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# Rancho Palma

## GREENHOUSE GAS ANALYSIS

### CITY OF SAN BERNARDINO

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## **LIST OF ABBREVIATED TERMS**

(1)	Reference
APS	Alternative Planning Organizations
ARB	California Air Resources Board
CAA	Federal Clean Air Act
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resource Board
CAT	Climate Action Team
CBSC	California Building Standards Commission
CEC	California Energy Commission
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations
CH <sub>4</sub>	Methane
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
CPUC	California Public Utilities Commission
EPA	Environmental Protection Agency
EPS	Emission Performance Standard
GCC	Global Climate Change
GHGA	Greenhouse Gas Analysis
GWP	Global Warming Potential
HFC	Hydrofluorocarbons
LCA	Life-Cycle Analysis
MMs	Mitigation Measures
MMTCO <sub>2</sub> e	Million Metric Ton of Carbon Dioxide Equivalent
MPOs	Metropolitan Planning Organizations
MTCO <sub>2</sub> e	Metric Ton of Carbon Dioxide Equivalent
N <sub>2</sub> O	Nitrogen Dioxide
NIOSH	National Institute for Occupational Safety and Health
NO <sub>x</sub>	Oxides of Nitrogen
PFC	Perfluorocarbons
PM <sub>10</sub>	Particulate Matter 10 microns in diameter or less

PM2.5	Particulate Matter 2.5 microns in diameter or less
PPM	Parts Per Million
Project	Rancho Palma
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategies
UNFCCC	United Nations' Framework Convention on Climate Change
VOC	Volatile Organic Compounds

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## EXECUTIVE SUMMARY

The City of San Bernardino does not have an established emissions reduction target for GHG emissions. However, the City of San Bernardino is a participant in the San Bernardino County Associated Governments and Participating San Bernardino County Cities Partnership (Partnership). The Partnership has prepared a Regional Greenhouse Gas Reduction Plan (Reduction Plan) that identifies emissions reduction targets for the City of San Bernardino and the other 20 participating cities within the sub-region. In the Reduction Plan, the City of San Bernardino selected a goal to reduce community GHG emissions to a level that is 15% below its 2008 greenhouse gas (GHG) emissions levels by 2020.

The Project’s 2020 GHG emissions levels will amount to a 32.34% reduction from the Project’s 2008 GHG emissions levels, as shown on Table ES-1 which is greater than the minimum reduction target identified in the Partnership’s Reduction Plan. Thus, project-related emissions would not have a significant direct or indirect impact on GHG and climate change.

**TABLE ES-1: 2008 VS 2020 TOTAL PROJECT GREENHOUSE GAS EMISSIONS REDUCTION LEVELS (ANNUAL)**

Emission Source	CO2e Emissions Levels (Metric Tons Per Year)	
	BAU	Project
Annual Construction-related emissions amortized over 30 years	57.78	57.78
Area	31.08	31.07
Energy Use	985.96	742.16
Mobile Sources	7,066.02	4,629.29
Waste	110.79	110.79
Water Usage	105.03	82.68
Total	8,356.66	5,653.77
<b>Total Project Reduction over 2008 levels</b>	<b>32.34%</b>	
Project Minimum Improvement	<b>15%</b>	
Meets Requirement?	<b>YES</b>	

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# 1 INTRODUCTION

This report presents the results of the greenhouse gas analysis (GHGA) prepared by Urban Crossroads, Inc., for the proposed Rancho Palma (referred to as “Project” ), which is located in the City of San Bernardino northeast of W. Little League Drive and northwest of Palm Avenue, as shown on Exhibit 1-A.

The purpose of this GHGA is to evaluate Project-related construction and operational emissions and determine the level of greenhouse gas (GHG) impacts as a result of constructing and operating the proposed Project.

## 1.1 PROJECT OVERVIEW

The Project is proposed to include the development of 120 single family detached residential dwelling units and 98,000 square feet of commercial retail use, as shown on Exhibit 1-B. The Project site is currently vacant and not emitting any emissions. For the purposes of this analysis, potential impacts have been assessed for two development phases. The two phases and their anticipated opening years are as follows:

- Phase 1 (2018) – 120 single family detached residential dwelling units (Western Half)
- Phase 2 (2019) – 98,000 square feet of commercial retail use (Eastern Half)

For the purposes of this GHGA, it is assumed that the Project will be constructed and at full occupancy by 2019.

EXHIBIT 1-A: LOCATION MAP



LEGEND:

EXHIBIT 1-B: SITE PLAN



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## 2 CLIMATE CHANGE SETTING

### 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, Section 3.0 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 201. For the Year 201 the sum of these emissions totaled approximately 28,865,994 Gg CO<sub>2</sub>e<sup>1</sup> (1) (2). 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.

<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,"

### United States

As noted in Table 2-1, the United States, as a single country, was the number two producer of GHG emissions in 2012. 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 (3). Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 78 percent of the GHG emissions.

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

<b>Emitting Countries</b>	<b>GHG Emissions (Gg CO<sub>2</sub>e)</b>
China	10,975,500
United States	6,665,700
European Union (27 member countries)	4,544,224
Russian Federation	2,322,220
India	3,013,770
Japan	1,344,580
<b>Total</b>	<b>28,865,994</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 (4). Based on the CARB inventory data and GHG inventories compiled by the World Resources Institute (5), 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 (6).

<sup>2</sup> Used <http://unfccc.int> data for Annex I countries. Consulted the CAIT Climate Data Explorer <http://www.wri.org> site to reference Non-Annex I countries such as China and India.



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 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 (5).

## **2.4 GREENHOUSE GASES**

For the purposes of this analysis, emissions of carbon dioxide, methane, and nitrous oxide were evaluated (see Table 3-1 later in this report) because these gasses are the primary contributors to GCC from development projects. Although other substances such as fluorinated gases also contribute to GCC, sources of fluorinated gases are not well-defined and no accepted emissions factors or methodology exist to accurately calculate these gases.

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 at Table 2-2. As shown in the table below, GWP range from 1 for carbon dioxide to 23,900 for sulfur hexafluoride.

**TABLE 2-2: GLOBAL WARMING POTENTIAL AND ATMOSPHERIC LIFETIME OF SELECT GHGS**

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	25
Nitrous Oxide	120	298
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: Environmental Protection Agency (EPA) 2013 (URL: <a href="http://www.epa.gov/ghgreporting/documents/pdf/2013/documents/2013-data-elements.pdf">http://www.epa.gov/ghgreporting/documents/pdf/2013/documents/2013-data-elements.pdf</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 human 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 (7).

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 (8).

**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.

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) (9).

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<sub>2</sub>H<sub>6</sub>) 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<sub>3</sub>), HFC-134a (CF<sub>3</sub>CH<sub>2</sub>F), and HFC-152a (CH<sub>3</sub>CHF<sub>2</sub>). 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 (10). 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

### *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 temperatures continue to increase, 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 temperatures 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 CO2 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 O3 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 HUMAN 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 in the scientific community. Their cumulative effects to global climate change have the potential to cause adverse effects to human health. Increases in Earth's ambient temperatures would result in more intense heat waves, causing more heat-related deaths. Scientists also purport 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 (11). Exhibit 2-A presents the potential impacts of global warming.

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 in the earth's atmosphere 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 (12).

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

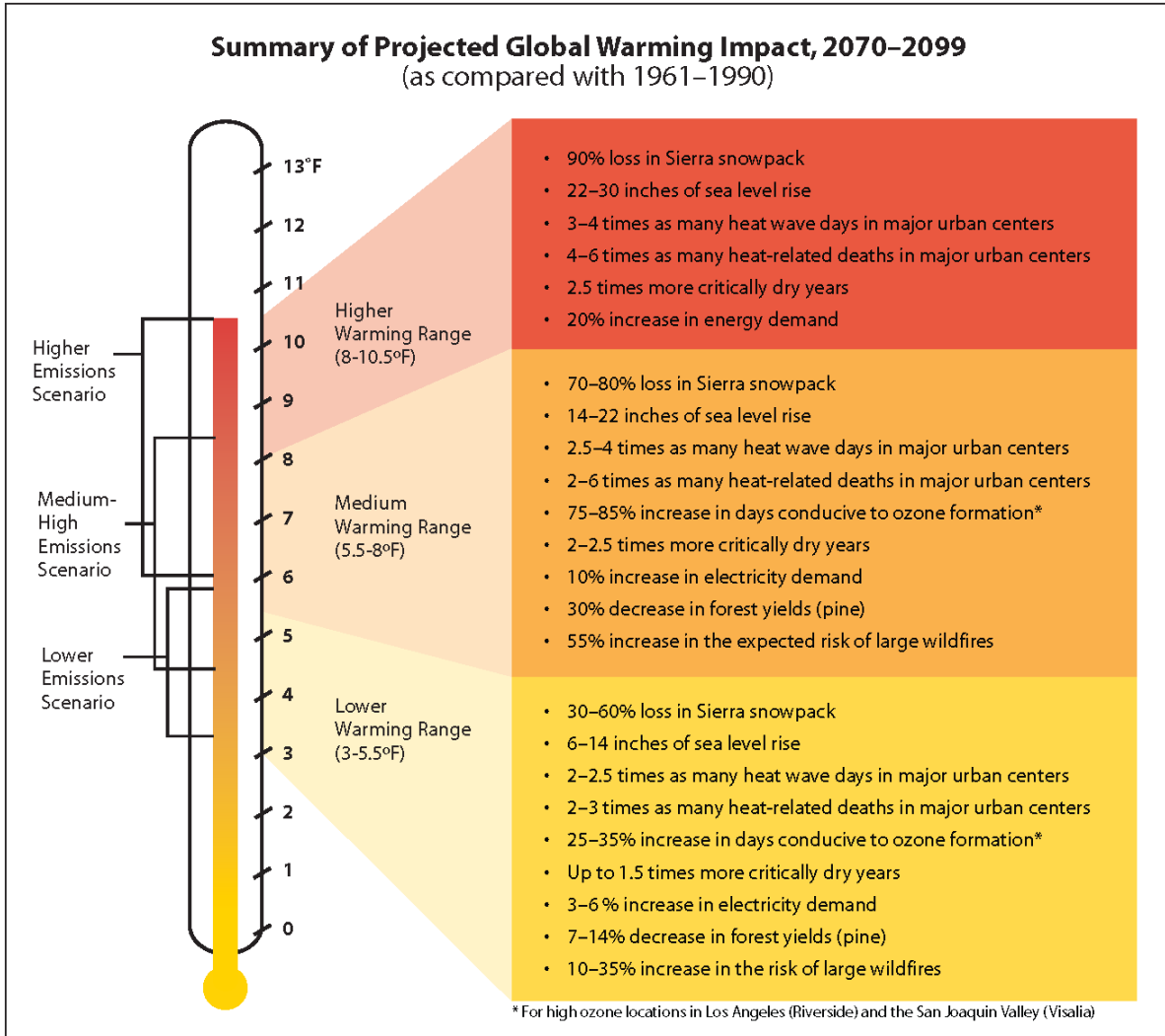
Methane: Methane is extremely reactive with oxidizers, halogens, and other halogen-containing compounds. Methane is also an asphyxiant and may displace oxygen in an enclosed space (13).

