

## **3.12-1 GREENHOUSE GAS ANALYSIS**





41 Corporate Park, Suite 300  
Irvine, CA 92606

Prepared by:

Haseeb Qureshi, MES

Prepared for:

SUNBELT COMMUNITIES  
27127 Calle Arroyo, Suite 1910  
San Juan Capistrano, CA 92675

**OAK CREEK (TENTATIVE TRACT MAP No. 36388)  
(PA 11-0261)**

**GREENHOUSE GAS ANALYSIS  
CITY OF WILDOMAR, CALIFORNIA**

May 30, 2012 (Revised)  
January 25, 2012

JN:07532-05 GHG REPORT  
HQ

# TABLE OF CONTENTS

---

<u>Section</u>	<u>Page</u>
1.0 Executive Summary .....	5
1.1 Introduction .....	5
1.2 Project Description .....	5
1.3 Existing Regulations and Standard Conditions .....	7
1.4 Summary of Findings .....	7
1.5 Construction Activity Mitigation Measures.....	8
1.6 Operational Activity Recommended Mitigation Measures .....	8
2.0 Global Climate Change Analysis.....	10
2.1 Introduction to Global Climate Change .....	10
2.2 Greenhouse Gas Emissions Inventories .....	11
2.3 Global Climate Change Defined.....	12
2.4 Greenhouse Gases .....	13
2.5 Effects of Climate Change in California.....	17
2.6 Health Effects.....	21
2.7 GCC Regulatory Setting.....	23
2.8 Discussion on Establishment of Significance Thresholds .....	35
2.9 Project-Related GHG Emissions Under Business as Usual Conditions .....	37
2.10 Analysis of Greenhouse Gas Impact.....	38

**LIST OF APPENDICES**

---

<u>Appendix</u>	<u>Page</u>
GHG Emissions Calculations.....	A

**LIST OF EXHIBITS**

---

<u>Exhibit</u>	<u>Page</u>
1-1 Site Plan .....	6

**LIST OF TABLES**

---

<u>Table</u>	<u>Page</u>
2-1 Top GHG Producer Countries and the European Union .....	11
2-2 Global Warming Potentials and Atmospheric Lifetime of Select GHGs .....	13
2-3 Scoping Plan GHG Reduction Measures toward 2020 Target.....	30
2-4 Total Greenhouse Gas Emissions (Annual) (Metric Tons Per Year).....	38
2-5 Recommended Actions for Climate Change Proposed Scoping Plan.....	40

**OAK CREEK (TENTATIVE TRACT MAP NO. 36388) (PA 11-0261)**  
**GREENHOUSE GAS ANALYSIS**  
**CITY OF WILDOMAR, CALIFORNIA**

**1.0 EXECUTIVE SUMMARY**

---

1.1 Introduction

The purpose of this air quality impact analysis is to evaluate the development of the Oak Creek (Tentative Tract Map No. 36388) development (Project) from a greenhouse gas standpoint. The Project site is generally located between the Farm Road and Sunset Avenue and on either side of Bundy Canyon Road in the City of Wildomar as shown on Exhibit 1-1.

1.2 Project Description

The City of Wildomar planning case PA 11-0261 for TTM No. 36388 proposes to amend Specific Plan No. 116 (Amendment 4) to allow 275 single family detached dwelling units and a 3.5 acre neighborhood commercial center (14,469 square foot pharmacy with drive-thru window, 2,550 square feet of specialty retail uses and an 8 vehicle fueling position gas station with convenience market and car wash) on 151.23 acres. Zoning for the property is proposed to change from Single Family Residential (R-1 – 7,200 square foot minimum) to Planned Residential Development (R-4). All Project access points along Bundy Canyon Road have been assumed to allow full-access, with the exception of the Commercial Access on Bundy Canyon Road. The Commercial Access on Bundy Canyon Road has been assumed to be restricted to right-in/right-out access only due to its proximity to Sunset Avenue.

It should also be noted that a specific development proposal for the retail component is not proposed as part of this Project. The aforementioned uses (14,469 square foot pharmacy with drive-thru window, 2,550 square feet of specialty retail uses and an 8 vehicle fueling position gas station with convenience market and car wash) represent a likely scenario that could be developed in light of the site's location and physical constraints.

For the purposes of this analysis, it is assumed that the Project will be constructed and at full occupancy by 2015.

# EXHIBIT 1-1 SITE PLAN



**LEGEND:**

- FULL** - FULL ACCESS
- R/O-I** - RIGHT-IN/RIGHT-OUT/LEFT-IN ACCESS
- R/O-O** - RIGHT-IN/RIGHT-OUT ACCESS

### 1.3 Existing Regulations and Standard Conditions

- Global Warming Solutions Act of 2006 (AB32)
- Regional GHG Emissions Reduction Targets/Sustainable Communities Strategies (SB 375)
- Pavely Fuel Efficiency Standards (AB1493). Establishes fuel efficiency ratings for new vehicles.
- Title 24 California Code of Regulations (California Building Code). Establishes energy efficiency requirements for new construction.
- Title 20 California Code of Regulations (Appliance Energy Efficiency Standards). Establishes energy efficiency requirements for appliances.
- Title 17 California Code of Regulations (Low Carbon Fuel Standard). Requires carbon content of fuel sold in California to be 10% less by 2020.
- California Water Conservation in Landscaping Act of 2006 (AB1881). Requires local agencies to adopt the Department of Water Resources updated Water Efficient Landscape Ordinance or equivalent by January 1, 2010 to ensure efficient landscapes in new development and reduced water waste in existing landscapes.
- Statewide Retail Provider Emissions Performance Standards (SB 1368). Requires energy generators to achieve performance standards for GHG emissions.
- Renewable Portfolio Standards (SB 1078). Requires electric corporations to increase the amount of energy obtained from eligible renewable energy resources to 20 percent by 2010 and 33 percent by 2020.

### 1.4 Summary of Findings

Results of the analysis indicate that the Project would generate GHG emission that would not have a significant impact on the environment. The Project is consistent with, or otherwise not in conflict with recommended measures and actions in the California Air Resources Board (CARB) December 2008 Scoping Plan (CARB Scoping Plan) setting forth strategies and measures to implement in order to achieve the GHG reductions goals set forth in the Global Warming Solutions Act of 2006 (AB 32).

The project will result in approximately 5,825.11 MT/yr CO<sub>2</sub>e and a 4.77 MT CO<sub>2</sub>e/Service Population (SP)/Yr; the proposed project would not exceed the threshold of 6.6 MT CO<sub>2</sub>e/SP/Yr. Therefore, a less than significant impact is expected.

1.5 Construction Activity Mitigation Measures

No significant impacts were identified and no mitigation measures are required.

1.6 Operational Activity Recommended Mitigation Measures

No significant impacts were identified and no mitigation measures are required.

THIS PAGE INTENTIONALLY LEFT BLANK

## **2.0 GLOBAL CLIMATE CHANGE ANALYSIS**

---

### 2.1 Introduction to Global Climate Change

Global Climate Change (GCC) is defined as the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. GCC is currently one of the most controversial environmental issues in the United States, and much debate exists within the scientific community about whether or not GCC is occurring naturally or as a result of human activity. Some data suggests that GCC has occurred in the past over the course of thousands or millions of years. These historical changes to the Earth's climate have occurred naturally without human influence, as in the case of an ice age. However, many scientists believe that the climate shift taking place since the industrial revolution (1900) is occurring at a quicker rate and magnitude than in the past. Scientific evidence suggests that GCC is the result of increased concentrations of greenhouse gases in the earth's atmosphere, including carbon dioxide, methane, nitrous oxide, and fluorinated gases. Many scientists believe that this increased rate of climate change is the result of greenhouse gases resulting from human activity and industrialization over the past 200 years.

An individual project like the proposed Project evaluated in this GHGA cannot generate enough greenhouse gas emissions to effect a discernible change in global climate. However, the proposed Project may participate in the potential for GCC by its incremental contribution of greenhouse gasses combined with the cumulative increase of all other sources of greenhouse gases, which when taken together constitute potential influences on GCC. Because these changes may have serious environmental consequences, this report will evaluate the potential for the proposed Project to have a significant effect upon the environment as a result of its potential contribution to the greenhouse effect.

## 2.2 Greenhouse Gas Emissions Inventories

### *Global*

Worldwide anthropogenic (man-made) GHG emissions are tracked by the Intergovernmental Panel on Climate Change for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). Man-made GHG emissions data for Annex I nations are available through 2009. Man-made GHG emissions data for Non-Annex I nations are available through 2007. For the Year 2009 the sum of these emissions totaled approximately 40,084 MMTCO<sub>2e</sub>.<sup>1</sup> Emissions from the top five countries and the European Union accounted for approximately 65 percent of the total global GHG emissions, according to the most recently available data (see Table 2-1, Top GHG Producer Countries and the European Union). The GHG emissions in more recent years may differ from the inventories presented in Table 2-1; however, the data is representative of currently available inventory data.

### *United States*

As noted in Table 2-1, the United States was the number two producer of GHG emissions in 2009. The primary greenhouse gas emitted by human activities in the United States was CO<sub>2</sub>, representing approximately 83 percent of total greenhouse gas emissions.<sup>2</sup> Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 78 percent of the GHG emissions.<sup>3</sup>

**TABLE 2-1**  
**TOP GHG PRODUCER COUNTRIES AND THE EUROPEAN UNION<sup>4</sup>**

Emitting Countries	GHG Emissions (MMT CO <sub>2e</sub> )
China	6,703
United States	6,608
European Union	8,338
Russian Federation	2,159

<sup>1</sup> The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2005 data, the UNFCCC data for the most recent year were used. United Nations Framework Convention on Climate Change, "Annex I Parties – GHG total without LULUCF,"

[http://unfccc.int/ghg\\_emissions\\_data/ghg\\_data\\_from\\_unfccc/time\\_series\\_annex\\_i/items/3841.php](http://unfccc.int/ghg_emissions_data/ghg_data_from_unfccc/time_series_annex_i/items/3841.php) and "Flexible GHG Data Queries" with selections for total GHG emissions excluding LULUCF/LUCF, all years, and non-Annex I countries, <http://unfccc.int/di/FlexibleQueries/Event.do?event=showProjection>. n.d.

