

## 3.2 GREENHOUSE GASES

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### INTRODUCTION

Global climate change refers to changes in average climatic conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation, and storms. Global warming, which is a part of climate change, is the observed increase in average temperature of the Earth's surface and atmosphere. One identified cause of global warming is an increase of greenhouse gas (GHG) emissions in the atmosphere. GHGs are those compounds in the Earth's atmosphere that play a critical role in determining the Earth's surface temperature. Specifically, GHGs allow the sun's rays to enter the Earth's atmosphere, but trap the energy that radiates back from the Earth to space, resulting in a warming of the atmosphere. The increase in net earthward movement of this radiation is known as the "greenhouse effect."

This section describes the current state of the regulations and programs addressing GHG emissions and global climate change in California. This section identifies the plans and policies developed by federal, state, and local authorities to reduce GHG emissions. This section identifies and discusses inventories of GHG emissions associated with implementation of the proposed project, evaluates the project's potential global climate change impacts, and identifies mitigation measures to reduce potential impacts. GHG emission calculations conducted for the proposed project are contained within **Appendix 3.2** of this EIR.

Implementation of the project would result in increased GHG emissions associated with car traffic from each of the 13 displacement events. The proposed project is estimated to emit maximum net emissions of approximately 8,555 metric tons of carbon dioxide equivalents (MTCO<sub>2e</sub>) per year, or 2.14 MTCO<sub>2e</sub> per service person (SP) per year, without the implementation of GHG-reducing project design features and mitigation measures. The proposed project's GHG emissions would be below the draft SCAQMD GHG threshold of 4.8 MTCO<sub>2e</sub> per SP per year. The Project would also incorporate objectives and GHG-reduction measures consistent with the goals, strategies, and control measures established under AB 32. Therefore, the project would have a less than significant impact on global climate change.

## EXISTING CONDITIONS

### Background

The natural process through which heat is retained in the troposphere<sup>1</sup> is called the greenhouse effect. The greenhouse effect traps heat in the troposphere through a three-fold process: (1) short-wave radiation in the form of visible light emitted by the Sun is absorbed by the Earth as heat; (2) long-wave radiation re-emitted by the Earth; and (3) greenhouse gases (GHGs) in the atmosphere absorbing or trapping the long-wave radiation and re-emitting it back towards the Earth and into space. Human activities that affect this third process are the focus of current climate change actions.

While water vapor and carbon dioxide (CO<sub>2</sub>) are the most abundant GHGs, other trace GHGs have a greater ability to absorb and re-radiate long-wave radiation. Scientists have established a Global Warming Potential (GWP) to gauge the potency of each GHG's ability to absorb and re-emit long-wave radiation. The GWP of a gas is determined using CO<sub>2</sub> as the reference gas with a GWP of 1 over 100 years. For example, a gas with a GWP of 10 is 10 times more potent than CO<sub>2</sub> over 100 years. The sum of each GHG multiplied by its associated GWP is referred to as carbon dioxide equivalents or CO<sub>2</sub>e. State law defines GHGs to include the following compounds:<sup>2</sup>

- **Carbon Dioxide (CO<sub>2</sub>).** CO<sub>2</sub> is primarily generated from fossil fuel combustion from stationary and mobile sources. CO<sub>2</sub> is the reference gas (GWP of 1) for determining the GWPs of other GHGs.
- **Methane (CH<sub>4</sub>).** CH<sub>4</sub> is emitted from biogenic sources (i.e., resulting from the activity of living organisms), incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. The GWP of methane is 21.
- **Nitrous Oxide (N<sub>2</sub>O).** N<sub>2</sub>O produced by human-related sources including agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of nitrous oxide is 310.
- **Hydrofluorocarbons (HFCs).** HFCs are typically used as refrigerants in both stationary refrigeration and mobile air conditioning. The GWPs of HFCs ranges from 140 for HFC-152a to 11,700 for HFC-23.
- **Perfluorocarbons (PFCs).** PFCs are compounds consisting of carbon and fluorine. They are primarily created as a byproduct of aluminum production and semiconductor manufacturing. The GWPs of PFCs range from 5,700 to 11,900.

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<sup>1</sup> The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface to 10 to 12 kilometers.

<sup>2</sup> All Global Warming Potentials are given as 100-year values. Unless noted otherwise, all Global Warming Potentials were obtained from the Intergovernmental Panel on Climate Change. *Climate Change 1995: The Science of Climate Change – Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge (UK): Cambridge University Press, 1996.

- **Sulfur Hexafluoride (SF<sub>6</sub>).** SF<sub>6</sub> is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. Sulfur hexafluoride has a GWP of 23,900. It is not prevalent in the atmosphere (4 parts per trillion [ppt] in 1990 versus 365 parts per million [ppm] of CO<sub>2</sub>).<sup>3</sup>

The primary GHGs of concern relative to the proposed project are CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. These three GHGs are generally emitted from combustion activities. HFCs are associated with refrigeration and air conditioning and are accounted for in this analysis with respect to motor vehicle air conditioning system leakage. The other GHGs listed above are related to specific industrial uses and are not anticipated to be emitted in measurable quantities by the project.

### State of California Greenhouse Gas Emissions Inventory

The California Air Resources Board (CARB) compiles GHG inventories for the State of California. Based on the 2009 GHG inventory data (i.e., the latest year for which data are available), California emitted 453 million metric tons of CO<sub>2</sub> equivalent (MMTCO<sub>2</sub>e) (including emissions resulting from imported electrical power) in 2009.<sup>4</sup> Based on the CARB inventory data, California's total statewide GHG emissions rank second in the United States (Texas is number one) with emissions of 405 MMTCO<sub>2</sub>e (excluding emissions related to imported power).<sup>5</sup>

The primary contributors to GHG emissions in California are transportation, electric power production from both in-state and out-of-state sources, industry, agriculture and forestry, and other sources, which include commercial and residential activities. **Table 3.2-1, GHG Emissions in California**, provides a summary of GHG emissions reported in California in 1990 and 2009 separated by categories defined by the United Nations Intergovernmental Panel on Climate Change (IPCC).

