# GREENHOUSE GAS EMISSIONS AND GLOBAL CLIMATE CHANGE STUDY

## EUCALYPTUS INDUSTRIAL PARK

## CITY OF MORENO VALLEY, CALIFORNIA

March 2012

LSA

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## CITY OF MORENO VALLEY, CALIFORNIA

Submitted to:

ProLogis
&
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# 1.0 EXECUTIVE SUMMARY

LSA Associates, Inc. (LSA) was retained to prepare a greenhouse gas (GHG) emissions and global climate change (GCC) impact study for the proposed Eucalyptus Industrial Park development located in the City of Moreno Valley (City) in Riverside County, California.

This GCC study provides a discussion of the proposed project, the physical setting of the project area, and the regulatory framework for GCC. The report provides data on existing GCC settings and evaluates potential GCC-related emissions associated with the proposed project. Modeled project emissions are based on project design, anticipated vehicle usage, and energy usage for this project.

The emissions from vehicle exhaust comprise approximately 79 percent of the project's total GCC-related emissions; however, they are controlled by the State and federal governments and are outside the control of this project. The remaining 21 percent of the emissions are primarily from energy use such as building heating systems, which are within the control of the project and will be minimized by compliance with State Title 24 regulations for building energy efficiency.

This evaluation was prepared in conformance with appropriate standards, utilizing procedures and methodologies in the South Coast Air Quality Management District (SCAQMD) California Environmental Quality Act (CEQA) Air Quality Handbook and the State CEQA Guidelines.

# 2.0 PROJECT DESCRIPTION

## 2.1 PROJECT LOCATION

The project site is adjacent to Quincy Channel, which is a north-south trending ravine/gully located along the eastern boundary of the project site. Land adjacent to the project site includes vacant land east and south of the proposed project site, State Route 60 (SR-60) to the north, and the Moreno Valley Auto Mall and the City of Moreno Valley Fire Department to the west of the project site. Single-family residential uses are located approximately 50 feet (ft) southeast of the southern boundary of the project site, approximately 395 ft southeast of the proposed warehouse buildings, and approximately 664 ft southeast of the proposed loading docks. (see Figure 1).

## 2.2 PROJECT DESCRIPTION

The proposed project is the construction and operation of a warehouse facility consisting of 2,244,638 square feet on a vacant site. The project site is approximately 121.33 acres in size. As evidenced by the presence of refuse identified in the southwest and southeast corners of the site, unauthorized dumping of materials has occurred within the project limits. Figure 2 shows the project's conceptual site plan.

As the project's site plan illustrates, direct access to the proposed development site will be via seven driveways on Eucalyptus Avenue. The project will also construct a small street between Buildings 3 and 4 to provide access to the parcel south of the project.

The project is scheduled to be completed in 2012. According to the City of Moreno Valley's General Plan, 5 percent of the project site is designated as R2 Residential, 2 percent as R5 Residential, 41 percent as R15 Residential, and the remaining 34 percent as Business Park/Light Industrial. Upon approval of the project, the entire site will have a designation of Business Park/Light Industrial.

Figure 1: Project Location Map

Figure 2: Proposed Site Plan

# 3.0 SETTING

## 3.1 EXISTING GLOBAL CLIMATE SETTING

Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other significant changes in climate (such as precipitation or wind) that last for an extended period of time. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures.

Climate change refers to any change in measures of weather (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from natural factors, such as changes in the sun's intensity; natural processes within the climate system, such as changes in ocean circulation; or human activities, such as the burning of fossil fuels, land clearing, or agriculture. The primary observed effect of global climate change has been a rise in the average global tropospheric[1] temperature of 0.36 degrees Fahrenheit (°F) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling shows that further warming could occur, which would induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include higher sea levels, drier or wetter weather, changes in ocean salinity, changes in wind patterns or more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold and increased intensity of tropical cyclones. Specific effects in California might include a decline in the Sierra Nevada snowpack, erosion of California's coastline, and seawater intrusion in the Delta.

Global surface temperatures have risen by 1.33°F ± 0.32°F over the last 100 years (1906 to 2005). The rate of warming over the last 50 years is almost double that over the last 100 years.[2] The latest projections, based on state-of-the art climate models, indicate that temperatures in California are expected to rise 3 to 10.5°F by the end of the century.[3] The prevailing scientific opinion on climate change is that "most of the warming observed over the last 50 years is attributable to human activities."[4] Increased amounts of carbon dioxide ($CO_2$) and other GHGs are the primary causes of the human-induced component of warming. The observed warming effect associated with the presence of GHGs in the atmosphere (from either natural or human sources) is often referred to as the greenhouse effect.[5]

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1 The troposphere is the zone of the atmosphere characterized by water vapor, weather, winds, and decreasing temperature with increasing altitude.

2 Intergovernmental Panel on Climate Change (IPCC), 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.*

3 California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* July.

4 IPCC, *Climate Change 2007: The Physical Science Basis*, http://www.ipcc.ch.

5 The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse lets heat from sunlight in and reduces the amount of heat that escapes, greenhouse gases like $CO_2$, methane ($CH_4$), and nitrous oxide ($N_2O$) in the atmosphere keep the Earth at a relatively

GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:[1]

- $CO_2$
- Methane ($CH_4$)
- Nitrous oxide ($N_2O$)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride ($SF_6$)

Over the last 200 years, human activities have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, and enhancing the natural greenhouse effect, which is believed to be causing global warming. While GHGs produced by human activities include naturally-occurring GHGs such as $CO_2$, $CH_4$, and $N_2O$, some gases, like HFCs, PFCs, and $SF_6$ are completely new to the atmosphere. Certain other gases, such as water vapor, are short-lived in the atmosphere as compared to these GHGs that remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is generally excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the purposes of this Environmental Impact Report (EIR), the term “GHGs” will refer collectively to the six gases identified in the bulleted list provided above.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The global warming potential is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere (“atmospheric lifetime”). The GWP of each gas is measured relative to $CO_2$, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of $CO_2$ over a specified time period. GHG emissions are typically measured in terms of pounds or tons of “$CO_2$ equivalents” ($CO_2$e). Table A shows the GWPs for each type of GHG. For example, sulfur hexafluoride is 22,800 times more potent at contributing to global warming than $CO_2$.

even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, although an excess of greenhouse gas results in global warming, the *naturally occurring* greenhouse effect is necessary to keep our planet at a comfortable temperature.

[1] The greenhouse gases listed are consistent with the definition in Assembly Bill (AB) 32 (Government Code 38505), as discussed later in this section.

**Table A: Global Warming Potential of Greenhouse Gases**

| Gas | Atmospheric Lifetime (Years) | Global Warming Potential (100-year Time Horizon) |
|---|---|---|
| Carbon Dioxide | 50–200 | 1 |
| Methane | 12 | 25 |
| Nitrous Oxide | 114 | 298 |
| HFC-23 | 270 | 14,800 |
| HFC-134a | 14 | 1,430 |
| HFC-152a | 1.4 | 124 |
| PFC: Tetrafluoromethane ($CF_4$) | 50,000 | 7,390 |
| PFC: Hexafluoromethane ($C_2F_6$) | 10,000 | 12,200 |
| Sulfur Hexafluoride ($SF_6$) | 3,200 | 22,800 |
| Halons | 16-65 | 1620 - 7030 |

Source: IPCC, 2007. *Climate Change 2007: The Physical Science Basis.* Contribution of Working Group I to the Fourth Assessment Report of the IPCC.
IPCC = Intergovernmental Panel on Climate Change

The following discussion summarizes the characteristics of the six primary GHGs.

