

# Courtyard and Towneplace Suites Hotel Project Greenhouse Gas Study

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# **COURTYARD AND TOWNEPLACE SUITES HOTEL PROJECT AGOURA HILLS, LOS ANGELES COUNTY GREENHOUSE GAS STUDY**

This report is an analysis of the potential greenhouse gas (GHG) emissions impacts of the proposed Courtyard and Towneplace Suites Hotel project located in Agoura Hills, California in Los Angeles County. The report has been prepared by Rincon Consultants, Inc. under contract to the City of Agoura Hills for use by the City of Agoura Hills, in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). The purpose of this study is to analyze the proposed project's GHG emissions and the associated impact to climate change. This study describes climate change, GHGs, and the current regulatory framework, quantifies GHG emissions for the proposed project, compares forecast emissions to quantitative thresholds, and discusses the project's consistency with applicable mitigation strategies.

## **PROJECT DESCRIPTION**

The Courtyard and Towneplace suites hotel project would involve the construction of a 225-room, dual brand, hotel on a 5.52-acre vacant parcel in the City of Agoura Hills. The site is generally situated between the 101 Freeway and Agoura Road west of Roadside Road, in the POM-FC – Planned Office Manufacturing (POM) and Freeway Corridor (FC) zones.

The project involves the construction of a new 3-story, 225 room hotel, with an outdoor swimming pool, a bar and lounge, a roof deck, and a parking lot. The site is currently vacant therefore no demolition would be required in order to construct the project. The site would be graded in order to construct the project, however, cut and fill would be balanced on site.

## **SETTING**

### **Overview of Climate Change**

Climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period of time. The term "climate change" is often used interchangeably with the term "global warming," but "climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures. The baseline against which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. The global climate is continuously changing, as evidenced by repeated episodes of substantial warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed acceleration in the rate of warming during the past 150 years. Per the United Nations Intergovernmental Panel on Climate Change (IPCC, 2013), the understanding of



anthropogenic warming and cooling influences on climate has led to a high confidence (95% or greater chance) that the global average net effect of human activities has been the dominant cause of warming since the mid-20<sup>th</sup> century (IPCC, 2013).

## **Greenhouse Gases (GHGs)**

Gases that absorb and re-emit infrared radiation in the atmosphere are called greenhouse gases (GHGs). The gases that are widely seen as the principal contributors to human-induced climate change include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxides (N<sub>2</sub>O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Water vapor is 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.

GHGs are emitted by both natural processes and human activities. Of these gases, CO<sub>2</sub> and CH<sub>4</sub> are emitted in the greatest quantities from human activities. Emissions of CO<sub>2</sub> are largely by-products of fossil fuel combustion, whereas CH<sub>4</sub> results from off-gassing associated with agricultural practices and landfills. Observations of CO<sub>2</sub> concentrations, globally-averaged temperature, and sea level rise are generally well within the range of the extent of the earlier IPCC projections. The recently observed increases in CH<sub>4</sub> and N<sub>2</sub>O concentrations are smaller than those assumed in the scenarios in the previous assessments. Each IPCC assessment has used new projections of future climate change that have become more detailed as the models have become more advanced.

Man-made GHGs, many of which have greater heat-absorption potential than CO<sub>2</sub>, include fluorinated gases and sulfur hexafluoride (SF<sub>6</sub>) (California Environmental Protection Agency [CalEPA], 2006). Different types of GHGs have varying global warming potentials (GWPs). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO<sub>2</sub>) is used to relate the amount of heat absorbed to the amount of the gas emissions, referred to as “carbon dioxide equivalent” (CO<sub>2</sub>e), and is the amount of a GHG emitted multiplied by its GWP. Carbon dioxide has a GWP of one. By contrast, methane (CH<sub>4</sub>) has a GWP of 21, meaning its global warming effect is 21 times greater than carbon dioxide on a molecule per molecule basis (IPCC, 1997).

The accumulation of GHGs in the atmosphere regulates the earth’s temperature. Without the natural heat trapping effect of GHG, Earth’s surface would be about 34° C cooler (CalEPA, 2006). However, it is believed that emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. The following discusses the primary GHGs of concern.

**Carbon Dioxide.** The global carbon cycle is made up of large carbon flows and reservoirs. Billions of tons of carbon in the form of CO<sub>2</sub> are absorbed by oceans and living biomass (i.e., sinks) and are emitted to the atmosphere annually through natural processes (i.e., sources). When in equilibrium, carbon fluxes among these various reservoirs are roughly balanced (United States Environmental Protection Agency [USEPA], April 2014). CO<sub>2</sub> was the first GHG demonstrated to



be increasing in atmospheric concentration, with the first conclusive measurements being made in the last half of the 20<sup>th</sup> Century. Concentrations of CO<sub>2</sub> in the atmosphere have risen approximately 40% since the industrial revolution. The global atmospheric concentration of CO<sub>2</sub> has increased from a pre-industrial value of about 280 parts per million (ppm) to 391 ppm in 2011 (IPCC, 2007; Oceanic and Atmospheric Association [NOAA], 2010). The average annual CO<sub>2</sub> concentration growth rate was larger between 1995 and 2005 (average: 1.9 ppm per year) than it has been since the beginning of continuous direct atmospheric measurements (1960–2005 average: 1.4 ppm per year), although there is year-to-year variability in growth rates (NOAA, 2010). Currently, CO<sub>2</sub> represents an estimated 74% of total GHG emissions (IPCC, 2007). The largest source of CO<sub>2</sub>, and of overall GHG emissions, is fossil fuel combustion.