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 (13).

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 (12).

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 (14).

### EXHIBIT 2-A: SUMMARY OF PROJECTED GLOBAL WARMING IMPACT



## 2.7 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 (15) 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 (16) 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 Energy Commission's most recent standard, 2013 Building Energy Efficiency Standard, is 25 percent more efficient than previous standards for residential construction and 30 percent better for nonresidential construction. The Standards, which took effect on January 1, 2014, offer builders better

windows, insulation, lighting, ventilation systems and other features that reduce energy consumption in homes and businesses. Some improved measures in the Standards include:

Residential:

- Solar-ready roofs to allow homeowners to add solar photovoltaic panels at a future date
- More efficient windows to allow increased sunlight, while decreasing heat gain
- Insulated hot water pipes, to save water and energy and reduce the time it takes to deliver hot water
- Whole house fans to cool homes and attics with evening air reducing the need for air conditioning load
- Air conditioner installation verification to insure efficient operation

Nonresidential:

- High performance windows, sensors and controls that allow buildings to use "daylighting"
- Efficient process equipment in supermarkets, computer data centers, commercial kitchens, laboratories, and parking garages
- Advanced lighting controls to synchronize light levels with daylight and building occupancy, and provide demand response capability
- Solar-ready roofs to allow businesses to add solar photovoltaic panels at a future date
- Cool roof technologies

CALGreen

Part 11 of the Title 24 Building Standards Code is referred to as the California Green Building Standards Code (CALGreen Code) (17). 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." 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. Unless otherwise noted in the regulation, all newly constructed buildings in California are subject of the requirements of the CALGreen Code.

CALGreen contains both mandatory and voluntary measures, for Non-Residential land uses there are 39 mandatory measures including, but not limited to: exterior light pollution reduction, wastewater reduction by 20%, and commissioning of projects over 10,000 sf. There are two tiers of voluntary measures for Non-Residential land uses for a total of 36 additional elective measures.

The 2013 CALGreen includes additions and amendments to the water efficiency standards for non-residential buildings in order to comply with the reduced flow rate table. The 2013

CALGreen has also been rewritten to clarify and definitively identify the requirements and applicability for residential and nonresidential buildings.

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 (18). Further, the 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 CO<sub>2</sub> 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 (19). 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 (20). 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). 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 28.4 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-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).

Overall, CARB determined that achieving the 1990 emission level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent in the absence of new laws and regulations (referred to as "Business-As-Usual" [BAU]). The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and California Climate Action

**TABLE 2-3: SCOPING PLAN GHG REDUCTION MEASURES TOWARDS 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

<sup>1</sup>Reductions represent an estimate of what may be achieved from local land use changes. It is not the SB 375 regional target.

<sup>2</sup>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

Team early actions and additional GHG reduction measures, identifies additional measures to be pursued as regulations, and outlines the role of the cap-and-trade program.

In connection with its preparation of the August 2011 Final Supplement to the Scoping Plan's Functional Equivalent Document, CARB released revised estimates of the 2020 emissions level projection in light of the economic recession and the availability of updated information from development of measure-specific regulations. Based on the new economic data, CARB determined the 2020 emissions level projection in the BAU condition would be reduced from 596 metric tons of CO<sub>2</sub> equivalent (MTCO<sub>2</sub>e) to 545 MTCO<sub>2</sub>e. (21) Under this scenario, achieving the 1990 emissions level in 2020 would require a reduction of GHG emissions of 118 MTCO<sub>2</sub>e, or 21.7 percent (down from 28.5 percent), from the BAU condition.

When the 2020 emissions level projection also was updated to account for implemented regulatory measures, including Pavley (vehicle model-years 2009 - 2016) and the renewable portfolio standard (12% - 20%), the 2020 projection in the BAU condition was reduced further to 507 MTCO<sub>2</sub>e. As a result, based on the updated economic and regulatory data, CARB determined that achieving the 1990 emissions level in 2020 would now only require a reduction of GHG emissions of 80 MTCO<sub>2</sub>e, or approximately 16 percent (down from 28.5 percent), from the BAU condition. (21) (22)

On February 10, 2014, CARB released a Draft Proposed First Update of the Scoping Plan. The draft recalculates 1990 GHG emissions using new global warming potentials identified in the IPCC Fourth Assessment Report released in 2007. Using those GWPs, the 427 MTCO<sub>2</sub>e 1990 emissions level and 2020 GHG emissions limit identified in the 2008 Scoping Plan would be slightly higher, at 431 MTCO<sub>2</sub>e. (23) Based on the revised 2020 emissions level projection identified in the 2011 Final Supplement and the updated 1990 emissions levels identified in the discussion draft of the First Update, achieving the 1990 emissions level in 2020 would require a reduction of 78 MTCO<sub>2</sub>e (down from 509 MTCO<sub>2</sub>e), or approximately 15.3 percent (down from 28.5 percent), from the BAU condition. (21) (22) (23)

Although CARB has released an update to the Scoping Plan and reduction targets from BAU, it is still appropriate to utilize the previous 28.5% reduction from BAU since the modeling tools available are not able to easily segregate the inclusion of the renewable portfolio standards, and Pavley requirements that are now included in the revised BAU scenario.

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 (24). 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.

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 (25). 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.”

Also amended were CEQA Guidelines Sections 15126.4 and 15130, which address mitigation measures and cumulative impacts respectively. Greenhouse gas mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement (Section 15130) simply directs agencies to analyze greenhouse gas emissions in an EIR when a Project’s incremental contribution of emissions may be cumulatively considerable, however it does not answer the question of when emission are cumulatively considerable.

Section 15183.5 permits programmatic greenhouse gas analysis and later project-specific tiering, as well as the preparation of Greenhouse Gas Reduction Plans. Compliance with such plans can support determination that a Project’s cumulative effect is not cumulatively considerable, according to proposed Section 15183.5(b).

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 (26). 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 (27). SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010 (26). 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 (28).

Executive Order B-30-15:

In January 2015, Governor Brown, in his inaugural address and annual report to the Legislature, established supplementary goals which would further reduce GHG emissions over the next 15 years. These goals include an increase in California’s renewable energy portfolio from 33% to 50%, a reduction in vehicle petroleum use for cars and trucks by up to 50% measures to double the efficiency of existing buildings, and decreasing emissions associated with heating fuels.

On April 29, 2015 California Governor Jerry Brown, through Executive Order B-30-15 (“BEO”) states a new statewide policy goal to reduce GHG emissions 40 percent below their 1990 levels by 2030.

The BEO sets an ambitious new Statewide GHG emissions reduction target of 40% below 1990 levels by 2030 as a “mid-term” benchmark needed to achieve the 80% below 1990 levels by 2050. It should be noted however that this target has not been formally enacted by the Legislature or even CARB. As such, the BEO does not appear to constitute a new regulation or requirement adopted to implement a statewide, regional or local plan for the reduction of GHG emissions within the context of CEQA.

The Project reduces its GHG emissions to the maximum extent feasible as discussed in this document. At this time, no further analysis is necessary or required by CEQA as it pertains to Executive Order B-30-15.

Additionally, as described previously, the project applicant would not actively interfere with any future City-mandated, state-mandated, or federally-mandated retrofit obligations enacted or promulgated to legally require development City-wide, state-wide, or nation-wide to assist in meeting state-adopted greenhouse gas emissions reduction targets, including that established under Executive Order S-3-05 or Executive Order B-30-15.

Based on the foregoing, the Project does not interfere with the state’s implementation of (i) Executive Order B-30-15’s target of reducing statewide GHG emissions to 40% below 1990 levels by 2030 or (ii) Executive Order S-3-05’s target of reducing statewide GHG emissions to 80% below 1990 levels by 2050 because it does not interfere with the state’s implementation of GHG reduction plans described in the CARB’s Updated Scoping Plan, including the state providing for 12,000 MW of renewable distributed generation by 2020, the California Building Commission mandating net zero energy homes in the building code after 2020, or existing building retrofits under AB 758. Therefore, the project’s impacts on greenhouse gas emissions in the 2030 and 2050 horizon years are less than significant.

