5.6 Greenhouse Gas Emissions

This section analyzes the potential air quality impacts related to greenhouse gas (GHG) emissions associated with the Proposed Project in terms of short-term (construction) impacts and long-term (operational) impacts. The existing setting has been detailed in Section 5.2, Air Quality, and is summarized in this section. Information in this section is based on the "Air Quality and Greenhouse Gas Emissions Impact Analysis" (Air Quality Analysis) prepared by Giroux & Associates (Giroux) dated July 2013. The complete Air Quality Analysis, including appendices, is included herein as Appendix C.

5.6.1 Existing Setting

1. Climate

The Project Site is located in the South Coast Air Basin (SCAB). The Basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean and high mountains. The climate in the SCAB is determined by its terrain and geographical location and is dominated by the strength and position of the semi-permanent high pressure center over the Pacific Ocean near Hawaii.

Acronyms used in this section:

AAQS	Ambient Air Quality Standards
AQMD	Air Quality management District
AQMP	Air Quality Management Plan
BAU	business as usual
CAAA	Clean Air Act Amendments
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CO	carbon monoxide
EPA	Environmental Protection Agency
GHG	greenhouse gas
NO_x	nitrogen oxides
RCM	reasonable control measure
ROG	reactive organic gases
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District

a. Temperature

The average temperature varies little throughout the SCAB, averaging 62°F. High temperatures in the Project Area average 75°F during the summer and 65.5°F during the winter. Low temperatures average 62.2°F during summer nights and 48.6°F during winter nights.

b. Winds

Winds in the vicinity display several characteristics. Summer daytime winds are generally from the south in the morning and the west in the afternoon. The warm air during spring and early summer lifts most of the pollution produced on an average day and moves it through the mountain passes. Late summer and winter months see a less pronounced flushing effect due to the lower

wind speeds and early off-shore winds. Pollutants are trapped in the valleys of the region due to this stagnation.

Adequate daytime ventilation speed typically does not allow for stagnation of air pollutants in the Project Area. Moderate onshore breezes carry locally generated emissions eastward toward Chino Hills or across northern Orange County and up Santa Ana or Carbon Canyons towards western San Bernardino and Riverside counties. Daytime air quality problems occur when winds shift into the northwest and the sea breeze is replaced by airflow across substantial pollution generation areas of southwestern Los Angeles County. Occasional unhealthful smog levels near the Project Site during the summer and early fall are the result of slower nighttime winds drifting seaward across the air basin, allowing for stagnation of pollution. However, during the night the density of vehicular sources in the upwind area is generally low enough to minimize any major air pollution problems. The Air Quality Analysis determined that air pollution episodes, if any, are due mainly to pollutants transported into the area rather than any locally generated emissions.

c. Temperature Inversions

Temperature inversions result when the daytime onshore flow of marine air is capped by a dome of warm air that acts like a lid over the basin. As the ocean air moves inland, pollutants are continually added from below without any dilution from above. This layer slows down in inland valleys and undergoes photochemical transformations due to sunlight, creating unhealthful levels of smog (ozone). Ozone typically occurs in high concentrations in late spring, summer, and early fall when light winds, low mixing height, and increased sunlight combine, resulting in ozone production. Smog effects are less significant when there is no inversion layer or when winds average 15 miles per hour or greater.

Nighttime inversions, especially during the winter, form as cool air pools in low elevations while the upper air remains warm. Shallow radiation inversions are formed that trap pollutants near intensive traffic sources such as freeways, forming localized effects called “hot spots.”

Pollutants generated by stationary and mobile sources mix with less contaminated air beneath the inversion layer and will become more concentrated unless the inversion breaks down. When strong inversions are formed on cool winter nights, carbon monoxide (CO) generated by automobile exhaust becomes concentrated. Generally, the highest levels of CO are produced during the months of November through February.

2. Baseline Air Quality

The SCAQMD Anaheim monitoring station, which is the nearest station to the Proposed Project, was used to determine existing and probable future levels of air quality in the Project Area. The station measures regional pollution levels (smog) and primary vehicular pollution levels near busy roadways (carbon monoxide, nitrogen oxides). Pollutants such as PM_{10} and $PM_{2.5}$ are also monitored. A six-year air quality monitoring summary (2006-2011) is found in Table 5-6-1 below. The Project Site is vacant land that currently contributes minimally to impacts from greenhouse gas emissions. The Air Quality Analysis provides the following conclusions regarding air quality/greenhouse gas emissions trends based on the table.