**Methane.** Methane (CH<sub>4</sub>) is an effective absorber of radiation, though its atmospheric concentration is less than that of CO<sub>2</sub> and its lifetime in the atmosphere is limited to 10 to 12 years. It has a global warming potential (GWP) approximately 21 times that of CO<sub>2</sub>. Over the last 250 years, the concentration of CH<sub>4</sub> in the atmosphere has increased by 148% (IPCC, 2007), although emissions have declined from 1990 levels. Anthropogenic sources of CH<sub>4</sub> include enteric fermentation associated with domestic livestock, landfills, natural gas and petroleum systems, agricultural activities, coal mining, wastewater treatment, stationary and mobile combustion, and certain industrial processes (USEPA, April 2014).

**Nitrous Oxide.** Concentrations of nitrous oxide (N<sub>2</sub>O) began to rise at the beginning of the industrial revolution and continue to increase at a relatively uniform growth rate (NOAA, 2010). N<sub>2</sub>O is produced by microbial processes in soil and water, including those reactions that occur in fertilizers that contain nitrogen, fossil fuel combustion, and other chemical processes. Use of these fertilizers has increased over the last century. Agricultural soil management and mobile source fossil fuel combustion are the major sources of N<sub>2</sub>O emissions. Nitrous oxide's GWP is approximately 298 times that of CO<sub>2</sub> (IPCC, 2007).

**Fluorinated Gases (HFCS, PFCS and SF<sub>6</sub>).** Fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfurhexafluoride (SF<sub>6</sub>), are powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are used as substitutes for ozone-depleting substances such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and halons, which have been regulated since the mid-1980s because of their ozone-destroying potential and are phased out under the Montreal Protocol (1987) and Clean Air Act Amendments of 1990. Electrical transmission and distribution systems account for most SF<sub>6</sub> emissions, while PFC emissions result from semiconductor manufacturing and as a by-product of primary aluminum production. Fluorinated gases are typically emitted in smaller quantities than CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O, but these compounds have much higher GWPs. SF<sub>6</sub> is the most potent GHG the IPCC has evaluated.

## **Greenhouse Gas Inventory**

Worldwide anthropogenic emissions of GHG were approximately 46,000 million metric tons (MMT) CO<sub>2</sub>e in 2010 (IPCC, 2014). CO<sub>2</sub> emissions from fossil fuel combustion and industrial processes contributed about 65% of total emissions in 2010. Of anthropogenic GHGs, carbon dioxide was the most abundant accounting for 76% of total 2010 emissions. Methane emissions



accounted for 16% of the 2010 total, while nitrous oxide and fluorinated gases account for 6 and 2 percent respectively (IPCC, 2014).

Total U.S. GHG emissions were 6,525.6 MMT CO<sub>2</sub>e in 2012 (USEPA, April 2014). Total U.S. emissions have increased by 4.7% since 1990, emissions decreased by 3.4% from 2011 to 2012 (USEPA, April 2014). This decrease from 2011 to 2012 was due to a decrease in the carbon intensity of fuels used to generate electricity due to a decrease in coal consumption, with increased natural gas consumption. Additionally, relatively mild winter conditions, especially in regions of the United States where electricity is important for heating, resulted in an overall decrease in electricity demand in most sectors. Since 1990, U.S. emissions have increased at an average annual rate of 0.2%. In 2012, the transportation and industrial end-use sectors accounted for 28.2% and 27.9% (with electricity-related emissions distributed), respectively. Meanwhile, the residential and commercial end-use sectors accounted for 16.3% and 16.4%, respectively, of CO<sub>2</sub>, respectively (USEPA, 2014).

Based upon the California Air Resources Board (ARB) *California Greenhouse Gas Inventory for 2000-2012* (ARB, March 2014), California produced 459 MMT CO<sub>2</sub>e in 2012. The major source of GHG in California is transportation, contributing 36% of the state's total GHG emissions. Electric power is the second largest source, contributing 21% of the state's GHG emissions (ARB, March 2014). The industrial sector accounted for approximately 19 percent of the total emissions. California emissions are due in part to its large size and large population compared to other states. Another factor that reduces California's per capita fuel use and GHG emissions, as compared to other states, is its relatively mild climate. ARB has projected statewide unregulated GHG emissions for the year 2020 will be 507 MMT CO<sub>2</sub>e (ARB, August 2013). These projections represent the emissions that would be expected to occur in the absence of any GHG reduction actions.