<sup>2</sup> US Environmental Protection Agency, "Inventory of US Greenhouse Gas Emissions and Sinks 1990–2009," <http://www.epa.gov/climatechange/emissions/usgginventory.html>. 2011.

<sup>3</sup> *ibid*

<sup>4</sup> World Resources Institute, "Climate Analysis Indicator Tool (CAIT) Excludes emissions and removals from land use, land-use change and forestry (LULUCF) Emissions Inventory," <http://cait.wri.org>

India	1,410
Japan	1,209
<b>Total</b>	<b>26,427</b>

*State of California*

CARB compiles GHG inventories for the State of California. Based upon the 2008 GHG inventory data (i.e., the latest year for which data are available) for the 2000-2008 greenhouse gas emissions inventory, California emitted 474 MMTCO<sub>2</sub>e **including** emissions resulting from imported electrical power in 2008.<sup>5</sup> Based on the CARB inventory data and GHG inventories compiled by the World Resources Institute<sup>6</sup>, California’s total statewide GHG emissions rank second in the United States (Texas is number one) with emissions of 417 MMTCO<sub>2</sub>e **excluding** emissions related to imported power.

2.3 Global Climate Change Defined

Global Climate Change (GCC) refers to the change in average meteorological conditions on the earth with respect to temperature, wind patterns, precipitation and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO<sub>2</sub> (Carbon Dioxide), N<sub>2</sub>O (Nitrous Oxide), CH<sub>4</sub> (Methane), hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. These particular gases are important due to their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the Earth’s atmosphere, but prevent radioactive heat from escaping, thus warming the Earth’s atmosphere. GCC can occur naturally as it has in the past with the previous ice ages. According to the California Air Resources Board (CARB), the climate change since the industrial revolution differs from previous climate changes in both rate and magnitude (CARB, 2004, Technical Support document for Staff Proposal Regarding Reduction of Greenhouse Gas Emissions from Motor Vehicles).

Gases that trap heat in the atmosphere are often referred to as greenhouse gases. Greenhouse gases are released into the atmosphere by both natural and anthropogenic (human) activity. Without the natural greenhouse gas effect, the Earth’s average temperature would be approximately 61° Fahrenheit (F) cooler than it is currently. The cumulative accumulation of

<sup>5</sup> California Air Resources Board, “California Greenhouse Gas 2000-2008 Inventory by Scoping Plan Category - Summary,” <http://www.arb.ca.gov/cc/inventory/data/data.htm>. 2010.

<sup>6</sup> World Resources Institute, “Climate Analysis Indicator Tool (CAIT)-US – Yearly Emissions Inventory,” <http://cait.wri.org>

these gases in the earth's atmosphere is considered to be the cause for the observed increase in the earth's temperature.

Although California's rate of growth of greenhouse gas emissions is slowing, the state is still a substantial contributor to the U.S. emissions inventory total. In 2004, California is estimated to have produced 492 million gross metric tons of carbon dioxide equivalent (CO<sub>2</sub>e) greenhouse gas emissions. Despite a population increase of 16 percent between 1990 and 2004, California has significantly slowed the rate of growth of greenhouse gas emissions due to the implementation of energy efficiency programs as well as adoption of strict emission controls.<sup>7</sup>

## 2.4 Greenhouse Gases

For the purposes of this analysis, emissions of carbon dioxide, methane, and nitrous oxide were evaluated. Although other substances such as fluorinated gases also contribute to global climate change, sources of fluorinated gases are not well defined and no accepted emissions factors or methodology exist to accurately calculate these gases. The potential for fluorinated gases to result from operation of the proposed project is primarily a concern for HCFC emissions associated with project air conditioning leakage.

Greenhouse gases have varying global warming potential (GWP) values; GWP values represent the potential of a gas to trap heat in the atmosphere. Carbon dioxide is utilized as the reference gas for GWP, and thus has a GWP of 1.

The atmospheric lifetime and GWP of selected greenhouse gases are summarized in the following Table. As shown in the table below, GWP range from 1 for carbon dioxide to 23,900 for sulfur hexafluoride.

<b>TABLE 2-2</b>		
<b>GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIME OF SELECT GHGs</b>		
<b>Gas</b>	<b>Atmospheric Lifetime (years)</b>	<b>Global Warming Potential (100 year time horizon)</b>
Carbon Dioxide	50-200	1

<sup>7</sup> California Energy Commission, "Inventory of California Greenhouse Gas Emissions and Sinks," <http://www.energy.ca.gov/2005publications/CEC-600-2005-025/CEC-600-2005-025.PDF>. 2005.

Methane	12 ± 3	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CH <sub>4</sub> )	50,000	6,500
PFC: Hexafluoroethane (C <sub>2</sub> F <sub>6</sub> )	10,000	9,200
Sulfur Hexafluoride (SF <sub>6</sub> )	3,200	23,900
Source: EPA 2006 (URL: <a href="http://www.epa.gov/nonco2/econ-inv/table.html">http://www.epa.gov/nonco2/econ-inv/table.html</a> )		

Water Vapor: Water vapor (H<sub>2</sub>O) is the most abundant, important, and variable greenhouse gas in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. A climate feedback is an indirect, or secondary, change, either positive or negative, that occurs within the climate system in response to a forcing mechanism. The feedback loop in which water is involved is critically important to projecting future climate change.

As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to ‘hold’ more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a “positive feedback loop.” The extent to which this positive feedback loop will continue is unknown as there are also dynamics that hold the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually also condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the Earth’s surface and heat it up).

There are no health effects from water vapor itself; however, when some pollutants come in contact with water vapor, they can dissolve and the water vapor can then act as a pollutant-carrying agent. The main source of water vapor is evaporation from the oceans (approximately

85 percent). Other sources include: evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.

Carbon Dioxide: Carbon dioxide (CO<sub>2</sub>) is an odorless and colorless GHG. Outdoor levels of carbon dioxide are not high enough to result in negative health effects. Carbon dioxide is emitted from natural and manmade sources. Natural sources include: the decomposition of dead organic matter; respiration of bacteria, plants, animals and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include: the burning of coal, oil, natural gas, and wood. Carbon dioxide is naturally removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and chemical weathering of carbonate rocks.

Since the industrial revolution began in the mid-1700s, the sort of human activity that increases GHG emissions has increased dramatically in scale and distribution. Data from the past 50 years suggests a corollary increase in levels and concentrations. As an example, prior to the industrial revolution, CO<sub>2</sub> concentrations were fairly stable at 280 parts per million (ppm). Today, they are around 370 ppm, an increase of more than 30 percent. Left unchecked, the concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources.

Methane: Methane (CH<sub>4</sub>) is an extremely effective absorber of radiation, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10-12 years), compared to other GHGs. No health effects are known to occur from exposure to methane.

Methane has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.

Nitrous Oxide: Nitrous oxide (N<sub>2</sub>O), also known as laughing gas, is a colorless greenhouse gas. Nitrous oxide can cause dizziness, euphoria, and sometimes slight hallucinations. In small

doses, it is considered harmless. However, in some cases, heavy and extended use can cause Olney's Lesions (brain damage).

Concentrations of nitrous oxide also began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 parts per billion (ppb). Nitrous oxide is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant, i.e., in whipped cream bottles. It is also used in potato chip bags to keep chips fresh. It is used in rocket engines and in race cars. Nitrous oxide can be transported into the stratosphere, be deposited on the Earth's surface, and be converted to other compounds by chemical reaction

Chlorofluorocarbons: Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane ( $C_2H_6$ ) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble and chemically unreactive in the troposphere (the level of air at the Earth's surface). CFCs are no longer being used; therefore, it is not likely that health effects would be experienced. Nonetheless, in confined indoor locations, working with CFC-113 or other CFCs is thought to result in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation.

CFCs have no natural source, but were first synthesized in 1928. They were used for refrigerants, aerosol propellants and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs are now remaining steady or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

Hydrofluorocarbons: Hydrofluorocarbons (HFCs) are synthetic, man-made chemicals that are used as a substitute for CFCs. Out of all the greenhouse gases, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 ( $CHF_3$ ), HFC-134a ( $CF_3CH_2F$ ), and HFC-152a ( $CH_3CHF_2$ ). Prior to 1990, the only significant emissions were of HFC-23. HFC-134a emissions are

increasing due to its use as a refrigerant. The U.S. EPA estimates that concentrations of HFC-23 and HFC-134a are now about 10 parts per trillion (ppt) each; and that concentrations of HFC-152a are about 1 ppt. No health effects are known to result from exposure to HFCs, which are manmade for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons: Perfluorocarbons (PFCs) have stable molecular structures and do not break down through chemical processes in the lower atmosphere. High-energy ultraviolet rays, which occur about 60 kilometers above Earth's surface, are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF<sub>4</sub>) and hexafluoroethane (C<sub>2</sub>F<sub>6</sub>). The U.S. EPA estimates that concentrations of CF<sub>4</sub> in the atmosphere are over 70 ppt.

No health effects are known to result from exposure to PFCs. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur Hexafluoride: Sulfur hexafluoride (SF<sub>6</sub>) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest GWP of any gas evaluated (23,900). The U.S. EPA indicates that concentrations in the 1990s were about 4 ppt. In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

## 2.5 Effects of Climate Change in California

The California Environmental Protection Agency (CalEPA) published a report titled "Scenarios of Climate Change in California: An Overview" (Climate Scenarios report) in February 2006 (California Climate Change Center 2006), that while not adequate for a CEQA project-specific or cumulative analysis, is generally instructive about the statewide impacts of global warming.

