3.4 GREENHOUSE GAS EMISSIONS

This section analyzes the Fountain Valley Crossings Specific Plan Project (Project) impacts related to greenhouse gas emissions (GHGs). The section estimates the GHG emissions that would result from construction and operation of the Project, including generation of vehicle trips. Project-related GHG emissions are estimated using the California Emission Estimator Model (CalEEMod) computer model in order to assess conformance with defined thresholds. This modeling is revised to reflect an updated air pollutant modeling analysis using an updated version of CalEEMod (Version 2016.3.1), provide clarification in level of Project impacts to GHGs and reliance on identified mitigation measures, analyze Project GHG emissions against South Coast Air Quality Management District (SCAQMD) proposed Tier 4 threshold, expand discussion on the Project's compliance with adopted SCAQMD Rules, and analyze plans and programs adopted after release of the initial Notice of Preparation including the 2016-2040 Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (adopted in April 2016) and the Air Quality Management Plan (AQMP) (adopted in March 2017). The revised GHG emissions modeling is reflected throughout the setting and analysis, including Tables 3.4-1, 3.4-2, 3.4-3, 3.4-4, and 3.4-5. Appendix D has been updated to include the revised CalEEMod emissions calculations.

3.4.1 Environmental Setting

The Project area is located within the city blocks bounded by Ward Street to the west, Talbert Avenue to the north, the Santa Ana River to the east, and Ellis Avenue to the south. It is bisected by Interstate 405 (I-405) in the southeastern portion of the City of Fountain Valley (City). The City is located in west Orange County (County), and is bounded by the Cities of Huntington Beach to the west and southwest, Westminster, Garden Grove and Santa Ana to the north and east, and Costa Mesa to the southeast. The City is located within the South Coast Air Basin (Basin), with GHGs generated by a wide range of emission sources, including utilities, industry, and heavy vehicular traffic.

3.4.1.1 Overview of Climate Change

Climate change refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer. These changes are caused by a number of natural factors—oceanic processes, variations in solar radiation received by Earth, plate tectonics, and volcanic eruptions—as well as human-induced alterations. The primary anthropogenic driver of climate change is the release of GHGs into the atmosphere.

The Earth's atmosphere consists of a variety of gases that regulate the Earth's temperature by trapping solar energy and maintaining existing global average temperatures: these gases are cumulatively referred to as GHGs. Human activities, such as producing electricity and driving

internal combustion vehicles, have contributed to elevated concentration of these gases in the atmosphere. Since the industrial revolution, human production and release of GHGs has added enough GHGs to the atmosphere to result in an increase in average global temperatures. This change in the global climate may lead to a number of physical and environmental effects, such as changes in rainfall patterns, smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans.

3.4.1.2 Potential Effects of Global Climate Change

Climate change could result in a number of potential adverse effects including sea level rise, flooding and increased weather variability and intensified storm events, reduced reliability of water supplies, reduced quality of water supplies, and increased stress on ecosystems that would reduce biodiversity. Additionally, climate change may have impacts to human health due to heat waves and extreme weather events, reduced air quality, and increased climate-sensitive diseases, including food-borne, water-borne, and animal-borne diseases.

Adverse effects from climate change would be distributed all across the globe. Sensitive communities, such as low-lying nations that are more susceptible to impacts from sea level rise, may be more heavily impacted than communities in other regions; however, climate change may not have clearly definable impacts to a specific region or community. In other words, the effects of climate change would have global consequences, many of which are not site-specific.

3.4.1.3 Greenhouse Gases

GHGs consist of a variety of gases that have the potential to trap heat, mainly water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and chlorofluorocarbons (CFCs). Water vapor and ozone and their relationship to climate change are not clearly understood and defined, so these GHGs are not currently regulated. Therefore, methodologies and regulations approved by the Intergovernmental Panel on Climate Change (IPCC), United States Environmental Protection Agency (USEPA), and the California Air Resources Board (CARB) focus on CO_2, CH_4, N_2O, and CFCs. CFC production has been banned and CFCs have no natural source, so these GHGs are not included in this analysis. The following provides a brief description of each of the remaining GHGs and their sources:

CO_2 The natural production and absorption of CO_2 occurs through the burning of fossil fuels (e.g., oil, natural gas, and coal), solid waste, trees and wood products, and as a result of other chemical reactions, such as those required to manufacture cement. Globally, the largest source of CO_2 emissions is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, and industrial facilities. CO_2 is removed from the atmosphere (or sequestered) when it is absorbed by plants as part of the biological carbon cycle. When in balance, total CO_2 emissions and removals from the entire carbon cycle are roughly equal. Since the Industrial Revolution in the 1700s, human activities have increased CO_2 concentrations in the atmosphere by 31 percent as of 2013 (IPCC 2013a).

CH_4 CH_4 is emitted from a variety of both human-related (anthropogenic) and natural sources. Anthropogenic sources of CH_4 include the production and transport of coal, natural gas, and oil; CH_4 emissions from livestock and other agricultural practices; as well as emissions from the decay of organic waste in municipal solid waste landfills. It is estimated that 50 to 65 percent of global CH_4 emissions are related to human activities. Natural sources of CH_4 include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and wildfires (IPCC 2013b).

N_2O Concentrations of N_2O also began to rise at the beginning of the Industrial Revolution, reaching 324.2 parts per billion (ppb) by 2011. Microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen, produce N_2O. In addition to agricultural sources, some industrial processes (e.g., fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to the atmospheric load of N_2O (IPCC 2013a).

Because the impact each GHG has on climate change varies, the common metric of Carbon Dioxide Equivalents (CO_2e) is used to report a combined impact from all of the GHGs. This metric scales the global warming potential of each GHG to that of CO_2. GHG emissions are typically expressed in metric tons ($MTCO_2e$), million metric tons ($TgCO_2e$), or billion metric tons ($GtCO_2e$) (IPCC 2014; USEPA 2016).