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 (29). 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."

The Southern California Association of Governments (SCAG) is required by law to update the Southern California Regional Transportation Plan (RTP) every four years. The 2012 draft plan has been released, this draft plan differs from past plans because it includes development of a SCS. The RTP/SCS incorporates land use and housing policies to meet the greenhouse gas emissions targets established by the California Air Resource Board (CARB) for 2020 (8% reduction) and 2035 (13% reduction). On April 4, 2012, the Regional Council of the Southern California Association of Governments (SCAG) adopted the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS): Towards a Sustainable Future.

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

Separate from its Scoping Plan approved in December of 2008 (30), 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, 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 yet to be defined for construction and transportation emissions are under consideration. However, CARB's proposal is not yet final, and thus cannot be applied to the 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.” 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 (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 (31). 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 (32), the Working Group released additional revisions that consist of the following recommended tiered approach:

- Tier 1 consists of evaluating whether or not the Project qualifies for applicable CEQA exemptions.
- Tier 2 consists of determining whether or not a Project is consistent with a greenhouse gas reduction plan. If a Project is consistent with a greenhouse gas reduction plan, it would not have a significant impact.
- Tier 3 consists of screening values at the discretion of the lead agency; however they should be consistent for all projects within its jurisdiction. Project-related construction emissions should be amortized over 30 years and should be added back the Project’s operational emissions. The following thresholds are proposed for consideration:
  - 3,000 MTCO<sub>2</sub>e per year for all land use types
  - or
  - 3,500 MTCO<sub>2</sub>e per year for residential; 1,400 MTCO<sub>2</sub>e per year for commercial; or 3,000 MTCO<sub>2</sub>e per year for mixed-use projects
- Tier 4 has the following options:
  - Option 1: Reduce emissions from business as usual by a certain percentage (currently undefined)
  - Option 2: Early implementation of applicable AB 32 Scoping Plan measures
  - Option 3: A 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 is 6.6 MTCO<sub>2</sub>e and the plan level target for 2035 is 4.1 MTCO<sub>2</sub>e

- Tier 5 involves mitigation offsets to achieve target significance thresholds

The SCAQMD has also adopted Rules 2700, 2701, and 2702 that address GHG reductions. However, these rules address boilers and process heater, forestry, and manure management projects, none of which are required by the Project

## **2.8 SAN BERNARDINO COUNTY REGIONAL GREENHOUSE GAS REDUCTION PLAN**

In March 2014, the San Bernardino Associated Governments and Participating San Bernardino County Cities Partnership (Partnership) created a final draft of the San Bernardino County Regional Greenhouse Gas Reduction Plan (Reduction Plan). This Reduction Plan was created in accordance to AB 32, which established a greenhouse gas limit for the state of California. The Reduction Plan seeks to create an inventory of GHG gases and develop jurisdiction-specific GHG reduction measures and baseline information that could be used by the 21 Partnership Cities of San Bernardino County, which include the City of San Bernardino, the city of the Project site, to create community climate action plans (CAP) (41). Projects that demonstrate consistency with the strategies, actions, and emission reduction targets contained in the Reduction Plan would have a less than significant impact on climate change.

In the Reduction Plan, the City of San Bernardino selected a goal to reduce community GHG emissions to a level that is 15% below its 2008 GHG emissions levels by 2020.

The Project will be compliant with the goal and objectives set forth in the Partnership's Reduction Plan (as shown on Table 4-2, presented later in the report). Therefore, Project consistency with the Reduction Plan would result in a less than significant impact with respect to GHG emissions.

## **2.9 DISCUSSION ON EMISSIONS REDUCTION TARGET**

The City of San Bernardino does not have an established emissions reduction target for GHG emissions. However, it is under the jurisdiction of the Reduction Plan. As such, the City uses the Reduction Plan's sub-region emissions reduction target of 15% below 2008 levels by 2020. Based on guidance from CARB and the Governor's Office of Planning and Research, this reduction target level is consistent with AB-32 and serves as a basis for Projects to be consistent with meeting statewide reduction targets.

As such, if a Project meets the emissions reduction target of 15% below 2008 emissions levels by 2020, it will have a less than significant impacts related to greenhouse gas emissions and global climate change. Conversely, Projects that do not meet the remissions reduction target will require additional analysis and potentially have significant impacts related to greenhouse gas emissions and global climate change.

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### 3 PROJECT GREENHOUSE GAS IMPACT

#### 3.1 INTRODUCTION

The Project has been evaluated to determine if it will result in a significant greenhouse gas impact. The significance of these potential impacts is described in the following section.

#### 3.2 PROJECT RELATED GREENHOUSE GAS 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 (35).

On October 2, 2013, the SCAQMD in conjunction with the California Air Pollution Control Officers Association (CAPCOA) released the latest version of the California Emissions Estimator Model™ (CalEEMod™) v2013.2.2. The purpose of this model is to more accurately calculate construction-source and operational-source criteria pollutant (NO<sub>x</sub>, VOC, PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>x</sub>, and CO) and greenhouse gas (GHG) emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (36). Accordingly, the latest version of CalEEMod™ has been used for this Project to determine construction and operational air quality impacts. Output from the model runs for both construction and operational activity are provided in Appendix 3.1

#### 3.3 CONSTRUCTION AND OPERATIONAL LIFE-CYCLE ANALYSIS

A full life-cycle analysis (LCA) for construction and operational activity is not included in this analysis due to the lack of consensus guidance on LCA methodology at this time. Life-cycle analysis (i.e., assessing economy-wide GHG emissions from the processes in manufacturing and transporting all raw materials used in the project development, infrastructure and on-going operations) depends on emission factors or econometric factors that are not well established for all processes. At this time a LCA would be extremely speculative and thus has not been prepared.

#### 3.4 CONSTRUCTION EMISSIONS

Construction activities associated with the proposed Project will result in emissions of CO<sub>2</sub> and CH<sub>4</sub> from construction activities.

The report [Rancho Palma Air Quality Impact Analysis Report](#), Urban Crossroads, Inc. (2015) contains detailed information regarding construction activity (36).

For construction phase Project emissions, GHGs are quantified and amortized over the life of the Project. To amortize the emissions over the life of the Project, the SCAQMD recommends calculating the total greenhouse gas emissions for the construction activities, dividing it by the a 30 year project life then adding that number to the annual operational phase GHG emissions (37). As such, construction emissions were amortized over a 30 year period and added to the annual operational phase GHG emissions.

### 3.5 OPERATIONAL EMISSIONS

Operational activities associated with the proposed Project will result in emissions of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O from the following primary sources:

- Area Source Emissions
- Energy Source Emissions
- Mobile Source Emissions
- Solid Waste
- Water Supply, Treatment and Distribution

#### 3.5.1 AREA SOURCE EMISSIONS

##### Landscape Maintenance Equipment

Landscape maintenance equipment would generate emissions from fuel combustion and evaporation of unburned fuel. Equipment in this category would include lawnmowers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers used to maintain the landscaping of the Project. The emissions associated with landscape maintenance equipment were calculated based on assumptions provided in the CalEEMod model.

#### 3.5.2 ENERGY SOURCE EMISSIONS

##### Combustion Emissions Associated with Natural Gas and Electricity

GHGs are emitted from buildings as a result of activities for which electricity and natural gas are typically used as energy sources. Combustion of any type of fuel emits CO<sub>2</sub> and other GHGs directly into the atmosphere; these emissions are considered direct emissions associated with a building. GHGs are also emitted during the generation of electricity from fossil fuels; these emissions are considered to be indirect emissions. Unless otherwise noted, CalEEMod™ default parameters were used.

#### 3.5.3 MOBILE SOURCE EMISSIONS

##### Vehicles

GHG emissions will also result from mobile sources associated with the Project. These mobile source emissions will result from the typical daily operation of motor vehicles by visitors, employees, and residents. Project mobile source emissions are dependent on both overall daily vehicle trip generation. Trip characteristics available from the report, Rancho Palma Traffic Impact Analysis Urban Crossroads (2015) were utilized in this analysis (38).

#### 3.5.4 SOLID WASTE

Residential and Commercial Retail land uses will result in the generation and disposal of solid waste. A large percentage of this waste will be diverted from landfills by a variety of means, such as reducing the amount of waste generated, recycling, and/or composting. The remainder of the waste not diverted will be disposed of at a landfill. GHG emissions from landfills are



associated with the anaerobic breakdown of material. GHG emissions associated with the disposal of solid waste associated with the proposed Project were calculated by the CalEEMod™ model using default parameters.

**3.5.5 WATER SUPPLY, TREATMENT AND DISTRIBUTION**

Indirect GHG emissions result from the production of electricity used to convey, treat and distribute water and wastewater. The amount of electricity required to convey, treat and distribute water depends on the volume of water as well as the sources of the water. Unless otherwise noted, CalEEMod™ default parameters were used.

**3.6 EMISSIONS SUMMARY**

The total project GHG emissions by phase for years 2008 and 2020 are shown on Table 3-1 and Table 3-2, respectively. In year 2008, total CO<sub>2</sub>E emissions produced would be 8,356.66 MMTCO<sub>2</sub>e. In year 2020, total CO<sub>2</sub>E emissions produced would be 5,653.77 MMTCO<sub>2</sub>e. The Project’s 2020 GHG emissions levels results in a 32.34% reduction from the Project’s 2008 GHG emissions levels.