The Climate Scenarios report uses a range of emissions scenarios developed by the Intergovernmental Panel on Climate Change (IPCC) to project a series of potential warming

ranges (i.e., temperature increases) that may occur in California during the 21<sup>st</sup> century: lower warming range (3.0-5.5°F); medium warming range (5.5-8.0°F); and higher warming range (8.0-10.5°F). The Climate Scenarios report then presents an analysis of future climate in California under each warming range, that while uncertain, present a picture of the impacts of global climate change trends in California.

In addition, most recently on August 5, 2009, the State's Natural Resources Agency released a public review draft of its "California Climate Adaptation Strategy" report that details many vulnerabilities arising from climate change with respect to matters such as temperature extremes, sea level rise, wildfires, floods and droughts and precipitation changes. This report responds to the Governor's Executive Order S-13-2008 that called on state agencies to develop California's strategy to identify and prepare for expected climate impacts. The report was released to the public in draft form for comment and has not yet been finalized.

According to the reports, substantial temperature increases arising from increased GHG emissions potentially could result in a variety of impacts to the people, economy, and environment of California associated with a projected increase in extreme conditions, with the severity of the impacts depending upon actual future emissions of GHGs and associated warming. Under the emissions scenarios of the Climate Scenarios report, the impacts of global warming in California have the potential to include, but are not limited to, the following areas:

### ***Public Health***

Higher temperatures may increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation could increase from 25 to 35 percent under the lower warming range to 75 to 85 percent under the medium warming range. In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances, depending on wind conditions. The Climate Scenarios report indicates that large wildfires could become up to 55 percent more frequent if GHG emissions are not significantly reduced.

In addition, under the higher warming range scenario, there could be up to 100 more days per year with temperatures above 90°F in Los Angeles and 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures could increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

### ***Water Resources***

A vast network of man-made reservoirs and aqueducts captures and transports water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

If GHG emissions continue unabated, more precipitation could fall as rain instead of snow, and the snow that does fall could melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. Under the lower warming range scenario, snowpack losses could be only half as large as those possible if temperatures were to rise to the higher warming range. How much snowpack could be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snowpack could pose challenges to water managers and hamper hydropower generation. It could also adversely affect winter tourism. Under the lower warming range, the ski season at lower elevations could be reduced by as much as a month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing and snowboarding.

The State's water supplies are also at risk from rising sea levels. An influx of saltwater could degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Sacramento/San Joaquin River Delta – a major fresh water supply.

### ***Agriculture***

Increased GHG emissions could cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. First, California farmers could possibly lose as much as 25 percent of the water supply they need. Although higher CO<sub>2</sub> levels can stimulate plant production and increase plant water-use efficiency, California's farmers could face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development could change, as could the intensity and frequency of pest and disease outbreaks. Rising temperatures could aggravate O<sub>3</sub> pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures could worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts.

In addition, continued global climate change could shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion could occur in many species while range contractions may be less likely in rapidly evolving species with significant populations already established. Should range contractions occur, new or different weed species could fill the emerging gaps. Continued global climate change could alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

### ***Forests and Landscapes***

Global climate change has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. In contrast, wildfires in northern California could increase by up to 90 percent due to decreased precipitation.

Moreover, continued global climate change has the potential to alter natural ecosystems and biological diversity within the state. For example, alpine and subalpine ecosystems could decline by as much as 60 to 80 percent by the end of the century as a result of increasing temperatures. The productivity of the state's forests has the potential to decrease as a result of global climate change.

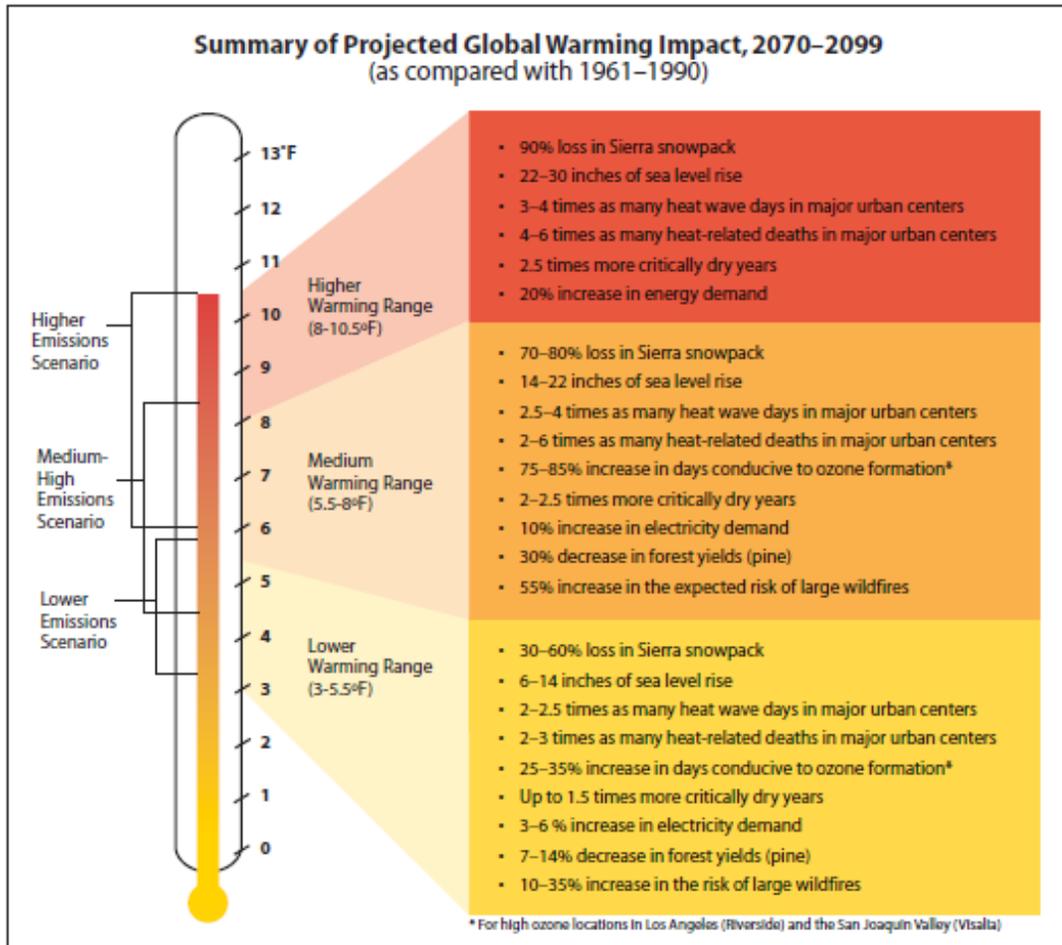
### ***Rising Sea Levels***

Rising sea levels, more intense coastal storms, and warmer water temperatures could increasingly threaten the state's coastal regions. Under the higher warming range scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate low-lying coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats. Under the lower warming range scenario, sea level could rise 12-14 inches.

## 2.6 Health Effects

The potential health effects related directly to the emissions of carbon dioxide, methane, and nitrous oxide as they relate to development projects such as the proposed project are still being debated. Their cumulative effects to global climate change have the potential to cause great harm to human health. Increases in Earth's ambient temperatures would result in more intense heat waves, causing more heat-related deaths. Scientists also fear that higher ambient temperatures would increase disease survival rates and result in more widespread disease. Climate change will likely cause shifts in weather patterns, potentially resulting in devastating droughts and food shortages in some areas (American Lung Association, 2004). Figure 1 presents the potential impacts of global warming.

Figure 1



Source: California Energy Commission, 2006. Our Changing Climate, Assessing the Risks to California, 2006 Biennial Report.

Specific health effects associated with directly emitted GHG emissions are as follows:

Water Vapor: There are no known direct health effects related to water vapor at this time. It should be noted however that when some pollutants react with water vapor, the reaction forms a transport mechanism for some of these pollutants to enter the human body through water vapor.

Carbon Dioxide: According to the National Institute for Occupational Safety and Health (NIOSH) high concentrations of carbon dioxide can result in health effects such as: headaches, dizziness, restlessness, difficulty breathing, sweating, increased heart rate, increased cardiac

output, increased blood pressure, coma, asphyxia, and/or convulsions. It should be noted that current concentrations of carbon dioxide are estimated to be approximately 370 parts per million (ppm), the actual reference exposure level (level at which adverse health effects typically occur) is at exposure levels of 5,000 ppm averaged over 10 hours in a 40-hour workweek and short-term reference exposure levels of 30,000 ppm averaged over a 15 minute period (NIOSH 2005).

Methane: Methane is extremely reactive with oxidizers, halogens, and other halogen-containing compounds. Methane is also an asphyxiant and may displace oxygen in an enclosed space (OSHA 2003).

Nitrous Oxide: Nitrous Oxide is often referred to as laughing gas; it is a colorless greenhouse gas. The health effects associated with exposure to elevated concentrations of nitrous oxide include dizziness, euphoria, slight hallucinations, and in extreme cases of elevated concentrations nitrous oxide can also cause brain damage (OSHA 1999).

Fluorinated Gases: High concentrations of fluorinated gases can also result in adverse health effects such as asphyxiation, dizziness, headache, cardiovascular disease, cardiac disorders, and in extreme cases, increased mortality (NIOSH 1989, 1997).

Aerosols: The health effects of aerosols are similar to that of other fine particulate matter. Thus aerosols can cause elevated respiratory and cardiovascular diseases as well as increased mortality (NASA 2002).

## 2.7 GCC Regulatory Setting

### International Regulation and the Kyoto Protocol:

In 1988, the United Nations established the Intergovernmental Panel on Climate Change to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States joined other countries around the world in signing the United Nations' Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling greenhouse gas emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHGs in the United States. The Plan currently consists of more than 50 voluntary programs for member nations to adopt.

The Kyoto protocol is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. Some have estimated that if the commitments outlined in the Kyoto protocol are met, global GHG emissions could be reduced an estimated five percent from 1990 levels during the first commitment period of 2008-2012. Notably, while the United States is a signatory to the Kyoto protocol, Congress has not ratified the Protocol and the United States is not bound by the Protocol's commitments. In December 2009, international leaders from 192 nations met in Copenhagen to address the future of international climate change commitments post-Kyoto.