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<sup>3</sup> US Environmental Protection Agency, "High GWP Gases and Climate Change," <http://www.epa.gov/highgwp/scientific.html#sf6>. n.d.

<sup>4</sup> California Air Resources Board, "California Greenhouse Gas 2000-2009 Inventory by Scoping Plan Category - Summary," <http://www.arb.ca.gov/cc/inventory/data/data.htm>. 2012.

<sup>5</sup> Ibid.

**Table 3.2-1  
GHG Emissions in California**

<b>Source Category</b>	<b>1990 (MMTCO<sub>2</sub>e)</b>	<b>Percent of Total</b>	<b>2009 (MMTCO<sub>2</sub>e)</b>	<b>Percent of Total</b>
<b>ENERGY</b>	<b>386.41</b>	<b>89.2%</b>	<b>389.05</b>	<b>85.2%</b>
Energy Industries	157.33	36.3%	148.87	32.6%
Manufacturing Industries & Construction	24.24	5.6%	18.24	4.0%
Transport	150.02	34.6%	172.07	37.7%
Other (Residential/Commercial/Institutional)	48.19	11.1%	44.68	9.8%
Non-Specified	1.38	0.3%	0.00	0.0%
Fugitive Emissions from Oil & Natural Gas	2.94	0.7%	3.76	0.8%
Fugitive Emissions from Other Energy Production	2.31	0.5%	1.44	0.3%
<b>INDUSTRIAL PROCESSES &amp; PRODUCT USE</b>	<b>18.34</b>	<b>4.2%</b>	<b>28.07</b>	<b>6.1%</b>
Mineral Industry	4.85	1.1%	3.63	0.8%
Chemical Industry	2.34	0.5%	0.12	0.0%
Non-Energy Products from Fuels & Solvent Use	2.29	0.5%	1.70	0.4%
Electronics Industry	0.59	0.1%	0.78	0.2%
Substitutes for Ozone Depleting Substances	0.04	0.0%	14.51	3.2%
Other Product Manufacture and Use	3.18	0.7%	1.65	0.4%
Other	5.05	1.2%	5.68	1.2%
<b>AGRICULTURE, FORESTRY, &amp; OTHER LAND USE</b>	<b>19.11</b>	<b>4.4%</b>	<b>29.67</b>	<b>6.5%</b>
Livestock	11.67	2.7%	19.64	4.3%
Land	0.19	0.0%	0.19	0.0%
Aggregate Sources & Non-CO <sub>2</sub> Sources on Land	7.26	1.7%	9.84	2.2%
<b>WASTE</b>	<b>9.42</b>	<b>2.2%</b>	<b>9.98</b>	<b>2.2%</b>
Solid Waste Disposal and Biological Treatment	6.26	1.4%	7.32	1.6%
Wastewater Treatment & Discharge	3.17	0.7%	2.66	0.6%
<b>EMISSIONS SUMMARY</b>				
Gross California Emissions	433.29		456.77	
Sinks from Forests and Rangelands	-6.69		-3.80	
Net California Emissions	426.60		452.97	

## Sources:

<sup>1</sup> California Air Resources Board, "California Greenhouse Gas 1990-2004 Inventory by IPCC Category - Summary," <http://www.arb.ca.gov/cc/inventory/archive/archive.htm>. 2011.

<sup>2</sup> California Air Resources Board, "California Greenhouse Gas 2000-2009 Inventory by IPCC Category - Summary," <http://www.arb.ca.gov/cc/inventory/data/data.htm>. 2012.

Between 1990 and 2009, the population of California grew by approximately 8.5 million (from 29.8 to 38.3 million).<sup>6</sup> This represents an increase of approximately 29 percent from 1990 population levels. In addition, the California economy, measured as gross state product, grew from \$773 billion in 1990 to \$1.85 trillion in 2009 representing an increase of approximately 139 percent (over twice the 1990 gross state product).<sup>7</sup> Despite the population and economic growth, California's net GHG emissions only grew by approximately 6 percent. The CEC attributes the slow rate of growth to the success of California's renewable energy programs and its commitment to clean air and clean energy.<sup>8</sup>

### *Global Ambient CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O Concentrations*

Air trapped by ice has been extracted from core samples taken from polar ice sheets to determine the global atmospheric variation of carbon dioxide, methane, and nitrous oxide from before the start of the industrialization, around 1750, to over 650,000 years ago. For that period, it was found that carbon dioxide concentrations ranged from 180 ppm to 300 ppm. For the period from around 1750 to the present, global carbon dioxide concentrations increased from a pre-industrialization period concentration of 280 ppm to 379 ppm in 2005, with the 2005 value far exceeding the upper end of the pre-industrial period range.<sup>9</sup> Recent values continue this upward trend. Global methane and nitrous oxide concentrations show similar increases for the same period (see **Table 3.2-2, Comparison of Global Pre-Industrial and Current GHG Concentrations**).

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<sup>6</sup> US Census Bureau, "Data Finders," <http://www.census.gov/>. 2009; California Department of Finance, "E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark," <http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2001-10/>. 2010.

<sup>7</sup> California Department of Finance, "Financial & Economic Data: Gross Domestic Product, California," [http://www.dof.ca.gov/HTML/FS\\_DATA/LatestEconData/FS\\_Misc.htm](http://www.dof.ca.gov/HTML/FS_DATA/LatestEconData/FS_Misc.htm). 2012. Amounts are based on current dollars as of the data of the report (July 2011).

<sup>8</sup> California Energy Commission, *Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004*, (2006).

<sup>9</sup> California Energy Commission, *Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004*, (2006).