**TABLE 3-1: 2008 TOTAL PROJECT GREENHOUSE GAS EMISSIONS (ANNUAL)**

Emission Source	Emissions (metric tons per year)			
	CO2	CH4	N2O	Total CO2E
Annual construction-related emissions amortized over 30 years	57.57	1.00E-02	--	57.78
Area	30.85	3.07E-03	5.30E-04	31.08
Energy	981.62	0.04	0.01	985.96
Mobile Sources	7,056.53	0.45	--	7,066.02
Waste	49.43	2.92	--	110.79
Water Usage	90.78	0.5	0.01	105.03
<b>Total CO<sub>2</sub>E (All Sources)</b>	<b>8,356.66</b>			

Source: CalEEMod™ model output, See Appendix 3.1 for detailed model outputs.  
 Note: Totals obtained from CalEEMod™ and may not total 100% due to rounding.  
 Table results include scientific notation. *e* is used to represent *times ten raised to the power of* (which would be written as x 10<sup>*b*</sup>) and is followed by the value of the exponent

**TABLE 3-2: 2020 TOTAL PROJECT GREENHOUSE GAS EMISSIONS (ANNUAL)**

Emission Source	Emissions (metric tons per year)			
	CO2	CH4	N2O	Total CO2E
Annual construction-related emissions amortized over 30 years	57.56	1.00E-02	--	57.78
Area	30.85	2.56E-03	--	31.07
Energy	738.08	0.04	1.00E-02	742.16
Mobile Sources	4,625.88	0.16	--	4,629.29
Waste	49.43	2.92	--	110.79
Water Usage	68.43	0.50	0.01	82.68
<b>Total CO<sub>2</sub>E (All Sources)</b>	<b>5,653.77</b>			

## 4 FINDINGS & CONCLUSIONS

The City of San Bernardino does not have an established emissions reduction target for GHG emissions. However, the City of San Bernardino is a participant in the San Bernardino County Associated Governments and Participating San Bernardino County Cities Partnership (Partnership). The Partnership has prepared a Regional Greenhouse Gas Reduction Plan (Reduction Plan) that identifies emissions reduction targets for the City of San Bernardino and the other 20 participating cities within the sub-region. In the Reduction Plan, the City of San Bernardino selected a goal to reduce community GHG emissions to a level that is 15% below its 2008 greenhouse gas (GHG) emissions levels by 2020.

The Project’s 2020 GHG emissions levels will amount to a 32.34% reduction from the Project’s 2008 GHG emissions levels, as shown on Table 4-1 which is greater than the minimum reduction target identified in the Partnership’s Reduction Plan. Thus, project-related emissions would not have a significant direct or indirect impact on GHG and climate change.

**TABLE 4-1: 2008 VS 2020 TOTAL PROJECT GREENHOUSE GAS EMISSIONS REDUCTION LEVELS (ANNUAL)**

Emission Source	CO2e Emissions Levels (Metric Tons Per Year)	
	BAU	Project
Annual Construction-related emissions amortized over 30 years	57.78	57.78
Area	31.08	31.07
Energy Use	985.96	742.16
Mobile Sources	7,066.02	4,629.29
Waste	110.79	110.79
Water Usage	105.03	82.68
Total	8,356.66	5,653.77
<b>Total Project Reduction over 2008 levels</b>	<b>32.34%</b>	
Project Minimum Improvement	<b>15%</b>	
Meets Requirement?	<b>YES</b>	

### Consistency with AB 32

AB 32 requires California to reduce its GHG to 1990 levels by 2020. CARB identified reduction measures to achieve this goal as set forth in the CARB Scoping Plan (39). Thus, projects that are consistent with the CARB Scoping Plan are also consistent with the reduction targets 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.

As stated previously, the Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32. The Scoping Plan recommendations serve as

statewide strategies to reduce the state’s existing GHG emissions and proposed Project’s contributions. Table 4-2: Project Consistency with Scoping Plan Greenhouse Gas Emissions Reduction Strategies, highlights measures that have or will be developed under the Scoping Plan and that would be applicable to the Project. Therefore, the Project will not conflict with or obstruct implementation of AB 32.

**TABLE 4-2: PROJECT CONSISTENCY WITH SCOPING PLAN GREENHOUSE GAS EMISSION REDUCTION STRATEGIES**

Scoping Plan Measure	Measure Number	Project Consistency
Pavley Motor Vehicle Standards (AB 1493)	T-1	The project’s employees and residences would purchase vehicles in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase.
Limit High GWP Use in Consumer Products	H-4	The project’s employees and residences would use consumer products that would comply with the regulations that are in effect at the time of manufacture.
Motor Vehicle Air Conditioning Systems – Reduction from Non-Professional Servicing	H-1	The project’s employees and residences would be prohibited from performing air conditioning repairs and required to use professional servicing.
Tire Pressure Program	T-4	Motor vehicles driven by the project’s employees and residences would maintain proper tire pressure when their vehicles are serviced.
Low Carbon Fuel Standard	T-2	Motor vehicles driven by project’s employees and residences would use compliant fuels in the future.
Water Use Efficiency	W-1	The project includes measures to minimize water use and maximize efficiency.
Green Buildings	GB-1	The project will be required to be constructed in compliance with state or local green building standards in effect at the time of building construction.
Air Conditioning Refrigerant Leak Test During Vehicle Smog Check	H-5	Motor vehicles driven by the project’s employees and residences would comply with the leak test requirements during smog checks.
Renewable Portfolios Standard (33% by 2020)	E-3	The electricity used by employees and residences in the proposed project will benefit from reduced GHG emissions resulting from increased use of renewable energy sources.
Energy Efficiency Measures (Electricity)	E-1	The project will comply with energy efficiency standards for electrical appliances and other devices at the time of building construction.
Energy Efficiency (Natural Gas)	CR-1	The project will comply with energy efficiency standards for natural gas appliances and other devices at the time of building construction.
Greening New Residential and Commercial Construction	GB-1	The project’s buildings would meet green building standards that are in effect at the time of design and construction.
Greening Existing Homes and Commercial Buildings	GB-1	The proposed project’s buildings would meet retrofit standards when they become effective.

**4.1 REGULATORY REQUIREMENTS**

The Project would be required to comply with all mandates imposed by the State of California and the South Coast Air Quality Management District aimed at the reduction of air quality emissions. Those that are applicable to the Project and that would assist in the reduction of greenhouse gas emissions are:

- Global Warming Solutions Act of 2006 (AB32) (40). AB 32 is applicable to the Project because, as a development Project, the Rancho Palma will need to meet 2020 GHG reduction goals set forth

in AB 32. AB 32 requires the California Air Resources Board (CARB or ARB) to develop regulations and market mechanisms to reduce California's greenhouse gas emissions to 1990 levels by the year of 2020. Many of the GHG reduction measures outlined in AB 32 (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted over the last five years and implementation activities are ongoing.

- Pavley Fuel Efficiency Standards (AB1493). Establishes fuel efficiency ratings for new vehicles (41). AB 1493 (Pavley) establishes fuel efficiency rating for model year 2009-2016 passenger cars and light trucks. AB 1493 is applicable to the Project because model year 2009-2016 passenger cars and light duty truck vehicles traveling to and from the Project site are required by the State of California to implement GHG emission reduction standards related to fuel efficiency. The CARB anticipates that implementation of the Pavley regulations will reduce GHG emissions from California passenger vehicles by about 30 percent in 2016 compared to emissions that occurred prior to 2009 when AB 1492 was enacted.
- Title 24 California Code of Regulations (California Building Code). Establishes energy efficiency requirements for new construction (42). The Title 24 energy standards address the energy efficiency of new (and altered) homes and commercial buildings. Because energy efficiency reduces energy costs, increases reliability and availability of electricity, improves building occupant comfort, and reduces impacts to the environment, standards are important and necessary for California's energy future. Therefore, a new development such as the Rancho Palma is required to comply with Title 24 Code of Regulations and would therefore increase the Project's energy efficiency and reduce its environmental impact.
- Title 17 California Code of Regulations (Low Carbon Fuel Standard). Requires carbon content of fuel sold in California to be 10% less by 2020 (43). Because the LCFS applies to any transportation fuel that is sold, supplied, or offered for sale in California, and to any person who, as a regulated party, is responsible for a transportation fuel in a calendar year, all vehicles accessing the site will be required to comply with LCFS. Implementation of such a standard will reduce greenhouse gas emissions by reducing the full fuel-cycle, carbon intensity of the transportation fuel pool used in California.
- 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 (44). As new development project within the State of California, the Rancho Palma is required to comply with the City of San Bernardino's adopted water efficient landscape requirements and would therefore be consistent with the requirements of AB1881 in order to help conserve California's water resources and to promote efficient water use.

## 4.2 CONSTRUCTION AND OPERATIONAL-SOURCE MITIGATION MEASURES

No significant impacts occur, thus no mitigation is required.