- Photochemical smog (ozone) levels occasionally exceed standards. The 1 hour state standard and the 8-hour state and federal ozone standard have been exceeded an average of 1% of all days in the past six years. Years 2009, 2010 and 2011 demonstrate progressively improved ozone levels in the area. While ozone levels are still high, they are much lower than 10 to 20 years ago.
- Respirable dust (PM_{10}) levels occasionally exceed the state standard on approximately 6% of measured days. As with ozone, the frequency of violations has noticeably decreased in 2009-2011. The less stringent federal PM_{10} standard was violated once in 2007 during a wildfire event.
- The federal ultra-fine particulate ($PM_{2.5}$) standard of 35 $\mu g/m^3$ has been exceeded about 2% of measurement days in the last six years. Similarly, 2009-2011 have been the "cleanest" years on record.
- More localized pollutants such as carbon monoxide, nitrogen oxides, etc. are very low near the Project Site. These pollutants can be naturally dispersed to reduce localized vehicular air pollutants such as NO_X or CO without any threat of violating applicable AAQS.

While complete attainment of every standard is not imminent, the steady improvement trend suggests that such attainment could occur within the reasonably near future.

Table 5-6-1 Air Quality Monitoring Summary (2006-2011)

Pollutant/Standard	Number of Days Standards Were Exceeded and Maximum Levels During Such Violations (Entries shown as ratios = samples exceeding standard/samples taken)					
	2006	2007	2008	2009	2010	2011
Ozone						
1-Hour > 0.09 ppm (S)	6	2	2	0	1	0
8-Hour > 0.07 ppm (S)	5	7	10	2	1	1
8- Hour > 0.075 ppm (F)	3	1	5	1	1	0
Max. 1-Hour Conc. (ppm)	0.113	0.127	0.105	0.093	0.104	0.088
Max. 8-Hour Conc. (ppm)	0.089	0.100	0.086	0.077	0.088	0.072
Carbon Monoxide						
1-hour > 20. ppm (S)	0	0	0	0	0	0
8- Hour > 9. ppm (S,F)	0	0	0	0	0	0
Max 1-hour concentration (ppm)	4.5	3.6	4.1	3.2	3.0	2.7
Max 8-hour concentration (ppm)	2.9	2.9	3.4	2.7	2.0	2.1
Nitrogen Dioxide						
1-Hour > 0.18 ppm (S)	0	0	0	0	0	0
Max. 1-Hour concentration (ppm)	0.114	0.086	0.093	0.068	0.073	0.074
Inhalable Particulates (PM_{10})						
24-hour > 50 μg/m3 (S)	7/55	6/59	3/58	1/56	0/57	2/57
24-hour > 150 μg/m3 (F)	0/55	1/59	0/58	0/56	0/57	0/57
Max. 24-Hr. concentration (μg/m3)	103.	488.*	61.	62.	43.	53.
Ultra-Fine Particulates ($PM_{2.5}$)						
24-Hour > 35 μg/m3 (F)	7/314	14/336	5/304	4/334	0/331	2/365
Max. 24-Hr. concentration (μg/m3)	56.2	79.4	67.8	64.5	31.7	39.2

*wildfire event
S=State standard
F=Federal standard
Source: South Coast Air Quality Management District, Anaheim Station (3176)

5.6.2 Regulatory Setting

The SCAQMD and the California Air Resources Board (CARB) are the principal agencies charged with managing air quality within the SCAB. The SCAQMD establishes and enforces regulations for stationary (non-mobile) sources of air pollution within the SCAB. The CARB is responsible for controlling motor vehicle emissions, establishing legal emissions rates for new vehicles, and the vehicle inspection program. In addition to the current regulatory status relating to GHG emissions, this section provides a brief summary of the regulatory setting for other principal pollutants. Detailed discussion of these pollutants is found in Section 5.2, Air Quality (beginning on page 5-65).

1. Greenhouse Gas Emissions (GHG)

Greenhouse gases (GHG) are so called because of their role in trapping heat near the surface of the earth. GHG are created by human activities and are implicated in global climate change, commonly referred to as global warming. The principal GHGs are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. Title 14, Chapter 3,

§15364.5 of the *California Code of Regulations* defines GHGs to include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of GHG emissions, accounting for approximately half of GHG emissions globally. Industrial and commercial sources are the second largest contributors of GHG emissions at about one-fourth of total emissions.