**Table 3.2-2**  
**Comparison of Global Pre-Industrial and Current GHG Concentrations**

<b>Greenhouse Gas</b>	<b>Natural Range for Last 650,000 Years<sup>1</sup> (ppm)</b>	<b>Year 1750 Concentrations (Early Industrial Period)<sup>1</sup> (ppm)</b>	<b>Year 2005 Concentrations<sup>1</sup> (ppm)</b>	<b>Year 2012 Concentrations<sup>2,3</sup> (ppm)</b>
Carbon Dioxide (CO <sub>2</sub> )	180 to 300	280	379	394
Methane (CH <sub>4</sub> )	0.320 to 0.790	0.715	1.774	1.871 / 1.750
Nitrous Oxide (N <sub>2</sub> O)	0.180 to 0.260	0.270	0.319	0.323 / 0.322

*Sources:*

<sup>1</sup> Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis*, (2007) 3, 100.

<sup>2</sup> Dr. Pieter Tans, National Oceanic and Atmospheric Administration (NOAA)/Earth System Research Laboratory (ESRL), "Trends in Atmospheric Carbon Dioxide," <http://www.esrl.noaa.gov/gmd/ccgg/trends>. 2012. This represents the global average as of March 2012.

<sup>3</sup> Carbon Dioxide Information Analysis Center, "Recent Greenhouse Gas Concentrations," [http://cdiac.ornl.gov/pns/current\\_ghg.html](http://cdiac.ornl.gov/pns/current_ghg.html). 2012. The first value for CH<sub>4</sub> and N<sub>2</sub>O represents Mace Head, Ireland, a mid-latitude Northern-Hemisphere site, and the second value represents Cape Grim, Tasmania, a mid-latitude Southern-Hemisphere site.

## *Effects of Global Climate Change*

The primary effect of global climate change has been a rise in the average global tropospheric temperature of 0.2° Celsius per decade, determined from meteorological measurements worldwide between 1990 and 2005.<sup>10</sup> Climate change modeling using 2000 emission rates shows that further warming is likely to occur, which would induce further changes in the global climate system during the current century.<sup>11</sup> Changes to the global climate system and ecosystems and to California could include:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures;<sup>12</sup>
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets;<sup>13</sup>

<sup>10</sup> Intergovernmental Panel on Climate Change, "Climate Change 2007: The Physical Science Basis, Summary for Policymakers," [http://ipcc-wg1.ucar.edu/wg1/docs/WG1AR4\\_SPM\\_PlenaryApproved.pdf](http://ipcc-wg1.ucar.edu/wg1/docs/WG1AR4_SPM_PlenaryApproved.pdf). (2007).

<sup>11</sup> IPCC, "Climate Change 2007: The Physical Science Basis, Summary for Policymakers," (2007).

<sup>12</sup> IPCC, "Climate Change 2007: The Physical Science Basis, Summary for Policymakers," (2007).

<sup>13</sup> IPCC, "Climate Change 2007: The Physical Science Basis, Summary for Policymakers," (2007).

- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns; and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;<sup>14</sup>
- Declining Sierra snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years;<sup>15</sup>
- Increasing the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21<sup>st</sup> century;<sup>16</sup>
- Increasing the potential for erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Delta and associated levee systems due to the rise in sea level;<sup>17</sup>
- Increasing pest infestation making California more susceptible to forest fires;<sup>18</sup> and
- Increasing the demand for electricity by 1 to 3 percent by 2020 due to rising temperatures resulting in hundreds of millions of dollars in extra expenditures.<sup>19</sup>

In 2009, the California Natural Resources Agency (CNRA) published the *California Climate Adaptation Strategy*<sup>20</sup> as a response to the Governor's Executive Order S-13-2008. The CNRA report lists specific recommendations for state and local agencies to best adapt to the anticipated risks posed by a changing climate. In accordance with the *California Climate Adaptation Strategy*, the California Energy Commission (CEC) was directed to develop a website on climate change scenarios and impacts that would be beneficial for local decision makers.<sup>21</sup> The website, known as Cal-Adapt, became operational in 2011.<sup>22</sup> According to the Cal-Adapt website, the project region could experience an average increase in temperature of approximately 5 to 10 percent (about 3.5 to 6.1° Fahrenheit) by 2070 through 2090, compared to the baseline 1961 through 1990 period. According to the Cal-Adapt website, these numbers represent a projection of potential future climate scenarios. The data are comprised of the average values

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14 IPCC, "Climate Change 2007: The Physical Science Basis, Summary for Policymakers," (2007).

15 California Environmental Protection Agency, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, (2006).

16 California EPA, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger*, (2006).

17 California EPA, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger*, (2006).

18 California EPA, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger*, (2006).

19 California EPA, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger*, (2006).

20 California Natural Resources Agency, Climate Action Team, *2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008*, (2009).

21 California Natural Resources Agency, *2009 California Climate Adaptation Strategy*, (2009). 9

22 The Cal-Adapt website address is: <http://cal-adapt.org>.

from a variety of scenarios and models and is meant to illustrate how the climate may change based on a variety of different potential social and economic factors.

## REGULATORY FRAMEWORK

### Federal

The US Environmental Protection Agency (EPA) adopted a mandatory GHG reporting rule in September 2009. The rule would require suppliers of fossil fuels or entities that emit industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions to submit annual reports to the US EPA beginning in 2011 (covering the 2010 calendar year emission). Vehicle and engine manufacturers began reporting GHG emissions for model year 2011.

On September 15, 2009, the US EPA and the Department of Transportation's (DOT) National Highway Traffic Safety Administration (NHTSA) issued a joint proposal to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. The proposed standards would be phased in and would require passenger cars and light-duty trucks to comply with a declining emissions standard. In 2012, passenger cars and light-duty trucks would have to meet an average emissions standard of 295 grams of CO<sub>2</sub> per mile and 30.1 miles per gallon.<sup>23</sup> By 2016, the vehicles would have to meet an average standard of 250 grams of CO<sub>2</sub> per mile and 35.5 miles per gallon.<sup>24</sup> The final standards were adopted by the US EPA and DOT on April 1, 2010.

On December 7, 2009, the US EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

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<sup>23</sup> US Environmental Protection Agency, "EPA and NHTSA Propose Historic National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks," <http://epa.gov/otaq/climate/regulations/420f09047a.htm>. 2009.