### 3.1.1 Carbon Dioxide

In the atmosphere, carbon generally exists in its oxidized form, as $CO_2$. Natural sources of $CO_2$ include the respiration (breathing) of humans, animals and plants, volcanic outgassing, decomposition of organic matter and the exchange of $CO_2$ between the atmosphere and the oceans. Human-caused sources of $CO_2$ include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. The Earth maintains a natural carbon balance and when concentrations of $CO_2$ are upset, the system gradually returns to its natural state through natural processes. Natural changes to the carbon cycle work slowly, especially compared to the rapid rate at which humans are adding $CO_2$ to the atmosphere. Natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of man-made $CO_2$, and consequently, the gas is building up in the atmosphere. The concentration of $CO_2$ in the atmosphere has risen about 30 percent since the late 1800s.[1]

In 2002, $CO_2$ emissions from fossil fuel combustion accounted for approximately 98 percent of man-made $CO_2$ emissions and approximately 84 percent of California's overall GHG emissions ($CO_2e$). The transportation sector accounted for California's largest portion of $CO_2$ emissions, with gasoline consumption making up the greatest portion of these emissions. Electricity generation was California's second largest category of GHG emissions.

[1] California Environmental Protection Agency (CalEPA). 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.

### 3.1.2 Methane

Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Anthropogenic sources include rice cultivation, livestock, landfills and waste treatment, biomass burning, and fossil fuel combustion (burning of coal, oil, natural gas, etc.). Decomposition occurring in landfills accounts for the majority of human-generated $CH_4$ emissions in California, followed by enteric fermentation (emissions from the digestive processes of livestock).[1] Agricultural processes such as manure management and rice cultivation are also significant sources of manmade $CH_4$ in California. Methane accounted for approximately 6 percent of gross climate change emissions ($CO_2e$) in California in 2002.[2] It is estimated that over 60 percent of global methane emissions are related to human-related activities.[3] As with $CO_2$, the major removal process of atmospheric $CH_4$—a chemical breakdown in the atmosphere—cannot keep pace with source emissions, and $CH_4$ concentrations in the atmosphere are increasing.

### 3.1.3 Nitrous Oxide

$N_2O$ is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. $N_2O$ is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit $N_2O$, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated $N_2O$ emissions in California. $N_2O$ emissions accounted for nearly 7 percent of man-made GHG emissions ($CO_2e$) in California in 2002.

### 3.1.4 Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride

HFCs are primarily used as substitutes for ozone ($O_3$)-depleting substances regulated under the Montreal Protocol.[4] PFCs and $SF_6$ are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry, which is active in California, leads to greater use of PFCs. HFCs, PFCs, and $SF_6$ accounted for about 3.5 percent of man-made GHG emissions ($CO_2e$) in California in 2002.[5]

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1 California Air Resources Board (ARB), Greenhouse Gas Inventory Data - 1990 to 2004. http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed November 2008.

2 Ibid.

3 IPCC, 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

4 The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

5 CalEPA. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.

### 3.1.5 Halons

These compounds are used in fire extinguishers and behave as both $O_3$-depleting and GHGs. Halon production ended in the United States in 1993. SCAQMD Rule 1418 – *Halon Emissions from Fire Extinguishing Equipment* requires the recovery and recycling of halons used in fire extinguishing systems and prohibits the sale of halon in small fire extinguishers.

## 3.2 EMISSIONS SOURCES AND INVENTORIES

An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing climate change. This section summarizes the latest information on global, United States, California, and local GHG emission inventories. However, because GHGs persist for a long time in the atmosphere (see Table A), accumulate over time, and are generally well-mixed, their impact on the atmosphere and climate cannot be tied to a specific point of emission.

### 3.2.1 Global Emissions

The International Energy Agency (IEA)[1] reports that worldwide emissions of $CO_2$e totaled 30.6 billion metric tons in 2010, a 5 percent increase over 2009. Global estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change (UNFCCC).

### 3.2.2 United States Emissions

In 2009, the United States emitted approximately 6.6 billion metric tons of $CO_2$e or approximately 24 tons per year (tpy) per person. Of the six economic sectors nationwide— electric power industry, transportation, industry, agriculture, commercial, residential— the electric power industry and transportation sectors combined account for approximately 60 percent of the GHG emissions; the majority of the electrical power industry and all of the transportation emissions are generated from direct fossil fuel combustion. Between 1990 and 2009, total United States GHG emissions rose approximately 7.3 percent.[2]

### 3.2.3 State of California Emissions

According to California Air Resources Board (ARB) emission inventory estimates, California emitted approximately 474 million metric tons (MMT)[3] of $CO_2$e emissions in 2008.[4] This large number is due primarily to the sheer size of California compared to other states. By contrast, California has the fourth lowest per-capita $CO_2$ emission rate from fossil fuel combustion in the country, due to the

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1 http://www.iea.org.

2 U.S. Environmental Protection Agency (EPA). 2011. *The 2011 U.S. Greenhouse Gas Inventory Report*. http://www.epa.gov/climatechange/emissions/usinventoryreport.html, accessed August 2011.

3 A metric ton is equivalent to approximately 1.1 tons.

4 California ARB, Greenhouse Gas Inventory Data - 1990 to 2004. http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed August 2011.

success of its energy efficiency and renewable energy programs and commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise.[1]

The CalEPA Climate Action Team stated in its December 2010 report that the composition of gross climate change pollutant emissions in California in 2002 (expressed in terms of $CO_2$e) was as follows:

- $CO_2$ accounted for 83.3 percent
- $CH_4$ accounted for 6.4 percent
- $N_2O$ accounted for 6.8 percent
- HFCs, PFC, and $SF_6$ accounted for 3.5 percent[2]

The California ARB estimates that transportation is the source of approximately 38 percent of the State's GHG emissions in 2004, followed by electricity generation (both in-State and out-of-State) at 23 percent, and industrial sources at 20 percent. The remaining sources of GHG emissions are residential and commercial activities at 9 percent, agriculture at 6 percent, high global warming potential gases at 3 percent, and recycling and waste at 1 percent.[3]

The California ARB is responsible for developing the California Greenhouse Gas Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State of California and supports the AB 32 Climate Change Program. The California ARB's current GHG emission inventory covers the years 1990-2004 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, agricultural lands). The emission inventory estimates are based on the actual amount of all fuels combusted in the State, which accounts for over 85 percent of the GHG emissions within California.

The California ARB staff has projected statewide unregulated GHG emissions for the year 2020, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions, will be 596 MMT of $CO_2$e. GHG emissions from the transportation and electricity sectors as a whole are expected to increase, but remain at approximately 38 percent and 23 percent of total $CO_2$e emissions, respectively. The industrial sector consists of large stationary sources of GHG emissions and the percentage of the total 2020 emissions is projected to be 17 percent of total $CO_2$e emissions. The remaining sources of GHG emissions in 2020 are high global warming potential gases at 8 percent, residential and commercial activities at 8 percent, agriculture at 5 percent, and recycling and waste at 1 percent.[4]

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1 California Energy Commission (CEC), 2007. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004 - Final Staff Report, publication # CEC-600-2006-013-SF, Sacramento, CA, December 22, 2006; and January 23, 2007, update to that report.

2 CalEPA. 2010. *Climate Action Team Report to Governor Schwarzenegger and the California Legislature*. December.

3 California ARB, 2008. http://www.climatechange.ca.gov/inventory/index.html. September.

4 California ARB, 2008. http://www.arb.ca.gov/cc/inventory/data/forecast.htm. September.

## 3.3 CLIMATE/METEOROLOGY

Air quality in the planning area is not only affected by various emission sources (mobile, industry, etc.), but also by atmospheric conditions such as wind speed, wind direction, temperature, rainfall, etc. The combination of topography, low mixing height, abundant sunshine, and emissions from the second-largest urban area in the United States gives the project area the worst air pollution problem in the nation.

The annual average temperature varies little throughout the project area, ranging from the low to middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site is the Riverside Citrus Exp St station.[1] The monthly average maximum temperature recorded at this station in the past ranged from 66.6°F in January to 94.4°F in August, with an annual average maximum of 79.0°F. The monthly average minimum temperature recorded at this station ranged from 41.3°F in December to 61.3°F in August, with an annual average minimum of 50.5°F. January or December is typically the coldest month, and August is typically the warmest month in this area of the Basin.