## 5 REFERENCES

1. **United Nations.** Flexible GHG Data Queries. [Online] [Cited: September 17, 2014.] [http://unfccc.int/ghg\\_data/ghg\\_data\\_unfccc/time\\_series\\_annex\\_i/items/3841.php](http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3841.php).
2. **U.S. Energy Information Administration.** [Online] <http://www.eia.gov/>.
3. **Environmental Protection Agency.** Inventory of U.S. Greenhouse Gas Emissions and Sinks. [Online] April 12, 2013. <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Main-Text.pdf>.
4. **Air Resources Board.** Greenhouse Gas Inventory Data - 2000 to 2011. [Online] [Cited: September 17, 2014.] <http://www.arb.ca.gov/cc/inventory/data/data.htm>.
5. **World Resources Institute.** Climate Analysis Indicator Tool (CAIT). [Online] [Cited: September 2014, 2014.] <http://cait.wri.org>.
6. **Air Resources Board.** Reducing Climate Change Emissions From Motor Vehicles. [Online] [Cited: September 17, 2014.] <http://www.arb.ca.gov/cc/factsheets/ccfactsheet.pdf>.
7. *The Carbon Cycle and Climate Change.* **Bennington, Bret J.** 1, s.l. : Brooks/Cole. ISBN 1 3: 978-0-495-73855-8.
8. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report.* **International Panel on Climate Change.** 4, 2007.
9. *Occupational Safety and Health Guideline for Nitrous Oxide.* **U.S. Department of Labor.**
10. **Environmental Protection Agency.** Overview of Greenhouse Gases. [Online] [Cited: September 17, 2014.] <http://www.epa.gov/highgwp/scientific.html>.
11. **American Lung Association.** Climate Change. [Online] 2013. [Cited: September 17, 2014.] <http://www.lung.org/associations/states/california/advocacy/climate-change/>.
12. **The National Institute for Occupational Safety and Health.** [Online] [Cited: September 17, 2014.] <http://www.cdc.gov/niosh/>.
13. **Occupational Health and Safety Administration.** [Online] [Cited: September 17, 2014.] <https://www.osha.gov/>.
14. **Hardin, Mary and Kahn, Ralph.** Aerosols & Climate Change. *Earth Observatory.* [Online] <http://earthobservatory.nasa.gov/Features/Aerosols/>.
15. **Environmental Protection Agency.** Air Pollution and the Clean Air Act. [Online] [Cited: September 17, 2014.] <http://www.epa.gov/air/caa/>.
16. **Building Standards Commission.** California Building Standards Code (Title 24, California Code of Regulations). [Online] [Cited: 17 2014, September.] <http://www.bsc.ca.gov/codes.aspx>.
17. —. CALGreen. [Online] 2010. [Cited: September 17, 2014.] <http://www.bsc.ca.gov/home/calgreen.aspx>.
18. **Air Resources Board.** Clean Car Standards - Pavley, Assembly Bill 1493. [Online] September 24, 2009. [Cited: September 17, 2014.] <http://www.arb.ca.gov/cc/ccms/ccms.htm>.
19. **Environmental Protection Agency.** State and Local Climate and Energy Program. [Online] [Cited: September 17, 2014.] <http://www.epa.gov/statelocalclimate/state/tracking/individual/ca.html>.
20. **Air Resources Board.** Assembly Bill 32: Global Warming Solutions Act. [Online] 2006. [Cited: September 17, 2014.] <http://www.arb.ca.gov/cc/ab32/ab32.htm>.

21. —. Status of Scoping Plan Recommended Measures. [Online] July 25, 2011. [Cited: September 23, 2014.] [http://www.arb.ca.gov/cc/scopingplan/status\\_of\\_scoping\\_plan\\_measures.pdf](http://www.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf).
22. —. Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document. [Online] August 19, 2011. [Cited: September 23, 2014.] [http://www.arb.ca.gov/cc/scopingplan/document/final\\_supplement\\_to\\_sp\\_fed.pdf](http://www.arb.ca.gov/cc/scopingplan/document/final_supplement_to_sp_fed.pdf).
23. —. Climate Change Scoping Plan First Update, Discussion Draft for Public Review and Comment. [Online] May 22, 2014. [Cited: September 23, 2014.] [http://www.arb.ca.gov/cc/scopingplan/2013\\_update/first\\_update\\_climate\\_change\\_scoping\\_plan.pdf](http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf).
24. **California Energy Commission**. SB 1368 Emission Performance Standards. [Online] September 29, 2006. [Cited: September 17, 2014.] [http://www.energy.ca.gov/emission\\_standards/](http://www.energy.ca.gov/emission_standards/).
25. **State of California**. Senate Bill No. 97. [Online] [Cited: September 17, 2014.] [http://opr.ca.gov/docs/SB\\_97\\_bill\\_20070824\\_chaptered.pdf](http://opr.ca.gov/docs/SB_97_bill_20070824_chaptered.pdf).
26. —. California Climate Change Executive Orders. [Online] [http://www.climatechange.ca.gov/state/executive\\_orders.html](http://www.climatechange.ca.gov/state/executive_orders.html).
27. —. Senate Bill No. 1078. [Online] <http://www.energy.ca.gov/portfolio/documents/documents/SB1078.PDF>.
28. —. EXECUTIVE ORDER S-14-08. [Online] [Cited: September 17, 2014.] <http://gov.ca.gov/news.php?id=11072>.
29. **Air Resources Board**. Sustainable Communities. [Online] 2008. [Cited: September 17, 2014.] <http://www.arb.ca.gov/cc/sb375/sb375.htm>.
30. **California Air Resources Board**. Preliminary Draft Staff Proposal. [Online] October 24, 2008. [Cited: November 13, 2013.] <http://www.arb.ca.gov/cc/localgov/ceqa/meetings/102708/prelimdraftproposal102408.pdf>.
31. **South Coast Air Quality Management District**. Greenhouse Gases (GHG) CEQA Significance Thresholds. [Online] [Cited: September 17, 2014.] <http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ghg-significance-thresholds>.
32. *Greenhouse Gas CEQA Significance Threshold Stakeholder Working Group Meeting #15. South Coast Air Quality Management District*. Diamond Bar : s.n., 2010.
33. **San Bernardino Associated Governments (SANBAG)**. San Bernardino County Regional Greenhouse Gas Reduction Plan- Final Draft. [Online] March 2014. [http://www.sanbag.ca.gov/planning2/greenhousegas/Final\\_SBCRegionalGHGReduction.pdf](http://www.sanbag.ca.gov/planning2/greenhousegas/Final_SBCRegionalGHGReduction.pdf).
34. **California Environmental Quality Act**. Addressing Analysis and Mitigation of Greenhouse Gas. [Online] [Cited: November 13, 2013.] [http://ceres.ca.gov/ceqa/docs/Final\\_Statement\\_of\\_Reasons.pdf](http://ceres.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf).
35. **South Coast Air Quality Management District**. California Emissions Estimator Model. [Online] 2013. [Cited: September 17, 2014.] <http://www.caleemod.com/>.
36. **Urban Crossroads, Inc.** *Rancho Palma Air Quality Impact Analysis Report*. Irvine : s.n., 2015.
37. **South Coast Air Quality Management District**. *Greenhouse Gas CEQA Significance Threshold Stakeholder Working Group #13*. [Powerpoint] Diamond Bar : s.n., 2009.
38. **Urban Crossroads, Inc.** *Rancho Palma Traffic Impact Analysis*. Irvine : s.n., 2015.



39. **Air Resources Board.** Assembly Bill 32: Global Warming Solutions Act. [Online] 2006. [Cited: November 13, 2013.] <http://www.arb.ca.gov/cc/ab32/ab32.htm>.
40. —. Assembly Bill 32: Global Warming Solutions Act. [Online] 2006. [Cited: November 13, 2013.] <http://www.arb.ca.gov/cc/ab32/ab32.htm>.
41. **South Coast Air Quality Management District.** Greenhouse Gases (GHG) CEQA Significance Thresholds. [Online] [Cited: September 17, 2014.] <http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ghg-significance-thresholds>.
42. **Building Standards Commission.** California Building Standards Code (Title 24, California Code of Regulations). [Online] [Cited: 13 2013, November.] <http://www.bsc.ca.gov/codes.aspx>.
43. **Air Resources Board.** Title 17 - California Code of Regulation. [Online] 2010. [Cited: September 17, 2014.] <http://www.arb.ca.gov/regs/regs-17.htm>.
44. **South Coast Air Quality Management District.** *Localized Significance Thresholds Methodology*. s.l. : South Coast Air Quality Management District, 2003.

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## 6 CERTIFICATION

The contents of this greenhouse gas study report represent an accurate depiction of the greenhouse gas impacts associated with the proposed Rancho Palma. The information contained in this greenhouse gas report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 660-1994 ext. 217.

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### EDUCATION

Master of Science in Environmental Studies  
California State University, Fullerton • May, 2010

Bachelor of Arts in Environmental Analysis and Design  
University of California, Irvine • June, 2006

### PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners  
AWMA – Air and Waste Management Association  
ASTM – American Society for Testing and Materials

### PROFESSIONAL CERTIFICATIONS

Planned Communities and Urban Infill – Urban Land Institute • June, 2011  
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008  
Principles of Ambient Air Monitoring – California Air Resources Board • August, 2007  
AB2588 Regulatory Standards – Trinity Consultants • November, 2006  
Air Dispersion Modeling – Lakes Environmental • June, 2006

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**APPENDIX 3.1:**  
**CALEEMOD EMISSIONS MODEL OUTPUTS**

**Rancho Palma**  
**San Bernardino-South Coast County, Annual**

**1.0 Project Characteristics**

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**1.1 Land Usage**

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	500.00	Space	4.50	200,000.00	0
Single Family Housing	120.00	Dwelling Unit	28.40	313,200.00	343
Regional Shopping Center	98.00	1000sqft	4.70	98,000.00	0

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Urban	<b>Wind Speed (m/s)</b>	2.2	<b>Precipitation Freq (Days)</b>	32
<b>Climate Zone</b>	10			<b>Operational Year</b>	2010
<b>Utility Company</b>	Southern California Edison				
<b>CO2 Intensity (lb/MWhr)</b>	630.89	<b>CH4 Intensity (lb/MWhr)</b>	0.029	<b>N2O Intensity (lb/MWhr)</b>	0.006

**1.3 User Entered Comments & Non-Default Data**

Project Characteristics - CPUC GHG Calculator version 3c, worksheet tab "CO2 Allocations," cells AH/AQ 35-44. Year 2010 used in absense of year 2008.