3.4.1.4 Existing GHG Emissions from Human Activity

The burning of fossil fuels, such as coal and oil, especially for the generation of electricity and powering of motor vehicles, has led to substantial increases in CO_2 emissions (and thus substantial increases in atmospheric concentrations). In 2011, atmospheric CO_2 concentrations were found to have increased by more than 31 percent above the pre-industrial concentrations present prior to 1750 (IPCC 2013a).

Global GHG Emissions

As of 2014, global GHG emissions were estimated at 49 $GtCO_2e$ per year, with CO_2 making up 76 percent of the total anthropogenic GHG emissions. This is an overall increase in GHG emissions of 71 percent from the 28.7 $GtCO_2e$ of emissions in 1970 (IPCC 2014). Annual anthropogenic GHG emissions have increased by 10 $GtCO_2e$ between 2000 and 2010, with this increase directly coming from energy supply (47 percent), industry (30 percent), transport (11 percent), and building (3 percent) sectors. About two-thirds of cumulative anthropogenic CO_2 emissions between 1750 and 2010 have occurred in the last 40 years. From 1750 to 1970, cumulative CO_2 emissions from fossil fuel combustion and cement production were 420 $GtCO_2e$. From 1970 to 2010, that cumulative total tripled to 1300 $GtCO_2e$ (IPCC 2014).

U.S. GHG Emissions

In 2013, the U.S. emitted 6,673 $TgCO_2e$ of GHGs. Total U.S. emissions have increased by 5.9 percent from 1990 to 2013, and increased by 2.0 percent from 2012 to 2013. Fossil fuel combustion accounted for 93.7 percent of CO_2 emissions and 78.0 percent of total U.S. GHG

emissions in 2012. Of the five major sectors generating emissions through direct fossil fuel combustion—electricity generation, transportation, industrial, residential, and commercial—electricity generation accounts for approximately 40 percent and transportation accounts for 33.4 percent of these emissions. Approximately 82 percent of the energy consumed in the U.S. was produced through combustion of fossil fuels, while the remaining 18 percent came from other energy sources such as hydropower, biomass, nuclear, wind, and solar energy. In 2012, total GHG emissions by sector were 31 percent for the electric power industry, 27 percent for transportation, 21 percent for industry, 9 percent for agriculture, 6 percent for commercial, and 6 percent for residential[1] (USEPA 2016).

State of California GHG Emissions

In 2012, California generated approximately 459 $TgCO_2e$, or about 6.8 percent of total US emissions, second only to Texas. This is due primarily to the large population and geographic size of California compared to other states. By contrast, California has the fifth lowest per-capita GHG emission rates in the country, due to its mild climate and the success of its energy-efficiency and renewable energy programs. State commitments to these strategies and programs have lowered the state's GHG emissions rate of growth by more than half of what it would have been otherwise. Reductions in 2008 and 2009 have also been attributed to the economic recession and higher fuel prices, with marked declines in on-road transportation, cement production, and electricity consumption (CARB 2016a).

Transportation is the source of approximately 37 percent of the state's GHG emissions, followed by industrial sources at 22 percent, and electricity generation (both in-state and out-of-state) at 21 percent. Agricultural sources account for 8.3 percent, while residential and commercial sources account for 6.9 and 4.9 percent, respectively. The remaining 0.04 percent is attributed to unspecified sources (CARB 2016a).

Project Area Emissions

In the Project vicinity, sources of GHG emissions include motor vehicles and building energy needs, as well as the construction and maintenance of buildings, streets, and infrastructure. Automobiles, motorcycles, and trucks are the primary source of GHG emissions. GHG emissions in the Project area also occur from various stationary sources, such as mechanical equipment (e.g., HVAC systems) associated with buildings, the operation of various types of businesses, and sources at residential locations.

The Project area is currently occupied with various light industrial, retail, and office land uses that generate operational GHG emissions associated with the building's energy needs and vehicle trips generated by employees and visitors to the Project area. Existing Project area operational GHG emissions were modeled using CalEEMod with analysis of existing land uses currently onsite (see Table 3.4-1).

[1] The remaining 1 percent of emissions was generated by U.S. Territories.

Table 3.4-1. Estimated Existing Annual GHGs Emitted by the Project Area

Category	Annual GHG Emissions ($MTCO_2e$/year)
Area	~~0~~ 0.08
Energy	~~8,861~~ 9,049.92
Mobile	~~31,666~~ 26,553.54
Waste	~~1,628~~ 1,800.14
Water	~~3,286~~ 3,645.94
Construction (amortized)	0
Total	~~**45,441**~~ **41,049.62**

Note: Totals may differ slightly from CalEEMod output sheets due to rounding. This table has been updated from that provided in the pre-recirculation Final EIR released in April 2017 to reflect updated GHG emissions modeling using the most recently updated version of CalEEMod (Version 2016.3.1). Refer to the revised Appendix D for detailed CalEEMod output sheets.

The estimated annual operational GHG emissions associated with the existing uses at the Project area but at the buildout year of 2035 instead of 2016 have also been calculated using CalEEMod. The comparison of the Project's operational GHG emissions to "No Project" operational GHG emissions is discussed in Section 5.4.1, *No Project Alternative*.

3.4.2 Regulatory Framework

Global climate change is addressed through the efforts of various federal, state, regional, and local government agencies as well as national and international scientific and governmental conventions and programs. These agencies work jointly and individually to understand and regulate the effects of GHG emissions and resulting climate change through legislation, regulations, planning, policymaking, education, and a variety of programs. The significant agencies, conventions, and programs focused on global climate change are discussed below.