#### Federal Regulation and the Clean Air Act:

Coinciding 2009 meeting in Copenhagen, on December 7, 2009, the U.S. Environmental Protection Agency (EPA) issued an Endangerment Finding under Section 202(a) of the Clean Air Act, opening the door to federal regulation of GHGs. The Endangerment Finding notes that GHGs threaten public health and welfare and are subject to regulation under the Clean Air Act. To date, the EPA has not promulgated regulations on GHG emissions, but it has already begun to develop them.

Previously the EPA had not regulated GHGs under the Clean Air Act because it asserted that the Act did not authorize it to issue mandatory regulations to address global climate change and that such regulation would be unwise without an unequivocally established causal link between GHGs and the increase in global surface air temperatures. In *Massachusetts v. Environmental Protection Agency et al.* (127 S. Ct. 1438 (2007)), however, the U.S. Supreme Court held that GHGs are pollutants under the Clean Air Act and directed the EPA to decide whether the gases endangered public health or welfare. The EPA had also not moved aggressively to regulate GHGs because it expected Congress to make progress on GHG legislation, primarily from the standpoint of a cap-and-trade system. However, proposals circulated in both the House of Representative and Senate have been controversial and it may be some time before the U.S. Congress adopts major climate change legislation. The EPA's Endangerment Finding paves the way for federal regulation of GHGs with or without Congress.

Although global climate change did not become an international concern until the 1980s, efforts to reduce energy consumption began in California in response to the oil crisis in the 1970s, resulting in the unintended reduction of greenhouse gas emissions. In order to manage the

state's energy needs and promote energy efficiency, AB 1575 created the California Energy Commission (CEC) in 1975.

Title 24 Energy Standards:

The California Energy Commission (CEC) first adopted Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the state. Although not originally intended to reduce GHG emissions, increased energy efficiency, and reduced consumption of electricity, natural gas, and other fuels would result in fewer GHG emissions from residential and nonresidential buildings subject to the standard. The standards are updated periodically to allow for the consideration and inclusion of new energy efficiency technologies and methods. The latest revisions were adopted in 2008 and became effective on January 1, 2010.

Part 11 of the Title 24 Building Standards Code is referred to as the California Green Building Standards Code (CALGreen Code). The purpose of the CALGreen Code is to “improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: (1) Planning and design; (2) Energy efficiency; (3) Water efficiency and conservation; (4) Material conservation and resource efficiency; and (5) Environmental air quality.”<sup>8</sup> The CALGreen Code is not intended to substitute or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California Building Standards Commission (CBSC). The CBSC has released the *2010 California Green Building Standards Code* on its Web site.<sup>9</sup> Unless otherwise noted in the regulation, all newly constructed buildings in California are subject of the requirements of the CALGreen Code.

California Assembly Bill No. 1493 (AB 1493):

AB 1493 requires CARB to develop and adopt the nation's first greenhouse gas emission standards for automobiles. The Legislature declared in AB 1493 that global warming was a matter of increasing concern for public health and environment in California. Further, the

---

<sup>8</sup> California Building Standards Commission, 2008 California Green Building Standards Code, (2009).

<sup>9</sup> “CALGreen,” <http://www.bsc.ca.gov/CALGreen/default.htm>. 2010

legislature stated that technological solutions to reduce greenhouse gas emissions would stimulate the California economy and provide jobs.

To meet the requirements of AB 1493, ARB approved amendments to the California Code of Regulations (CCR) adding GHG emission standards to California's existing motor vehicle emission standards in 2004. Amendments to CCR Title 13 Sections 1900 (CCR 13 1900) and 1961 (CCR 13 1961) and adoption of Section 1961.1 (CCR 13 1961.1) require automobile manufacturers to meet fleet average GHG emission limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes beginning with the 2009 model year. Emission limits are further reduced each model year through 2016.

In December 2004 a group of car dealerships, automobile manufacturers, and trade groups representing automobile manufacturers filed suit against ARB to prevent enforcement of CCR 13 1900 and CCR 13 1961 as amended by AB 1493 and CCR 13 1961.1 (*Central Valley Chrysler-Jeep et al. v. Catherine E. Witherspoon*, in her official capacity as Executive Director of the California Air Resources Board, et al.). The suit, heard in the U.S. District Court for the Eastern District of California, contended that California's implementation of regulations that in effect regulate vehicle fuel economy violates various federal laws, regulations, and policies. In January 2007, the judge hearing the case accepted a request from the State Attorney General's office that the trial be postponed until a decision is reached by the U.S. Supreme Court on a separate case addressing GHGs. In the Supreme Court Case, *Massachusetts vs. EPA*, the primary issue in question is whether the federal CAA provides authority for USEPA to regulate CO2 emissions. In April 2007, the U.S. Supreme Court ruled in Massachusetts' favor, holding that GHGs are air pollutants under the CAA. On December 11, 2007, the judge in the *Central Valley Chrysler-Jeep* case rejected each plaintiff's arguments and ruled in California's favor. On December 19, 2007, the USEPA denied California's waiver request. California filed a petition with the Ninth Circuit Court of Appeals challenging USEPA's denial on January 2, 2008.

The Obama administration subsequently directed the USEPA to re-examine their decision. On May 19, 2009, challenging parties, automakers, the State of California, and the federal government reached an agreement on a series of actions that would resolve these current and potential future disputes over the standards through model year 2016. In summary, the USEPA and the U.S. Department of Transportation agreed to adopt a federal program to reduce GHGs

and improve fuel economy, respectively, from passenger vehicles in order to achieve equivalent or greater greenhouse gas benefits as the AB 1493 regulations for the 2012–2016 model years. Manufacturers agreed to ultimately drop current and forego similar future legal challenges, including challenging a waiver grant, which occurred on June 30, 2009. The State of California committed to (1) revise its standards to allow manufacturers to demonstrate compliance with the fleet-average GHG emission standard by “pooling” California and specified State vehicle sales; (2) revise its standards for 2012–2016 model year vehicles so that compliance with USEPA-adopted GHG standards would also comply with California’s standards; and (3) revise its standards, as necessary, to allow manufacturers to use emissions data from the federal CAFE program to demonstrate compliance with the AB 1493 regulations (CARB 2009, <http://www.arb.ca.gov/regact/2009/ghgpv09/ghgpvisor.pdf>) both of these programs are aimed at light-duty auto and light-duty trucks.

Executive Order S-3-05:

Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra’s snowpack, further exacerbate California’s air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 1990 level by 2020, and to 80% below the 1990 level by 2050. The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary also is required to submit biannual reports to the Governor and state Legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California’s resources; and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the CalEPA created a Climate Action Team (CAT) made up of members from various state agencies and commission. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

California Assembly Bill 32 (AB 32):

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006. AB 32 requires that statewide GHG emissions be reduced to 1990 levels

by the year 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

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

In November 2007, CARB completed its estimates of 1990 GHG levels. Net emission 1990 levels were estimated at 427 MMTs (emission sources by sector were: transportation – 35 percent; electricity generation – 26 percent; industrial – 24 percent; residential – 7 percent; agriculture – 5 percent; and commercial – 3 percent)<sup>10</sup>. Accordingly, 427 MMTs of CO<sub>2</sub> equivalent was established as the emissions limit for 2020. For comparison, CARB’s estimate for baseline GHG emissions was 473 MMT for 2000 and 532 MMT for 2010. “Business as usual” conditions (without the 30 percent reduction to be implemented by CARB regulations) for 2020 were projected to be 596 MMTs.

In December 2007, CARB approved a regulation for mandatory reporting and verification of GHG emissions for major sources. This regulation covered major stationary sources such as cement plants, oil refineries, electric generating facilities/providers, and co-generation facilities, which comprise 94 percent of the point source CO<sub>2</sub> emissions in the State.

On December 11, 2008, CARB adopted a scoping plan to reduce GHG emissions to 1990 levels. The Scoping Plan’s recommendations for reducing GHG emissions to 1990 levels by 2020 include emission reduction measures, including a cap-and-trade program linked to Western Climate Initiative partner jurisdictions, green building strategies, recycling and waste-

---

<sup>10</sup> On a national level, the EPA’s Endangerment Finding stated that electricity generation is the largest emitting sector (34%), followed by transportation (28%), and industry (19%).

related measures, as well as Voluntary Early Actions and Reductions. Implementation of individual measures must begin no later than January 1, 2012, so that the emissions reduction target can be fully achieved by 2020.

Table 2-3 shows the proposed reductions from regulations and programs outlined in the Scoping Plan. While local government operations were not accounted for in achieving the 2020 emissions reduction, local land use changes are estimated to result in a reduction of 5 MMTons of CO<sub>2</sub>e, which is approximately 3 percent of the 2020 GHG emissions reduction goal. In recognition of the critical role local governments will play in successful implementation of AB 32, CARB is recommending GHG reduction goals of 15 percent of 2006 levels by 2020 to ensure that municipal and community-wide emissions match the state's reduction target. According to the Measure Documentation Supplement to the Scoping Plan, local government actions and targets are anticipated to reduce vehicle miles by approximately 2 percent through land use planning, resulting in a potential GHG reduction of 2 MMTons tons of CO<sub>2</sub>e (or approximately 1.2 percent of the GHG reduction target).

California Senate Bill No. 1368 (SB 1368):

In 2006, the State Legislature adopted Senate Bill 1368 ("SB 1368"), which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission ("CPUC") to adopt a greenhouse gas emission performance standard ("EPS") for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than five years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Due to the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants. Accordingly, the new law will effectively prevent California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. Thus, SB 1368 will lead to dramatically lower greenhouse gas emissions associated with California energy demand, as SB 1368 will effectively prohibit California utilities from purchasing power from out of state producers that cannot satisfy the EPS standard required by SB 1368.