<sup>24</sup> US EPA, "EPA and NHTSA Propose Historic Nation Program," 2009.

While these findings do not impose additional requirements on industry or other entities, this action is a prerequisite to finalizing the US EPA's proposed GHG emissions standards for light-duty vehicles, which were jointly proposed by the US EPA and the National Highway Traffic Safety Administration (NHTSA). On April 1, 2010, the US EPA and NHTSA issued final rules requiring that by the 2016 model-year, manufacturers must achieve a combined average vehicle emission level of 250 grams CO<sub>2</sub> per mile, which is equivalent to 35.5 miles per gallon as measured by US EPA standards. These agencies are currently in the process of developing more stringent vehicle emissions standards for the 2017 through 2025 model years. The proposed standard would reduce emissions from all passenger cars, light-duty trucks, and medium-duty passenger vehicles (including SUVs) to an average of 163 grams CO<sub>2</sub> per mile for model year 2025, which is equivalent to 54.5 miles per gallon if the standard were met solely through fuel economy improvements.<sup>25</sup>

## State

### *Assembly Bill 1493*

In response to the transportation sector's contribution of more than half of California's CO<sub>2</sub> emissions, Assembly Bill 1493 (AB 1493, Pavley) was enacted on July 22, 2002. AB 1493 requires CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles whose primary use is noncommercial personal transportation. CARB adopted the standards in September 2004. The new standards would phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009 through 2012) standards will result in a reduction of about 22 percent in greenhouse gas emissions compared to the emissions from the 2002 fleet, while the mid-term (2013 through 2016) standards will result in a reduction of about 30 percent.

Before these regulations could go into effect, the US EPA had to grant California a waiver under the federal Clean Air Act (CAA), which ordinarily preempts state regulation of motor vehicle emission standards. On June 30, 2009, the US EPA formally approved California's waiver request. As previously discussed, in the September 2009, the US EPA and the NHTSA issued a joint proposal to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. These standards were formally adopted by the US EPA and DOT on April 1, 2010. In light of the federal US EPA and NHTSA standards, California—and states adopting California emissions standards—agreed to defer to the national standard through model

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<sup>25</sup> US Environmental Protection Agency, "EPA and NHTSA Propose to Extend the National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks," <http://www.epa.gov/oms/climate/regulations.htm>. 2011.

year 2016. The 2016 endpoint of the two standards is similar, although the national standard ramps up slightly more slowly than what was required under the California standard. The Pavley standards require additional reductions in CO<sub>2</sub> emissions beyond 2016 (referred to as Phase II standards). The Phase II standards are currently in development for the 2017-2025 model years. As was done with the Phase I standards, the US EPA and NHTSA have proposed a national standard that all passenger cars, light-duty trucks, and medium-duty passenger vehicles (including SUVs) achieve an average of 163 grams CO<sub>2</sub> per mile for model year 2025, which is equivalent to 54.5 miles per gallon if the standard were met solely through fuel economy improvements.<sup>26</sup>

### ***Executive Order S-3-05 and the Climate Action Team***

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals: GHG emissions should be reduced to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050. The Secretary of California Environmental Protection Agency (CalEPA) is required to coordinate efforts of various agencies in order to collectively and efficiently reduce GHGs. Some of the agency representatives involved in the GHG reduction plan include the Secretary of the Business, Transportation, and Housing Agency, the Secretary of the Department of Food and Agriculture, the Secretary of the Resources Agency, the Chairperson of CARB, the Chairperson of the CEC, and the President of the Public Utilities Commission. Representatives from these agencies comprise the Climate Action Team.

### ***Renewables Portfolio Standard***

In 2002, Senate Bill 1078 (SB 1078, Sher) established California's Renewables Portfolio Standard (RPS) which requires investor-owned utilities, such as Pacific Gas and Electric, Southern California Edison, and San Diego Gas and Electric, to increase energy production from renewable source 1 percent per year up to a minimum of 20 percent of total energy generation by 2017. SB 107 (Simitian), signed by the Governor on September 26, 2008, accelerated the Renewable Portfolio Standard by requiring investor-owned utilities to meet the 20 percent target by 2010.

On September 15, 2009, the Governor issued Executive Order S-21-0911 requiring CARB, under its AB 32 authority, to adopt regulations to meet a 33 percent RPS target by 2020. The CARB regulations would use

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<sup>26</sup> US Environmental Protection Agency, "EPA and NHTSA Propose to Extend the National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks," <http://www.epa.gov/oms/climate/regulations.htm>. 2011.

a phased-in or tiered requirement to increase the amount of electricity from eligible renewable sources over an eight-year period beginning in 2012. CARB adopted the regulation in September 2010.

In March 2011, the Legislature passed SB X1-2, which was signed into law by the Governor. SB X1-2 requires utilities to procure renewable energy products equal to 33 percent of retail sales by December 31, 2020 and also established interim targets: 20 percent by December 31, 2013 and 25 percent by December 31, 2016. SB X1-2 also includes publicly owned utilities in California. According to the California Public Utilities Commission (CPUC), California's three large investor owned utilities (IOUs) collectively served 20.6 percent of their 2011 retail electricity sales with renewable power, with Southern California Edison achieving 21.1 percent.<sup>27</sup>

### ***Assembly Bill 32***

In furtherance of the goals established in Executive Order S-3-05, the Legislature enacted Assembly Bill 32 (AB 32, Nuñez and Pavley), the California Global Warming Solutions Act of 2006, which Governor Schwarzenegger signed on September 27, 2006. AB 32 represents the first enforceable statewide program to limit GHG emissions from all major industries with penalties for noncompliance. AB 32 requires the state to undertake several actions; the major requirements are discussed below.