The majority of annual rainfall in the Basin occurs between November and April. Summer rainfall is minimal and is generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the Basin and along the coastal side of the mountains. The Riverside Citrus Exp St station monitored precipitation from 1948 to 2009. Average monthly rainfall measured during that period varied from 2.16 inches in February to 0.32 inch or less between May and October, with an annual total of 9.86 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

The project area experiences a persistent temperature inversion (increasing temperature with increasing altitude) as a result of the Pacific high. This inversion limits the vertical dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground and the lower air layer, the temperature of the lower air layer approaches the temperature of the base of the inversion (upper) layer until the inversion layer finally breaks, allowing vertical mixing with the lower layer. This phenomenon is observed in midafternoon to late afternoon on hot summer days, when the smog appears to clear up suddenly. Winter inversions frequently break by midmorning.

Winds in the vicinity of the project area blow predominantly from the south-southwest, with relatively low velocities. Wind speeds in the project area average approximately 4 miles per hour (mph). Summer wind speeds average slightly higher than winter wind speeds. Low average wind speeds, together with a persistent temperature inversion, limit the vertical dispersion of air pollutants throughout the project area. Strong dry north or northeasterly winds, known as Santa Ana winds, occur during the fall and winter months, dispersing air contaminants. The Santa Ana conditions tend to last for several days at a time.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are the lowest. During periods of low inversions and low wind speeds, air pollutants generated in

[1] Western Regional Climate Center, www.wrcc.dri.edu.

urbanized areas are transported predominantly on shore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are carbon monoxide (CO) and oxides of nitrogen ($NO_X$) because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and $NO_X$ to form photochemical smog.

## 3.4 LOCAL AIR QUALITY

There are no local air quality monitoring stations that measure GHG concentrations. This is partially due to the relatively new concern with these pollutants, but also because these are atmospheric pollutants. The ground-level concentrations are unrelated to the upper atmospheric effects of concern.

## 3.5 REGULATORY SETTINGS

### 3.5.1 Federal Regulations/Standards

The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the EPA has the authority to regulate $CO_2$ emissions under the federal Clean Air Act (CAA). While there currently are no adopted federal regulations for the control or reduction of GHG emissions, the EPA commenced several actions in 2009 that are required to implement a regulatory approach to global climate change.

On September 30, 2009, the EPA announced a proposal that focuses on large facilities emitting over 25,000 tons of GHG emissions per year. These facilities would be required to obtain permits that would demonstrate they are using the best practices and technologies to minimize GHG emissions.

On December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six GHGs ($CO_2$, $CH_4$, $N_2O$, HFCs, PFCs, $SF_6$) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to global climate change. This EPA action does not impose any requirements on industry or other entities. However, the findings are a prerequisite to finalizing the GHG emission standards for light-duty vehicles mentioned below.

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a final joint rule to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. EPA is finalizing the first-ever national GHG emissions standards under the CAA, and NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. The EPA GHG standards require these vehicles to meet an estimated combined average emissions level of 250 grams of $CO_2$ per mile in model year 2016, equivalent to 35.5 miles per gallon (mpg).

### 3.5.2 State Regulations/Standards

In a response to the transportation sector's significant contribution to California's $CO_2$ emissions, AB 1493 (Pavley) was enacted on July 22, 2002. AB 1493 requires ARB to set GHG emission standards for passenger vehicles and light-duty trucks (and other vehicles whose primary use is

noncommercial personal transportation in the State) manufactured in 2009 and all subsequent model years. To set its own GHG emissions limits on motor vehicles, California must receive a waiver from the EPA. On June 30, 2009, the EPA granted the waiver of CAA preemption to California for its GHG emission standards for motor vehicles beginning with the 2009 model year. Notice of the decision was published in the Federal Register on July 8, 2009.

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order (EO) S-3-05. This EO established the following goals for the State of California: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80 percent below 1990 levels by 2050.

California's major initiative for reducing GHG emissions is outlined in AB 32, the "Global Warming Solutions Act," passed by the California State legislature on August 31, 2006. This effort aims at reducing GHG emissions to 1990 levels by 2020. The ARB has established the level of GHG emissions in 1990 at 427 million metric tons of carbon dioxide equivalent ($MMTCO_2e$). The emissions target of 427 MMT requires the reduction of 169 MMT from the State's projected business-as-usual 2020 emissions of 596 MMT. AB 32 requires ARB to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline and to reduce GHGs that contribute to global climate change. The Scoping Plan was approved by ARB on December 11, 2008, and includes measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures.[1] Emission reductions that are projected to result from the recommended measures in the Scoping Plan are expected to total 174 $MMTCO_2e$, which would allow California to attain the emissions goal of 427 $MMTCO_2e$ by 2020. The Scoping Plan includes a range of GHG reduction actions that may include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. The Scoping Plan, even after Board approval, remains a recommendation. The measures in the Scoping Plan will not be binding until after they are adopted through the normal rulemaking process. The ARB rule-making process includes preparation and release of each of the draft measures, public input through workshops and a public comment period, followed by an ARB Board hearing and rule adoption.

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed ARB and the newly created Climate Action Team (CAT)[2] to identify a list of "discrete early action GHG reduction measures" that can be adopted and made enforceable by January 1, 2010. On January 18, 2007, Governor Schwarzenegger signed EO S-1-07, further solidifying California's dedication to reducing GHGs by setting a new Low Carbon Fuel Standard. This EO sets a target to reduce the carbon intensity of California transportation fuels by at least 10 percent by 2020 and directs ARB to consider the Low Carbon Fuel Standard as a discrete early action measure.

In June 2007, ARB approved a list of 37 early action measures, including three discrete early action measures (Low Carbon Fuel Standard, Restrictions on High Global Warming Potential Refrigerants, and Landfill Methane Capture). Discrete early action measures are measures that were required to be

1 ARB. 2008. *Climate Change Proposed Scoping Plan: a Framework for Change*. October.

2 CAT is a consortium of representatives from State agencies who have been charged with coordinating and implementing GHG emission reduction programs that fall outside of ARB's jurisdiction.

adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code (HSC) Section 38560.5. The ARB adopted additional early action measures in October 2007[1] that tripled the number of discrete early action measures. These measures relate to truck efficiency, port electrification, reduction of perfluorocarbons from the semiconductor industry, reduction of propellants in consumer products, proper tire inflation, and $SF_6$ reductions from the non-electricity sector. The combination of early action measures is estimated to reduce State-wide GHG emissions by nearly 16 MMT.[2]

To assist public agencies in analyzing the effects of GHGs under CEQA, Senate Bill (SB) 97 (Chapter 185, 2007) required the Governor's Office of Planning and Research (OPR) to develop CEQA guidelines on how to minimize and mitigate a project's GHG emissions. On December 30, 2009, the Natural Resources Agency adopted CEQA Guidelines Amendments related to climate change. These amendments became effective on March 18, 2010.

SB 375, signed into law on October 1, 2008, is intended to enhance ARB's ability to reach AB 32 goals by directing ARB to develop regional GHG emissions reduction targets to be achieved within the automobile and light truck sectors for 2020 and 2035. ARB will work with California's 18 metropolitan planning organizations to align their regional transportation, housing, and land use plans and prepare a "Sustainable Communities Strategy" to reduce the number of vehicle miles traveled in their respective regions and demonstrate the region's ability to attain its GHG reduction targets.

California Green Buildings Standards Code (Cal Green Code) (California Code of Regulations [CCR], Title 24, part 11) was adopted by the California Building Standards Commission in 2010 and became effective in January, 2011. The Code applies to all new constructed residential, nonresidential, commercial, mixed-use, and State-owned facilities, as well as schools and hospitals. Cal Green Code is comprised of Mandatory Residential and Nonresidential Measures and more stringent Voluntary Measures (TIERs I and II).