3.4.2.1 International/Federal Regulations

International Protocols

The US participated in the United Nations Framework Convention on Climate Change (UNFCCC) (signed on March 21, 1994). The Kyoto Protocol was the first treaty made under the UNFCCC on December 1, 1997 and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol were met, global GHG emissions could have been reduced by an estimated 5 percent from 1990 levels during the first commitment period of 2008–2012. The US has not ratified the Protocol and is not bound by the Protocol's commitments. The Kyoto Protocol expired at the end of 2012, and efforts are currently underway to negotiate a new agreement with broader international support. The 2015 United Nations Climate Change Conference was held in Paris, from November 30 to December 11, 2015. It was the 21st yearly session of the Conference of the Parties (COP 21) to the 1992 UNFCCC and the 11th session of the Meeting of the Parties to the 1997 Kyoto Protocol. The conference objective was to achieve a legally binding and universal agreement on climate, from all the nations of the world; 195 nations supported the agreement to

take steps to limit global temperature increase to 2 degrees Celsius, while aiming to keep the increase under 1.5 degrees Celsius. The Paris Agreement was opened for signature on April 22, 2016. At this ceremony, 174 States and the European Union signed the agreement and 15 States also deposited their instruments of ratification (UNFCCC 2016).

U.S. Environmental Protection Agency (USEPA)

The USEPA is responsible for implementing federal policy to address global climate change. The federal government administers a wide array of public-private partnerships to reduce U.S. GHG emissions. These programs focus on energy efficiency, renewable energy, methane and other non-CO_2 gases, agricultural practices, and implementation of technologies to achieve GHG reductions.

On May 13, 2010, the USEPA issued a Final Rule that took effect on January 2, 2011, setting a threshold of 75,000 $MTCO_2e$ per year for GHG emissions from major industrial facilities. The USEPA has not yet established a threshold for other sectors.

Federal Heavy-Duty National Program

In August 2011, the USEPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced the first-ever program to reduce GHG emissions and improve fuel efficiency of heavy-duty trucks and buses. The USEPA and the NHTSA have each adopted complementary standards under their respective authorities covering model years 2014-2018, which together form a comprehensive Heavy-Duty National Program. The goal of the joint rulemaking is to present coordinated federal standards that help manufacturers build single vehicle fleets and engines that are able to comply with both. The Heavy-Duty National Program is projected to reduce fuel use and GHG emissions from all types and sizes of work trucks and buses. Vehicles covered by this program comprise the transportation segment's second largest contributor to oil consumption and GHG emissions.

3.4.2.2 State Policies and Regulations

California Air Resources Board

The California Air Resources Board (CARB) a part of the California EPA, is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, CARB conducts research, sets state ambient air quality standards, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB has primary responsibility for the development of California's State Implementation Plan (SIP), for which it works closely with the federal government and the local air districts. CARB has also recently adopted a statewide GHG emissions limit for 2020 (427 $TgCO_2e$), an emissions inventory, and requirements to measure, track, and report GHG emissions by major industries (Office of Planning and Research [OPR] 2008).

Executive Order B-30-15

California Governor Brown announced on April 29, 2015 through Executive Order B-30-15 a new statewide policy goal to reduce GHG emissions 40 percent below their 1990 levels by 2030. This order acts as an intermediate goal to achieving 80 percent reductions by 2050 as outlined in Executive Order S-3-05 below.

Executive Order S-3-05

Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets:

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

Executive Order S-1-07

On January 18, 2007, Former California Governor Arnold Schwarzenegger established a requirement through Executive Order S-1-07 that a statewide Low Carbon Fuel Standard goal be established to reduce the carbon intensity of the California's transportation fuels by at least 10 percent by 2020.

Senate Bill 1078 and Executive Order S-14-08

Established in 2002 under Senate Bill 1078, accelerated in 2006 under Senate Bill 107 and expanded in 2011 under Senate Bill 2, California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020.

Assembly Bill 1493

Assembly Bill (AB) 1493 (Pavley) of 2002 (Health and Safety Code Sections 42823 and 43018.5) requires the California ARB to develop and adopt the nation's first GHG emissions standards, also known as Pavley 1, for automobiles. In 2004, the State of California submitted a request for a waiver from federal clean air regulations, as it is authorized to do under the Clean Air Act, to allow the state to require reduced tailpipe emissions of CO_2. In late 2007, the USEPA denied California's waiver request and declined to promulgate adequate federal regulations limiting GHG emissions. In early 2008, the state brought suit against the USEPA related to this denial. In January 2009, President Obama instructed the USEPA 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 USEPA granted California's waiver request, enabling the state to enforce its GHG emissions standards for new motor vehicles beginning with the current model year.

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

The California Global Warming Solutions Act of 2006 (AB 32) recognizes that California is a major contributor to U.S. GHG emissions. AB 32 acknowledges that such emissions cause significant adverse impacts to human health and the environment, and therefore must be identified and mitigated where appropriate. AB 32 also establishes a State goal of reducing GHG emissions to 1990 levels by 2020 – a reduction of approximately 30 percent from projected State emission levels and 15 percent from current State levels, with even more substantial reductions required in the future (OPR 2008).[2]

CARB has adopted the Climate Change Scoping Plan, which outlines the state's strategy to achieve the 2020 GHG limit set by AB 32. This Scoping Plan proposes a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California, improve the environment, reduce dependence on oil, diversify energy sources, save energy, create new jobs, and enhance public health.

Senate Bill 375

The adoption of SB 375 (Steinberg, Chapter 728, Statutes of 2008) on September 30, 2008 created a process whereby local governments and other stakeholders must work together within their region to achieve the reductions specified in AB 32 through integrated development patterns, improved transportation planning, and other transportation measures and policies.