#### **State of California 1990 Greenhouse Gas Inventory and 2020 Limit**

As required under AB 32, on December 6, 2007, CARB approved the 1990 greenhouse gas emissions inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was set at 427 MMTCO<sub>2e</sub>. The inventory revealed that in 1990 transportation, with 35 percent of the state's total emissions, was the largest single sector generating carbon dioxide, followed by industrial emissions, 24 percent; imported electricity, 14 percent; in-state electricity generation, 11 percent; residential use, 7 percent; agriculture, 5 percent; commercial uses, 3 percent; and forestry emissions (excluding sinks) less than 1 percent. These figures represent the 1990 values. AB 32 does not require individual sectors to meet their individual 1990 GHG emissions inventory; the total statewide emissions are required to meet the 1990 threshold by 2020.

#### **CARB Mandatory Reporting Requirements**

In addition to the 1990 emissions inventory, CARB also adopted regulations requiring the mandatory reporting of GHG emissions for large facilities on December 6, 2007. The mandatory reporting regulations

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<sup>27</sup> California Public Utilities Commission, "California Renewables Portfolio Standard (RPS)," <http://www.cpuc.ca.gov/PUC/energy/Renewables/index.htm>. 2012.

require annual reporting from the largest facilities in the state, which account for approximately 94 percent of greenhouse gas emissions from industrial and commercial stationary sources in California. About 800 separate sources fall under the new reporting rules and include electricity generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources that emit over 25,000 tons of carbon dioxide each year from on-site stationary combustion sources. Transportation sources, which account for 38 percent of California's total greenhouse gas emissions as of the 2002 through 2004 GHG inventory conducted by CARB,<sup>28</sup> are not covered by these regulations, but will continue to be tracked through existing means. Affected facilities began tracking their emissions in 2008, and reported them beginning in 2009, with a phase-in process to allow facilities to develop reporting systems and train personnel in data collection. Emissions for 2008 could be based on best available emission data. Beginning in 2010, however, emissions reporting requirements became more rigorous and are subject to third-party verification. Verification will take place annually or every three years, depending on the type of facility.

### **AB 32 Climate Change Scoping Plan**

As indicated above, AB 32 requires CARB to adopt a scoping plan indicating how reductions in significant GHG sources will be achieved through regulations, market mechanisms, and other actions. CARB released the *Climate Change Scoping Plan* in October 2008, which contained an outline of the proposed state strategies to achieve the 2020 GHG emission limits. The CARB Governing Board approved the *Climate Change Scoping Plan* on December 11, 2008. The *Climate Change Scoping Plan* indicates how emissions reductions will be achieved from significant sources of GHGs via regulations, market mechanism, and other actions. The *Climate Change Scoping Plan* identifies 18 recommended strategies the state should implement to achieve AB 32. As of October 2010, CARB has identified ongoing programs and has adopted regulations for 29 individual measures to reduce GHG emissions in accordance with the *Climate Change Scoping Plan* strategies. Key elements of the *Climate Change Scoping Plan* include the following recommendations:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
- Achieving a statewide renewables energy mix of 33 percent
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system

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<sup>28</sup> California Air Resources Board, "Greenhouse Gas Inventory Data – 2020 Forecast," <http://www.arb.ca.gov/cc/inventory/data/forecast.htm>. 2009.

- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets
- Adopting and implementing measures pursuant to existing state laws and policies, including California’s clean car standards, goods movement measures, and the Low Carbon Fuel Standard
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state’s long-term commitment to AB 32 implementation

Under the *Climate Change Scoping Plan*, approximately 85 percent of the state’s emissions are subject to a cap-and-trade program where covered sectors are placed under a declining emissions cap. The emissions cap incorporates a margin of safety whereby the 2020 emissions limit will still be achieved even in the event that uncapped sectors do not fully meet their anticipated emission reductions. Emissions reductions will be achieved through regulatory requirements and the option to reduce emissions further or purchase allowances to cover compliance obligations. It is expected that emission reductions from the cap-and-trade program will account for a significant portion of the reductions required by AB 32.

### ***Executive Order S-1-07 (Low Carbon Fuel Standard)***

On January 18, 2007, California set a new Low Carbon Fuel Standard (LCFS) for transportation fuels sold within the state. Executive Order S-1-07 sets a declining standard for GHG emissions measured in CO<sub>2</sub>e grams per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10 percent by 2020. The LCFS will apply to refiners, blenders, producers, and importers of transportation fuels and will use market-based mechanisms to allow these providers to choose how they reduce emissions during the “fuel cycle” using the most economically feasible methods. CARB identified the LCFS as an early action item under AB 32 and the final regulation was adopted on April 23, 2009; however, the regulation is currently blocked by litigation in federal court.

### ***Senate Bill 375***

SB 375 requires CARB, working in consultation with the metropolitan planning organizations (MPOs), to set regional greenhouse gas reduction targets for the automobile and light truck sector for 2020 and 2035. The target must then be incorporated within that region’s Regional Transportation Plan (RTP), which is used for long-term transportation planning, in a Sustainable Communities Strategy (SCS). Certain transportation planning and programming activities would then need to be consistent with the SCS; however, SB 375 expressly provides that the SCS does not regulate the use of land, and further provides that local land use plans and policies (e.g., general plan) are not required to be consistent with either the RTP or SCS.

CARB staff proposed draft per capita reduction targets for the four largest MPOs (Bay Area, Sacramento, Southern California, and San Diego) of 7 to 8 percent for 2020 and reduction targets between 13 to 16 percent for 2035. For the Southern California Association of Governments (SCAG), which is the MPO for the region in which the proposed project is located, CARB established a draft target of 8 percent for 2020 and 13 percent for 2035.<sup>29</sup> Of note, the proposed reduction targets explicitly exclude emission reductions expected from the AB 1493 and the low carbon fuel standard regulations. CARB adopted the final targets (the same targets as the proposed draft targets) on September 23, 2010.

In April 2012, SCAG adopted the 2012-2035 RTP/SCS. The RTP/SCS demonstrates GHG reductions that exceed the targets set by CARB by achieving a 9 percent reduction by 2020 and 16 percent reduction by 2035 compared to the 2005 level on a per capita basis. This RTP/SCS also meets criteria pollutant emission budgets set by the US EPA. The reduction in emissions are largely achieved by more sustainable planning, integrating transportation and land use decisions to allow Southern Californians to live closer to where they work and play, and to high-quality transit service.