State of California Assembly Bill 32 (AB 32) (Division 25.5 of the *Health and Safety Code*, §38500, et seq.), known as the Global Warming Solutions Act, was passed in August 2006. AB 32 requires that levels of GHG be reduced to 1990 levels by the year 2020. Senate Bill 97 (SB 97) requires that the Governor's Office of Planning and Research develop guidelines for CEQA compliance related to GHG emissions, including mitigation measures for the reduction of GHG.

AB 32 is the state bill requiring that levels of GHG be reduced to 1990 levels by the year 2020 and is one of the most significant pieces of environmental legislation that California has adopted. The bill will have wide-ranging effects on California businesses and lifestyles as well as far reaching effects on other states and countries. A unique aspect of AB 32, beyond its broad and wide-ranging mandatory provisions and dramatic GHG reductions are the short timeframes within which is must be implemented. Major components include:

- Require the monitoring and reporting of GHG emissions beginning with sources or categories of sources that contribute the most to statewide emissions.
- Requires immediate "early action" control programs on the most readily controlled GHG sources.
- Mandates that by 2020, California's GHG emissions be reduced to 1990 levels.
- Forces an overall reduction of GHG gases in California by 25-40% from business as usual, to be achieved by 2020.
- Must complement efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminants.

Section 15064.4 of CEQA provides that emissions identification may be quantitative, qualitative or based on performance standards. CEQA guidelines allow the selection of the model or methodology the lead agency considers most appropriate. Use of a computer model such as CalEEMod is the most common practice for emissions quantification to determine the significance of the emissions. The threshold of significance must take into consideration what level of GHG emissions would be cumulatively considerable. The guidelines are clear that they do not support a zero net emissions threshold. A lead agency may rely on thresholds adopted by an agency with greater expertise if it does not have sufficient expertise in evaluating the impacts.

California has passed several bills and the Governor has signed at least three executive orders regarding GHG. GHG statutes and executive orders (EO) include AB 32,

SB 1368 (Chapter 596, Statutes of 2000), EO S-03-05, EO S-20-06 and EO S-01-07. Statewide, the framework for developing the implementing regulations for AB 32 is under way. Maximum GHG reductions are expected to derive from increased vehicle fuel efficiency, from greater use of renewable energy and increased structural energy efficiency. Additionally, through the California Climate Action Reserve, general and industry-specific protocols for assessing and reporting GHG emissions have been developed. The California Climate Action Reserve is a program of the Climate Action Reserve committed to solving climate change through emissions and accounting and reduction. GHG sources are categorized into direct sources (i.e. company owned) and indirect sources (i.e., not company owned). Direct sources include combustion emissions from on- and off-road mobile sources and fugitive emissions. Fugitive emissions are defined as gases or vapors emitted from pressurized equipment due to leaks and other unintended or irregular releases of gases, generally from industrial activities. Indirect sources include off-site electricity generation and non-company owned mobile sources.

2. Ambient Air Quality Standards (AAQS)

To gauge the significance of the air quality impacts of the Proposed Project, those impacts, together with existing background air quality levels, must be compared to the applicable ambient air quality standards. These standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare of those people most susceptible to further respiratory distress. This group, called "sensitive receptors," includes asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. National Ambient Air Quality Standards (AAQS) were established in 1971 for six pollution species with states retaining the option to add other pollutants, require more stringent compliance, or include different exposure periods. The federal Clean Air Act Amendments of 1990 required that the EPA review all national AAQS in light of known health effects. The EPA was charged with modifying existing standards or promulgating new standards where appropriate. EPA subsequently developed standards for chronic ozone exposure (8+ hours per day) and for very-small-diameter particulate matter ($PM_{2.5}$). New national AAQS were adopted on July 17, 1997.

Because the State of California had established AAQS several years before the federal action, and because of unique air quality problems introduced by the restrictive dispersion meteorology, there is a considerable difference between state and national clean air standards. Table 5-2-2, Health Effects of Major Criteria Pollutants (page 5-70) describes the health effects of the major criteria pollutants and lists sources and primary effects for each.

3. Federal Clean Air Act Amendments

The Federal Clean Air Act Amendments (CAAA) of 1990 required that the EPA review all national AAQS in light of currently known health effects, including modifying existing standards or promulgating new standards where appropriate. EPA subsequently developed standards for chronic ozone exposure (8+ hours per day) and for very small diameter particulate matter ($PM_{2.5}$). New national AAQS were adopted in 1997 for these pollutants. Additional details regarding the CAAA can be found in Section 5.2, Air Quality (beginning on page 5-65).