On September 23, 2010, the ARB adopted the vehicular GHG emissions reduction targets that require a 7 to 8 percent reduction by 2020 and between 13 to 16 percent reduction by 2035 relative to emissions in 2005 for each metropolitan planning organization (MPO). ~~Southern California Council of Governments (~~SCAG~~)~~ is the MPO for the southern California region and is required to work with local jurisdictions. CARB has determined SCAG's reduction target for per capita vehicular emissions to be 8 percent by 2020 and 13 percent by 2035. SCAG recently completed and adopted the 2012-2035 RTP/SCS, which provides a number of Sustainable Communities Strategies (SCS) to achieve the GHG reduction goals of AB32. With the adopted RTP/SCS, SCAG's per capita reduction target (defined in the June 4, 2012 Executive Order G-12-039) is 9 percent by 2020 and 16 percent by 2035 and thus, would exceed CARB's GHG's established targets.

Senate Bill 97

Senate Bill (SB) 97, adopted in 2007, amended the California Environmental Quality Act (CEQA) to establish that GHG emissions and their effects are appropriate subjects for CEQA analysis, and directs the OPR to develop draft CEQA Guidelines for evaluating and mitigating GHG emissions and global climate change effects. In March 2010, the California Office of Administrative Law codified into law CEQA amendments that provide regulatory guidance with

[2] ARB has determined the statewide levels of GHG emissions in 1990 to be 427 $MTCO_2e$

respect to the analysis and mitigation of the potential effects of GHG emissions, as found in CEQA Guidelines Section 15183.4. The California Resources Agency adopted the Guidelines in January 2009 (OPR 2008).

Executive Order S-13-08

Executive Order S-13-08, the Climate Adaptation and Sea Level Rise Planning Directive, provides clear direction for how the state should plan for future climate impacts. The first result is the 2009 California Adaptation Strategy (CAS) report, which summarizes the best known science on climate change impacts in the state to assess vulnerability and outlines possible solutions that can be implemented within and across state agencies to promote resiliency.

California Code of Regulations (CCR) Title 24

CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to increase the baseline energy efficiency requirements. Although it was not originally intended to reduce GHG emissions, electricity production by fossil fuels results in GHG emissions and energy efficient buildings require less electricity. Therefore, increased energy efficiency results in decreased GHG emissions. The 2008 standards are the most recent version which went into effect on January 1, 2010.

CCR Title 24, Part 11: California's Green Building Standard Code (CALGreen) establishes mandatory green building code requirements as well as voluntary measures (Tier 1 and Tier 2) for new buildings in California. The mandatory provisions in CALGreen will reduce the use of volatile organic compound (VOC)-emitting materials, strengthen water efficiency conservation, increase construction waste recycling, and increase energy efficiency. Tier 1 and Tier 2 are intended to further encourage building practices that minimize the building's impact on the environment and promote a more sustainable design.

3.4.2.3 Regional Policies and Regulations

South Coast Air Quality Management District

The South Coast Air Quality Management District (SCAQMD) is the agency principally responsible for comprehensive air pollution control in the Los Angeles County area. In order to provide GHG emissions guidance to local jurisdictions within the South Coast Air Basin, the SCAQMD has organized a Working Group to develop GHG emission analysis guidance and thresholds.

As of the present date, the only regulation adopted by the SCAQMD addressing the generation of GHG emissions is the establishment of a 10,000 $MTCO_2e$ per year screening level threshold of significance for stationary/source/industrial projects for which the SCAQMD is the Lead Agency.

SCAQMD released a draft guidance document regarding interim CEQA GHG significance thresholds in October 2008. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for stationary sources (i.e., industrial projects) where the SCAQMD is the Lead Agency. SCAQMD proposed a tiered approach, whereby the level of detail and refinement needed to determine significance increases with a project's total GHG emissions. The tiered approach defines projects that are exempt under CEQA and projects that are within the jurisdiction of, and subject to the policies of, a GHG Reduction Plan as less than significant. This tiered approach is discussed in the following threshold section.

Air Quality Management Plan

SCAQMD and SCAG are the agencies responsible for preparing the Air Quality Management Plan (AQMP) for the Basin. The 2016~~2012~~ AQMP is designed to meet the state and Federal Clean Air Act planning requirements and focuses on ozone and fine particulate matter ($PM_{2.5}$) rather than GHGs. The 2016 AQMP represents a thorough analysis of existing and potential regulatory control options, includes available, proven, and cost-effective strategies, and seeks to achieve multiple goals in partnership with other entities promoting reductions in GHGs and toxic risk, as well as efficiencies in energy use, transportation, and goods movement. These planning efforts have substantially decreased the population's exposure to unhealthful levels of pollutants, even while substantial population growth has occurred within the Basin.

Southern California Association of Governments (SCAG) Regional Transportation Plan/ Sustainable Communities Strategy

SCAG has adopted the ~~Regional Transportation/Sustainable Communities Strategy (~~RTP/SCS~~)~~, which is the culmination of a multi-year effort involving stakeholders from across the SCAG region. The RTP/SCS includes a strong commitment to reducing emissions from transportation sources and emphasizes the crucial linkages and interrelationships between the economy, the regional transportation system, and land use. Strategies for achieving goals of available, safe, sustainable and affordable transportation include: 1) investing in bus, light rail and heavy rail

transit, passenger and high-speed rail, pedestrian and bicycle transportation corridors, infrastructure and transportation demand management (e.g., carpooling to reduce demand for individual transport); 2) encouraging public participation in the planning processes; and 3) educating the public about available transportation methods available in the region. As discussed above, CARB has determined SCAG's reduction target for per capital vehicular GHG emissions to be 8 percent by 2020 and 13 percent by 2035 relative to the 2005 baseline. In June 2016, CARB determined that SCAG's 2016–2040 RTP/SCS is consistent with their GHG reduction targets (CARB 2016b). Specifically, SCAG's plan is expected to help California meet and exceed its GHG reduction goals, with estimated reductions in per capita transportation emissions of 8 percent by 2020, 18 percent by 2035, and 21 percent by 2040.