**TABLE 2-3**  
**SCOPING PLAN GHG REDUCTION MEASURES TOWARD 2020 TARGET**

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

Source: CARB. 2008, MMTons CO<sub>2</sub>e: million metric tons of CO<sub>2</sub>e 1 Reductions represent an estimate of what may be achieved from local land use changes. It is not the SB 375 regional target. 2 According to the Measure Documentation Supplement to the Scoping Plan, local government actions and targets are anticipated to reduce vehicle miles by approximately 2 percent through land use planning, resulting in a potential GHG reduction of 2 million metric tons of CO<sub>2</sub>e (or approximately 1.2 percent of the GHG reduction target). However, these reductions were not included in the Scoping Plan reductions to achieve the 2020 Target

Senate Bill 97 (SB 97):

Pursuant to the direction of SB 97, OPR released preliminary draft CEQA Guideline amendments for greenhouse gas emissions on January 8, 2009, and submitted its final proposed guidelines to the Secretary for Natural Resources on April 13, 2009. The Natural Resources Agency adopted the Guideline amendments and they became effective on March 18, 2010.

Of note, the new guidelines state that a lead agency shall have discretion to determine whether to use a quantitative model or methodology, or in the alternative, rely on a qualitative analysis or performance based standards. CEQA Guideline § 15064.4(a)“A lead agency shall have discretion to determine, in the context of a particular project, whether to: (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use . . .; or (2) Rely on a qualitative analysis or performance based standards.”

CEQA emphasizes that the effects of greenhouse gas emissions are cumulative, and should be analyzed in the context of CEQA's requirements for cumulative impacts analysis. (See CEQA Guidelines Section 15130(f)).

Section 15064.4(b) of the CEQA Guidelines provides direction for lead agencies for assessing the significance of impacts of greenhouse gas emissions:

1. The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; or
3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project’s incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively

considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

The CEQA Guideline amendments do not identify a threshold of significance for greenhouse gas emissions, nor do they prescribe assessment methodologies or specific mitigation measures. Instead, they call for a “good-faith effort, based on available information, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project.” The amendments encourage lead agencies to consider many factors in performing a CEQA analysis and preserve lead agencies’ discretion to make their own determinations based upon substantial evidence. The amendments also encourage public agencies to make use of programmatic mitigation plans and programs from which to tier when they perform individual project analyses. Specific GHG language incorporated in the Guidelines’ suggested Environmental Checklist (Guidelines Appendix G) is as follows:

## VII. GREENHOUSE GAS EMISSIONS

Would the project:

- a) Generate greenhouse gas 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 the emissions of greenhouse gases?

### Executive Order S-01-07:

On January 18, 2007 California Governor Arnold Schwarzenegger, through Executive Order S-01-07, mandated a statewide goal to reduce the carbon intensity of California’s transportation fuel by at least ten percent by 2020. The order also requires that a California specific Low Carbon Fuel Standard be established for transportation fuels.

### Senate Bills 1078 and 107 and Executive Order S-14-08:

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20% of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to

2010. In November 2008 Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Energy Standard to 33% renewable power by 2020.

Senate Bill 375:

SB 375, signed in September 2008 (Chapter 728, Statutes of 2008), aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will prescribe land use allocation in that MPO's regional transportation plan. ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects will not be eligible for funding programmed after January 1, 2012.

This law also extends the minimum time period for the regional housing needs allocation cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City or county land use policies (including general plans) are not required to be consistent with the regional transportation plan (and associated SCS or APS). However, new provisions of CEQA would incentivize (through streamlining and other provisions) qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

CARB's Preliminary Draft Staff Proposal for Interim Significance Thresholds:

Separate from its Scoping Plan approved in December of 2008, CARB issued a Staff Proposal in October 2008, as its first step toward developing recommended statewide interim thresholds of significance for GHGs that may be adopted by local agencies for their own use. CARB staff's objective in this proposal is to develop a threshold of significance that will result in the vast majority (approximately 90 percent statewide) of GHG emissions from new industrial projects being subject to CEQA's requirement to impose feasible mitigation. The proposal does not attempt to address every type of project that may be subject to CEQA, but instead focuses on common project types that, collectively, are responsible for substantial GHG emissions –

specifically, industrial, residential, and commercial projects. CARB is developing these thresholds in these sectors to advance climate objectives, streamline project review, and encourage consistency and uniformity in the CEQA analysis of GHG emissions throughout the state. These draft thresholds are under revision in response to comments. There is currently no timetable for finalized thresholds at this time.

As currently proposed by CARB, the threshold consists of a quantitative threshold of 7,000 metric tons (MT) of CO<sub>2</sub>e per year for operational emissions (excluding transportation), and performance standards for construction and transportation emissions. These performance standards have not yet been developed.

However, CARB's proposal is not yet final, and thus cannot be applied to the Project. Further, CARB's proposal sets forth draft thresholds for industrial projects that have high operational stationary GHG emissions, such as manufacturing plants, or uses that utilize combustion engines. Thus, mobile source emissions are not addressed. This Project's GHG emissions are mostly from mobile sources and from a land use that is not intended to fall into CARB's definition of "industrial", and as such, the CARB proposal is not applicable to the Project.<sup>11</sup> Further, it would be misleading to apply the CARB industrial threshold to the Project since the intent by CARB was to establish an applicable threshold for Project's that have GHG emissions mainly from combustion engines and on-site stationary sources.

Furthermore, CARB's draft threshold contains a separate proposed threshold for Residential and Commercial land uses. However CARB did not and has not proposed any numerical threshold related to Residential and Commercial land uses. Thus there is no CARB threshold that can be applied to this Project.

South Coast Air Quality Management District Recommendations for Significance Thresholds:

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 CEQA documents, convened a "GHG CEQA Significance Threshold Working Group."<sup>12</sup> The goal of the working group is to develop and reach consensus on an acceptable CEQA significance threshold for GHG emissions that would be utilized on an interim basis until CARB

<sup>11</sup> <http://www.arb.ca.gov/cc/localgov/ceqa/meetings/102708/prelimdraftproposal102408.pdf>

<sup>12</sup> For more information visit: <http://www.aqmd.gov/ceqa/handbook/GHG/GHG.html>.

(or some other state agency) develops statewide 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 metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e) as a screening numerical threshold for stationary sources. More importantly it should be noted that when setting the 10,000 MTCO<sub>2</sub>e threshold, the SCAQMD did not consider mobile sources (vehicular travel), rather the threshold is based mainly on stationary source generators such as boilers, refineries, power plants, etc. Therefore it would be misleading to apply a threshold that was developed without consideration for mobile sources to a Project where the majority of emissions are related to mobile sources. Thus there is no SCAQMD threshold that can be applied to this Project.

In September 2010, the Working Group released additional revisions which recommended a threshold of 3,500 MTCO<sub>2</sub>e for residential projects, 1,400 MTCO<sub>2</sub>e for commercial projects, and 3,000 MTCO<sub>2</sub>e for mixed use projects, additionally the working group identified project-level efficiency target of 4.8 MTCO<sub>2</sub>e per service population as a 2020 target and 3.0 MTCO<sub>2</sub>e per service population as a 2035 target. The recommended plan-level target for 2020 was 6.6 MTCO<sub>2</sub>e and the plan level target for 2035 was 4.1 MTCO<sub>2</sub>e. 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 address GHG reductions; however, these rules are currently applicable to boilers and process heaters, forestry, and manure management projects.

## 2.8 Discussion on Establishment of Significance Thresholds

In order to assess the significance of a proposed project's environmental impacts it is necessary to identify quantitative or qualitative thresholds which, if exceeded, would constitute a finding of significance. As discussed above, while project-related GHG emissions can be estimated, the direct impacts of such emissions on climate change and global warming cannot be determined on the basis of available science. There is no evidence at this time that would indicate that the

emissions from a project the size of the proposed project would directly affect global climate change. The SCAQMD has adopted a quantitative GHG emission significance thresholds to assess direct impacts from industrial projects for which the SCAQMD is the lead agency. The SCAQMD and other air quality agencies concur that GHG and climate change should be evaluated as a potentially significant cumulative rather than project-specific impact. The SCAQMD is also considering adoption of a numeric plan-level efficiency target of 6.6 MTCO<sub>2</sub>e per service population.

AB 32 states, in part, that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California." Because global warming is the result of GHG emissions, and GHGs are emitted by innumerable sources worldwide, global climate change is considered to be a significant cumulative impact. GHG emissions from the project would contribute to cumulative GHG emissions in California and to the potential adverse environmental impacts of climate change.

As previously discussed, the new CEQA guidelines indicate that a project would result in a significant impact on climate change if a project were to: a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. Or b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Since AB 32 is the primary plan, policy or regulation adopted to reduce GHG emissions, a project would have a significant impact if it did not comply with the applicable Scoping Plan Measures.

Currently, there is no adopted threshold of significance for determining the cumulative significance of a project's GHG emissions on global climate change. In the most recent 2007 IPCC assessment report (IPCC 2007b, Synthesis Report), the IPCC acknowledges that anthropogenic warming and sea level rise would continue for centuries due to the time scales associated with climate processes and feedbacks even if GHG concentrations were to be stabilized. The IPCC further found that both past and future anthropogenic CO<sub>2</sub> emissions will continue to contribute to warming and sea level rise for more than a millennium, due to the time scales required for the removal of this gas from the atmosphere. (IPCC 2007b, Synthesis Report) Further, the IPCC assessment noted that defining what is dangerous anthropogenic

interference with the climate system and, consequently, the limits to be set for policy purposes are complex tasks that can only be partially based on science, as such definitions inherently involve normative judgments. (IPCC 2007b – Working Group III)

Based on all the above, for the purposes of this analysis, implementation of the proposed project may have a significant adverse impact on GHG emissions if it would result in any of the following:

1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on any applicable threshold of significance.
  - a. A potentially significant impact would occur if the project exceeds the proposed SCAQMD's threshold of 6.6 MT CO<sub>2</sub>e/SP/Yr.
2. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.
  - a. Fail to show consistency with AB 32's Scoping Plan and related measures.