In response to continuing evidence that ozone exposure at levels just meeting federal clean air standards is demonstrably unhealthful, EPA proposed a further strengthening of the 8-hour standard. Draft standards were published in 2010 with an 8-hour standard of 0.065 ppm. Environmental organizations generally approved of the proposal; however, most manufacturing, transportation, or power generation groups opposed the new standard as economically unwise in an uncertain fiscal climate. In recognition of the fact that a stronger ozone standard could adversely impact employment, the draft proposal was placed on indefinite hold. EPA did propose and adopt a revised annual $PM_{2.5}$ standard that may require a revision to the basin-wide fine particulate attainment plan. The Clean Air Act defines "non-attainment as a locality where air pollution levels persistently exceed national AAQS.

4. California Air Resources Board

In 2005, CARB extensively evaluated health effects of ozone exposure and adopted a new state standard for an 8-hour ozone exposure which aligned with the federal 8-hour standard. The state 8-hour standard of 0.07 parts per million (ppm) is more stringent than the federal standards of 0.075 ppm. As with the $PM_{2.5}$ standard, there is no specific attainment deadline. State jurisdictions are required to make progress towards attaining state standards, but there are no consequences of non-attainment. At the same time, CARB adopted an annual state standard for nitrogen dioxide (NO_2) which is more stringent than the federal standard.

A new federal one-hour standard for NO_2 was adopted in 2010 that is more stringent than the existing state standard. Based on air quality monitoring data in the SCAB, the CARB has requested the EPA to designate the basin as "in attainment" for this standard. The federal standard for sulfur dioxide (SO_2) was also recently revised. However, with minimal combustion of coal and mandatory use of low sulfur fuels in California, SO_2 is typically not a problem pollutant.

5. Air Quality Management Plan

The federal Clean Air Act Amendments of 1977 required that designated agencies in any area of the nation not meeting national clean air standards must prepare a plan demonstrating the steps that would bring the area into compliance. The SCAB was unable to meet deadlines for ozone, nitrogen dioxide, carbon monoxide, or PM_{10}. The agencies designated by the Governor to develop regional air quality plans within the

SCAB are the SCAQMD and the Southern California Association of Governments (SCAG). The first Air Quality Management Plan (Plan) was adopted by these agencies in 1979. However, attainment forecasts were overly optimistic and the Plan was revised several times.

The Federal Clean Air Act Amendments of 1990 required that all states with air-sheds with "serious" or worse ozone problems submit a revision to the State Implementation Plan (SIP). Over the past decade, revisions and amendments to the SIP have been approved. The most current attainment emissions forecast for ozone precursors – i.e., reactive organic gases (ROG) and nitrogen oxides (NO_X) and for carbon monoxide (CO) and particulate matter are shown in Table 5-6-2 below. Substantial reductions of ROG, NO_X and CO are forecast to continue throughout the next several decades. PM_{10} and $PM_{2.5}$ are forecast to slightly increase unless new particulate control programs are implemented.

Table 5-6-2 South Coast Air Basin Emissions Forecasts

	Emissions in Tons per Day			
Pollutant	**2008 [a]**	**2010 [b]**	**2015 [b]**	**2020 [b]**
NO_X	917	836	667	561
ROG	632	596	545	525
CO	3,344	3,039	2,556	2,281
PM_{10}	308	314	328	340
$PM_{2.5}$	110	110	111	113

[a] 2008 base year
[b] With current emissions reduction programs and adopted growth forecasts.
Source: California Air Resources Board, California Emissions Projection Analysis Model, 2009

In 2003, the AQMD adopted an updated AQMP, which was approved by the EPA in 2004. The AQMP outlined the air pollution measures needed to meet federal health-based standards for ozone by 2010 and for particulates by 2006. The AQMP was based on the federal one-hour ozone standard, which was revoked late in 2005 and replaced by an 8-hour federal standard, which action initiated a new air quality planning cycle.

Re-designation of the air basin as non-attainment for the 8-hour ozone standards resulted in a new attainment plan being developed. The plan shifted most of the one-hour ozone standard attainment strategies to the 8-hour standard. The attainment date was changed from 2010 to 2021.

Because projected attainment by 2021 requires control technologies that do not yet exist, the SCAQMD requested a voluntary "bump-up" from a "severe non-attainment" area to an "extreme non-attainment" designation for ozone, allowing a longer time for the technologies to develop. Without attainment, EPA would have been required to impose sanctions on the region if the bump-up had not been approved. In April 2010, EPA approved the change in designation to "extreme," thus setting a later attainment deadline. This reclassification also requires the air basin to adopt even more stringent emissions controls.