Land Use - Total Lot Acreage: 37.6; Average home size is 2,610 SF based on 50% maximum coverage

Construction Phase - Operation run only

Off-road Equipment - Operation run only

Vehicle Trips - Trip Rate based on Traffic Study; Weekend Trip Rates based on ITE Trip Generation Handbook, 9th Edition. Credit for Internal Capture and Pass-By Trips have been taken.

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Woodstoves - Gas Stoves Only

Energy Use -

Mobile Land Use Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	50.00	1.00
tblFireplaces	NumberGas	102.00	120.00
tblFireplaces	NumberNoFireplace	12.00	0.00
tblFireplaces	NumberWood	6.00	0.00
tblLandUse	LandUseSquareFeet	216,000.00	313,200.00
tblLandUse	LotAcreage	38.96	28.40
tblLandUse	LotAcreage	2.25	4.70
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2010
tblVehicleTrips	DV_TP	35.00	0.00
tblVehicleTrips	PB_TP	11.00	34.00
tblVehicleTrips	PR_TP	54.00	66.00
tblVehicleTrips	ST_TR	49.97	46.20
tblVehicleTrips	ST_TR	10.08	5.53
tblVehicleTrips	SU_TR	25.24	23.34
tblVehicleTrips	SU_TR	8.77	4.81
tblVehicleTrips	WD_TR	42.94	63.23
tblVehicleTrips	WD_TR	9.57	5.31
tblWoodstoves	NumberCatalytic	6.00	0.00
tblWoodstoves	NumberNoncatalytic	6.00	0.00

## 2.0 Emissions Summary

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**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	2.5027	0.0159	1.3256	7.0000e-005		8.5600e-003	8.5600e-003		8.5300e-003	8.5300e-003	0.0000	30.8528	30.8528	3.0700e-003	5.3000e-004	31.0810
Energy	0.0231	0.1979	0.0888	1.2600e-003		0.0159	0.0159		0.0159	0.0159	0.0000	981.6236	981.6236	0.0390	0.0114	985.9613
Mobile	6.6842	17.7326	70.7687	0.0785	5.4787	0.3808	5.8595	1.4647	0.3493	1.8140	0.0000	7,056.5288	7,056.5288	0.4520	0.0000	7,066.0197
Waste						0.0000	0.0000		0.0000	0.0000	49.4344	0.0000	49.4344	2.9215	0.0000	110.7857
Water						0.0000	0.0000		0.0000	0.0000	4.7834	85.9980	90.7814	0.4953	0.0124	105.0315
<b>Total</b>	<b>9.2100</b>	<b>17.9463</b>	<b>72.1832</b>	<b>0.0798</b>	<b>5.4787</b>	<b>0.4053</b>	<b>5.8840</b>	<b>1.4647</b>	<b>0.3738</b>	<b>1.8385</b>	<b>54.2178</b>	<b>8,155.0032</b>	<b>8,209.2210</b>	<b>3.9108</b>	<b>0.0243</b>	<b>8,298.8791</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	2.5027	0.0159	1.3256	7.0000e-005		8.5600e-003	8.5600e-003		8.5300e-003	8.5300e-003	0.0000	30.8528	30.8528	3.0700e-003	5.3000e-004	31.0810
Energy	0.0231	0.1979	0.0888	1.2600e-003		0.0159	0.0159		0.0159	0.0159	0.0000	981.6236	981.6236	0.0390	0.0114	985.9613
Mobile	6.6842	17.7326	70.7687	0.0785	5.4787	0.3808	5.8595	1.4647	0.3493	1.8140	0.0000	7,056.5288	7,056.5288	0.4520	0.0000	7,066.0197
Waste						0.0000	0.0000		0.0000	0.0000	49.4344	0.0000	49.4344	2.9215	0.0000	110.7857
Water						0.0000	0.0000		0.0000	0.0000	4.7834	85.9980	90.7814	0.4952	0.0124	105.0239
<b>Total</b>	<b>9.2100</b>	<b>17.9463</b>	<b>72.1832</b>	<b>0.0798</b>	<b>5.4787</b>	<b>0.4053</b>	<b>5.8840</b>	<b>1.4647</b>	<b>0.3738</b>	<b>1.8385</b>	<b>54.2178</b>	<b>8,155.0032</b>	<b>8,209.2210</b>	<b>3.9107</b>	<b>0.0243</b>	<b>8,298.8715</b>

	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
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00

## 3.0 Construction Detail

### Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/1/2016	5	1	

Acres of Grading (Site Preparation Phase): 0

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	0	8.00	162	0.38
Demolition	Rubber Tired Dozers	0	8.00	255	0.40

**Trips and VMT**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**



### 3.2 Demolition - 2016

#### Mitigated Construction On-Site

	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					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

#### Mitigated Construction Off-Site

	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					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

### 4.0 Operational Detail - Mobile

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### 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	6.6842	17.7326	70.7687	0.0785	5.4787	0.3808	5.8595	1.4647	0.3493	1.8140	0.0000	7,056.5288	7,056.5288	0.4520	0.0000	7,066.0197
Unmitigated	6.6842	17.7326	70.7687	0.0785	5.4787	0.3808	5.8595	1.4647	0.3493	1.8140	0.0000	7,056.5288	7,056.5288	0.4520	0.0000	7,066.0197

### 4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	6,196.54	4,527.60	2287.32	12,327,577	12,327,577
Single Family Housing	637.20	663.60	577.20	2,161,007	2,161,007
<b>Total</b>	<b>6,833.74</b>	<b>5,191.20</b>	<b>2,864.52</b>	<b>14,488,584</b>	<b>14,488,584</b>

### 4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	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	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	66	0	34
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.486544	0.064021	0.169147	0.160108	0.054635	0.009206	0.014429	0.031168	0.001207	0.001399	0.004490	0.000757	0.002888

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

Category	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						0.0000	0.0000		0.0000	0.0000	0.0000	753.2590	753.2590	0.0346	7.1600e-003	756.2069
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	753.2590	753.2590	0.0346	7.1600e-003	756.2069
NaturalGas Mitigated	0.0231	0.1979	0.0888	1.2600e-003		0.0159	0.0159		0.0159	0.0159	0.0000	228.3646	228.3646	4.3800e-003	4.1900e-003	229.7544
NaturalGas Unmitigated	0.0231	0.1979	0.0888	1.2600e-003		0.0159	0.0159		0.0159	0.0159	0.0000	228.3646	228.3646	4.3800e-003	4.1900e-003	229.7544



### 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/yr	tons/yr										MT/yr					
Single Family Housing	4.05203e+006	0.0219	0.1867	0.0795	1.1900e-003		0.0151	0.0151		0.0151	0.0151	0.0000	216.2318	216.2318	4.1400e-003	3.9600e-003	217.5477
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	227360	1.2300e-003	0.0112	9.3600e-003	7.0000e-005		8.5000e-004	8.5000e-004		8.5000e-004	8.5000e-004	0.0000	12.1328	12.1328	2.3000e-004	2.2000e-004	12.2066
<b>Total</b>		<b>0.0231</b>	<b>0.1979</b>	<b>0.0888</b>	<b>1.2600e-003</b>		<b>0.0160</b>	<b>0.0160</b>		<b>0.0160</b>	<b>0.0160</b>	<b>0.0000</b>	<b>228.3646</b>	<b>228.3646</b>	<b>4.3700e-003</b>	<b>4.1800e-003</b>	<b>229.7544</b>

#### 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/yr	tons/yr										MT/yr					
Single Family Housing	4.05203e+006	0.0219	0.1867	0.0795	1.1900e-003		0.0151	0.0151		0.0151	0.0151	0.0000	216.2318	216.2318	4.1400e-003	3.9600e-003	217.5477
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	227360	1.2300e-003	0.0112	9.3600e-003	7.0000e-005		8.5000e-004	8.5000e-004		8.5000e-004	8.5000e-004	0.0000	12.1328	12.1328	2.3000e-004	2.2000e-004	12.2066
<b>Total</b>		<b>0.0231</b>	<b>0.1979</b>	<b>0.0888</b>	<b>1.2600e-003</b>		<b>0.0160</b>	<b>0.0160</b>		<b>0.0160</b>	<b>0.0160</b>	<b>0.0000</b>	<b>228.3646</b>	<b>228.3646</b>	<b>4.3700e-003</b>	<b>4.1800e-003</b>	<b>229.7544</b>

### 5.3 Energy by Land Use - Electricity

#### Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	176000	50.3654	2.3200e-003	4.8000e-004	50.5625
Regional Shopping Center	1.53468e+006	439.1746	0.0202	4.1800e-003	440.8933
Single Family Housing	921557	263.7190	0.0121	2.5100e-003	264.7511
<b>Total</b>		<b>753.2590</b>	<b>0.0346</b>	<b>7.1700e-003</b>	<b>756.2069</b>

#### Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	176000	50.3654	2.3200e-003	4.8000e-004	50.5625
Regional Shopping Center	1.53468e+006	439.1746	0.0202	4.1800e-003	440.8933
Single Family Housing	921557	263.7190	0.0121	2.5100e-003	264.7511
<b>Total</b>		<b>753.2590</b>	<b>0.0346</b>	<b>7.1700e-003</b>	<b>756.2069</b>

### 6.0 Area Detail

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### 6.1 Mitigation Measures Area