## **Effects of Climate Change**

Globally, climate change has the potential to affect numerous environmental resources through potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21<sup>st</sup> century than were observed during the 20<sup>th</sup> century. Long-term trends have found that each of the past three decades has been warmer than all the previous decades in the instrumental record, and the decade from 2000 through 2010 has been the warmest. The global combined land and ocean temperature data show an increase of about 0.89°C (0.69°C–1.08°C) over the period 1901–2012 and about 0.72°C (0.49°C–0.89°C) over the period 1951–2012 when described by a linear trend. Several independently analyzed data records of global and regional Land-Surface Air Temperature (LSAT) obtained from station observations are in agreement that LSAT as well as sea surface temperatures have increased. In addition to these projections, there are identifiable signs that global warming is currently taking place, including substantial ice loss in the Arctic over the past two decades (IPCC, 2013). According to the CalEPA's *2010 Climate Action Team Biennial Report*, potential impacts of climate change in California may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CalEPA, April 2010). Below is a summary of some of the potential effects that could be experienced in California as a result of climate change.



**Sea Level Rise.** According to *The Impacts of Sea-Level Rise on the California Coast*, prepared by the California Climate Change Center (CCCC) (May 2009), climate change has the potential to induce substantial sea level rise in the coming century. The rising sea level increases the likelihood and risk of flooding. Sea levels are rising faster now than in the previous two millennia, and the rise is expected to accelerate, even with robust GHG emission control measures. The most recent IPCC report (2013) predicts a mean sea-level rise of 11-38 inches by 2100. This prediction is more than 50 percent higher than earlier projections of 7-23 inches, when comparing the same emissions scenarios and time periods. The previous IPCC report (2007) identified a sea level rise on the California coast over the past century of approximately eight inches. Based on the results of various global climate change models, sea level rise is expected to continue. The California Climate Adaptation Strategy (December 2009) estimates a sea level rise of up to 55 inches by the end of this century.

**Air Quality.** Higher temperatures, which are conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thereby ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state (CEC March 2009).

**Water Supply.** Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. Uncertainty remains with respect to the overall impact of climate change on future water supplies in California. However, the average early spring snowpack in the Sierra Nevada decreased by about 10 percent during the last century, a loss of 1.5 million acre-feet of snowpack storage. During the same period, sea level rose eight inches along California's coast. California's temperature has risen 1°F, mostly at night and during the winter, with higher elevations experiencing the highest increase. Many Southern California cities have experienced their lowest recorded annual precipitation twice within the past decade. In a span of only two years, Los Angeles experienced both its driest and wettest years on record (California Department of Water Resources [DWR], 2008; CCCC, May 2009).

This uncertainty complicates the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood. The Sierra snowpack provides the majority of California's water supply by accumulating snow during our wet winters and releasing it slowly when we need it during our dry springs and summers. Based upon historical data and modeling DWR projects that the Sierra snowpack will experience a 25 to 40 percent reduction from its historic average by 2050. Climate change is also anticipated to bring warmer storms that result in less snowfall at lower elevations, reducing the total snowpack (DWR, 2008).



**Hydrology.** As discussed above, climate change could potentially affect: the amount of snowfall, rainfall, and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. The rate of increase of global mean sea levels over the 2001-2010 decade, as observed by satellites, ocean buoys and land gauges, was approximately 3.2 mm per year, which is double the observed 20<sup>th</sup> century trend of 1.6 mm per year (World Meteorological Organization [WMO], 2013). As a result, sea levels averaged over the last decade were about 8 inches higher than those of 1880 (WMO, 2013). Sea level rise may be a product of climate change through two main processes: expansion of sea water as the oceans warm and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could jeopardize California's water supply due to salt water intrusion. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

**Agriculture.** California has a \$30 billion agricultural industry that produces half of the country's fruits and vegetables. Higher CO<sub>2</sub> levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase; crop-yield could be threatened by a less reliable water supply; and greater air pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality (CCCC, 2006).

**Ecosystems and Wildlife.** Climate change and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. Increasing concentrations of GHGs are likely to accelerate the rate of climate change. Scientists project that the average global surface temperature could rise by 1.0-4.5°F (0.6-2.5°C) in the next 50 years, and 2.2-10°F (1.4-5.8°C) in the next century, with substantial regional variation. Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Rising temperatures could have four major impacts on plants and animals: (1) timing of ecological events; (2) geographic range; (3) species' composition within communities; and (4) ecosystem processes, such as carbon cycling and storage (Parmesan, 2006).

While the above-mentioned potential impacts identify the possible effects of climate change at a global and potentially statewide level, in general scientific modeling tools are currently unable to predict what impacts would occur locally with a similar degree of accuracy. In general, regional and local predictions are made based on downscaling statewide models (CEC, March 2009).

## **Regulatory Setting**

The following regulations address both climate change and GHG emissions.