5.6.3 Thresholds of Significance

The California Resources Agency developed guidelines for the treatment of GHG emissions under CEQA in response to requirements of SB 97. The new guidelines became state laws under Title 14 of the *California Code of Regulations* in March 2010. The CEQA Appendix G Guidelines for air quality state that a project would have a potentially significant impact if it:

a) Generates GHG emissions, directly or indirectly, that may have a significant impact on the environment, or,

b) Conflicts with an applicable plan, policy or regulation adopted to reduce GHG emissions.

California Code of Regulations §15064.4 specifies how significance of GHG emissions is to be evaluated, even though guidelines have not been adopted. The process is broken down into quantification of project-related GHG emissions, making a determination of significance and specification of any appropriate mitigation if impacts are found to be potentially significant. The lead agency is afforded substantial flexibility at each of these steps.

On December 5, 2008, the SCAQMD governing board adopted an Interim Quantitative GHG Significance Threshold for industrial projects where the SCAQMD is the lead agency (e.g., stationary source permit projects, rules, plans) of 10,000 metric tons (MT) CO_2 equivalent/year. In September 2010, the Working Group released revisions which recommended a threshold of 3,500 MT CO_{2e} for residential projects. This 3,500 MT per year recommendation was used as a guideline for the Proposed Project Air Quality Analysis. However, because the recommendations included a threshold of 3,000 MT CO_2 for mixed use projects, the more restrictive threshold is used here. Some jurisdictions have adopted a numerical annual GHG emissions level as a CEQA threshold of significance. Others, such as the County of Orange, have taken the numerical threshold to be an indicator level that signals a requirement for incorporating reasonable and feasible enhanced "green" building practices without formal adoption of an absolute significance standard.

As detailed in Section 5.2, Air Quality (beginning on page 5-65), air quality impacts can be categorized as primary or secondary. Primary pollutant impacts can generally be evaluated directly in comparison to appropriate clean air standards. Violations of these standards where they are currently met, or a measurable worsening of an existing or future violation, would be considered a significant impact.

Secondary pollutants, by comparison, require time to transform from a more benign form to a more unhealthful contaminant. The impact occurs regionally far from the source. Analysis of significance of such emissions is based on a specified amount of emissions (e.g., pounds, tons) even though there is no way to translate those emissions directly into a corresponding ambient air quality impact.

The SCAQMD has established significance thresholds based on Section 182(e) of the federal Clean Air Act that identify levels of volatile organic compounds from stationary sources operating in extreme non-attainment regions for ozone at 10 tons per year. These established values were converted into threshold levels of pounds per day for the construction and operational phases of a project. The SCAQMD states that any project located in the SCAB having daily emissions from direct and indirect sources that exceed the emissions thresholds should be considered significant.

Table 5-6-3 below depicts threshold levels for direct construction emissions and indirect operations emissions. Impacts related to these pollutants are further discussed in Section 5.2, Air Quality (beginning on page 5-65).

Table 5-6-3 Daily Emissions Thresholds

Pollutant	Construction	Operations
ROG	75	55
NO_X	100	55
CO	550	550
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150
Lead	3	3

Source: SCAQMD CEQA Air Quality Handbook, November, 1993 Rev.

Sensitive Receptors

The Air Quality Analysis combined the existing background air quality levels and potential impacts from the Proposed Project and then compared the results to the applicable air quality standards. These standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare, particularly for those people most susceptible to further respiratory distress. These population groups include asthmatics, the elderly, very young children, people already weakened by other disease or illness and persons engaged in strenuous work or exercise and are called, collectively, sensitive receptors. Healthy adults can generally tolerate occasional exposure to air pollutant levels considerably above the minimum standards before adverse effects result. However, recent research has shown that chronic exposure to ozone (the primary ingredient in photochemical smog) may lead to adverse respiratory health even at concentrations close to the ambient standard.

A health risk assessment was prepared by Giroux Associates to determine risks to sensitive receptors from construction emissions. An analysis of this assessment is included in Section 5.2, Air Quality (beginning on page 5-65).

5.6.4 Project Impacts Prior to Mitigation

Local air quality impacts/emissions are usually divided into short-term and long-term impacts. Short-term impacts are normally the result of demolition, construction, or grading operations. Long-term impacts are associated with the built-out condition of the Proposed Project and are the result of day-to-day operation and maintenance, use of consumer products, natural gas use, and vehicle trips associated with residents, visitors, and employees.