## Local

### *South Coast Air Quality Management District*

In April 2008, the South Coast Air Quality Management District (SCAQMD), in order to provide guidance to local lead agencies on determining the significance of GHG emissions identified in California Environmental Quality Act (CEQA) documents, convened a GHG CEQA Significance Threshold Working Group.<sup>30</sup> The goal of the working group is to develop and reach consensus on an acceptable CEQA significance thresholds for GHG emissions that may be utilized on an interim basis until CARB (or some other state agency) develops guidance on assessing the significance of GHG emissions under CEQA.

Initially, SCAQMD staff presented the working group with a significance threshold that could be applied to various types of projects – residential; non-residential; industrial; etc. However, the threshold is still under development. In December 2008, staff presented the SCAQMD Governing Board with a significance threshold for stationary source projects where it is the lead agency. This threshold uses a tiered approach to determine a project's significance, with 10,000 MTCO<sub>2e</sub> as a screening numerical threshold.

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<sup>29</sup> California Air Resources Board (CARB), *Staff Report: Proposed Regional Greenhouse Gas Emission Reduction Targets For Automobiles And Light Trucks Pursuant To Senate Bill 375*, (2010).

<sup>30</sup> For more information see: <http://www.aqmd.gov/ceqa/handbook/GHG/GHG.html>.

At present time, the SCAQMD has not adopted thresholds for residential, commercial or projects such as the one analyzed in this study. The SCAQMD is considering a tiered approach to determine the significance of residential and commercial projects and the most recent draft approach that was published in September 2010 is as follows:

- **Tier 1:** Is the project exempt from further analysis under existing statutory or categorical exemptions? If yes, there is a presumption of less than significant impacts with respect to climate change.
- **Tier 2:** Is the project's GHG emissions within the GHG budgets in an approved regional plan? (The plan must be consistent with *State CEQA Guidelines* Sections 15064(h)(3), 15125(d), or 15152(s).) If yes, there is a presumption of less than significant impacts with respect to climate change.
- **Tier 3:** Is the project's incremental increase in GHG emissions below or mitigated to less than the significance screening level (10,000 MTCO<sub>2e</sub> per year for industrial projects; 3,500 MTCO<sub>2e</sub> for residential projects; 1,400 MTCO<sub>2e</sub> for commercial projects; 3,000 MTCO<sub>2e</sub> for mixed-use or all land use projects)? If yes, there is a presumption of less than significant impacts with respect to climate change.
- **Tier 4:** Does the project meet one of the following performance standards? If yes, there is a presumption of less than significant impacts with respect to climate change.
  - **Option #1:** Achieve some percentage reduction in GHG emissions from a base case scenario, including land use sector reductions from AB 32 (e.g., 29 percent reduction as recommended by the San Joaquin Valley Air Pollution Control District).
  - **Option #2:** For individual projects, achieve a project-level efficiency target of 4.8 MTCO<sub>2e</sub> per service population by 2020 or a target of 3.0 MTCO<sub>2e</sub> per service population by 2035. For plans, achieve a plan-level efficiency target of 6.6 MTCO<sub>2e</sub> per service population by 2020 or a target of 4.1 MTCO<sub>2e</sub> per service population by 2035.
- **Tier 5:** Projects should obtain GHG emission offsets to reduce significant impacts. Offsets in combination with any mitigation measures should achieve the target thresholds for any of the above Tiers. Otherwise, project impacts would remain significant.

The SCAQMD has not announced when staff is expecting to present a finalized version of these thresholds to the Governing Board. The SCAQMD has also adopted Rules 2700, 2701, and 2702 that establishes a GHG reduction program within the SCAQMD; however, GHG emission reduction protocols pursuant to these rules have only been established for boilers and process heaters, forestry, and manure management reduction projects.

### ***City of Pasadena General Plan***

The City of Pasadena (The City) General Plan identifies goals and policies relating to the improving the safety and health of the community. The City supports the SCAQMD's mission to protect public health

and welfare from the adverse effects of air pollution. The objectives and actions related to air emissions in general that are applicable to the project are listed below.

#### 2004 Land Use Element<sup>31</sup>

**Objective 18** Improvement Environment: Improve the quality of the environment for Pasadena and the region.

**Policy 18.1** Air Quality: Improve the air quality in Pasadena and in the region.

#### 2004 Mobility Element<sup>32</sup>

**Objective 1-5.5.1** Promote a Livable and Economically Strong Community

**Action 5.5.1.7** Community Event Support

Provide transportation services to support major community events including improvements to the Traffic Management Center (TMC) to support venues of regional and national significance taking into account the impact on adjacent neighborhoods.

**Action 5.5.1.8** Air quality improvements

Participate in inter-jurisdictional efforts to continue recent improvements in air quality and to meet state and federal mandates through advanced technology (vehicles, fuels, automated traffic signal systems, and telecommunications) and Transportation Demand Management (TDM) programs.

**Objective 2-5.5.2** Encourage Non-Auto Travel

**Action 5.5.2.2** Expand Local Transit

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<sup>31</sup> City of Pasadena. 2004. *General Plan: Land Use Element*. November 8.

<sup>32</sup> City of Pasadena Department of Transportation, 2004. *General Plan: 2004 Mobility Element*. November 8.

Promote the expansion and use of regional ARTS bus service with particular emphasis on transit-dependent areas and major activity centers including work, retail, entertainment, and recreational destinations.

**Action 5.5.2.3** Improve Bus Stops and Stations

Encourage the construction of safe, clean, and attractive bus stops by requiring the transit enhancements, bicycle facilities, and pedestrian amenities be included in the City's review process for new development projects.

**Action 5.5.2.6** Design and Operating Considerations for Bicycles

Extend bicycle routes/paths to provide a citywide network.

Require promoters of large events to provide bicycle parking.

***City of Pasadena Green City Action Plan***<sup>33</sup>

The City of Pasadena developed an Action Plan to create a more sustainable City capable of meeting growing demands and reducing impacts to natural resources.