## 2.9 Project-Related GHG Emissions

CEQA Guidelines 15064.4 (b) (1) states that a lead agency may use a model or methodology to quantify greenhouse gas emissions associated with a project.

On February 3, 2011, the SCAQMD released the California Emissions Estimator Model (CALEEMOD) Emissions Inventory Model™. The purpose of this new model is to more accurately calculate air quality and greenhouse gas (GHG) emissions from direct and indirect sources and quantify applicable air quality and GHG reductions achieved from mitigation measures. As such, the latest version of CALEEMOD™ was used for this project. The CalEEMod™ model includes GHG emissions from the following source categories: construction, area, energy, mobile, waste, water.

A summary of the project's GHG emissions are presented on Table 2-4 as follows.

**TABLE 2-4**  
**TOTAL PROJECT GREENHOUSE GAS EMISSIONS (ANNUAL) (METRIC TONS PER YEAR)**

Emission Source	Emissions (metric tons per year)			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Total CO <sub>2</sub> E
Annual construction-related emissions amortized over 30 years	69.89	0.007	--	70.04
Area Source Emissions	185.14	0.01	--	186.37
Energy	1,195.70	0.04	0.02	1,203.46
Mobile Sources	4,074.69	0.16	--	4,078.05
Waste	74.88	4.43	--	167.80
Water Usage	101.87	0.59	0.02	119.59
<b>Total CO<sub>2</sub>E (All Sources)</b>		<b>5,825.11</b>		
<b>Service Population</b>		<b>1,221</b>		
<b>MT CO<sub>2</sub>E/Service Population (SP)/Yr</b>		<b>4.77</b>		
<b>Threshold MT CO<sub>2</sub>E/SP/Yr</b>		<b>6.6</b>		
<b>Significant?</b>		<b>NO</b>		

Source: CalEEMod™ model output, See Appendix "A" for detailed model outputs.  
 Note: Totals obtained from CalEEMod™ and may not total 100% due to rounding

2.10 Analysis of Greenhouse Gas Impact

**FACTOR NO. 1: The extent to which the project may generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, based on any applicable threshold of significance.**

As shown on Table 2-4 the project will result in approximately 5,825.11 MT/yr CO<sub>2</sub>e and a 4.77 MT CO<sub>2</sub>e/Service Population (SP)/Yr; the proposed project would not exceed the threshold of 6.6 MT CO<sub>2</sub>e/SP/Yr.

**FACTOR NO. 2: The extent to which the project may conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.**

Consistency with the CARB Scoping Plan

AB 32 requires California to reduce its GHG emissions by approximately 29% below business as usual. CARB identified reduction measures to achieve this goal as set forth in the CARB Scoping Plan. Thus, projects that are consistent with the CARB Scoping Plan are also consistent with the 29% reduction below business as usual required by AB 32.

The proposed project would generate GHG emissions from a variety of sources which would all emit CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. GHGs could also be indirectly generated by incremental electricity consumption and waste generation from the proposed project.

Table 2-5 below, presents the 39 Recommended Actions (qualitative measures) identified to date by CARB in its Climate Change Proposed Scoping Plan. Of the 39 measures identified, those that would be considered to be applicable to the Project would primarily be those actions related to transportation, electricity and natural gas use, green building design and industrial uses. Consistency of the Project with these measures is evaluated by each source-type measure below. Table 2-5 identifies which CARB Recommended Actions applies to the Project, and of those, whether the Project is consistent therewith. A discussion of how the Project is consistent with each applicable CARB Recommended Action is set forth after Table 2-5.

**TABLE 2-5  
RECOMMENDED ACTIONS FOR CLIMATE CHANGE PROPOSED SCOPING PLAN**

<b>ID #</b>	<b>Sector</b>	<b>Strategy Name</b>	<b>Applicable to Project?</b>	<b>Will Project Conflict With Implementation?</b>
T-1	Transportation	Pavley I and II – Light-Duty Vehicle GHG Standards	YES	NO
T-2	Transportation	Low Carbon Fuel Standard (Discrete Early Action)	YES	NO
T-3	Transportation	Regional Transportation-Related GHG Targets	YES	NO
T-4	Transportation	Vehicle Efficiency Measures	YES	NO
T-5	Transportation	Ship Electrification at Ports (Discrete Early Action)	NO	NO
T-6	Transportation	Goods-movement Efficiency Measures	NO	NO
T-7	Transportation	Heavy Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)	NO	NO
T-8	Transportation	Medium and Heavy-Duty Vehicle Hybridization	NO	NO
T-9	Transportation	High Speed Rail	NO	NO
E-1	Electricity and Natural Gas	Increased Utility Energy efficiency programs More stringent Building and Appliance Standards	YES	NO
E-2	Electricity and Natural Gas	Increase Combined Heat and Power Use by 30,000GWh	NO	NO
E-3	Electricity and Natural Gas	Renewable Portfolio Standard	NO	NO
E-4	Electricity and Natural Gas	Million Solar Roofs	NO	NO
CR-1	Electricity and Natural Gas	Energy Efficiency	NO	NO
CR-2	Electricity and Natural Gas	Solar Water Heating	NO	NO
GB-1	Green Buildings	Green Buildings	YES	NO
W-1	Water	Water Use Efficiency	YES	NO
W-2	Water	Water Recycling	NO	NO
W-3	Water	Water System Energy Efficiency	NO	NO
W-4	Water	Reuse Urban Runoff	NO	NO
W-5	Water	Increase Renewable Energy Production	NO	NO
W-6	Water	Public Goods Charge (Water)	NO	NO
I-1	Industry	Energy Efficiency and Co-benefits Audits for Large Industrial Sources	NO	NO
I-2	Industry	Oil and Gas Extraction GHG Emission Reduction	NO	NO
I-3	Industry	GHG Leak Reduction from Oil and Gas Transmission	NO	NO
I-4	Industry	Refinery Flare Recovery Process Improvements	NO	NO
I-5	Industry	Removal of Methane Exemption from Existing Refinery Regulations	NO	NO
RW-1	Recycling and Waste Management	Landfill Methane Control (Discrete Early Action)	NO	NO
RW-2	Recycling and Waste Management	Additional Reductions in Landfill Methane – Capture Improvements	NO	NO
RW-3	Recycling and Waste Management	High Recycling/Zero Waste	NO	NO
F-1	Forestry	Sustainable Forest Target	NO	NO
H-1	High Global Warming Potential Gases	Motor Vehicle Air Conditioning Systems (Discrete Early Action)	NO	NO
H-2	High Global Warming Potential Gases	SF <sub>6</sub> Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)	NO	NO
H-3	High Global Warming Potential Gases	Reduction in Perfluorocarbons in Semiconductor Manufacturing (Discrete Early Action)	NO	NO
H-4	High Global Warming Potential Gases	Limit High GWP Use in Consumer Products (Discrete Early Action, Adopted June 2008)	NO	NO
H-5	High Global Warming Potential Gases	High GWP Reductions from Mobile Sources	NO	NO
H-6	High Global Warming Potential Gases	High GWP Reductions from Stationary Sources	NO	NO
H-7	High Global Warming Potential Gases	Mitigation Fee on High GWP Gases	NO	NO
A-1	Agriculture	Methane Capture at Large Dairies	NO	NO

SOURCE: CARB, 2008.

A detailed discussion of the applicability of each measure and if the project conflicts with its implementation is as follows:

### Transportation

CARB's Scoping Plan identifies nine transportation-related recommended actions. Action T-1 concerns improvements to light-duty vehicle technology for the purposes of reducing GHG emissions. This action focuses on legislating improved controls for vehicle manufacturers and would not generally be considered applicable to the proposed project. Vehicles utilized by the proposed project would be subject to the Pavley standards, as applicable, and would be consistent with and not conflict with this recommended action.

Action T-2 concerns implementation of a low carbon fuel standard. To reduce the carbon intensity of transportation fuels, CARB is developing a Low Carbon Fuel Standard (LCFS), which would reduce the carbon intensity of California's transportation fuels by at least ten percent by 2020 as called for by Governor Schwarzenegger in Executive Order S-01-07. LCFS will incorporate compliance mechanisms that provide flexibility to fuel providers in how they meet the requirements to reduce greenhouse gas emissions.

While implementation of such a standard is not within the purview of a development project, a land use such the proposed project would be a substantial consumer of fuels for transportation purposes. Projects such as the proposed project would be required to participate with the use of low carbon fuels as they are made available through purchase of fuels for its vehicle fleet. Therefore, the proposed project would not conflict with measures concerning the use of low carbon fuels.

Action T-3 addresses regional transportation targets for reducing GHG emissions. SB 375 requires CARB to develop, in consultation with metropolitan planning organizations (MPOs), passenger vehicle greenhouse gas emissions reduction targets for 2020 and 2035 by September 30, 2010. It sets forth a collaborative process to establish these targets, including the appointment by CARB of a Regional Targets Advisory Committee to recommend factors to be considered and methodologies for setting greenhouse gas emissions reduction targets. SB 375 also provides incentives – relief from certain California Environmental Quality Act (CEQA) requirements for development projects that are consistent with regional plans that achieve the targets. The proposed project is not expected to conflict with the SB 375 targets.

Action T-4 is concerned with vehicle efficiency measures. The California Integrated Waste Management Board (CIWMB) with various partners continues to conduct a public awareness campaign to promote sustainable tire practices. CARB is pursuing a regulation to ensure that tires are properly inflated when vehicles are serviced. In addition, CEC in consultation with CIWMB is developing an efficient tire program focusing first on data gathering and outreach, then on potential adoption of minimum fuel-efficient tire standards, and lastly on the development of consumer information requirements for replacing tires. CARB is also pursuing ways to reduce engine load via lower friction oil and reducing the need for air conditioner use. ARB is actively engaged in the regulatory development process for the tire inflation component of this measure. While implementation of such a standard is not within the purview of a development project, a land use such as that proposed would generate VMT and be subject to any applicable adopted standards and would therefore not conflict with the recommended measure.

Action T-5 addresses electrification of ships at ports and is not applicable to the proposed project. Therefore, the proposed project would not conflict with this measure.