Mandatory Measures are required to be implemented on all new construction projects and consist of a wide array of green measures concerning project site design, water use reduction, improvement of indoor air quality, and conservation of materials and resources. The Cal Green Building Code refers to Title 24, Part 6 compliance with respect to energy efficiency; however, it encourages 15 percent energy use reduction over the required in Part 6. Voluntary Measures are optional, more stringent measures to be used by jurisdictions that strive to enhance their commitment towards green and sustainable design and achievement of AB 32 goals. Under TIERs 1 and 2, all new construction projects are required to reduce energy consumption by 15 percent and 30 percent, respectively, below the baseline required under the California Energy Commission (CEC), as well as implement more stringent green measures than those required by mandatory code.

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1 ARB. 2007. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration*. October.

2 ARB. 2007. "ARB approves tripling of early action measures required under AB 32." News Release 07-46. http://www.arb.ca.gov/newsrel/nr102507.htm. October 25.

### 3.5.3 Regional Regulations/Standards

**South Coast Air Quality Management District.** In April 2008, the 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."[1] 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 ARB (or some other state agency) develops statewide guidance on assessing the significance of GHG emissions under CEQA.

Initially, SCAQMD staff presented the working group with a significance threshold that could be applied to various types of projects—residential; non-residential; industrial; etc. However, the threshold is still under development. In December 2008, staff presented the SCAQMD Governing Board with a significance threshold for stationary source projects in which 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 ($MTCO_2e$) as a screening numerical threshold.

In September 2010, the Working Group released additional revisions, which recommended a project-level efficiency target of 4.8 $MTCO_2e$ per service population (SP) as a 2020 target and 3.0 $MTCO_2e$, per SP as a 2035 target. The recommended plan-level target for 2020 was 6.6 $MTCO_2e$ and the plan level target for 2035 was 4.1 $MTCO_2e$. The SCAQMD has not announced when staff is expecting to present a finalized version of these thresholds to the Governing Board. The SCAQMD has also adopted Rules 2700, 2701, and 2702 that address GHG reductions; however, these rules are currently applicable to boilers and process heaters, forestry, and manure management projects.

**City of Moreno Valley.**

**General Plan.** Although the City of Moreno Valley General Plan does not include any specific GHG or climate change policies or goals, a number of the goals, objectives, policies, and programs identified in the air quality (Chapter 6 – Safety) and energy (Chapter 7 – Conservation) elements will result in an indirect reduction in GHG emissions through reductions in vehicle trips, vehicle miles traveled, and energy use. Therefore, the proposed project has been analyzed in order to determine consistency with these measures, as shown in Table B.

## 3.6 IMPACTS TO A PROJECT FROM GLOBAL CLIMATE CHANGE

AB 32 indicates that "the potential effects of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the State from the Sierra snow pack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidence of infections, disease, asthma, and other health-related problems" (State of California 2006, AB 32, Section 38501[a]).

The California Climate Change Center published a report that assesses the risks of climate change to California. The following is a summary of the potential risks to California from that report:

[1] For more information see: http://www.aqmd.gov/ceqa/handbook/GHG/GHG.html.

## Table B: Moreno Valley General Plan Air Quality and Energy Objectives And Policies

| Objective/Policy |
|---|
| **Air Quality Objective 6.6:** Promote land use patterns that reduce daily automotive trips and reduce trip distance for work, shopping, school, and recreation. |
| **Policy 6.6.1:** Provide sites for new neighborhood commercial facilities within close proximity to the residential areas they serve. |
| **Policy 6.6.2:** Provide multi-family residential development sites in close proximity to neighborhood commercial centers in order to encourage pedestrian instead of vehicular travel. |
| **Policy 6.6.3:** Locate neighborhood parks in close proximity to the appropriate concentration of residents in order to encourage pedestrian and bicycle travel to local recreation areas. |
| **Air Quality Objective 6.7:** Reduce mobile and stationary source air pollution emissions. |
| **Policy 6.7.1:** Cooperate with regional efforts to establish and implement regional air quality strategies and tactics. |
| **Policy 6.7.2:** Encourage the financing and construction of park-and-ride facilities. |
| **Policy 6.7.3:** Encourage express transit service from Moreno Valley to the greater metropolitan areas of Riverside, San Bernardino, Orange, and Los Angeles Counties. |
| **Policy 6.7.4:** Locate heavy industrial and extraction facilities away from residential areas and sensitive receptors. |
| **Policy 6.7.5:** Require grading activities to comply with the South Coast Air Quality Management District's (SCAQMD) Rule 403 regarding the control of fugitive dust. |
| **Policy 6.7.6:** Require building construction to comply with the energy conservation requirements of Title 24 of the California Administrative Code. |
| **Energy Objective 7.5:** Encourage efficient use of energy resources. |
| **Policy 7.5.1:** Encourage building, site design, and landscaping techniques that provide passive heating and cooling to reduce energy demand. |
| **Policy 7.5.2:** Encourage energy efficient modes of transportation and fixed facilities, including transit, bicycle, equestrian, and pedestrian transportation. Emphasize fuel efficiency in the acquisition and use of City-owned vehicles. |
| **Policy 7.5.3:** Locate areas planned for commercial, industrial and multiple family density residential development within areas of high transit potential and access. |
| **Policy 7.5.4:** Encourage efficient energy usage in all city public buildings. |
| **Policy 7.5.5:** Encourage the use of solar power and other renewable energy systems. |

City of Moreno Valley General Plan, July 11, 2006.

- A reduction in the Sierra snow pack could result in a reduction in hydropower, which comprises about 15 percent of California's in-state electricity production.
- A reduction in the Sierra snow pack could result in a loss of winter recreation from insufficient snow for skiing and snowboarding.
- A decrease in water supply could negatively impact the food supply.
- Climate change could increase temperatures, leading to decreased supply of certain agricultural products such as wine, fruit, nuts, and milk. California farmers may also have to face increasing threats from pests and pathogens.
- Climate change could result in increasing wildfires. If temperatures rise into the medium range, the risk of fires in California could increase as much as 55 percent.
- Climate change could result in plant and animal species relocating to cooler more habitable "up slope" locations.

- Climate change could negatively affect the health and productivity of California's forests. The productivity of mixed conifer forests is expected to diminish by as much as 18 percent by the end of the century.
- A rise in sea levels could result in increased coastal floods and shrinking beaches.

# 4.0 THRESHOLDS AND METHODOLOGY

A number of modeling tools are available to assess air quality impacts of projects. In addition, certain air districts, such as the SCAQMD, have created guidelines and requirements to conduct air quality analysis. SCAQMD's guidelines, *CEQA Air Quality Handbook, April 1993* and associated updates,[1] were adhered to in the assessment of air quality impacts for the proposed project. The air quality models identified in the document (including an older version of the URBEMIS model) are outdated; therefore, the SCAQMD model, CalEEMod Version 2011.1.1, was used to estimate project-related mobile and stationary sources emissions in this Climate Change Analysis.

The Climate Change Impact Analysis includes estimated emissions associated with short-term construction and long-term operation of the proposed project. GHGs with regional impacts would be emitted by project-related vehicular trips, as well as by emissions associated with stationary sources used on site.

## 4.1 THRESHOLDS OF SIGNIFICANCE

Based on *Guidelines for the Implementation of California Environmental Quality Act,* Appendix G, Public Resource Code (PRC) Sections 15000–15387, a project would normally be considered to have a significant effect on air quality if the project would violate any ambient air quality standards (AAQS), contribute substantially to an existing air quality violation, expose sensitive receptors to substantial pollutants concentrations, or conflict with adopted environmental plans and goals of the community in which it is located.