Table 5-6-4 below shows CalEEMod's default equipment fleet with the addition of several scrapers and a grader to the grading phase to ensure an accurate and conservative analysis. Activity duration estimates were provided by the Project Applicant. CalEEMod defaults are included in the Appendix C of the Air Quality Analysis (Appendix C to this DEIR).

Table 5-6-4 CalEEMod Equipment Fleet

Clearing (120 Days)	4 Tractors/loaders/backhoes 3 Dozers
Grading (260 days)	2 Excavators 1 Dozer 2 Graders 6 Scrapers 2 Tractors/loaders/backhoes
Construction (1,000 days)	1 Crane 3 Forklifts 1 Generator set 3 Tractors/loaders/backhoes 1 Welder
Paving (120 days)	2 Pavers 2 Paving equipment 2 Rollers

Using the equipment fleet indicated above as a worst case scenario required dust mitigation measures, which have been included in the mitigation section herein. However, it is unlikely that all equipment will be in use at the same time. The mitigation measures applied to construction equipment for the "with mitigation" scenario include the best available construction management practices.

The CalEEMod construction model demonstrated the unmitigated and mitigated emissions for an assumed eight-year construction scenario. This information is further detailed in Section 5.2, Air Quality (beginning on page 5-65).

2. Construction GHG Emissions

The CalEEMod used to determine construction activity GHG emissions estimated construction emissions over a 6- to 7-year timespan. The SCAQMD GHG emissions policy is to amortize emissions over a 30-year lifetime. Table 5-6-5 below identifies the projected construction emissions for Option 1 and Option 2 alternatives, including the amortized level for both options. As shown, GHG impacts from construction are considered individually less-than-significant.

Table 5-6-5 Construction Emissions

	Metric Tons CO_2(e)	
	Option 1	**Option 2**
Year 2014	1,557.3	1,525.5
Year 2015	1,501.9	1,470.9
Year 2016	613.0	613.0
Year 2017	607.5	607.5
Year 2018	606.9	606.9
Year 2019	604.2	604.2
Year 2020	490.1	490.1
Overall Total	**6,005.2**	**5,942.4**
Amortized	**200.2**	**198.1**

*CalEEMod Output provided in appendix *[to Air Quality and Greenhouse Gas Emissions Impact Analysis dated July 12, 2013]*

3. Operational GHG Emissions

Project operational emissions were analyzed using the CalEEMod model. The GHG conversion from consumption to annual regional CO_2(e) emissions in the model output files included in Appendix C. Total operational and annualized construction emissions are depicted in Table 5-6-6 below.

Table 5-6-6 Proposed Residential Operational Emissions

Consumption Source	MT CO_2(e) tons/year
Area Sources	256.2
Energy Utilization	1,572.1
Mobile Source	4,535.7
Solid Waste Generation	201.6
Water Consumption	166.2
Annualized Construction	198.6
Total	**6,930.4**

As shown, total project GHG emissions are substantially above the proposed significance threshold of 3,000 MT and are, therefore, considered significant.

4. Consistency with GHG Plans and Policies

Consistency with GHG plans and policies is typically evaluated relative to AB 32 requirements. A reduction in statewide GHG emissions of 28.9% compared to

business-as-usual (BAU) conditions has been established as a goal of AB 32. In preparing the Air Quality Analysis for the Proposed Project, BAU conditions were conservatively presumed to continue throughout the lifetime of the project. However, a number of statewide programs are in place to achieve GHG emissions reductions that will attain a very substantial fraction of the AB 32 goal, creating a 5% shortfall. As shown in Table 5-6-7 below, SCAQMD has estimated that the adopted low carbon fuel standard, the enhanced renewable portfolio standard, and required enhanced energy efficiencies will combine to achieve 23.9% of the 28.9% goal. Assuming the remaining 5% reductions can be achieved by local initiatives, the Proposed Project would not interfere with timely implementation of AB 32.