**Action 1** Increase the use of renewable energy to meet 10% of the city's peak electric load within seven years.

**Action 2** Reduce the city's peak electric load by 10% within seven years through energy efficiency, shifting the timing of energy demands and conservation measures.

2. Conducting a feasibility study for installing devices on municipal and private buildings that reduce the power required to operate equipment and for shifting the equipment usage to off-peak
3. Creating a "time of use" billing rate that offers lower rates for electric usage during off-peak hours than during peak hours. Other possible rates to consider include tiered energy rates.

**Action 3** Reduce greenhouse gas emissions by 25% by 2030, and include a system for accounting and auditing these emissions.

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33 City of Pasadena Planning & Development Department. 2006. *Green City Action Plan*.

- Action 4** Achieve zero waste to landfills and incinerators by 2040.
- Action 5** Reduce the use of disposable, toxic, or non-renewable product category by at least 50% in seven years.
- Action 21** Adopt municipal wastewater management guidelines and reduce the volume of untreated wastewater discharges by 10% in seven years through the expanded use of recycled water and the implementation of a sustainable urban watershed planning process that includes participants of all affected communities and is based on sound economic, social, and environmental principles.

## METHODOLOGY

The proposed project is evaluated in this EIR for potential impacts related to GHG emissions and climate change and utilized approved emissions models and guidelines as tools to create the analytical basis for the assessment. The Office of Planning and Research (OPR), in its Climate Change Technical Advisory, recommended that GHG emissions from project-related traffic, energy consumption, water usage, and construction activities, should be identified and estimated, to the extent that data is available to calculate such emissions. In addition, CARB believes that indirect energy usage provides a more complete picture of the emissions footprint of a facility. According to CARB, “As facilities consider changes that would affect their emissions – addition of a cogeneration unit to boost overall efficiency even as it increases direct emissions, for example – the relative impact on total (direct plus indirect) emissions by the facility should be monitored. Annually reported indirect energy usage also aids the conservation awareness of the facility” For these reasons, CARB has proposed requiring the calculation of direct and indirect GHG emissions as part of the AB 32 reporting requirements, and this analysis does so.

Emissions modeling was conducted for mobile sources using the California Emissions Estimator Model (CalEEMod) and information provided in the *CalEEMod User’s Guide*.<sup>34</sup> CalEEMod is a program that calculates air pollutant emissions from land use sources and incorporates the CARB on-road and off-road vehicle emissions models. Site-specific or project-specific data were used in the CalEEMod model where available. The project would not include substantial stationary sources of GHG emissions. Mobile source GHG emissions from vehicles traveling to and from the project would generate the bulk of the operational emissions. The mobile source emissions are based on the trip rates provided in the traffic report for the project (see **Section 3.7, Transportation, Circulation, and Parking**). Additional sources

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<sup>34</sup> South Coast Air Quality Management District, *California Emissions Estimator Model User’s Guide*, (2011). The model and User’s Guide may be downloaded from the following website: <http://www.caleemod.com>.

were consulted for this analysis as referenced. Emission calculations conducted for the proposed project are contained in **Appendix 3.2**.

## THRESHOLDS OF SIGNIFICANCE

This analysis will use the performance standard of 4.8 MTCO<sub>2</sub>e per SP per year to determine if the proposed project would have a significant impact on the environment. This threshold was developed by the SCAQMD to allow the air basin to meet the GHG reduction requirements of AB 32. The methodology used to arrive at the specific numerical thresholds is similar to that used in other air districts in California in conjunction with growth projections and data specific to the South Coast Air Basin. Emissions below the draft thresholds developed by the SCAQMD would thereby indicate that a project would not hinder the air basin in meeting its AB 32 goals.

## IMPACTS

**Impact 3.2-1:                   The proposed project would generate greenhouse gas emissions as a result of the increased number of events at the Rose Bowl Stadium.**

The proposed project would not necessitate any construction to permit 13 additional events a year. Therefore, this analysis does not include any consideration of construction emissions.

### *Motor Vehicle Emissions*

The proposed project would increase the number of events with 20,000 or more attendees held at the Rose Bowl by up to 13 a year for a total of 25 events. The patrons and employees attending the Rose Bowl events would add vehicle trips coming to and from the Rose Bowl Stadium. Trips from personal vehicles as well as trucks and busses could contribute to vehicle emissions. The larger number of vehicle trips and congestion produced by the influx of vehicles would increase the amount of GHG emissions in the area. Up to two NFL football games would be held on weeknights which would result in event traffic compounding with daily peak hour traffic. Mobile source emissions were calculated using CalEEMod, based on the trip generation rates provided in the traffic study performed for the proposed project.<sup>35</sup>

### *On-Site Emissions*

On-site emissions from the proposed project would result from consumption of natural gas and the use of landscaping equipment and other vehicles and equipment. Natural gas use was calculated using gas

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<sup>35</sup> Fehr & Peers, *Traffic Study for the Temporary Use of the Rose Bowl by the NFL*, 2012.

usage history reported on gas bills for the stadium. The stadium consumed approximately 300 therms of natural gas during the month of June 2012, when there were no events. This was assumed to be an average rate of consumption for months without events. The period of October through December 2011 was assumed to have a typical rate of events, and has an average consumption rate of approximately 650 therms per month. The difference between the average monthly rate of consumption in the October through December 2011 period and June 2012, approximately 350 therms, was assumed to be attributable to events at the stadium. To provide a conservative estimate, the entire 350 therms was assumed to be associated with a single event. The resulting emissions were calculated using emission factors from the Local Government Operations Protocol<sup>36</sup> and multiplied by 13 to obtain total emissions from natural gas use. Any increases in emissions from landscaping equipment and similar small sources in connection with the project would be negligible.