As the SCAQMD has recognized, the analysis of GHGs is a much different analysis than the analysis of criteria pollutants for the following reasons. For criteria pollutants, significance thresholds are based on daily emissions because attainment or nonattainment is based on daily exceedances of applicable AAQS. Further, several AAQS are based on relatively short-term exposure effects on human health (e.g., 1-hour and 8-hour). Since the half-life of $CO_2$ is approximately 100 years, for example, the effects of GHGs are longer-term, affecting global climate over a relatively long time frame. As a result, the SCAQMD's current position is to evaluate GHG effects over a longer time frame than a single day.

The recommended approach for GHG analysis included in OPR's June 2008 release is to: (1) identify and quantify GHG emissions, (2) assess the significance of the impact on climate change, and (3) if significant, identify alternatives and/or mitigation measures to reduce the impact below a level of significance.[2] The June 2008 OPR guidance provides some additional direction regarding planning documents as follows: "CEQA can be a more effective tool for GHG emissions analysis and

[1] Including the SCAQMD update to Greenhouse Gas CEQA Significance Thresholds, http://www.aqmd.gov/ceqa/handbook/GHG/GHG.html.

[2] State of California, 2008. Governor's Office of Planning and Research. *CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act Review*. June 19.

mitigation if it is supported and supplemented by sound development policies and practices that will reduce GHG emissions on a broad planning scale and that can provide the basis for a programmatic approach to project-specific CEQA analysis and mitigation…. For local government lead agencies, adoption of general plan policies and certification of general plan EIRs that analyze broad jurisdiction-wide impacts of GHG emissions can be part of an effective strategy for addressing cumulative impacts and for streamlining later project-specific CEQA reviews."

The State CEQA Guidelines include the following direction regarding determination of significant impacts from GHG emissions (Section 15064.4):

> (a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the Lead Agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based on available information, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. 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. The lead agency has discretion to select the model it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; or
> >
> > (2) Rely on a qualitative analysis or performance based standards.
>
> (b) A lead agency may consider the following when assessing the significance of impacts from greenhouse gas emissions on the environment:
>
> > (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.
> >
> > (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.

CEQA Guidelines Section 15064(b) provides that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further, states that an

"ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

Individual projects incrementally contribute toward the potential for GCC on a cumulative basis in concert with all other past, present, and probable future projects. While individual projects are unlikely to measurably affect GCC, each project incrementally contributes toward the potential for GCC on a cumulative basis, in concert with all other past, present, and probable future projects.

Revisions to Appendix G of the *CEQA Guidelines* suggest that the project be evaluated for the following impacts:

- Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
- Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

However, despite this, currently neither the CEQA statutes, OPR guidelines, nor the draft proposed changes to the CEQA Guidelines prescribe thresholds of significance or a particular methodology for performing an impact analysis; as with most environmental topics, significance criteria are left to the judgment and discretion of the Lead Agency.

On September 28, 2010, the SCAQMD proposed the following draft-tiered interim GHG significance threshold for development projects:

- **Tier 1** consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA. If the project qualifies for an exemption, no further action is required. If the project does not qualify for an exemption, then it would move to the next tier.
- **Tier 2** consists of determining whether or not the project is consistent with a GHG reduction plan that may be part of a local general plan, for example. The concept embodied in this tier is equivalent to the existing consistency determination requirements in CEQA Guidelines Sections 15064(h)(3), 15125(d), or 15152(a). The GHG reduction plan must, at a minimum, comply with AB 32 GHG reduction goals; include an emissions inventory agreed upon by either ARB or the SCAQMD, have been analyzed under CEQA and have a certified Final CEQA document, and have monitoring and enforcement components. If the proposed project is consistent with the qualifying local GHG reduction plan, it is not significant for GHG emissions. If the project is not consistent with a local GHG reduction plan, there is no approved plan, or the GHG reduction plan does not include all of the components described above, the project would move to Tier 3.
- **Tier 3** establishes a screening significance threshold level to determine significance using a 90 percent GHG emission capture rate. The 90 percent capture rate GHG significance screening level in Tier 3 for stationary sources was derived using the following methodology. Using the SCAQMD's Annual Emission Reporting (AER) Program, the reported annual natural gas consumption for 1,297 permitted facilities for 2006 through 2007 was compiled and the facilities were rank-ordered to estimate the 90th percentile of the cumulative natural gas usage for all permitted facilities. Approximately 10 percent of facilities evaluated comprise more than 90 percent of the total natural gas consumption, which corresponds to 10,000 $MTCO_2e$/yr (the majority of combustion emissions comprise $CO_2$). SCAQMD suggested the following GHG

screening thresholds: Industrial (when SCAQMD is the Lead Agency): 10,000 tpy $CO_2e$; Residential: 3,500 tpy $CO_2e$; Commercial: 1,400 tpy $CO_2e$; Mixed-use: 3,000 tpy $CO_2e$. If a project's GHG emissions exceed the GHG screening threshold, the project would move to Tier 4.

- **Tier 4** establishes a decision tree approach that includes compliance options for projects that have incorporated design features into the project and/or implement GHG mitigation measures.
  - Efficiency Target (2020 Targets)
    - 4.8 mt $CO_2e$ per SP for project level threshold (land use emissions only) and total residual emissions not to exceed 25,000 million tons per year (mty) $CO_2e$
    - 6.6 mt $CO_2e$ per SP for plan level threshold (all sectors)
  - Efficiency Target (2035 Targets)
    - 3.0 mt $CO_2e$ per SP for project level threshold
    - 4.1 mt $CO_2e$ per SP for plan level threshold

  If a project fails to meet any of these emissions efficiency targets, the project would move to Tier 5.
- **Tier 5** would require projects that implement off-site GHG mitigation that includes purchasing offsets to reduce GHG emission impacts to purchase sufficient offsets for the life of the project (30 years) to reduce GHG emissions to less than the applicable GHG screening threshold level.

This air quality analysis analyzes whether the project's GHG emissions should be considered cumulatively significant based on the following:

- Hinder attainment of the State's goals of reducing GHG emissions to 1990 levels by 2020, as stated in the Global Warming Solutions Act of 2006. A project may be considered to help attainment of the State's goals by being consistent with an adopted Statewide 2020 GHG emissions limit or the plans, programs, and regulations adopted to implement the Global Warming Solutions Act of 2006.
- Fail to achieve increased energy efficiency or reduce overall GHG emissions from an existing facility.
- Significantly increase the consumption of fuels or other energy resources, especially fossil fuels that contribute to GHG emissions when consumed.

# 5.0 IMPACTS AND MITIGATION

GHG emissions associated with the project would occur over the short term from construction activities, primarily emissions from equipment exhaust. There would be long-term regional emissions associated with project-related vehicular trips and stationary source emissions, such as natural gas used for heating. GHG emissions generated by the proposed project would predominantly consist of $CO_2$. In comparison to criteria air pollutants such as $O_3$ and particulate matter less than 10 microns in diameter ($PM_{10}$), $CO_2$ emissions persist in the atmosphere for a substantially longer period of time. While emissions of other GHGs, such as $CH_4$, are important with respect to global climate change, emission levels of other GHGs are less dependent on the land use and circulation patterns associated with the proposed land use development project than are levels of $CO_2$.

## 5.1 CONSTRUCTION IMPACTS

### 5.1.1 Equipment Exhausts and Related Construction Activities

Construction activities produce combustion emissions from various sources such as site grading, utility engines, on-site heavy-duty construction vehicles, asphalt paving, and motor vehicles transporting the construction crew. Exhaust emissions from construction activities envisioned on site would vary daily as construction activity levels change. The use of construction equipment on site would result in localized exhaust emissions. Table C lists the anticipated construction schedule, and Table D lists the anticipated equipment to be used for each phase of construction.