3.4.2.4 Local Policies and Regulations

The City of Fountain Valley currently has no polices, plans, regulations, and thresholds of significance, or other municipal laws that directly address climate change.

3.4.3 Impact Assessment and Methodology

3.4.3.1 Thresholds of Significance

The 2016 CEQA Guidelines do not establish a quantitative threshold of significance for GHG impacts; instead, lead agencies have the discretion to establish such thresholds for their respective jurisdictions. GHG analysis is typically based on the cumulative impact of emissions. The following thresholds of significance are based on Appendix G of the 2016 CEQA Guidelines. For purposes of this EIR, impacts related to GHG emissions from the Project would be significant if the Project elements would:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment;

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing GHG emissions.

With regard to the first criteria, CEQA defines a "significant effect on the environment" as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the Project. With respect to global climate change, no one project can individually create a direct impact on what is a global problem (i.e., no project will, by itself, raise the temperature of the planet). As such, GHG analysis is typically based on the cumulative impact of GHG emissions.

Generally, the evaluation of an impact under CEQA requires measuring data from a project against a "threshold of significance." Further, the CEQA Guidelines clarify that "*when adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.*" For GHG emissions and global warming, there is not, at this time, one established, universally

agreed-upon "threshold of significance" by which to measure an impact. The 2016 CEQA Guidelines do not establish a threshold of significance for GHG impacts; instead lead agencies have the discretion to establish significance thresholds for their respective jurisdictions. A Lead Agency may look to thresholds developed by other public agencies or other expert entities, so long as the threshold chosen is supported by substantial evidence. SCAG, SCAQMD, and the City have not adopted a GHG significance threshold applicable to the development of non-stationary source projects. Therefore, guidance documents from other agencies and CEQA were evaluated for determining an appropriate significance threshold.

The significance threshold used for this EIR is based on methodologies proposed by the SCAQMD and methodologies adopted by other AQMDs. The SCAQMD has been evaluating GHG significance thresholds since April 2008. In December 2008, the SCAQMD adopted an interim 10,000 $MTCO_2e$ per year screening level threshold for stationary source/industrial projects for which the SCAQMD is the Lead Agency. The SCAQMD has continued to consider adoption of significance thresholds for residential and general development projects. The most recent proposal issued in September 2010 uses the following tiered approach to evaluate potential GHG impacts from various uses:

- Tier 1: Determine if CEQA categorical exemptions are applicable. If not, move to Tier 2.

- Tier 2: Consider whether or not the proposed project is consistent with a locally adopted GHG reduction plan that has gone through public hearings and CEQA review, that has an approved inventory, includes monitoring, etc. If not, move to Tier 3.

- Tier 3: Consider whether the project generates GHG emissions in excess of screening thresholds for individual land uses. The 10,000 $MTCO_2e$/year threshold for industrial uses would be recommended for use by all lead agencies. Under Option 1, separate screening thresholds are proposed for residential projects (3,500 $MTCO_2e$/year), commercial projects (1,400 $MTCO_2e$/year), and mixed-use projects (3,000 $MTCO_2e$/year). Under Option 2 a single numerical screening threshold of 3,000 $MTCO_2e$/year would be used for all non-industrial projects. If the project generates emissions in excess of the applicable screening threshold, move to Tier 4.

- Tier 4: Consider whether the project generates GHG emissions in excess of applicable performance standards for the project service population (population plus employment). The 2020 efficiency targets were established based on the goal of AB 32 to reduce statewide GHG emissions to 1990 levels by 2020. The 2035 targets were selected to be consistent with the GHG reduction target date of SB 375. The 2020 efficiency targets are 4.8 $MTCO_2e$/year per service population for project level analyses and 6.6 $MTCO_2e$/year per service population for plan level analyses. The 2035 targets are 3.0 $MTCO_2e$/year per service population for project level analyses and 4.1 $MTCO_2e$/year per service population for plan level analyses. If the project generates emissions in excess of the applicable efficiency targets, move to Tier 5.

- Tier 5: Consider the implementation of offsite mitigation (GHG reduction projects) to reduce GHG emission impacts to less than the proposed screening level. Any offsite mitigation measures that include purchase of offsets would require that the project provide offsets for the life of the project, which is defined as 30 years. If the project is unable to implement offsite GHG reduction mitigation measures to reduce GHG emission impacts to less than the screening level, then GHG emissions from the project would be considered significant. Since it is currently uncertain how offsite mitigation measures, including purchased offsets, interact with future AB 32 Scoping Plan measures, the SCAQMD would allow substitution of mitigation measures that include an enforceable commitment to provide mitigation prior to the occurrence of emissions.

The thresholds identified above have not been adopted by the SCAQMD or distributed for widespread public review and comment, and the working group tasked with developing the thresholds has not met since September 2010. The future schedule and likelihood of threshold adoption is uncertain. However, while not officially adopted by SCAQMD, the City has elected to use the SCAQMD proposed tiered approach. Because the Project involves both residential and commercial development, the numerical threshold of 3,000 $MTCO_2e$/year would apply. If the Project were to result in annual emissions that exceed the interim residential/commercial sector threshold, then the proposed Tier 4 threshold of 3.0 $MTCO_2e$/year per service population would apply in determining Project GHG impacts.