Table 5-6-7 GHG Emissions Reductions from State Regulations

Category	Source	Percent of Category	Percent of State Total
Mobile	AB 1493	19.7%	8.9%
	LCFS-auto	7.2%	3.2%
	LCFS-medium	7.2%	0.4%
	Truck efficiency	2.9%	0.2%
	Passenger efficiency	2.8%	1.3%
Area	Res. Energy Efficiency (gas)	9.5%	1.0%
	Non-Res. Energy Efficiency (gas)	9.5%	1.0%
Indirect	RPS	21.0%	3.5%
	Energy efficiency (elec)	15.7%	4.0%
	Solar roofs	1.5%	0.2%
Total			**23.9%**

LCFS = low carbon fuel standard
RPS = renewable portfolio standard
Totals may not sum due to rounding.
Source: http://www.aqmd.gov/ceqa/handbook/GHG/2009/nov19mtg/ghgmtg14.pdf

If it can be demonstrated that more than adequate options exist to attain the local mitigation responsibility of 5%, mitigation would not be considered to be deferred even if the development plan is not yet finalized. In the absence of an adopted Orange County Climate Action Plan (CAP), reasonable and feasible mitigation measures have been evaluated to achieve the 5% reduction as an interim measure to be taken prior to any CAP adoption. Therefore, mitigation aimed at achieving a 5% reduction in GHG emissions is included herein.

The California Air Pollution Control Officers Association (CAPCOA) has developed candidate GHG reduction programs to supplement the statewide AB-32 compliance program. CAPCOA's "CEQA and Climate Change" (2010) is one of the most detailed and annotated mitigation plans outlined. This plan was applied to the preliminary Esperanza Hills GHG mitigation plan because it is so comprehensive and because it quantifies the potential measure effectiveness in great detail.

Five general categories of emissions reduction potential were evaluated, including transportation control measures, energy conservation enhancement, water supply, solid waste generation, and miscellaneous measures. Table 5-6-8 below presents a

detailed breakdown of the general measures and levels of emissions reduction potential that CAPCOA considers feasible on a project-level basis. In presenting the potential effectiveness, the CAPCOA document presents a percent range of documented results. The low end of the effectiveness range is presented. This is considered appropriate because the implementation of multiple programs simultaneously tends to result in duplicated efforts, which reduces the effectiveness of each measure. For example, while some measures may achieve a 3% to 5% capture rate independently, they may not achieve maximum efficiency when a larger array of "green" options is employed. In addition, because the Proposed Project is residential, measures applicable to commercial uses are not considered.

Table 5-6-8 Design Control Measures and Potential Effectiveness

Measures	Effectiveness
Transportation control measures	
Bus shelters for future transit	1.0%
Pedestrian access and paths though parking areas	1.0%
Voluntary Rideshare w/ Incentives	1.0%
Preferential Parking for EVs and Hybrids	1.0%
Electric vehicle charge stations	1.0%
Total (transportation)	5.0%
Energy Efficiency	
Energy Star and Cool Roofs	0.5%
On-site solar panels on flat roofs	2.0%
Exceed Title 24 requirements by 10%	3.0%
Solar orientation of buildings	0.5%
Low energy cooling	0.5%
Energy Star appliances	0.5%
"Green Building" materials	0.25%
Shading mechanisms	0.25%
High efficiency lighting systems	0.5%
Total energy conservation	8.0%
Water Supply	
Use Reclaimed Water	0.5%
Low Flow Fixtures	0.5%
Water Efficient Landscape	5.0%
Total	6.0%
Solid Waste	
Enhanced Recycling/Recovery Programs	10.0%
Reuse Cut-and-Fill	10.0%
Total	20.0%
Miscellaneous Measures	
Electric lawnmowers	
Enhanced recycling, reduction and reuse	
LEED certification	Benefits not quantified
Drought resistant landscaping	
Local farmer's markets	

Source: CAPCOA (2008), Chapter 7

Table 5-6-9 below summarizes the GHG reductions attainable with the application of reasonable control measures (RCM). Reductions will be provided through Specific Plan Development Guidelines, which include drought-tolerant landscaping and nine community parks to reduce travel to other area parks. As noted herein, the Proposed Project shall incorporate project design features to reduce operational emissions, including use of Energy Star appliances, high-efficiency lighting, low-flow fixtures, Energy Star and Cool roofs, and gas fireplaces instead of wood-burning fireplaces. The table below shows projected GHG reductions overall and for project-specific conditions.

Table 5-6-9 GHG Reductions Attainable with Implementation of Reasonable Control Measures

Category	Applies To	Overall Effectiveness [a]	Overall Percent Reduction [b]	Annual Metric Tons Reduced	Proposed Project RCMs
Transportation control	Transportation	5.0%	3.3%	227	NA
Water supply	Water use	6.0%	0.1%	10	5.5%
Solid waste	Solid waste	20.0%	0.6%	40	NA
Energy efficiency	Electric and natural gas	8.0%	1.8%	126	4.5
Miscellaneous	All	unknown	unknown	NA	NA
Total			5.8%	403	10%

[a] percentage reduction within a given source category

[b] effectiveness within a given source category times the source category share of the total burden

The Proposed Project has incorporated all design features feasible to reduce impacts. Even without reductions from the categories of transportation and solid waste, with feasible options and realistic expectations of effectiveness, mitigation levels exceeding the local goal of 5% can be demonstrated in the categories of water supply and energy efficiency. As shown in the last column of Table 5-6-9 above, the Proposed Project, with implementation of recommended RCMs, can achieve a 10% reduction in GHG emissions. Achievement of this emissions reduction goal would require the implementation of mitigation measures proposed herein, as well as incorporation of identified design features. With available options, project compliance with AB 32 goals and policies can be assured with a reasonable margin of safety.