**Table C: Construction Schedule**

| Phase Name | Phase Start Date | Phase End Date | Number of Days |
|---|---|---|---|
| Site Preparation | 09/01/2012 | 09/26/2012 | 18 |
| Grading | 09/27/2012 | 11/27/2012 | 44 |
| Building Construction | 11/28/2012 | 08/16/2013 | 188 |
| Architectural Coating | 01/17/2013 | 08/16/2013 | 152 |
| Paving | 06/01/2013 | 08/16/2013 | 55 |

Source: Project Plans

### Table D: Construction Equipment Utilized by Construction Phase

| Construction Phase | Off Road Equipment Type | Off-Road Equipment Unit Amount | Hours Used per Day | Horsepower | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 3 | 8 | 358 | 0.59 |
| | Tractors/Loaders/Backhoes | 4 | 8 | 75 | 0.55 |
| Grading | Excavators | 2 | 8 | 157 | 0.57 |
| | Graders | 1 | 8 | 162 | 0.61 |
| | Rubber Tired Dozers | 1 | 8 | 358 | 0.59 |
| | Scrapers | 2 | 8 | 356 | 0.72 |
| | Tractors/Loaders/Backhoes | 2 | 8 | 75 | 0.55 |
| Building Construction | Cranes | 1 | 7 | 208 | 0.43 |
| | Forklifts | 3 | 8 | 149 | 0.3 |
| | Generator Sets | 1 | 8 | 84 | 0.74 |
| | Tractors/Loaders/Backhoes | 3 | 7 | 75 | 0.55 |
| | Welders | 1 | 8 | 46 | 0.45 |
| Architectural Coating | Air Compressors | 1 | 6 | 78 | 0.48 |
| Paving | Pavers | 2 | 8 | 89 | 0.62 |
| | Paving Equipment | 2 | 8 | 82 | 0.53 |
| | Rollers | 2 | 8 | 84 | 0.56 |

Source: Project Plans and CalEEMod Defaults, November 2011

On February 3, 2011, the SCAQMD released the California Emissions Estimator Model (CalEEMod). The purpose of this new model is to more accurately calculate air quality and GHG emissions from direct and indirect sources and quantify applicable air quality and GHG reductions achieved from mitigation measures. The most recent version of this model (version 2011.1.1), was used to calculate the construction emissions, as shown in Table E. The emissions rates shown in Table E are from the CalEEMod output tables listed as "Mitigated Construction", even though the only mitigation that has been applied to the analysis are the required construction emissions control measures. They are also the combination of the on- and off-site emissions. Details of the emission factors and other assumptions are included in Appendix A. The total GHG emissions over the entire construction process is expected to be 2,700 metric tons.

### Table E: Short-Term Regional Construction Emissions

| | Total Regional Pollutant Emissions, MT/year | | | | | |
|---|---|---|---|---|---|---|
| Construction Phase | Bio-$CO_2$ | NBio-$CO_2$ | Total $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Site Preparation | 0 | 67 | 67 | 0.01 | 0 | 67 |
| Grading | 0 | 221 | 221 | 0.02 | 0 | 222 |
| Building Construction | 0 | 1,884 | 1,884 | 0.1 | 0 | 1,886 |
| Architectural Coating | 0 | 174 | 174 | 0.01 | 0 | 174 |
| Paving | 0 | 77 | 77 | 0.01 | 0 | 77 |

Source: LSA Associates, Inc., November 2011
Bio-$CO_2$ = biologically generated $CO_2$ lbs/day = pounds per day
$CH_4$ = methane MT = metric ton
$CO_2$ = carbon dioxide $N_2O$ = nitrous oxide

$CO_2e$ = carbon dioxide equivalent NBio-$CO_2$ = Non-biologically generated $CO_2$

### 5.1.2 Architectural Coatings and Floorings

Architectural coatings, carpet systems, composite wood products, and resilient flooring contain volatile organic compounds (VOCs) that are similar to reactive organic compounds (ROCs) and are part of the $O_3$ precursors. There are no significant emissions of GHG from architectural coatings.

Emissions associated with carpet systems, composite wood products, and resilient flooring could be reduced by using natural, rapidly renewable materials for example. Emissions could be minimized by adherence to the California Green Building Code 2010, Pollutant Control Section.

## 5.2 LONG-TERM REGIONAL CLIMATE IMPACTS

### 5.2.1 Greenhouse Gas Emissions

This section evaluates potentially significant impacts to GCC that could result from implementation of the proposed project. Because it is not possible to tie specific GHG emissions to actual changes in climate, this evaluation focuses on the project's emission of GHGs. Mitigation measures are identified as appropriate.

**GHG Emissions Background.** Emissions estimates for the proposed project are discussed below. GHG emissions estimates are provided herein for informational purposes only, as there is no established quantified GHG emissions threshold. Bearing in mind that CEQA does not require "perfection" but instead "adequacy, completeness, and a good faith effort at full disclosure," the analysis below is based on methodologies and information available to the City of Moreno Valley and the applicant at the time this analysis was prepared. Estimation of GHG emissions in the future does not account for all changes in technology that may reduce such emissions; therefore, the estimates are based on past performance of similar projects and represent a scenario that is worse than that which is likely to be encountered (after energy-efficient technologies have been implemented). While information is presented below to assist the public and the decision-makers in understanding the project's potential contribution to GCC impacts, the information available to the City is not sufficiently detailed to allow a direct comparison between particular project characteristics and particular climate change impacts, nor between any particular proposed mitigation measure and any reduction in climate change impacts.

Operation of the project would generate GHG emissions, with the majority of energy consumption (and associated generation of GHG emissions) occurring during the project's operation (as opposed to its construction). Typically, more than 80 percent of the total lifecycle energy consumption takes place during the use of buildings, and less than 20 percent is consumed during construction.[1]

Overall, the following activities associated with the proposed project could directly or indirectly contribute to the generation of GHG emissions:

[1] United Nations Environment Programme (UNEP), 2007. *Buildings and Climate Change: Status, Challenges and Opportunities*, Paris, France.

- **Removal of Vegetation:** The net removal of vegetation for construction results in a loss of the carbon sequestration in plants. However, planting of additional vegetation would result in additional carbon sequestration and would lower the carbon footprint of the project.
- **Construction Activities:** During construction of the project, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs, such as $CO_2$, $CH_4$, and $N_2O$.
- **Gas, Electric and Water Use:** Natural gas use results in the emissions of two GHGs: $CH_4$ (the major component of natural gas) and $CO_2$ from the combustion of natural gas. Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel. California's water conveyance system is energy-intensive. Preliminary estimates indicate that the total energy used to pump and treat this water exceeds 6.5 percent of the total electricity used in the State per year.[1]
- **Solid Waste Disposal:** Solid waste generated by the project could contribute to GHG emissions in a variety of ways. Landfilling and other methods of disposal use energy for transporting and managing the waste, and they produce additional GHGs to varying degrees. Landfilling, the most common waste management practice, results in the release of $CH_4$ from the anaerobic decomposition of organic materials. $CH_4$ is 25 times more potent a GHG than $CO_2$. However, landfill $CH_4$ can also be a source of energy. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere.
- **Motor Vehicle Use:** Transportation associated with the proposed project would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips.

The GHG emission estimates presented in Table F show the emissions associated with operation of the proposed project. Appendix A includes the CalEEMod modeling output for these GHG emissions.

As shown in Table F, the project will produce 79,000 metric tpy of $CO_2$e, which is 0.079 MMT$CO_2$e/yr. This includes the short-term construction emissions amortized over 30 years, as directed by the SCAQMD. As a comparison, the existing emissions from the entire Southern California Association of Governments (SCAG) region are estimated to be approximately 176.79 MMT$CO_2$e/yr and approximately 496.95 MMT$CO_2$e/yr for the entire State.

[1] CEC, 2004. *Water Energy Use in California* (online information sheet) Sacramento, CA, August 24. Website: energy.ca.gov/pier/iaw/industry/water.html. Accessed July 24, 2007.