**International and Federal Regulations.** The United States is, and has been, a participant in the United Nations Framework Convention on Climate Change (UNFCCC) since it was produced by the United Nations in 1992. The objective of the treaty is "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." This is generally understood to be achieved by stabilizing global GHG concentrations between 350 and 400 ppm, in order to limit





the global average temperature increases between 2 and 2.4°C above pre-industrial levels (IPCC 2007). The UNFCCC itself does not set limits on GHG emissions for individual countries or enforcement mechanisms. Instead, the treaty provides for updates, called “protocols,” that would identify mandatory emissions limits.

Five years later, the UNFCCC brought nations together again to draft the Kyoto Protocol (1997). The Kyoto Protocol established commitments for industrialized nations to reduce their collective emissions of six GHGs (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, SF<sub>6</sub>, HFCs, and PFCs) to 5.2 percent below 1990 levels by 2012. The United States is a signatory of the Kyoto Protocol, but Congress has not ratified it and the United States has not bound itself to the Protocol’s commitments (UNFCCC, 2007). The first commitment period of the Kyoto Protocol ended in 2012. Governments, including 38 industrialized countries, agreed to a second commitment period of the Kyoto Protocol beginning January 1, 2013 and ending either on December 31, 2017 or December 31, 2020, to be decided by the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its seventeenth session (UNFCCC, November 2011).

In Durban (17<sup>th</sup> session of the Conference of the Parties in Durban, South Africa, December 2011), governments decided to adopt a universal legal agreement on climate change as soon as possible, but not later than 2015. Work will begin on this immediately under a new group called the Ad Hoc Working Group on the Durban Platform for Enhanced Action. Progress was also made regarding the creation of a Green Climate Fund (GCF) for which a management framework was adopted (UNFCCC, December 2011; United Nations, November 2011).

The United States Supreme Court in *Massachusetts et al. v. Environmental Protection Agency et al.* ([2007] 549 U.S. 05-1120) held that the United States Environmental Protection Agency (EPA) has the authority to regulate motor-vehicle GHG emissions under the federal Clean Air Act.

The USEPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and vehicle engines, and requires annual reporting of emissions. The first annual reports for these sources were due in March 2011.

On May 13, 2010, the U.S. EPA issued a Final Rule that took effect on January 2, 2011, setting a threshold of 75,000 tons CO<sub>2</sub>e per year for GHG emissions. New and existing industrial facilities that meet or exceed that threshold will require a permit after that date. On November 10, 2010, the U.S. EPA published the “PSD and Title V Permitting Guidance for Greenhouse Gases.” The U.S. EPA’s guidance document is directed at state agencies responsible for air pollution permits under the Federal Clean Air Act to help them understand how to implement GHG reduction requirements while mitigating costs for industry. It is expected that most states will use the U.S. EPA’s new guidelines when processing new air pollution permits for power plants, oil refineries, cement manufacturing, and other large pollution point sources.

On January 2, 2011, the U.S. EPA implemented the first phase of the Tailoring Rule for GHG emissions Title V Permitting. Under the first phase of the Tailoring Rule, all new sources of emissions are subject to GHG Title V permitting if they are otherwise subject to Title V for another air pollutant and they emit at least 75,000 tons CO<sub>2</sub>e per year. Under Phase 1, no



sources were required to obtain a Title V permit solely due to GHG emissions. Phase 2 of the Tailoring Rule went into effect July 1, 2011. At that time new sources were subject to GHG Title V permitting if the source emits 100,000 tons CO<sub>2</sub>e per year, or they are otherwise subject to Title V permitting for another pollutant and emit at least 75,000 tons CO<sub>2</sub>e per year.

On July 3, 2012 the U.S. EPA issued the final rule that retains the GHG permitting thresholds that were established in Phases 1 and 2 of the GHG Tailoring Rule. These emission thresholds determine when Clean Air Act permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

**California Regulations.** ARB is responsible for the coordination and oversight of State and local air pollution control programs in California. California has a numerous regulations aimed at reducing the state's GHG emissions. These initiatives are summarized below.

Assembly Bill (AB) 1493 (2002), California's Advanced Clean Cars program (referred to as "Pavley"), requires ARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, U.S. EPA granted the waiver of Clean Air Act preemption to California for its greenhouse gas emission standards for motor vehicles beginning with the 2009 model year. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG" will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction by 2012 and 30 percent by 2016. The Advanced Clean Cars program coordinates the goals of the Low Emissions Vehicles (LEV), Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs and would provide major reductions in GHG emissions. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions from their model year 2016 levels (ARB, 2011).