Action T-6 also primarily addresses port operations and is not applicable to the proposed project. Therefore, the proposed project would not conflict with this measure.

Action T-7 requires existing trucks/trailers to be retrofitted with the best available technology and/or CARB-approved technology. Implementation of such a standard is not within the purview of the proposed project since various trucks may access the site. Therefore, the proposed project would not conflict with this measure.

Action T-8 focuses on hybridization of medium- and heavy-duty vehicles. The implementation approach to Action T-8 is to adopt a regulation and/or incentive program that reduces GHG emissions by encouraging hybrid technology as applied to vocational applications that have significant urban, stop-and-go driving, idling, and power take-off operations in their duty cycle. Such applications include parcel delivery trucks and vans. Implementation of such a standard is not within the purview of the proposed project since various trucks may access the site. Therefore, the proposed project would not conflict with this measure.

Action T-9 concerns implementation of a high speed rail system. A high speed rail (HSR) system is part of the statewide strategy to provide more mobility choice and reduce greenhouse gas emissions. This measure supports implementation of plans to construct and operate a HSR system between northern and southern California. As planned, the HSR is a 700-mile-long rail system capable of speeds in excess of 200 miles per hour on dedicated, fully-grade separated tracks with state-of-the-art safety, signaling and automated rail control systems. The system would serve the major metropolitan centers of California in 2030 and is projected to displace between 86 and 117 million riders from other travel modes in 2030. The proposed project would not conflict with implementation of a HSR system.

### Electricity and Natural Gas

Action E-1, together with Action GB-1 (Green Building), aims to reduce electricity demand by increased efficiency of Utility Energy Programs and adoption of more stringent building and appliance standards. Elements of this action include encouraging construction of zero net energy (ZNE) buildings and implementation of passive solar design. In addition to employing on-site electricity generation, a ZNE building must either replace natural gas with renewable energy for space and water heating, or compensate for natural gas use by generating surplus electricity for sale on the state's electricity grid. The proposed project is required to comply with the 2008 Title 24 Energy Efficiency Standards and applicable Green Building Standards. Therefore, the proposed project would not conflict with this measure.

Action E-2 encourages an increase in the use of combined heat and power (CHP) use, or co-generation, facilities. California has supported CHP for many years, but market and other barriers continue to keep CHP from reaching its full market potential. Increasing the deployment of efficient CHP will require a multi-pronged approach that includes addressing significant barriers and instituting incentives or mandates where appropriate. Implementation of such a standard is not within the purview of the proposed project; therefore, the proposed project would not conflict with this measure.

Action E-3 concerns Renewable Portfolio Standards for utilities and does not apply directly to development projects, therefore, the proposed project would not conflict with the recommended measure.

Action E-4 strives to promote solar generated electricity. The Million Solar Roofs initiative is not within the purview of any one individual project. Therefore, the proposed project would not conflict with this measure.

#### Water Use

Implementation of all but two of the Recommended Actions related to water use are not within the purview of the proposed project. The two that apply W-1 (Water Use Efficiency) and W-3 (Water System Energy Efficiency). Because the proposed project would not exceed the audit threshold, as set forth in the preceding impact analysis, the proposed project is consistent with and would not obstruct the recommended actions.

#### Industrial Use

The proposed project is not an industrial use and therefore these measures do not apply to the project.

#### Conclusion

The Project is consistent with, or otherwise not in conflict with the CARB Scoping Plan recommended measures and actions.

As such, a qualitative assessment of the Project impacts based upon consistency with the CARB Scoping Plan supports the conclusion that the Project GHG emissions are not cumulatively considerable.

Lastly results of the analysis indicate that the proposed project will not exceed the applicable quantitative thresholds. Therefore a less than significant impact is expected with respect to greenhouse gas emissions.

THIS PAGE INTENTIONALLY LEFT BLANK

## APPENDIX A

### GHG Emissions Calculations

**Oak Creek**  
**Riverside-South Coast County, Annual**

**1.0 Project Characteristics**

---

**1.1 Land Usage**

Land Uses	Size	Metric
Pharmacy/Drugstore with Drive Thru	14.47	1000sqft
Single Family Housing	275	Dwelling Unit
Convenience Market With Gas Pumps	8	Pump
Strip Mall	2.55	1000sqft

**1.2 Other Project Characteristics**

**Urbanization**    Urban                      **Wind Speed (m/s)**    2.4                      **Utility Company**    Southern California Edison  
**Climate Zone**    10                              **Precipitation Freq (Days)** 28

**1.3 User Entered Comments**

Project Characteristics -  
 Land Use -  
 Construction Phase - End date for building construction adjusted to conform with Project Buildout Year  
 Off-road Equipment - Load Factor from OFFROAD 2011 Source Documentation

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Mobile Commute Mitigation -

Off-road Equipment - Load Factor from OFFROAD 2011 Source Documentation

Off-road Equipment - Load Factor from OFFROAD 2011 Source Documentation

Off-road Equipment - Load Factor from OFFROAD 2011 Source Documentation

Off-road Equipment -

Grading - acreage for grading from site plan

Vehicle Trips - Weekday trip rate from Traffic Study

Area Mitigation -

## **2.0 Emissions Summary**

---

## 2.1 Overall Construction

### Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2012	0.48	3.83	2.22	0.00	2.11	0.19	2.30	1.12	0.19	1.31	0.00	341.56	341.56	0.04	0.00	342.37
2013	1.05	8.54	4.78	0.01	1.04	0.40	1.45	0.52	0.40	0.93	0.00	883.65	883.65	0.09	0.00	885.44
2014	0.67	4.40	3.55	0.01	1.19	0.25	1.44	0.53	0.25	0.78	0.00	616.14	616.14	0.05	0.00	617.24
2015	2.53	2.51	1.92	0.00	0.05	0.21	0.26	0.00	0.21	0.21	0.00	255.37	255.37	0.03	0.00	256.09
<b>Total</b>	<b>4.73</b>	<b>19.28</b>	<b>12.47</b>	<b>0.02</b>	<b>4.39</b>	<b>1.05</b>	<b>5.45</b>	<b>2.17</b>	<b>1.05</b>	<b>3.23</b>	<b>0.00</b>	<b>2,096.72</b>	<b>2,096.72</b>	<b>0.21</b>	<b>0.00</b>	<b>2,101.14</b>

### Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2012	0.48	3.83	2.22	0.00	0.83	0.19	1.02	0.44	0.19	0.63	0.00	341.56	341.56	0.04	0.00	342.37
2013	1.05	8.54	4.78	0.01	0.43	0.40	0.83	0.20	0.40	0.61	0.00	883.65	883.65	0.09	0.00	885.44
2014	0.67	4.40	3.55	0.01	0.57	0.25	0.82	0.21	0.25	0.46	0.00	616.14	616.14	0.05	0.00	617.24
2015	2.53	2.51	1.92	0.00	0.05	0.21	0.26	0.00	0.21	0.21	0.00	255.37	255.37	0.03	0.00	256.09
<b>Total</b>	<b>4.73</b>	<b>19.28</b>	<b>12.47</b>	<b>0.02</b>	<b>1.88</b>	<b>1.05</b>	<b>2.93</b>	<b>0.85</b>	<b>1.05</b>	<b>1.91</b>	<b>0.00</b>	<b>2,096.72</b>	<b>2,096.72</b>	<b>0.21</b>	<b>0.00</b>	<b>2,101.14</b>

**Oak Creek**  
**Riverside-South Coast County, Annual**

**1.0 Project Characteristics**

---

**1.1 Land Usage**

Land Uses	Size	Metric
Pharmacy/Drugstore with Drive Thru	14.47	1000sqft
Single Family Housing	275	Dwelling Unit
Convenience Market With Gas Pumps	8	Pump
Strip Mall	2.55	1000sqft

**1.2 Other Project Characteristics**

**Urbanization** Urban                      **Wind Speed (m/s)** 2.4                      **Utility Company** Southern California Edison  
**Climate Zone** 10                      **Precipitation Freq (Days)** 28

**1.3 User Entered Comments**

Project Characteristics - The Utility CO2 has been modified to 583 lb/MWhr to reflect the RPS of 20% based on SCE's 2007 PUP Report of 631 lb/MWhr and 13% Renewable Portfolio.

Land Use - Land uses from Traffic Study

Construction Phase - Construction Run separately.

Off-road Equipment - Construction run separately

Vehicle Trips - Weekday Trip Rate from Traffic Study

Mobile Land Use Mitigation -

Mobile Commute Mitigation -

Area Mitigation -

Energy Mitigation -

Water Mitigation -

## 2.0 Emissions Summary

---

### 2.2 Overall Operational

#### Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.11	0.07	5.93	0.00		0.00	0.29		0.00	0.29	29.21	175.24	204.45	0.10	0.00	207.71
Energy	0.06	0.52	0.22	0.00		0.00	0.04		0.00	0.04	0.00	1,195.70	1,195.70	0.04	0.02	1,203.46
Mobile	2.55	6.27	24.76	0.05	5.35	0.29	5.64	0.08	0.28	0.36	0.00	4,074.69	4,074.69	0.16	0.00	4,078.05
Waste						0.00	0.00		0.00	0.00	74.88	0.00	74.88	4.43	0.00	167.80
Water						0.00	0.00		0.00	0.00	0.00	101.87	101.87	0.59	0.02	119.39
<b>Total</b>	<b>5.72</b>	<b>6.86</b>	<b>30.91</b>	<b>0.05</b>	<b>5.35</b>	<b>0.29</b>	<b>5.97</b>	<b>0.08</b>	<b>0.28</b>	<b>0.69</b>	<b>104.09</b>	<b>5,547.50</b>	<b>5,651.59</b>	<b>5.32</b>	<b>0.04</b>	<b>5,776.41</b>