## Table F: Long-Term Regional Operational Emissions

| Construction Phase | Total Regional Pollutant Emissions, MT/year | | | | | |
|---|---|---|---|---|---|---|
| | **Bio-$CO_2$** | **NBio-$CO_2$** | **Total $CO_2$** | **$CH_4$** | **$N_2O$** | **$CO_2e$** |
| Construction emissions amortized over 30 years | 0 | 90 | 90 | 0.006 | 0 | 90 |
| Area | 0 | 0 | 0 | 0 | 0 | 0 |
| Energy | 0 | 2,200 | 2,200 | 0.09 | 0.04 | 2,200 |
| Mobile | 0 | 66,000 | 66,000 | 2.6 | 0 | 66,000 |
| Waste | 4,900 | 0 | 4,900 | 290 | 0 | 11,000 |
| Water | 0 | 110 | 110 | 0.91 | 0.02 | 140 |
| **Total Project Emissions** | 4,900 | 68,000 | 73,000 | 290 | 0.06 | 79,000 |

Source: LSA Associates, Inc., November 2011
Bio-$CO_2$ = biologically generated $CO_2$
$CH_4$ = methane
$CO_2$ = carbon dioxide
$CO_2e$ = carbon dioxide equivalent
MT = metric tons
$N_2O$ = nitrous oxide
NBio-$CO_2$ = Non-biologically generated $CO_2$

As described above, project-related GHG emissions are not confined to a particular region but are dispersed worldwide. Consequently, it is difficult to determine how project-related GHG emissions would contribute to GCC and how GCC may impact California. Therefore, project-related GHG emissions are not project-specific impacts to global warming but are instead the project's contribution to this cumulative impact. As stated previously, project-related $CO_2$ emissions and their contribution to GCC impacts in the State of California are less than significant and less than cumulatively considerable because the project's impacts alone would not cause or significantly contribute to GCC.

**Area Sources.** Area sources of GHG emissions include architectural coatings, carpet systems, resilient flooring, composite wood, consumer products, and landscaping. The project would result in a small amount of GHG emissions from area sources due to the relatively small building size requiring little architectural coating and the anticipated light use of consumer products and landscaping.

**Energy/Natural Gas Use.** Buildings represent 39 percent of the United States' primary energy usage and 70 percent of electricity consumption.[1] The proposed project would increase the demand for electricity and natural gas due to the increased building area. The project would indirectly result in increased GHG emissions from off-site electricity generation at power plants and on-site natural gas consumption (2,200 $MTCO_2e$/year).

**Mobile Sources.** Mobile sources (vehicle trips and associated miles traveled) are the largest source of GHG emissions in California and represent approximately 38 percent of annual $CO_2$ emissions generated in the State. Like most land use development projects, vehicle miles traveled (VMT) is the most direct indicator of $CO_2$ emissions from the proposed project, and associated $CO_2$ emissions function as the best indicator of total GHG emissions. The emissions from vehicle exhaust would

[1] United States Department of Energy. 2003. *Buildings Energy Data Book.*

comprise approximately 84 percent of the project's total $CO_2e$ emissions. The emissions from vehicle exhaust are controlled by the State and federal governments and are outside the control of the City.

**Waste.** The proposed project would also generate solid waste during the operation phase of the project. The project would indirectly result in increased GHG emissions from solid waste treatment at treatment plants (11,000 $MTCO_2e$/year).

**Water.** Water-related energy use consumes 19 percent of California's electricity every year.[1] Energy use and related GHG emissions are based on electricity used for water supply and conveyance, water treatment, water distribution, and wastewater treatment (140 $MTCO_2e$/year). The project will comply with provisions of the California Green Building Code and will install water efficient fixtures such that it will experience reduction of indoor potable water use by 20 percent from what is required in the California Buildings Standards Code. In addition, the outdoor water use will be monitored by irrigation controls as prescribed in the Cal Green Building Code.

The project will comply with existing State and federal regulations regarding the energy efficiency of buildings, appliances, and lighting, which will reduce the project's electricity demand compared to older buildings. The produce market building will be built in compliance with the new 2010 California Building Code (CBC) 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.

At present, there is a federal ban on chlorofluorocarbons (CFCs) and Halons; therefore, it is assumed the project would not generate emissions of CFCs or Halons. The project may emit a small amount of HFC emissions from leakage and service of refrigeration and air conditioning equipment and from disposal at the end of the life of the equipment. However, the details regarding refrigerants to be used in the project site are unknown at this time. PFCs and sulfur hexafluoride are typically used in industrial applications, none of which would be used on the project site. Therefore, it is not anticipated that the project would contribute significant emissions of these additional GHGs.

Comparing the proposed project to the SCAQMD tiered interim GHG significance criteria; it is not exempt as described in Tier 1. Considering the Tier 2 criteria, there is not a GHG reduction plan in the Moreno Valley General Plan, nor any other GHG reduction plan applicable to the proposed project. Considering the Tier 3 screening significance threshold level, the most applicable screening threshold listed is the Industrial (even though SCAQMD is not the Lead Agency) at 10,000 tpy CO2e. The long-term project operational GHG emissions shown in Table F exceed this threshold, thus the project operational GHG emissions are significant.

Table G lists strategies that are either part of the project design or requirements under local or State ordinances. With implementation of these strategies/measures, the project's contribution to cumulative GHG emissions would be reduced. In order to ensure that the proposed project complies with and would not conflict with or impede the implementation of reduction goals identified in

[1] California, State of, 2005. California Energy Commission. California's Water-Energy Relationship. November.

AB 32, the Governor's EO S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor, Minimization Measure GCC-1 shall be implemented. Many of the individual elements of this measure are already included as part of the proposed project or are required as part of project-specific mitigation measures.

## Table G: Project Compliance with Greenhouse Gas Emission Reduction Strategies

| Strategy | Project Compliance |
|---|---|
| ***Mandatory Code*** | |
| **California Green Building Code.**<br>The Cal Green Code prescribes a wide array of measures that would directly and indirectly result in reduction of GHG emissions from the Business as Usual Scenario (California Building Code). The mandatory measures that are applicable to non-residential projects include site selection, energy efficiency, water efficiency, materials conservation and resource efficiency, and environmental quality measures. | **Compliant.** The project would be required to adhere to the non-residential mandatory measures as required by the Cal Green Code. |
| ***Energy Efficiency Measures*** | |
| **Energy Efficiency.**<br>Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities).<br>**Renewables Portfolio Standard.**<br>Achieve a 33 percent renewable energy mix statewide.<br>**Green Building Strategy.**<br>Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings. | **Compliant with Mitigation Incorporated.**<br>The proposed project will comply with the updated Title 24 standards, including the new 2010 CBC, for building construction if any building interior improvements are required. In addition, the project would be required to comply with the requirements of Minimization Measure GCC-1, identified later, including measures to incorporate energy efficient building design features. |
| ***Water Conservation and Efficiency Measures*** | |
| **Water Use Efficiency.**<br>Continue efficiency programs and use cleaner energy sources to move and treat water. Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions. | **Compliant with Mitigation Incorporated.**<br>The project would be required to adhere to the non-residential mandatory measures as required by the Cal Green Code, including measures to increase water use efficiency. |
| ***Solid Waste Reduction Measures*** | |
| **Increase Waste Diversion, Composting, and Commercial Recycling, and Move Toward Zero-Waste.**<br>Increase waste diversion from landfills beyond the 50 percent mandate to provide for additional recovery of recyclable materials. Composting and commercial recycling could have substantial GHG reduction benefits. In the long term, zero-waste policies that would require manufacturers to design products to be fully recyclable may be necessary. | **Compliant with Mitigation Incorporated.**<br>Data available from the CIWMB indicates that the City of Moreno Valley has not achieved the 50 percent diversion rate. The project would be required to adhere to the non-residential mandatory measures as required by the Cal Green Code, including measures to increase solid waste diversion, composting, and recycling. |
| ***Transportation and Motor Vehicle Measures*** | |
| **Vehicle Climate Change Standards.**<br>AB 1493 (Pavley) required the State to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles and light-duty trucks. Regulations were adopted by the ARB in September 2004. | **Compliant.**<br>The project does not involve the manufacture of vehicles. However, vehicles that are purchased and used within the project site would comply with any vehicle and fuel standards that the ARB adopts. |