In 2005, former Governor Schwarzenegger issued Executive Order (EO) S-3-05, establishing statewide GHG emissions reduction targets. EO S-3-05 provides that by 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80 percent below 1990 levels (CalEPA, 2006). In response to EO S-3-05, CalEPA created the Climate Action Team (CAT), which in March 2006 published the Climate Action Team Report (the "2006 CAT Report") (CalEPA, 2006). The 2006 CAT Report identified a recommended list of strategies that the state could pursue to reduce GHG emissions. These are strategies that could be implemented by various state agencies to ensure that the emission reduction targets in EO S-3-05 are met and can be met with existing authority of the state agencies. The strategies include the reduction of passenger and light duty truck emissions, the reduction of idling times for diesel trucks, an overhaul of shipping technology/infrastructure, increased use of alternative fuels, increased recycling, and landfill methane capture, etc.

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "California Global Warming Solutions Act of 2006," signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 (essentially a 15 percent reduction below 2005 emission levels; the same requirement as under S-3-05), and requires ARB to prepare a Scoping Plan that outlines the main State strategies for reducing



GHGs to meet the 2020 deadline. In addition, AB 32 requires ARB to adopt regulations to require reporting and verification of statewide GHG emissions.

After completing a comprehensive review and update process, ARB approved a 1990 statewide GHG level and 2020 limit of 427 MMT CO<sub>2</sub>e. The Scoping Plan approved by ARB on December 11, 2008 included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures including in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted over the last five years. Implementation activities are ongoing and ARB is currently the process of updating the Scoping Plan.

In May 2014, ARB approved the first update to the AB 32 Scoping Plan. The 2013 Scoping Plan update defines ARB's climate change priorities for the next five years and sets the groundwork to reach post-2020 goals set forth in EO S-3-05. The update highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluates how to align the State's longer-term GHG reduction strategies with other State policy priorities, such as for water, waste, natural resources, clean energy and transportation, and land use (ARB, June 2014).

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in California Environmental Quality Act (CEQA) documents. In March 2010, the California Resources Agency (Resources Agency) adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts.

ARB Resolution 07-54 establishes 25,000 MT of GHG emissions as the threshold for identifying the largest stationary emission sources in California for purposes of requiring the annual reporting of emissions. This threshold is just over 0.005 percent of California's total inventory of GHG emissions for 2004.

Senate Bill (SB) 375, signed in August 2008, enhances the state's ability to reach AB 32 goals by directing ARB to develop regional GHG emission reduction targets to be achieved from vehicles for 2020 and 2035. In addition, SB 375 directs each of the state's 18 major Metropolitan Planning Organizations (MPO) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). On September 23, 2010, ARB adopted final regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035.

The Southern California Association of Governments (SCAG) was assigned targets of an 8% reduction in GHGs from transportation sources by 2020 and a 13% reduction in GHGs from transportation sources by 2035. In the SCAG region, SB 375 also provides the option for the coordinated development of subregional plans by the subregional councils of governments and the county transportation commissions to meet SB 375 requirements.



In April 2011, Governor Brown signed SB 2X requiring California to generate 33 percent of its electricity from renewable energy by 2020.

For more information on the Senate and Assembly Bills, Executive Orders, and reports discussed above, and to view reports and research referenced above, please refer to the following websites: [www.climatechange.ca.gov](http://www.climatechange.ca.gov) and [www.arb.ca.gov/cc/cc.htm](http://www.arb.ca.gov/cc/cc.htm).

**California Environmental Quality Act.** Pursuant to the requirements of SB 97, the Resources Agency has adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. As noted previously, the adopted CEQA Guidelines provide general regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts. To date, the Bay Area Air Quality Management District (BAAQMD), the South Coast Air Quality Management District (SCAQMD), the San Luis Obispo Air Pollution Control District (SLOAPCD), and the San Joaquin Air Pollution Control District (SJVAPCD) have adopted quantitative significance thresholds for GHGs. On March 5, 2012 the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds contained in the BAAQMD's 2010 Updated CEQA Guidelines. The BAAQMD was ordered to set aside the thresholds and is no longer recommending that these thresholds be used as a general measure of a project's significant air quality impacts. In August 2013, the First District Court of Appeal overturned the trial court and held that the thresholds of significance adopted by the BAAQMD were not subject to CEQA review. The California Supreme Court has agreed to hear an appeal of this case. The case is currently being briefed and the matter is still pending. Thus, BAAQMD will not issue a further recommendation until this litigation is complete.

**Local Regulations and CEQA Requirements.** Pursuant to the requirements of SB 97, the Resources Agency has adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted CEQA Guidelines provide general regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, but contain no suggested thresholds of significance for GHG emissions. Instead, they give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts. The general approach to developing a Threshold of Significance for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions needed to move the state towards climate stabilization. If a project would generate GHG emissions above the threshold level, its contribution to cumulative impacts would be considered significant. To date, the BAAQMD, the SCAQMD, and the SJVAPCD have adopted quantitative significance thresholds for GHGs. The SCAQMD threshold, which was adopted in December 2008, considers emissions of over 10,000 metric tons CO<sub>2</sub>e/year to be significant. However, the SCAQMD's threshold applies only to stationary sources and is expressly intended to apply only when the SCAQMD is the CEQA lead agency. Although not yet adopted, the SCAQMD recommends a quantitative threshold for all land use types of 3,000 metric tons CO<sub>2</sub>e/year (SCAQMD, "Proposed Tier 3 Quantitative Thresholds - Option 1", September 2010). No air district has the power to establish definitive



thresholds that will completely relieve a lead agency of the obligation to determine significance on a case-by-case basis for a specific project.