## 2.2 Overall Operational

### Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.21	0.05	4.20	0.00		0.00	0.04		0.00	0.04	0.00	185.14	185.14	0.01	0.00	186.37
Energy	0.06	0.52	0.22	0.00		0.00	0.04		0.00	0.04	0.00	1,195.70	1,195.70	0.04	0.02	1,203.46
Mobile	2.55	6.27	24.76	0.05	5.35	0.29	5.64	0.08	0.28	0.36	0.00	4,074.69	4,074.69	0.16	0.00	4,078.05
Waste						0.00	0.00		0.00	0.00	74.88	0.00	74.88	4.43	0.00	167.80
Water						0.00	0.00		0.00	0.00	0.00	101.87	101.87	0.59	0.02	119.39
<b>Total</b>	<b>4.82</b>	<b>6.84</b>	<b>29.18</b>	<b>0.05</b>	<b>5.35</b>	<b>0.29</b>	<b>5.72</b>	<b>0.08</b>	<b>0.28</b>	<b>0.44</b>	<b>74.88</b>	<b>5,557.40</b>	<b>5,632.28</b>	<b>5.23</b>	<b>0.04</b>	<b>5,755.07</b>

## 3.0 Construction Detail

---

### 3.1 Mitigation Measures Construction

## 4.0 Mobile Detail

---

### 4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.55	6.27	24.76	0.05	5.35	0.29	5.64	0.08	0.28	0.36	0.00	4,074.69	4,074.69	0.16	0.00	4,078.05
Unmitigated	2.55	6.27	24.76	0.05	5.35	0.29	5.64	0.08	0.28	0.36	0.00	4,074.69	4,074.69	0.16	0.00	4,078.05
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

#### 4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Convenience Market With Gas Pumps	1,222.72	1,635.76	1335.04	696,130	696,130
Pharmacy/Drugstore with Drive Thru	1,275.68	1,275.68	1275.68	1,452,619	1,452,619
Single Family Housing	2,631.75	2,772.00	2411.75	7,442,129	7,442,129
Strip Mall	113.02	107.20	52.10	159,367	159,367
<b>Total</b>	<b>5,243.16</b>	<b>5,790.64</b>	<b>5,074.56</b>	<b>9,750,244</b>	<b>9,750,244</b>

#### 4.3 Trip Type Information

Land Use	Miles			Trip %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
Convenience Market With Gas Pumps	9.50	7.30	7.30	0.80	80.20	19.00
Pharmacy/Drugstore with Drive Thru	9.50	7.30	7.30	7.50	73.50	19.00

Land Use	Miles			Trip %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
Single Family Housing	10.80	7.30	7.50	40.20	19.20	40.60
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00

## 5.0 Energy Detail

### 5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	598.75	598.75	0.03	0.01	602.87
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	598.75	598.75	0.03	0.01	602.87
NaturalGas Mitigated	0.06	0.52	0.22	0.00		0.00	0.04		0.00	0.04	0.00	596.95	596.95	0.01	0.01	600.58
NaturalGas Unmitigated	0.06	0.52	0.22	0.00		0.00	0.04		0.00	0.04	0.00	596.95	596.95	0.01	0.01	600.58
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

## 5.2 Energy by Land Use - NaturalGas

### Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
Convenience Market With Gas Pumps	2620.21	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.14	0.14	0.00	0.00	0.14
Pharmacy/Drugstore with Drive Thru	33570.4	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	1.79	1.79	0.00	0.00	1.80
Single Family Housing	1.11443e+007	0.06	0.51	0.22	0.00		0.00	0.04		0.00	0.04	0.00	594.70	594.70	0.01	0.01	598.32
Strip Mall	5916	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.32	0.32	0.00	0.00	0.32
<b>Total</b>		<b>0.06</b>	<b>0.51</b>	<b>0.22</b>	<b>0.00</b>		<b>0.00</b>	<b>0.04</b>		<b>0.00</b>	<b>0.04</b>	<b>0.00</b>	<b>596.95</b>	<b>596.95</b>	<b>0.01</b>	<b>0.01</b>	<b>600.58</b>

## 5.2 Energy by Land Use - NaturalGas

### Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
Convenience Market With Gas Pumps	2620.21	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.14	0.14	0.00	0.00	0.14
Pharmacy/Drugstore with Drive Thru	33570.4	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	1.79	1.79	0.00	0.00	1.80
Single Family Housing	1.11443e+007	0.06	0.51	0.22	0.00		0.00	0.04		0.00	0.04	0.00	594.70	594.70	0.01	0.01	598.32
Strip Mall	5916	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.32	0.32	0.00	0.00	0.32
<b>Total</b>		<b>0.06</b>	<b>0.51</b>	<b>0.22</b>	<b>0.00</b>		<b>0.00</b>	<b>0.04</b>		<b>0.00</b>	<b>0.04</b>	<b>0.00</b>	<b>596.95</b>	<b>596.95</b>	<b>0.01</b>	<b>0.01</b>	<b>600.58</b>

### 5.3 Energy by Land Use - Electricity

#### Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Convenience Market With Gas Pumps	17686.4					4.68	0.00	0.00	4.71
Pharmacy/Drugstore with Drive Thru	226600					59.92	0.00	0.00	60.34
Single Family Housing	1.97995e+006					523.59	0.03	0.01	527.20
Strip Mall	39933					10.56	0.00	0.00	10.63
<b>Total</b>						<b>598.75</b>	<b>0.03</b>	<b>0.01</b>	<b>602.88</b>

### 5.3 Energy by Land Use - Electricity

#### Mitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Convenience Market With Gas Pumps	17686.4					4.68	0.00	0.00	4.71
Pharmacy/Drugstore with Drive Thru	226600					59.92	0.00	0.00	60.34
Single Family Housing	1.97995e+006					523.59	0.03	0.01	527.20
Strip Mall	39933					10.56	0.00	0.00	10.63
<b>Total</b>						<b>598.75</b>	<b>0.03</b>	<b>0.01</b>	<b>602.88</b>

### 6.0 Area Detail

---

#### 6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.21	0.05	4.20	0.00		0.00	0.04		0.00	0.04	0.00	185.14	185.14	0.01	0.00	186.37
Unmitigated	3.11	0.07	5.93	0.00		0.00	0.29		0.00	0.29	29.21	175.24	204.45	0.10	0.00	207.71
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

## 6.2 Area by SubCategory

### Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.21					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	1.85					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.91	0.02	1.73	0.00		0.00	0.27		0.00	0.27	29.21	168.40	197.61	0.09	0.00	200.73
Landscaping	0.13	0.05	4.20	0.00		0.00	0.02		0.00	0.02	0.00	6.84	6.84	0.01	0.00	6.98
<b>Total</b>	<b>3.10</b>	<b>0.07</b>	<b>5.93</b>	<b>0.00</b>		<b>0.00</b>	<b>0.29</b>		<b>0.00</b>	<b>0.29</b>	<b>29.21</b>	<b>175.24</b>	<b>204.45</b>	<b>0.10</b>	<b>0.00</b>	<b>207.71</b>

## 6.2 Area by SubCategory

### Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.21					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	1.85					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.02	0.00	0.00	0.00		0.00	0.01		0.00	0.01	0.00	178.30	178.30	0.00	0.00	179.39
Landscaping	0.13	0.05	4.20	0.00		0.00	0.02		0.00	0.02	0.00	6.84	6.84	0.01	0.00	6.98
<b>Total</b>	<b>2.21</b>	<b>0.05</b>	<b>4.20</b>	<b>0.00</b>		<b>0.00</b>	<b>0.03</b>		<b>0.00</b>	<b>0.03</b>	<b>0.00</b>	<b>185.14</b>	<b>185.14</b>	<b>0.01</b>	<b>0.00</b>	<b>186.37</b>

## 7.0 Water Detail

---

### 7.1 Mitigation Measures Water

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					101.87	0.59	0.02	119.39
Unmitigated					101.87	0.59	0.02	119.39
<b>Total</b>	<b>NA</b>							

## 7.2 Water by Land Use

### Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Convenience Market With Gas Pumps	0.0836574 / 0.0512739					0.44	0.00	0.00	0.52
Pharmacy/Drugstore with Drive Thru	1.01938 / 0.624779					5.36	0.03	0.00	6.29
Single Family Housing	17.9174 / 11.2957					95.08	0.55	0.02	111.43
Strip Mall	0.188885 / 0.115768					0.99	0.01	0.00	1.16
<b>Total</b>						<b>101.87</b>	<b>0.59</b>	<b>0.02</b>	<b>119.40</b>

## 7.2 Water by Land Use

### Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Convenience Market With Gas Pumps	0.0836574 / 0.0512739					0.44	0.00	0.00	0.52
Pharmacy/Drugstore with Drive Thru	1.01938 / 0.624779					5.36	0.03	0.00	6.29
Single Family Housing	17.9174 / 11.2957					95.08	0.55	0.02	111.43
Strip Mall	0.188885 / 0.115768					0.99	0.01	0.00	1.16
<b>Total</b>						<b>101.87</b>	<b>0.59</b>	<b>0.02</b>	<b>119.40</b>

## 8.0 Waste Detail

---

### 8.1 Mitigation Measures Waste

**Category/Year**

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					74.88	4.43	0.00	167.80
Unmitigated					74.88	4.43	0.00	167.80
<b>Total</b>	<b>NA</b>							

**8.2 Waste by Land Use**

**Unmitigated**

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Pharmacy/Drugstore with Drive Thru	43.51					8.83	0.52	0.00	19.79
Single Family Housing	322.67					65.50	3.87	0.00	146.79
Strip Mall	2.68					0.54	0.03	0.00	1.22
<b>Total</b>						<b>74.87</b>	<b>4.42</b>	<b>0.00</b>	<b>167.80</b>

## 8.2 Waste by Land Use

### Mitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Pharmacy/Drugstore with Drive Thru	43.51					8.83	0.52	0.00	19.79
Single Family Housing	322.67					65.50	3.87	0.00	146.79
Strip Mall	2.68					0.54	0.03	0.00	1.22
<b>Total</b>						<b>74.87</b>	<b>4.42</b>	<b>0.00</b>	<b>167.80</b>

## 9.0 Vegetation

---