### *Off-Site (Indirect) Emissions*

The Pasadena Water and Power Department provides utilities to the City of Pasadena. The proposed project would increase use of electricity and water, and produce more wastewater and solid waste for each of the additional 13 events per year, during the life of the project. Emission factors for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O are based on CARB's Local Government Operations Protocol.<sup>37</sup> The cited factors in the Protocol are based on data collected by the California Climate Action Registry. The emission factors take into account the current mix of energy sources used to generate electricity and the relative carbon intensities of these sources, and includes natural gas, coal, nuclear, large hydroelectric, and other renewable sources of energy. Electricity consumption was provided by the City of Pasadena.

GHG emissions from water consumption are due to the electricity needed to convey, treat, and distribute water. The annual electrical demand factors for potable water were obtained from the CEC.<sup>38</sup> Project-specific data for water use, solid waste, and wastewater generation were provided by the City of Pasadena. Similar to natural gas use, water use data was only available on a monthly basis. Therefore, an event was estimated using the same methodology as for natural gas use described above..

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<sup>36</sup> California Air Resources Board, *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.1, (2010) 208.

<sup>37</sup> *Ibid*

<sup>38</sup> California Energy Commission, *Refining Estimates of Water-Related Energy Use in California, PIER Final Project Report* (CEC-500-2006-118), (2006) 22. Prepared by Navigant Consulting, Inc.

### Summary of Emissions

A summary of the operational emissions of the proposed project is provided below in **Table 3.2-3, Total Greenhouse Gas Emissions due to Additional Rose Bowl Events**. Detailed emission calculations are provided in **Appendix 3.2**. The estimates represent emissions under “business as usual” conditions; that is, GHG emissions that would occur as a result of implementation of the proposed project without the reductions from policies, strategies, and mitigation measures from AB 32 and other GHG reduction plans or regulations. The total emissions are divided by the number of service persons (SP), which is defined as employees and residents of the proposed project. There are no residents and approximately 4,000 employees, for a total of 4,000 SP associated with the proposed project. As discussed above, exceedance of the threshold of 4.8 MTCO<sub>2e</sub> per SP per year would result in a determination of significance.

**Table 3.2-3  
Total Greenhouse Gas Emissions due to Additional Rose Bowl Events**

Operational GHG Emissions from Area, and Mobile and Indirect Sources	GHG Emissions (MTCO <sub>2e</sub> /Year)
Proposed Project	
Mobile Sources	4,405.59
Electricity Use	1,956.38
Natural Gas Use	24.39
Wastewater Generation	78.47
Water Supply	456.22
Solid Waste	19.46
<b>Total Emissions</b>	<b>6,940.51</b>
<b>Emissions per SP</b>	<b>1.7</b>
<b>SCAQMD Threshold</b>	<b>4.8</b>
<b>Exceed Threshold?</b>	<b>NO</b>

*Source: Impact Sciences, Inc. Emissions calculations are provided in Appendix 3.2.*

As shown in **Table 3.2-3**, the estimated emissions from the proposed project would not exceed this threshold. Therefore, the proposed project’s impact would be considered less than significant.

### Project Design Features

The Rose Bowl Stadium has an existing plan used during large events that would also be implemented as part of the proposed project. These measures are designed to keep traffic flow moving, thereby reducing

greenhouse gas emissions. During special events at the Stadium, the Pasadena Police Department (PPD) implements a traffic control plan involving a combination of the following:

- Barricading of local neighborhood streets to prevent unauthorized spectator parking and cut through traffic
- Restriction of particular movements at intersections surrounding the Rose Bowl to expedite traffic through movements toward the Stadium (arrival) and toward the freeways (departure)
- Direction of vehicular traffic by traffic control officers at signalized intersections along major routes between local freeways and the Stadium to increase capacity

The traffic control plan is implemented and modified based on the specific needs of each event. For large events, traffic is monitored by a Police Department traffic lieutenant from a helicopter, which provides PPD the opportunity to manipulate traffic flow based on levels of congestion and backup. Traffic can be diverted to varying travel routes depending on street conditions and the parking occupancy at the different lots.

Varying plans are employed based on the anticipated attendance figures. For example, a PPD helicopter is utilized to assist traffic control operations staff on the ground for events that are anticipated to draw more than 20,000 persons. Police personnel are positioned at key traffic decision points on the perimeter of the arrival travel routes. Arriving traffic can be diverted to another travel route to obtain a better distribution of parking loading since the traffic personnel are in direct radio contact with the Police helicopter and the police stationed in the Rose Bowl Traffic Control Command Center (located in the press box). As drivers near the Rose Bowl, the level of traffic control and Police personnel increases. For larger events, temporary changeable message signs (CMS) on SR-134 and I-210 are deployed in coordination with the State of California Department of Transportation (Caltrans), and are used to create a more even traffic distribution.

Currently for UCLA Football events, the PPD deploys uniformed officers to over 30 posts at all major intersections in the Arroyo Seco and along key roadways leading to and from the regional freeway system. These officers manage reversible lane operations and direct traffic.

The Rose Bowl Operating Company (RBOC) coordinates with Metro to provide expanded rail service when displacement events occur, which provides patrons with an alternative form of transportation. The use of public transportation would reduce the number of vehicles driving to the event. This reduction would minimize the amount of greenhouse gas emissions caused from vehicle emissions.

### *Mitigation Measures*

No mitigation measures are required.

### *Residual Impacts*

Impacts would be less than significant.

## **CUMULATIVE IMPACTS**

Global climate change is by definition a cumulative impact as GHG emissions do not have a localized impact; they impact the globe as a whole. Since GHGs typically remain in the atmosphere for an extended period they ultimately mix with emissions from other sources, both local and distant. The impacts of the emissions from any one proposed project cannot be distinguished from the impacts of any other project in the same air basin, state or anywhere on the globe. Therefore GHG reductions measures in California aim to reduce emissions on a statewide basis, specifically through the requirements of AB 32. The significance threshold set forth above is calculated to allow a specific region to meet these overall statewide targets by requiring substantial projects to match the reductions from business as usual required for the state as a whole in AB 32. Consequently, while the thresholds are applied to individual proposed projects, they also serve as cumulative impact thresholds. Therefore the analysis presented in the section above leads to a conclusion that the project's contribution to cumulative impacts is less than significant.