## **CLIMATE CHANGE IMPACT ANALYSIS**

Pursuant to the requirements of SB 97, the Resources Agency adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions in March 2010. These guidelines are used in evaluating the cumulative significance of GHG emissions from the proposed project. According to the adopted CEQA Guidelines, impacts related to GHG emissions from the proposed project would be significant if the project would:

- *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and/or*
- *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.*

The vast majority of individual projects do not generate sufficient GHG emissions to create a project-specific impact through a direct influence to climate change; therefore, the issue of climate change typically involves an analysis of whether a project's contribution towards an impact is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (CEQA Guidelines, Section 15355).

For future projects, the significance of GHG emissions may be evaluated based on locally adopted quantitative thresholds, or consistency with a regional GHG reduction plan (such as a Climate Action Plan). However, because the SCAQMD has not yet adopted GHG emissions thresholds that apply to land use projects where the SCAQMD is not the lead agency and no GHG emissions reduction plan or GHG emissions thresholds have been adopted in the City of Malibu, the proposed project is evaluated based on the SCAQMD's recommended/preferred option threshold for all land use types – including retail – of 3,000 metric tons CO<sub>2</sub>e per year (SCAQMD, "Proposed Tier 3 Quantitative Thresholds – Option 1", September 2010).

The proposed project would have a significant impact related to GHG emissions if the project would generate more than 3,000 metric tons of CO<sub>2</sub>e per year. In addition, in order to determine whether or not the proposed project's GHG emissions are "cumulatively considerable," an inconsistency with applicable GHG emissions reductions strategies would be a significant impact under the second significance checklist item discussed above.

### **Methodology**

Calculations of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions are provided to identify the magnitude of potential project effects. The analysis focuses on CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O because these make up 98.9% of all GHG emissions by volume (IPCC, 2007) and are the GHG emissions that the project would emit in the largest quantities. Fluorinated gases, such as HFCs, PFCs, and SF<sub>6</sub>, were also considered for the analysis. However, emissions of fluorinated gases are primarily associated with industrial processes; because the project involves the development of religious memorial site, the



quantity of fluorinated gases would be minimal. Emissions of all GHGs are converted into their equivalent weight in CO<sub>2</sub> (CO<sub>2</sub>e). Minimal amounts of other main GHGs (such as chlorofluorocarbons [CFCs]) would be emitted, and these other GHG emissions would not substantially add to the calculated CO<sub>2</sub>e amounts. Calculations are based on the methodologies discussed in the California Air Pollution Control Officers Association (CAPCOA) *CEQA and Climate Change* white paper (January 2008) and included the use of the California Climate Action Registry (CCAR) General Reporting Protocol (January 2009).

This analysis calculates GHG emissions by quantifying the project's amenities and design features and also takes into account current state and federal measures that are intended to reduce GHG emissions. State and federal measures that are built into the emissions model calculation include Title 24 Energy Standards, Pavley (Clean Car Standards) and Low Carbon Fuel Standards.

**Construction Emissions.** Although construction activity is addressed in this analysis, CAPCOA does not discuss whether any of the suggested threshold approaches (as discussed below in *GHG Cumulative Significance*) adequately address impacts from temporary construction activity. As stated in the *CEQA and Climate Change* white paper, "more study is needed to make this assessment or to develop separate thresholds for construction activity" (CAPCOA, 2008). Nevertheless, the SCAQMD has recommended amortizing construction-related emissions over a 30-year period in conjunction with the proposed project's operational emissions.

Construction of the proposed project would generate GHG emissions, primarily due to the operation of construction equipment and truck trips. Project construction was estimated to be completed within 15 months. For this analysis, it was assumed that construction would commence in January 2017 and would be completed in March of 2018. Emissions associated with the construction period were estimated using the California Emissions Estimator Model (CalEEMod) software, based on the projected maximum amount of equipment that would be used on-site at one time. Complete CalEEMod results and assumptions can be viewed in the Appendix.

**On-site Operational Emissions.** Operational emissions from energy use (electricity and natural gas use) for the proposed project were estimated using CalEEMod (see Appendix for CalEEMod output). The default values on which CalEEMod are based include the California Energy Commission (CEC) sponsored California Commercial End Use Survey (CEUS) and Residential Appliance Saturation Survey (RASS) studies. CalEEMod provides operational emissions of CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub>. This methodology is considered reasonable and reliable for use, as it has been subjected to peer review by numerous public and private stakeholders, and in particular by the CEC. It is also recommended by CAPCOA (January 2008).