5.6.5 Mitigation Measures

1. Short-Term Impacts (Construction)

Project-related air quality impacts were shown to be potentially significant during project grading due to off-road diesel equipment NO_X emissions. To further minimize potential impacts, during construction and grading activities the construction contractor shall ensure that standard construction practices set forth in the SCAQMD Handbook shall be implemented. In addition, Mitigation Measures AQ-1, AQ-2, and AQ-3 have been included in Section 5.2, Air Quality (beginning on page 5-65), to minimize construction impacts, including potential GHG emissions.

GHG-1 Prior to issuance of building permits for residential units, the County shall ensure that all fireplaces are gas rather than wood burning.

2. Long Term Impacts (GHG)

With incorporation of the following mitigation measure, operational emissions would be reduced; however, GHG emissions would exceed SCAQMD significance thresholds.

GHG-2 Prior to construction of project, the developer shall implement or develop a plan for implementation of one or more mitigation strategies for the reduction of greenhouse gas (GHG) emissions from the report "CEQA and Climate Change" prepared by the California Air Pollution Control Officers Association (CAPCOA) as updated in 2010. The total benefit of the mitigation strategies must result in a minimum 5% reduction in GHG emissions from the business-as-usual value. Alternative strategies not listed in the CAPCOA report may be used with approval of the Orange County Planning Director. The selected strategies, including measures for their long-term maintenance, must be described in a memo submitted to and approved by the County Planning Department prior to initial occupancy of any on-site facility.

5.6.6 Level of Significance after Mitigation

The project may eventually be annexed to the City of Yorba Linda (City). The City has requested that the County consult with it regarding sustainability initiatives planned to be incorporated as project design features to reduce GHG emissions. The County and City currently have no formally adopted climate change action plan (CAP). However, any adoption and implementation of mitigation measures for GHG impact minimization under the County CEQA responsibilities will be equally effective if the project is annexed to the City. Therefore, to achieve the required 5% reduction in GHG emissions, reasonable control measures (RCMs) are included herein as depicted in Table 5-6-9 above. Mitigation Measure GHG-2 will ensure that such RCMs are included during the construction phase to reduce GHG by combining with SCAQMD standards towards achievement of the AB-32 goal.

Implementation of the mitigation measures identified in Section 5.2.5, Mitigation Measures (Air Quality) beginning on page 5-88 above) will reduce GHG emissions to the extent feasible. As shown in Table 5-6-5, Construction Emissions (page 5-268) and Table 5-6-6, Proposed Residential Operational Emissions (page 5-268), the size of the Proposed Project is such that direct construction GHG emissions and indirect operations GHG emissions will exceed the SCAQMD screening level threshold (3,000 MT CO_{2e} per year) by a large margin (3,889.6 MT per year). This finding is based on a BAU assumption and does not include statewide or locally sponsored mitigation. State program reductions reduce the emissions in the BAU scenario by 23.9%. Feasible local reductions, with application of RCMs as summarized above, would result in an additional 10% reduction. Specific local reductions to be implemented on the site would be determined prior to construction based on then-

current strategies and technologies and as required in Mitigation Measure GHG-2 above. However, even with implementation of required and discretionary GHG reduction measures, annual emissions cannot be reduced below the SCAQMD's advisory level and the impact remains significant and unavoidable.

5.6.7 Cumulative Impacts

With respect to GHG, the Proposed Project will add emissions above the SCAQMD's advisory level of 3,000 MT $CO_{2(e)}$. The addition of the adjacent Cielo Vista project and the 18 related projects identified in the Traffic Analysis will further contribute to an exceedance of GHG and, therefore, cumulative impact remains significant and unavoidable.

5.6.8 Unavoidable Adverse Impacts

Project impacts related to GHG will remain above the SCAQMD advisory level for construction, operation, and cumulative conditions and are, therefore, considered significant and unavoidable.