3.4.3.2 Methodology

GHG emissions associated with the construction and operation of the Project was estimated using the CalEEMod software. The methodology and assumptions used in this analysis are detailed below for construction and operation activities. GHG emissions estimates have been updated in the Partial Recirculated Draft EIR to use the latest version of CalEEMod, Version 2016.3.1, which includes updated assumptions on vehicle fleet mixes, Title 24 energy efficiency standards, utility intensity demand factors, etc. Default emission assumptions integrated applicable SCAQMD Rules and regulations for both construction and operation. Although buildout of the Project would result a net increase in new development on the site, CalEEMod estimates for existing Project area operational mobile emissions are higher than the Project buildout operational mobile emissions given CalEEMod assumes the use of "cleaner" vehicles and fleet mixes in the buildout year of 2035 of the Project, compared to the comparatively "dirty" vehicles in the existing year of 2016. Due to these factors, GHG emissions are estimated to be below previous calculations. Refer to Appendix D for updated model output and detailed calculations.

Construction

Construction equipment typically uses fossil fuels, which generates GHGs such as carbon dioxide, methane, and nitrous oxide. Methane may also be emitted during the fueling of heavy equipment. The raw materials used to construct new buildings can sequester carbon; however, demolition of structures can result in the gradual release of the carbon stored in waste building materials as those materials decompose in landfills. Since the exact nature of the origin or

make-up of the construction materials is unknown, only operation of construction vehicles and equipment is considered in the analysis of construction GHG emissions.

Based on current SCAQMD methodology, GHGs emitted during construction are amortized over an estimated 30-year project lifetime.

Operation

The following activities are typically associated with the operation of residential, retail, industrial, and commercial land uses that will contribute to the generation of GHG emissions:

Vehicular trips. Vehicle trips generated by the Project would result in GHG emissions through combustion of fossil fuels. Carbon dioxide emissions were determined based on the trip rates provided in the traffic analysis and assumed by CalEEMod, and average trip length for trips in the City. The GHG emissions estimates have been updated to include trip generation information in the revised Fountain Valley Crossroads Specific Plan Transportation Impact Analysis (TIA) in Appendix E prepared by Fehr & Peers and amended in September 2017. Revisions to the TIA in December 2017 to account for revised plans for improvement to the Ellis Avenue/Euclid Street & Southbound I-405 Ramp (see Section 8.0, *Response to Comments)* have not resulted in the need for revised analysis of Project-related GHG emissions, as revised intersection improvements have not affected assumptions regarding Project GHG emissions (i.e., traffic volume, distribution, development plans, construction schedule, etc.).

Onsite use of natural gas and other fuels. Natural gas would be used by the Project for heating of the industrial, commercial, and retail spaces, resulting in a direct release of GHGs. Estimated emissions from the combustion of natural gas and other fuels is based on the number of dwelling units and square footage of industrial, office, and retail space. CH_4 and N_2O emissions were estimated using the total vehicle miles traveled as determined by CalEEMod and USEPA emissions factors for on-road vehicles.

Electricity use. Electricity is generated by a combination of methods, which include combustion of fossil fuels. Use of electricity for operation of the Project would contribute to the indirect emissions associated with electricity production. Estimated emissions from the consumption of electricity is based on the number of dwelling units and square footage of industrial, office, and retail space, and standard electrical consumption rates from the CalEEMod software model.

Water use and Wastewater generation. The amount of water used and wastewater generated by a Project has indirect GHG emissions as a result of the energy used to supply, distribute and treat water and wastewater. In addition to the indirect GHG emissions associated with energy use, wastewater treatment can directly emit both methane and nitrous oxide depending on the treatment method.

Solid waste. Emissions calculated for solid waste reflect the indirect GHG emissions associate with waste that is disposed of at a landfill. Disposal rates from the California Department of Resources Recycling and Recovery (CalRecycle) are used to estimate amount of disposal for individual land uses. GHG emissions associated with the decomposition of waste are quantified

based on amount of degradable organic carbon. CO_2 emissions are also quantified based on associated methane, if applicable.

3.4.4 Project Impacts and Mitigation Measures

Impact GHG-1 Description

GHG-1 The Project would generate GHG emissions from both mobile and operational sources, as well as short-term GHG emissions from construction that could have a significant effect on the environment (*Less than Significant ~~with Mitigation~~*).

Construction-related GHG emissions are difficult to quantify as the details of construction, design/size, and timing of each individual development within the Project is unknown at this time. However, as a reasonable worst-case scenario, GHG emissions associated with the Project were estimated for construction, operation, and related transportation using full buildout numbers and a construction timeline assuming chronological order of construction phases. Total annual emissions for construction and operation of the Project were modeled using CalEEMod, and detailed assumptions and data can be found in Appendix D.

Per current SCAQMD methodology, construction-related GHG emissions were amortized over an anticipated 30-year period to provide an average annual estimate (see Table 3.4-2). Construction activities for the Project would result in temporary GHG emissions.

Table 3.4-2. Unmitigated GHG Emissions from Construction of the Project

	~~Annual~~ GHG Emissions ($MTCO_2e$/year)
Maximum Annual GHG Emissions	~~2,415.22~~ 2,419.92
Total **GHG Emissions**	~~30,822.65~~ 30,886.91
Amortized over 30 years	**~~1,027.42~~ 1,029.56**

Note: Refer to Appendix D for detailed CalEEMod output sheets. This table has been updated from that provided in the pre-recirculation Final EIR released in April 2017 to reflect updated air pollutant modeling using the most recently updated version of CalEEMod (Version 2016.3.1), as well as implementation and compliance with SCAQMD rules and regulations.