Emissions associated with area sources, including consumer products, landscape maintenance, and architectural coating were calculated in CalEEMod and utilize standard emission rates from CARB, USEPA, and district supplied emission factor values (CalEEMod User Guide, 2011).

Emissions from waste generation were also calculated in CalEEMod and are based on the IPCC's methods for quantifying GHG emissions from solid waste using the degradable organic content of waste (CalEEMod User Guide, 2011). Waste disposal rates by land use and overall composition of



municipal solid waste in California was primarily based on data provided by the California Department of Resources Recycling and Recovery (CalRecycle).

Emissions from water and wastewater usage calculated in CalEEMod were based on the default electricity intensity from the CEC's 2006 Refining Estimates of Water-Related Energy Use in California using the average values for Northern and Southern California.

**Direct Emissions from Mobile Combustion.** Emissions of CO<sub>2</sub> and CH<sub>4</sub> from transportation sources for the proposed project were quantified using CalEEMod. Because CalEEMod does not calculate N<sub>2</sub>O emissions from mobile sources, N<sub>2</sub>O emissions were quantified using the California Climate Action Registry General Reporting Protocol (January 2009) direct emissions factors for mobile combustion (see Appendix for calculations). The estimate of total daily trips, associated with development of the proposed project, was based on the Institute of Traffic Engineers, Trip Generation manual, 9<sup>th</sup> Edition. Total vehicle trips generated by the project were then calculated and extrapolated to derive total annual mileage in CalEEMod. Emission rates for N<sub>2</sub>O emissions were based on the vehicle mix output generated by CalEEMod and the emission factors found in the California Climate Action Registry General Reporting Protocol.

## Estimate of GHG Emissions

**Construction Emissions.** Construction activity is assumed to occur over a period of approximately 15 months. Based on CalEEMod results, construction activity for the project would generate an estimated 596 metric tons of CO<sub>2</sub>e (as shown in Table 1). Amortized over a 30-year period (the assumed life of the project), construction of the proposed project would generate approximately 20 metric tons of CO<sub>2</sub>e per year.

**Table 1**  
**Estimated Construction Emissions of Greenhouse Gases**

	<b>Annual Emissions (CO<sub>2</sub>e)</b>
<b>Total</b>	<b>595.6 metric tons</b>
<b>Amortized over 30 years</b>	<b>19.9 metric tons per year</b>

*Sources: See Appendix for CalEEMod output and for GHG emission factor assumptions.*

## Operational Indirect and Stationary Direct Emissions.

Energy Use. Operation of on-site development would consume both electricity and natural gas (see Appendix for CalEEMod output). The generation of electricity through combustion of fossil fuels typically yields CO<sub>2</sub>, and to a smaller extent, N<sub>2</sub>O and CH<sub>4</sub>. As discussed above, annual electricity and natural gas emissions can be calculated using default values from the CEC sponsored CEUS and RASS studies which are built into CalEEMod.

Electricity consumption associated with the project would generate approximately 418 metric tons of CO<sub>2</sub>e per year. As shown in Table 2, natural gas use would generate approximately 262



metric tons of CO<sub>2</sub>e per year. Thus, overall energy use at the project site would generate approximately 680 metric tons of CO<sub>2</sub>e per year.

**Table 2**  
**Estimated Annual Energy-Related Greenhouse Gas Emissions**

<b>Emission Source</b>	<b>Annual Emissions (CO<sub>2</sub>e)</b>
Electricity	418.3 metric tons
Natural Gas	262.0 metric tons
<b>Total</b>	<b>680.3 metric tons</b>

*Sources: See Appendix for CalEEMod output and for GHG emission factor assumptions.*

Solid Waste Emissions. For solid waste generated on-site, it was assumed that the project would include a recycling program that would achieve the 50% diversion rate required by the California Integrated Waste Management Act of 1989 and reinforced by the objectives of the Conservation Element of the City’s General Plan. The project is estimated to dispose of 123 metric tons of solid waste in landfills after diversion. As shown in Table 3, based on this estimate, the project would result in approximately 56 metric tons of CO<sub>2</sub>e per year.

**Table 3**  
**Estimated Annual Solid Waste Greenhouse Gas Emissions**

	<b>Annual Emissions (CO<sub>2</sub>e)</b>
Waste	<b>56.0 metric tons</b>

*Source: See Appendix for CalEEMod output and GHG emission factor assumptions.*

*<sup>1</sup>Based on a 50% diversion rate, as required by the California Integrated Waste Management Act.*

Water Use Emissions. It is anticipated that the project would use approximately six million gallons of water per year. Based on the amount of electricity generated in order to supply this amount of water, as shown in Table 4, the project would generate approximately 30 metric tons of CO<sub>2</sub>e per year.