	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	2.5027	0.0159	1.3256	7.0000e-005		8.5600e-003	8.5600e-003		8.5300e-003	8.5300e-003	0.0000	30.8528	30.8528	3.0700e-003	5.3000e-004	31.0810
Unmitigated	2.5027	0.0159	1.3256	7.0000e-005		8.5600e-003	8.5600e-003		8.5300e-003	8.5300e-003	0.0000	30.8528	30.8528	3.0700e-003	5.3000e-004	31.0810

### 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	0.2430					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.2086					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.9100e-003	0.0000	1.6000e-004	0.0000		2.0100e-003	2.0100e-003		1.9900e-003	1.9900e-003	0.0000	28.8165	28.8165	5.5000e-004	5.3000e-004	28.9918
Landscaping	0.0482	0.0159	1.3255	7.0000e-005		6.5400e-003	6.5400e-003		6.5400e-003	6.5400e-003	0.0000	2.0363	2.0363	2.5200e-003	0.0000	2.0891
<b>Total</b>	<b>2.5027</b>	<b>0.0159</b>	<b>1.3256</b>	<b>7.0000e-005</b>		<b>8.5500e-003</b>	<b>8.5500e-003</b>		<b>8.5300e-003</b>	<b>8.5300e-003</b>	<b>0.0000</b>	<b>30.8528</b>	<b>30.8528</b>	<b>3.0700e-003</b>	<b>5.3000e-004</b>	<b>31.0810</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	0.2430					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.2086					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.9100e-003	0.0000	1.6000e-004	0.0000		2.0100e-003	2.0100e-003		1.9900e-003	1.9900e-003	0.0000	28.8165	28.8165	5.5000e-004	5.3000e-004	28.9918
Landscaping	0.0482	0.0159	1.3255	7.0000e-005		6.5400e-003	6.5400e-003		6.5400e-003	6.5400e-003	0.0000	2.0363	2.0363	2.5200e-003	0.0000	2.0891
<b>Total</b>	<b>2.5027</b>	<b>0.0159</b>	<b>1.3256</b>	<b>7.0000e-005</b>		<b>8.5500e-003</b>	<b>8.5500e-003</b>		<b>8.5300e-003</b>	<b>8.5300e-003</b>	<b>0.0000</b>	<b>30.8528</b>	<b>30.8528</b>	<b>3.0700e-003</b>	<b>5.3000e-004</b>	<b>31.0810</b>

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	90.7814	0.4952	0.0124	105.0239
Unmitigated	90.7814	0.4953	0.0124	105.0315

## 7.2 Water by Land Use

### Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	7.25911 / 4.44913	43.4969	0.2384	5.9800e-003	50.3568
Single Family Housing	7.81848 / 4.92904	47.2845	0.2568	6.4400e-003	54.6747
<b>Total</b>		<b>90.7814</b>	<b>0.4953</b>	<b>0.0124</b>	<b>105.0315</b>

### Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	7.25911 / 4.44913	43.4969	0.2384	5.9700e-003	50.3531
Single Family Housing	7.81848 / 4.92904	47.2845	0.2568	6.4300e-003	54.6708
<b>Total</b>		<b>90.7814</b>	<b>0.4952</b>	<b>0.0124</b>	<b>105.0239</b>

## 8.0 Waste Detail

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### 8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Unmitigated	49.4344	2.9215	0.0000	110.7857
Mitigated	49.4344	2.9215	0.0000	110.7857

### 8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	102.9	20.8878	1.2344	0.0000	46.8108
Single Family Housing	140.63	28.5466	1.6871	0.0000	63.9748
<b>Total</b>		<b>49.4344</b>	<b>2.9215</b>	<b>0.0000</b>	<b>110.7857</b>

## 8.2 Waste by Land Use

### Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	102.9	20.8878	1.2344	0.0000	46.8108
Single Family Housing	140.63	28.5466	1.6871	0.0000	63.9748
<b>Total</b>		<b>49.4344</b>	<b>2.9215</b>	<b>0.0000</b>	<b>110.7857</b>

## 9.0 Operational Offroad

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Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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## 10.0 Vegetation

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**Rancho Palma 2020**  
**San Bernardino-South Coast County, Annual**

**1.0 Project Characteristics**

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**1.1 Land Usage**

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	500.00	Space	4.50	200,000.00	0
Single Family Housing	120.00	Dwelling Unit	28.40	313,200.00	343
Regional Shopping Center	98.00	1000sqft	4.70	98,000.00	0

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Urban	<b>Wind Speed (m/s)</b>	2.2	<b>Precipitation Freq (Days)</b>	32
<b>Climate Zone</b>	10			<b>Operational Year</b>	2020
<b>Utility Company</b>	Southern California Edison				
<b>CO2 Intensity (lb/MWhr)</b>	466.9067	<b>CH4 Intensity (lb/MWhr)</b>	0.029	<b>N2O Intensity (lb/MWhr)</b>	0.006

**1.3 User Entered Comments & Non-Default Data**



Project Characteristics - CPUC GHG Calculator version 3c, worksheet tab "CO2 Allocations," cells AH/AQ 35-44.

Land Use - Total Lot Acreage: 37.6; Average home size is 2,610 SF based on 50% maximum coverage

Construction Phase - Operation run only

Off-road Equipment - Operation run only

Vehicle Trips - Trip Rate based on Traffic Study; Weekend Trip Rates based on ITE Trip Generation Handbook, 9th Edition. Credit for Internal Capture and Pass-By Trips have been taken.

Woodstoves - Gas Stoves Only

Energy Use - Title-24 Energy Intensity for Electricity & Natural Gas were adjusted by 21.8% & 16.8% respectively, for Non-Residential, and by 36.4% & 6.5%, respectively, for Residential. Impact Analysis California's 2013 Building Energy Efficiency Standards (CEC).

Mobile Land Use Mitigation -

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	50.00	1.00
tblEnergyUse	T24E	5.60	4.38
tblEnergyUse	T24E	980.99	623.91
tblEnergyUse	T24NG	2.02	1.68
tblEnergyUse	T24NG	27,816.78	26,008.69
tblFireplaces	NumberGas	102.00	120.00
tblFireplaces	NumberNoFireplace	12.00	0.00
tblFireplaces	NumberWood	6.00	0.00
tblLandUse	LandUseSquareFeet	216,000.00	313,200.00
tblLandUse	LotAcreage	38.96	28.40
tblLandUse	LotAcreage	2.25	4.70
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	630.89	466.9067
tblProjectCharacteristics	OperationalYear	2014	2020
tblVehicleTrips	DV_TP	35.00	0.00
tblVehicleTrips	PB_TP	11.00	34.00
tblVehicleTrips	PR_TP	54.00	66.00
tblVehicleTrips	ST_TR	49.97	46.20
tblVehicleTrips	ST_TR	10.08	5.53
tblVehicleTrips	SU_TR	25.24	23.34
tblVehicleTrips	SU_TR	8.77	4.81
tblVehicleTrips	WD_TR	42.94	63.23
tblVehicleTrips	WD_TR	9.57	5.31
tblWoodstoves	NumberCatalytic	6.00	0.00
tblWoodstoves	NumberNoncatalytic	6.00	0.00



	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
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**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	2.4930	0.0144	1.2495	7.0000e-005		8.8700e-003	8.8700e-003		8.8500e-003	8.8500e-003	0.0000	30.8528	30.8528	2.5600e-003	5.3000e-004	31.0704
Energy	0.0217	0.1862	0.0832	1.1900e-003		0.0150	0.0150		0.0150	0.0150	0.0000	738.0812	738.0812	0.0366	0.0107	742.1558
Mobile	2.8846	8.1511	30.8718	0.0813	5.4888	0.1211	5.6099	1.4682	0.1117	1.5798	0.0000	5,736.1177	5,736.1177	0.1975	0.0000	5,740.2643
Waste						0.0000	0.0000		0.0000	0.0000	49.4344	0.0000	49.4344	2.9215	0.0000	110.7857
Water						0.0000	0.0000		0.0000	0.0000	4.7834	63.6451	68.4285	0.4953	0.0124	82.6786
<b>Total</b>	<b>5.3993</b>	<b>8.3518</b>	<b>32.2045</b>	<b>0.0826</b>	<b>5.4888</b>	<b>0.1450</b>	<b>5.6338</b>	<b>1.4682</b>	<b>0.1355</b>	<b>1.6037</b>	<b>54.2178</b>	<b>6,568.6967</b>	<b>6,622.9145</b>	<b>3.6534</b>	<b>0.0236</b>	<b>6,706.9547</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	2.4930	0.0144	1.2495	7.0000e-005		8.8700e-003	8.8700e-003		8.8500e-003	8.8500e-003	0.0000	30.8528	30.8528	2.5600e-003	5.3000e-004	31.0704
Energy	0.0217	0.1862	0.0832	1.1900e-003		0.0150	0.0150		0.0150	0.0150	0.0000	738.0812	738.0812	0.0366	0.0107	742.1558
Mobile	2.7310	6.8352	27.0576	0.0656	4.3855	0.0987	4.4842	1.1731	0.0910	1.2640	0.0000	4,625.879 1	4,625.879 1	0.1622	0.0000	4,629.285 9
Waste						0.0000	0.0000		0.0000	0.0000	49.4344	0.0000	49.4344	2.9215	0.0000	110.7857
Water						0.0000	0.0000		0.0000	0.0000	4.7834	63.6451	68.4285	0.4952	0.0124	82.6710
<b>Total</b>	<b>5.2457</b>	<b>7.0359</b>	<b>28.3903</b>	<b>0.0669</b>	<b>4.3855</b>	<b>0.1225</b>	<b>4.5081</b>	<b>1.1731</b>	<b>0.1148</b>	<b>1.2879</b>	<b>54.2178</b>	<b>5,458.458 1</b>	<b>5,512.676 0</b>	<b>3.6181</b>	<b>0.0236</b>	<b>5,595.968 7</b>