**Table G: Project Compliance with Greenhouse Gas Emission Reduction Strategies**

| Strategy | Project Compliance |
|---|---|
| **Light-Duty Vehicle Efficiency Measures.**<br>Implement additional measures that could reduce light-duty GHG emissions. For example, measures to ensure that tires are properly inflated can both reduce GHG emissions and improve fuel efficiency.<br>**Adopt Heavy- and Medium-Duty Fuel and Engine Efficiency Measures.**<br>Regulations to require retrofits to improve the fuel efficiency of heavy-duty trucks that could include devices that reduce aerodynamic drag and rolling resistance. This measure could also include hybridization of and increased engine efficiency of vehicles.<br>**Low Carbon Fuel Standard.**<br>ARB identified this measure as a Discrete Early Action Measure. This measure would reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. | |
| **Regional Transportation-Related Greenhouse Gas Targets.**<br>Develop regional GHG emissions reduction targets for passenger vehicles. Local governments will play a significant role in the regional planning process to reach passenger vehicle GHG emissions reduction targets. Local governments have the ability to directly influence both the siting and design of new residential and commercial developments in a way that reduces GHGs associated with vehicle travel. | **Compliant.**<br>Specific regional emission targets for transportation emissions do not directly apply to this project; regional GHG reduction target development is outside the scope of this project. The project will comply with any plans developed by the City of Moreno Valley. |
| **Measures to Reduce High Global Warming Potential Gases.**<br>ARB has identified Discrete Early Action measures to reduce GHG emissions from the refrigerants used in car air conditioners, semiconductor manufacturing, and consumer products. ARB has also identified potential reduction opportunities for future commercial and industrial refrigeration, changing the refrigerants used in auto air conditioning systems, and ensuring that existing car air conditioning systems do not leak. | **Compliant.**<br>New products used or serviced on the project site (after implementation of the reduction of GHG gases) would comply with future ARB rules and regulations. |

Source: LSA Associates, Inc., September 2011.
AB = Assembly Bill
ARB = California Air Resources Board
Cal Green Code = California Green Buildings Standards Code
CBC = California Building Code
CIWMB = California Integrated Waste Management Board
GHG = greenhouse gas
GWP = Global Warming Potential

## 5.3 STANDARD CONDITIONS

### 5.3.1 Project Operations

The proposed project is required to comply with Title 24 of the CCR established by the CEC regarding energy conservation and green buildings standards. The project applicant shall incorporate the following in building plans:

- Low-emission water heaters shall be used. Solar water heaters are encouraged.
- Exterior windows shall utilize window treatments for efficient energy conservation.

- Per Cal Green Code requirements water-efficient fixtures and appliances, including but not limited to low-flow faucets, dual-flush toilets minimizing water consumption by 20 percent from the Building Standards Code baseline water consumption shall be used.
- Per Cal Green Code requirements, a Commissioning Plan shall be prepared and all building systems (e.g., heating, ventilation, and air-conditioning [HVAC], irrigation systems, lighting, water heating) shall be commissioned by the Commissioning Authority.
- Per Cal Green Code, restrict watering methods (e.g. , prohibit systems that apply water to nonvegetated surfaces) and control runoff.

## 5.4 MINIMIZATION MEASURES

### 5.4.1 Global Climate Change Impacts

**Minimization Measure GCC-1.** To ensure reductions below the expected "Business As Usual" (BAU) scenario, the project will be subject to a variety of measures that will reduce the project's greenhouse gas (GHG) emissions. To the satisfaction of the City of Moreno Valley, the following measures should be incorporated into the design and construction of the project (including specific building projects):

**Construction and Building Materials.**

- Use locally produced and/or manufactured building materials for at least 10 percent of the construction materials used for the project.
- Use "Green Building Materials," such as those materials that are resource efficient, and recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project.
- Limit unnecessary idling of construction equipment. A reduction in equipment idling would reduce fuel consumption, and therefore, GHG emissions.
- Maximize the use of electricity from the power grid by replacing diesel- or gasoline-powered equipment. This would reduce GHG emissions because electricity can be produced more efficiently at centralized power plants.

**Energy Efficiency Measures.**

- Design all project buildings to exceed the California Building Code's (CBC) Title 24 energy standard, including, but not limited to, any combination of the following:
  - Increase insulation such that heat transfer and thermal bridging is minimized.
  - Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption.
  - Incorporate ENERGY STAR or better rated windows, space heating and cooling equipment, light fixtures, appliances, or other applicable electrical equipment.

- Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping.
- Install efficient lighting and lighting control systems. Use daylight as an integral part of the lighting systems in buildings.
- Install light-colored "cool" roofs and cool pavements.
- Install energy-efficient heating and cooling systems, appliances and equipment, and control systems.
- Install solar or light-emitting diodes (LEDs) for outdoor lighting.
- The project applicant shall use less than 3,900 Global Warming Potential (GWP) hydrofluorocarbon (HFC) refrigerants or natural refrigerants (ammonia, propane, carbon dioxide [$CO_2$]) for refrigeration and fire suppression equipment.
- Provide vegetative or man-made exterior wall shading devices for east-, south-, and west-facing walls with windows.

**Water Conservation and Efficiency Measures.**

- Devise a comprehensive water conservation strategy appropriate for the project and its location. The strategy may include the following, plus other innovative measures that may be appropriate:
  - Install drought tolerant plants for landscaping.
  - Use reclaimed water for landscape irrigation within the project. Install the infrastructure to deliver and use reclaimed water.
  - Install water-efficient irrigations systems, such as weather-based and soil-moisture-based irrigation controllers and sensors for landscaping according to the California Department of Water Resources Model Efficient Landscape Ordinance.

**Solid Waste Measure.**

- Provide employee education about reducing waste and available recycling services.

In addition, the project would be subject to all applicable regulatory requirements, which would also reduce the GHG emissions of the project. After implementation of Minimization Measure GCC-1 and application of regulatory requirements, the project would implement appropriate GHG reduction strategies and would not conflict with or impede implementation of reduction goals identified in AB 32, the Governor's EO S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor. Therefore, the project's contribution to cumulative GHG emissions would be reduced to a less than significant level.

## 5.5 CUMULATIVE IMPACTS

As described above, project-related GHG emissions are not confined to a particular region but are dispersed worldwide. Therefore, project-related GHG emissions are not project-specific impacts to global warming, but the project's contribution to this cumulative impact. Because the project's impacts alone would not cause or significantly contribute to GCC, project-related $CO_2e$ emissions and their contribution to GCC impacts are less than significant and less than cumulatively considerable.

## 5.6 IMPACTS TO THE PROPOSED PROJECT FROM GLOBAL CLIMATE CHANGE

Local temperatures could increase in time as a result of global climate change, with or without development as envisioned by the project. This increase in temperature could lead to other climate effects including, but not limited to, increased flooding due to increased precipitation and runoff. At present, the extent of climate change impacts is uncertain, and more extensive monitoring of runoff is necessary for greater understanding of changes in hydrologic patterns. Studies indicate that increased temperatures could result in a greater portion of peak streamflows occurring earlier in the spring, with decreases in late spring and early summer. These changes could have implications for water supply, flood management, and ecosystem health. The following is an analysis of potential impacts of climate change to the project:

- The project site is in an elevated location, and therefore, would not be threatened from rising waters.
- The region in which the project site is located is subject to seasonal wildfires. The project building will have all required fire suppression systems, minimizing the risk of fire damage.

In summary, climate change impacts to the project are expected to be less than significant.

# 6.0 REFERENCES

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# APPENDIX A

# CALEEMOD MODEL PRINTOUTS