**Table 4**  
**Estimated Greenhouse Gas Emissions from Water Use**

<b>Emission Source</b>	<b>Annual Emissions (CO<sub>2</sub>e)</b>
Water Use	<b>30.4 metric tons</b>

*Source: See Appendix for CalEEMod output and GHG emission factor assumptions.*

Transportation Emissions. Mobile source GHG emissions were estimated using the average daily trips derived from the trip generation rates for a cemetery from the Institute of





Traffic Engineers, Trip Generation manual 9<sup>th</sup> Edition, and by the total VMT estimated in CalEEMod. On-site development would generate approximately 4,217,643 annual VMT.

Table 5 shows the estimated mobile emissions of GHGs for the project based on the estimated annual VMT. As noted above, CalEEMod does not calculate N<sub>2</sub>O emissions related to mobile sources. As such, N<sub>2</sub>O emissions were calculated based on the project's VMT using calculation methods provided by the California Climate Action Registry General Reporting Protocol (January 2009). As shown in Table 5, the project would generate approximately 1,865 metric tons of CO<sub>2</sub>e associated with mobile emissions.

**Table 5**  
**Estimated Annual Mobile Emissions of Greenhouse Gases**

Emission Source	Annual Emissions (CO <sub>2</sub> e)
Mobile Emissions (CO <sub>2</sub> & CH <sub>4</sub> ) <sup>1</sup>	1,772.8 metric tons
Mobile Emissions (N <sub>2</sub> O)	92.1 metric tons
<b>Total</b>	<b>1,864.9 metric tons</b>

Sources: See Appendix for CalEEMod output and GHG emission factor assumptions.

<sup>1</sup> California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009, page 30-35.

Combined Construction, Stationary and Mobile Source Emissions. Table 6 combines the construction, operational and mobile GHG emissions associated with on-site development for the proposed project. As discussed above, construction emissions associated with construction activity (approximately 596 metric tons CO<sub>2</sub>e) are amortized over 30 years (the anticipated life of the project).

**Table 6**  
**Combined Annual Emissions of Greenhouse Gases**

Emission Source	Annual Emissions
<b>Construction</b>	19.9 metric tons CO <sub>2</sub> e
<b>Operational</b>	
Energy	680.3 metric tons CO <sub>2</sub> e
Area Sources	<0.1 metric tons CO <sub>2</sub> e
Solid Waste	56.0 metric tons CO <sub>2</sub> e
Water	30.4 metric tons CO <sub>2</sub> e
<b>Mobile</b>	1,864.9 metric tons CO <sub>2</sub> e
<b>Total</b>	<b>2,651.5 metric tons CO<sub>2</sub>e</b>

Sources: See Appendix for CalEEMod output and for GHG emission factor assumptions.



For the proposed project, the combined annual emissions would total approximately 2,652 metric tons of CO<sub>2</sub>e per year. This total represents less than 0.0006% of California's total 2008 emissions of 478 million metric tons. This is below the threshold of 3,000 metric tons of CO<sub>2</sub>e

**GHG Cumulative Significance.** CalEPA's Climate Action Team (CAT) published the 2006 CAT Report which includes GHG emissions reduction strategies intended for projects emitting less than 10,000 tons CO<sub>2</sub>e/year. In addition, the California Attorney General's Office has developed Global Warming Measures (2008) and OPR's CEQA and Climate Change (CAPCOA, 2008) document includes GHG reduction measures intended to reduce GHG emissions in order to achieve statewide emissions reduction goals. All of these measures aim to curb the GHG emissions through suggestions pertaining to land use, transportation, renewable energy, and energy efficiency. Several of these actions are already required by California regulations, such as:

- AB 1493 (Pavley) requires the state to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of climate change emissions emitted by passenger vehicles and light duty trucks.
- In 2004, ARB adopted a measure to limit diesel-fueled commercial motor vehicle idling.
- The Integrated Waste Management Act of 1989, (AB 939, Sher, Chapter 1095, Statutes of 1989) established a 50% waste diversion mandate for California.
- Public Resources Code 25402 authorizes the CEC to adopt and periodically update its building energy efficiency standards (that apply to newly constructed buildings and additions to and alterations to existing buildings).
- California's Renewable Portfolio Standard (RPS), established in 2002, requires that all load serving entities achieve a goal of 33 percent of retail electricity sales from renewable energy sources by 2020, within certain cost constraints.
- Green Building Executive Order, S-20-04 (CA 2004), sets a goal of reducing energy use in public and private buildings by 20 percent by the year 2015, as compared with 2003 levels.

The proposed project does not include any elements that would conflict with state or local regulations intended to reduce GHG emissions from new development. Consistency with these state regulations and goals illustrates that the project would not conflict with the state's GHG-related legislation and would not contribute to the inability to meet reduction goals. The project would not conflict with any of these statewide emissions reduction strategies. In addition, the proposed project not conflict with applicable City General Plan policies that support energy efficiency and sustainability, including policies related to outdoor lighting, electric landscaping equipment, and solid waste/wastewater. Therefore, the project would not conflict with any applicable state plan, policy or regulation intended to reduce GHG emissions, and impacts would be less than significant.



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