	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
<b>Percent Reduction</b>	<b>2.84</b>	<b>15.76</b>	<b>11.84</b>	<b>19.05</b>	<b>20.10</b>	<b>15.49</b>	<b>19.98</b>	<b>20.10</b>	<b>15.27</b>	<b>19.69</b>	<b>0.00</b>	<b>16.90</b>	<b>16.76</b>	<b>0.97</b>	<b>0.08</b>	<b>16.56</b>

## 3.0 Construction Detail

### Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/1/2016	5	1	

Acres of Grading (Site Preparation Phase): 0

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	0	8.00	162	0.38
Demolition	Rubber Tired Dozers	0	8.00	255	0.40

**Trips and VMT**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**



### 3.2 Demolition - 2016

#### Mitigated Construction On-Site

	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					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

#### Mitigated Construction Off-Site

	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					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

### 4.0 Operational Detail - Mobile

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### 4.1 Mitigation Measures Mobile

Increase Diversity

Improve Pedestrian Network

	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	2.7310	6.8352	27.0576	0.0656	4.3855	0.0987	4.4842	1.1731	0.0910	1.2640	0.0000	4,625.879 1	4,625.879 1	0.1622	0.0000	4,629,285 9
Unmitigated	2.8846	8.1511	30.8718	0.0813	5.4888	0.1211	5.6099	1.4682	0.1117	1.5798	0.0000	5,736.117 7	5,736.117 7	0.1975	0.0000	5,740,264 3

### 4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	6,196.54	4,527.60	2287.32	12,327,577	9,849,740
Single Family Housing	637.20	663.60	577.20	2,161,007	1,726,646
<b>Total</b>	<b>6,833.74</b>	<b>5,191.20</b>	<b>2,864.52</b>	<b>14,488,584</b>	<b>11,576,385</b>

### 4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	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	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	66	0	34
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.468914	0.065172	0.173428	0.156844	0.056897	0.009079	0.016419	0.042157	0.001108	0.001337	0.005012	0.000672	0.002962

**5.0 Energy Detail**

Historical Energy Use: N

**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						0.0000	0.0000		0.0000	0.0000	0.0000	523.0731	523.0731	0.0325	6.7200e-003	525.8391
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	523.0731	523.0731	0.0325	6.7200e-003	525.8391
NaturalGas Mitigated	0.0217	0.1862	0.0832	1.1900e-003		0.0150	0.0150		0.0150	0.0150	0.0000	215.0081	215.0081	4.1200e-003	3.9400e-003	216.3166
NaturalGas Unmitigated	0.0217	0.1862	0.0832	1.1900e-003		0.0150	0.0150		0.0150	0.0150	0.0000	215.0081	215.0081	4.1200e-003	3.9400e-003	216.3166

### 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/yr	tons/yr										MT/yr					
Single Family Housing	3.83506e+006	0.0207	0.1767	0.0752	1.1300e-003		0.0143	0.0143		0.0143	0.0143	0.0000	204.6534	204.6534	3.9200e-003	3.7500e-003	205.8989
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	194040	1.0500e-003	9.5100e-003	7.9900e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004	0.0000	10.3547	10.3547	2.0000e-004	1.9000e-004	10.4177
<b>Total</b>		<b>0.0217</b>	<b>0.1862</b>	<b>0.0832</b>	<b>1.1900e-003</b>		<b>0.0150</b>	<b>0.0150</b>		<b>0.0150</b>	<b>0.0150</b>	<b>0.0000</b>	<b>215.0081</b>	<b>215.0081</b>	<b>4.1200e-003</b>	<b>3.9400e-003</b>	<b>216.3166</b>

#### 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/yr	tons/yr										MT/yr					
Single Family Housing	3.83506e+006	0.0207	0.1767	0.0752	1.1300e-003		0.0143	0.0143		0.0143	0.0143	0.0000	204.6534	204.6534	3.9200e-003	3.7500e-003	205.8989
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	194040	1.0500e-003	9.5100e-003	7.9900e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004	0.0000	10.3547	10.3547	2.0000e-004	1.9000e-004	10.4177
<b>Total</b>		<b>0.0217</b>	<b>0.1862</b>	<b>0.0832</b>	<b>1.1900e-003</b>		<b>0.0150</b>	<b>0.0150</b>		<b>0.0150</b>	<b>0.0150</b>	<b>0.0000</b>	<b>215.0081</b>	<b>215.0081</b>	<b>4.1200e-003</b>	<b>3.9400e-003</b>	<b>216.3166</b>

### 5.3 Energy by Land Use - Electricity

#### Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	176000	37.2742	2.3200e-003	4.8000e-004	37.4713
Regional Shopping Center	1.41512e+006	299.7016	0.0186	3.8500e-003	301.2865
Single Family Housing	878707	186.0973	0.0116	2.3900e-003	187.0814
<b>Total</b>		<b>523.0731</b>	<b>0.0325</b>	<b>6.7200e-003</b>	<b>525.8391</b>

#### Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	176000	37.2742	2.3200e-003	4.8000e-004	37.4713
Regional Shopping Center	1.41512e+006	299.7016	0.0186	3.8500e-003	301.2865
Single Family Housing	878707	186.0973	0.0116	2.3900e-003	187.0814
<b>Total</b>		<b>523.0731</b>	<b>0.0325</b>	<b>6.7200e-003</b>	<b>525.8391</b>

### 6.0 Area Detail

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### 6.1 Mitigation Measures Area

	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	2.4930	0.0144	1.2495	7.0000e-005		8.8700e-003	8.8700e-003		8.8500e-003	8.8500e-003	0.0000	30.8528	30.8528	2.5600e-003	5.3000e-004	31.0704
Unmitigated	2.4930	0.0144	1.2495	7.0000e-005		8.8700e-003	8.8700e-003		8.8500e-003	8.8500e-003	0.0000	30.8528	30.8528	2.5600e-003	5.3000e-004	31.0704

### 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	0.2430					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.2086					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.9100e-003	0.0000	1.6000e-004	0.0000		2.0100e-003	2.0100e-003		1.9900e-003	1.9900e-003	0.0000	28.8165	28.8165	5.5000e-004	5.3000e-004	28.9918
Landscaping	0.0385	0.0144	1.2493	7.0000e-005		6.8500e-003	6.8500e-003		6.8500e-003	6.8500e-003	0.0000	2.0363	2.0363	2.0100e-003	0.0000	2.0785
<b>Total</b>	<b>2.4930</b>	<b>0.0144</b>	<b>1.2495</b>	<b>7.0000e-005</b>		<b>8.8600e-003</b>	<b>8.8600e-003</b>		<b>8.8400e-003</b>	<b>8.8400e-003</b>	<b>0.0000</b>	<b>30.8528</b>	<b>30.8528</b>	<b>2.5600e-003</b>	<b>5.3000e-004</b>	<b>31.0704</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	0.2430					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.2086					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.9100e-003	0.0000	1.6000e-004	0.0000		2.0100e-003	2.0100e-003		1.9900e-003	1.9900e-003	0.0000	28.8165	28.8165	5.5000e-004	5.3000e-004	28.9918
Landscaping	0.0385	0.0144	1.2493	7.0000e-005		6.8500e-003	6.8500e-003		6.8500e-003	6.8500e-003	0.0000	2.0363	2.0363	2.0100e-003	0.0000	2.0785
<b>Total</b>	<b>2.4930</b>	<b>0.0144</b>	<b>1.2495</b>	<b>7.0000e-005</b>		<b>8.8600e-003</b>	<b>8.8600e-003</b>		<b>8.8400e-003</b>	<b>8.8400e-003</b>	<b>0.0000</b>	<b>30.8528</b>	<b>30.8528</b>	<b>2.5600e-003</b>	<b>5.3000e-004</b>	<b>31.0704</b>

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	68.4285	0.4952	0.0124	82.6710
Unmitigated	68.4285	0.4953	0.0124	82.6786

## 7.2 Water by Land Use

### Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	7.25911 / 4.44913	32.7896	0.2384	5.9800e-003	39.6495
Single Family Housing	7.81848 / 4.92904	35.6389	0.2568	6.4400e-003	43.0291
<b>Total</b>		<b>68.4285</b>	<b>0.4953</b>	<b>0.0124</b>	<b>82.6786</b>

### Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	7.25911 / 4.44913	32.7896	0.2384	5.9700e-003	39.6459
Single Family Housing	7.81848 / 4.92904	35.6389	0.2568	6.4300e-003	43.0251
<b>Total</b>		<b>68.4285</b>	<b>0.4952</b>	<b>0.0124</b>	<b>82.6710</b>

## 8.0 Waste Detail

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### 8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Unmitigated	49.4344	2.9215	0.0000	110.7857
Mitigated	49.4344	2.9215	0.0000	110.7857

### 8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	102.9	20.8878	1.2344	0.0000	46.8108
Single Family Housing	140.63	28.5466	1.6871	0.0000	63.9748
<b>Total</b>		<b>49.4344</b>	<b>2.9215</b>	<b>0.0000</b>	<b>110.7857</b>



## 8.2 Waste by Land Use

### Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	102.9	20.8878	1.2344	0.0000	46.8108
Single Family Housing	140.63	28.5466	1.6871	0.0000	63.9748
<b>Total</b>		<b>49.4344</b>	<b>2.9215</b>	<b>0.0000</b>	<b>110.7857</b>

## 9.0 Operational Offroad

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Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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## 10.0 Vegetation

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