenic, cultural, natural, or biological significance.

Goal LU-11 – Protection of water quality in the land use decision making process.

Policy LU-11.2 - Preserve wetlands, riparian corridors, and buffer zones to establish reasonable limits on the clearing of vegetation from the project site.

Circulation Element

Goal CR-1 – A circulation system that meets the needs of current and future residents, businesses, and visitors of the City, has adequate capacity for projected future traffic demands at acceptable levels of service, and facilitates the safe and efficient movement of people and goods throughout the City.

Policy CR-1.1 - Develop and maintain a road system that is based upon, and is in balance with, the Land Use Element of the General Plan.

Policy CR-1.2 - Utilize a roadway classification system that is based on functional hierarchy and conforms to the Orange County Transportation Authority's roadway classification system to the greatest extent possible.

Policy CR-1.3 - Develop street design standards that conform with Caltrans and Orange County Transportation Authority Highway Design Manuals to the greatest extent feasible.

Policy CR-1.4 - Maintain a Level of Service (LOS) "D" or better along all City arterials and at intersections during peak hours.

Policy CR-1.8 - Work jointly with adjacent jurisdictions to achieve capacity improvements for intersections outside of the City, but have significant impacts on the community.

Goal CR-3 – An efficient circulation system that utilizes transportation system management and demand management strategies.

Policy CR-3.1 - Coordinate with a broad range of regional and state agencies to promote and support Transportation Demand Management (TDM) strategies and programs.

Policy CR-3.3 - Continue to adhere to OCTA's Congestion Management Program.

Policy CR-3.4 - Promote employers to provide transit subsidies, bicycle facilities, alternative work schedules, ridesharing, telecommuting and work-at-home programs, employee education, and preferential parking for carpools/vanpools.

Policy CR-3.6 - Promote the reduction of single occupant vehicle trips, through transportation demand management programs, such as ridesharing, telecommuting, and parking management.

Policy CR-3.7 - Ensure the circulation system promotes a wide variety of travel modes to serve the greatest cross section of residents, employees and businesses.

Policy CR-3.8 - Encourage new development to provide access to transit, bicycle, pedestrians, and other non-vehicular modes of transportation.

Goal CR-5 – A safe, integrated, and efficient public transportation system.

Policy CR-5.1 - Continue to work with the Orange County Transportation Authority (OCTA) to promote the development of additional regional public transportation services and support facilities that will serve those who live and work in Yorba Linda.

Policy CR-5.2 - Encourage public and private shuttle services to provide greater transit choices.

Policy CR-5.3 - Coordinate with the Orange County Transportation Authority (OCTA) to investigate potential locations for future "Park and Ride" facilities.

Goal CR-6 – An efficient non-motorized transportation system.

Policy CR-6.1 - Promote the development and maintenance, where feasible, of safe and convenient non-motorized transportation and multi-purpose trails throughout the City.

Policy CR-6.2 - Provide for safe pedestrian, bicycle, and equestrian access throughout the City.

Policy CR-6.3 - Support the recommendations and action strategies of the Parks and Recreation Master Plan for multi-purpose trails, equestrian facilities, and bikeways.

Policy CR-6.4 - Promote existing and new traffic generators to incorporate facilities, such as bicycle racks and storage, into the development.

Goal CR-10 – A transportation system that promotes use by multiple modes of travel through Complete Streets.

Policy CR-10.1 - Establish model street network cross sections and design guidance that promote multimodal travel in Yorba Linda.

Policy CR-10.2 - Ensure future Complete Streets improvements are evaluated to ensure resident, bicyclist, equestrian, and pedestrian safety as a top priority.

Policy CR-10.3 - Promote incorporation of Complete Streets concepts when designing new roadways or making improvements to existing roadways in conjunction with new development.

Policy CR-10.4 - Promote and prioritize complete streets where improvements will demonstrably improve safety of sidewalk and bicycle access to schools.

Policy CR-10.5 - When developing model complete street cross sections, promote the participation of various user groups.

Policy CR-10.6 - Consider reducing the number of lanes where existing infrastructure or site conditions limits the ability to construct complete streets.

Policy CR-10.7 - Coordinate with the County of Orange for potential complete street improvements within the City's Sphere of Influence

Policy CR-10.8 - Ensure any future improvements to the transportation system are integrated with the city's existing and future bikeway and trail systems.

Policy CR-10.9 - Promote and prioritize complete streets where improvements to existing roadways will demonstrably improve integration with the City's bike and trail system

Policy CR-10.10 - Incorporate design features and other techniques to improve neighborhood multimodal capabilities for pedestrians.

Policy CR-10.11- Prioritize opportunities for complete streets integration into the General Plan Focus Areas.

Growth Management Element

Goal GM-2 – Reduced traffic congestion.

Policy GM-2.5 - Maintain consistency with the County of Orange Congestion Management Plan and Master Plan of Arterial Highways pursuant to the requirement of state law to continue to receive State gasoline sales tax revenues.

Mitigation Measures

Mitigation Measure AQ-2 (see Section 4.3, *Air Quality*).

Level of Significance After Mitigation

Less than significant.

5.7.5 Cumulative Impacts

Cumulative impacts would be less than significant. The increase in GHG emissions that could occur as a result of the implementation of the General Plan Update, the majority of which would be cause by increased motor vehicle use, still falls within that SCAQMD threshold of 6.6 6.6 $MTCO_2e$/SP. In addition,

Mitigation Measure AQ-2 (found in Section 5.3, *Air Quality*) and specific General Plan Update plans, policies, and regulations would not conflict with existing GHG reduction plans.

5.7.6 Significant Unavoidable Impacts

No significant unavoidable impacts are identified.