Direct operational emissions from the Project would result from increased use of natural gas as a result of daily operational activities, as well as from vehicle fuel from increased personal vehicle trips. Indirect operational emissions would result from the consumption of electricity for use in residential, commercial, and industrial land uses, as well as electricity used for transportation. Other indirect operational emissions would be related to increased landfill emissions due to greater solid waste generation, and increased electricity used for water pumping to supply greater water demand. Operation-related GHG emissions were split into emission categories and totaled to provide an average annual estimate. For comparative purposes, existing GHGs (see Table 3.4-1) were compared to the proposed Project's estimated GHG emissions shown below to determine net new emissions (see Table 3.4-3). The Project also contains mechanisms to reduce GHG emissions, such as measures to meet or exceed Title 24 energy efficiency standards, Transportation Demand Management (TDM) Measures,

bicycle and pedestrian facilities, and amenities to encourage non-motorized transportation. Further, as described in Section 3.2, *Air Quality*, the Project is required to comply with SCAQMD Rules regarding the use of low VOC architectural coatings, idling of equipment, and prohibitions on the installation of wood burning stoves and hearth fireplaces.

Table 3.4-3. Unmitigated Net New GHG Emissions from Operation of the Project

Category	Existing (2016) Operational Annual GHG Emissions ($MTCO_2e$/year)	Project Operational Annual GHG Emissions ($MTCO_2e$/year)	Net Annual GHG Emissions ($MTCO_2e$/year)
Area	0.08	~~126.26~~ 127.16	~~126.18~~ 127.08
Energy	9,049.92	~~19,483.51~~ 19,557.24	~~10,433.59~~ 10,507.32
Mobile	26,553.54	~~18,417.38~~ 18,435.08	~~-8,136.16~~ -8,118.46
Waste	1,800.14	~~776.12~~ 1,922.79	~~-1,024.02~~ 122.65
Water	3,645.94	~~3,691.37~~ 4,401.08	~~-45.43~~ 755.14
Total	**41,049.62**	**~~42,494.64~~ 44,443.36**	**~~1,445.02~~ 3,393.74**

Note: Totals may differ slightly from CalEEMod output sheets due to rounding. Refer to the revised Appendix D for detailed ~~680~~CalEEMod output sheets. This table has been updated from that provided in the pre-recirculation Final EIR released in April 2017 to reflect updated air pollutant modeling using the most recently updated version of CalEEMod (Version 2016.3.1), as well as implementation and compliance with SCAQMD rules and regulations.

Table 3.4-4. Total Unmitigated Net New GHG Emissions from Construction and Operation of the Project

Category	Net Annual GHG Emissions ($MTCO_2e$/year)
Construction (amortized)	~~1,027.42~~ 1,029.56
Operation	~~1,445.02~~ 3,393.74
Total	**~~2,472.44~~ 4,423.30**

Note: Refer to Appendix D for detailed CalEEMod output sheets. This table has been updated from that provided in the pre-recirculation Final EIR released in April 2017 to reflect updated air pollutant modeling using the most recently updated version of CalEEMod (Version 2016.3.1), as well as implementation and compliance with SCAQMD rules and regulations.

~~**Table 3.4-5. Mitigated GHG Emissions from Construction of the Project**~~

	~~Annual GHG Emissions ($MTCO_2e$/year)~~
~~**Total**~~	~~28,888~~
~~**Amortized over 30 years**~~	~~**963**~~

~~Note: Refer to Appendix D for detailed CalEEMod output sheets.~~

Per current SCAQMD methodology, the maximum annual GHG emissions for the construction and operation of the Project are estimated to be ~~2,472.44~~ 4,423.30 $MTCO_2e$, which is ~~well below~~ ~~exceeds the City's~~ above SCAQMD's Tier 3 Option 2 screening threshold for mixed-use projects of 3,000 $MTCO_2e$/year threshold, ~~as well as~~ but below the 10,000 $MTCO_2e$/year threshold for industrial projects. ~~Therefore, Project impacts related to GHG emissions are *less than significant.*~~

~~Although~~ Given the Project ~~not~~ exceeds the applicable Tier 3 threshold of 3,000 $MTCO_2e$/year, per SCAQMD methodology, Project net annual GHG emissions ~~and does not~~ ~~need to~~ must be compared to the Tier 4 threshold. Since an updated 2035 target threshold of 3.0 $MTCO_2e$/year per service population for project level analyses was recently proposed, the Project was also conservatively analyzed against this threshold (see Table 3.4-5).

Table 3.4-5. Combined Annual GHG Emissions for the Project Compared to SCAQMD Tier 4 Threshold

Annual GHG Emissions by Category	GHG Emissions ($MTCO_2e$/year)
Net Operational Emissions	~~1,455.02~~ 3,393.74
Construction Emission (Amortized over 30 years)	~~1,027.42~~ 1,029.56
Total Combined Emissions	~~2,472.22~~ 4,423.30
Service Population (employees + residents)	3,507
Emissions per Service Populations ($MTCO_2e$/year)	~~**0.7**~~ **1.26**
GHG Emission Tier 4 Threshold	3.0
Above Threshold?	**No**

Notes: The service population for the Project was calculated by considering the estimated new employment and residential population generated by buildout of the proposed Project. See Section 3.9, *Population and Housing.*

As indicated in Table 3.4-5 above, the Project's combined annual GHG emissions per service population are ~~0.7~~ 1.26 $MTCO_2e$/year per service population and would not exceed the 2035 3.0 $MTCO_2e$/year per service population threshold. Therefore, Project impacts related to GHG emissions are *less than significant*.

Mitigation Measures

No mitigation required.[3]

~~With the input of applicable mitigation measures into CalEEMod, the following reduction in GHG emissions resulted (see Table 3.4-6).~~

~~**Table 3.4-6. Mitigated Net New GHG Emissions from Operation of the Project**~~

~~Category~~	~~Annual GHG Emissions ($MTCO_2e$/year)~~
~~**Area**~~	~~110~~
~~**Energy**~~	~~1,887~~

[3] Revisions to this discussion have been made to provide clarification in the identification and classification of Project impacts related to construction air pollutant emissions. As discussed in the description of Impact GHG-1, impacts of the Project from the generation of construction and operational GHG emissions are below adopted thresholds of significance, and mitigation is not required to reduce Project impacts to a less than significant level.

Mobile	-5,586
Waste	-1,193
Water	14
Total	**-4,768**

Note: Totals may differ slightly from CalEEMod output sheets due to rounding. Refer to Appendix D for detailed CalEEMod output sheets.

Table 3.4-7. Total Mitigated Net New GHG Emissions from Construction and Operation of the Project

Category	Annual GHG Emissions ($MTCO_2e$/year)
Construction (amortized)	963
Operation	-4,768
Total	**-3,805**

Note: Refer to Appendix D for detailed CalEEMod output sheets.

After mitigation, total mitigated GHG emissions of -3,805 $MTCO_2e$/year are well under the SCAQMD threshold of 10,000 $MTCO_2e$/year. A negative value resulted due to the mitigation measures applied to the Project, as well as CalEEMod's assumption of the use of "cleaner" vehicles in the buildout year of 2015 2035 compared to vehicles in the existing year of 2016. Detailed CalEEMod assumptions and results can be found in Appendix D.

With the implementation of mitigation measures detailed below, impacts to the environment from direct and indirect GHG emissions would be *less than significant with mitigation*.

Mitigation Measures

MM AQ-1a through AQ-1e shall apply.

MM GHG-1. *The Project shall include, but not be limited to, the following measures. These measures shall be incorporated into the Project design and plans to ensure consistency with adopted statewide plans and programs. The Applicant shall demonstrate the incorporation of Project design features prior to the issuance of building permits and acceptance of the Development Plan by the City.*

Transportation

- *To the greatest extent feasible, ensure new development within the Project area implements City programs to reduce GHG emissions, including requiring preparation of transportation demand management (TDM) plans for new development, which provide incentives to employees to carpool/vanpool, use public transportation, telecommute, walk, bike, as well as other approaches to reduce vehicle trips. Further, priority parking shall be assigned for car- and van-pooling employees, as supported by the City's TDM program requirements.*
- *Provide pedestrian connections to the offsite circulation network.*
- *Provide amenities for non-motorized transportation (i.e., secure bicycle storage, changing rooms, and showers).,*

- ~~*Limit idling time for commercial vehicles, including delivery and construction vehicles.*~~

~~*Energy Efficiency*~~

- ~~*Design buildings to be energy efficient, 25 percent above Title 24 requirements.*~~
- ~~*Install light colored "cool" roofs and cool pavements, and strategically placed shade trees.*~~
- ~~*Install high efficiency lighting (25 percent reduction in lighting energy), and energy efficient heating and cooling systems.*~~
- ~~*Reduce unnecessary outdoor lighting.*~~

~~*Area Efficiency*~~

- ~~*Install natural gas hearths.*~~
- ~~*Use low VOC cleaning supplies.*~~
- ~~*Use zero VOC paint for architectural coatings.*~~

~~*Water Conservation and Efficiency*~~

- ~~*Install water-efficient irrigation systems.*~~
- ~~*Utilize reclaimed and grey water for both indoor and outdoor uses.*~~
- ~~*Comply with Municipal Code Section 21.20.050, Landscape Standards.*~~
- ~~*Install water-efficient fixtures (e.g. faucets, toilets, showers).*~~

~~*Solid Waste*~~

- ~~*Reuse and recycle construction and demolition waste (including, but not limited to: soil, vegetation, concrete, lumber, metal, and cardboard).*~~
- ~~*Provide interior and exterior storage areas for recyclables and adequate recycling containers located in public areas.*~~
- ~~*Institute recycling and composting services to reduce 75 percent of waste.*~~

~~***Residual Impact***~~

~~After the implementation of mitigation measures above, residual impacts would be *less than significant.*~~

Impact GHG-2 Description

GHG-2 The Project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs (*Less than Significant*).

The City does not currently have an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. ~~Also, with the implementation of the mitigation~~

~~measures described above, the Project would include design features to reduce energy and water consumption, reduce vehicle trips, and reduce area emissions.~~ The Project would not hinder the state's GHG reduction goals established by AB 32 and SB 375 and as provided above, the Project would result in GHG emissions that are below adopted regional 2035 GHG reduction goals. Transportation-related GHG emissions are the largest sector of emissions from the Project. Regional plans, such as the 2016-2040 SCAG RTP/SCS, focus on an integrated land use and transportation strategy to reduce GHG emissions. The purpose of the SCAG RTP/SCS is to achieve the regional per capita GHG reduction targets for the passenger vehicle and light-duty truck sector established by CARB pursuant to SB 375. The Project's diverse mix of uses would help promote a reduction in vehicle miles traveled (VMT) and GHG emissions. Consistent with SCAG's 2016-2040 RTP/SCS alignment of transportation, land use, and housing strategies, the Project site is an infill location and would provide residential and commercial uses in walking distance to proposed recreational uses, entertainment, and commercial retail, which would result in reduced VMT, as compared to a project of similar size and land uses at a more suburban location. Additional discussion of Project consistency with the goals and policies of SCAG's 2016-2040 RTP/SCS is provided in Section 3.7, *Land Use and Planning Policies* (see Table 3.7-1).

Therefore, the Project would not conflict with any applicable plan, policy, or regulation pertaining to GHGs, and the impact would be *less than significant*.

Mitigation Measures

No mitigation required.

3.4.4.1 Cumulative Impacts

Analysis of GHG emissions is cumulative in nature because impacts are caused by cumulative global emissions. Additionally, climate change impacts related to GHG emissions do not necessarily occur in the same area as the Project is located. Therefore, the preceding analysis is inherently related to cumulative impacts of GHG emissions, and in this analysis the Project is found to have a *less than significant ~~with mitigation~~* impact.