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# MEMORANDUM

**DATE:** February 22, 2018

**TO:** Alyssa Helper, Project Manager

**FROM:** Akshay Newgi, Air Quality Specialist

**SUBJECT:** Air Quality and Greenhouse Gas Memorandum for the Farm Specific Plan Project in the City of San Juan Capistrano, California

## INTRODUCTION

LSA Associates, Inc. (LSA) is pleased to submit this air quality and greenhouse gas (GHG) analysis for The Farm Specific Plan project (proposed project), which would allow for the future development of a residential community consisting of up to 180 single-family residential units on a 35 acre site, which includes a 0.5 acre park and a 1-acre shared-use trail in the City of San Juan Capistrano (City). The project would be constructed over a period of 33 months starting December 2019. The project would be operational in the year 2022.

## PROJECT LOCATION AND DESCRIPTION

The project site is located at 32382 Del Obispo Street in the southwestern portion of the City of San Juan Capistrano, which itself is located in southern Orange County (County). Figure 1 (all figures attached) shows the project location. The proposed project would comprise of a plan for the future development of a residential community consisting of up to 180 single-family residential units, a 0.5 acre park, and a 1-acre shared-use trail. Figure 2 illustrates the site plan.

## EXISTING SENSITIVE LAND USES IN THE PROJECT AREA

The project site is surrounded primarily by residential development with the nearest residential uses immediately adjacent to the north and west. The areas adjacent to the project site include the following uses:

- **North:** Religious (Church) and single-family residential development
- **East:** Commercial and single-family residential development
- **South:** Commercial and multi-family residential development, schools, a sports park, and agricultural uses
- **West:** Commercial and single-family development

The nearest single family residence is 50 feet (15 meters) to the north of the project site.

## EXISTING SETTING

The project site is located in the City of San Juan Capistrano, which is part of the South Coast Air Basin (Basin), and is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

### Climate/Meteorology

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

Climate in the Basin is determined by its terrain and geographical location. The Basin is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern border, and high mountains surround the rest of the Basin, which lies in the semi-permanent high-pressure zone of the eastern Pacific, resulting in a climate that is mild and tempered by cool ocean breezes. This climatological pattern is rarely interrupted; however, periods of extremely hot weather, winter storms, or Santa Ana wind conditions do occur.

The annual average temperature varies little throughout the Basin, ranging from the low to middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site is the Laguna Beach Station. The monthly average maximum temperature recorded at this station 1928 onwards ranged from 65.1°F in January to 78.1°F in August, with an annual average maximum of 71.2°F. The monthly average minimum temperature recorded at this station ranged from 43.0°F in January to 59.6 °F in August, with an annual average minimum of 51.0 °F. January is typically the coldest month, and August is typically the warmest month in this area of the Basin.

Most rainfall in the Basin occurs between November and April. Summer rainfall is minimal and is generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the Basin and along the coastal side of the mountains. The Laguna Beach Station monitored precipitation from 1928 onwards, during which average monthly rainfall varied from 0.03 inch in July to 2.77 inches in February, with an annual total of 12.52 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

Although the Basin has a semiarid climate, air near the surface is generally moist because of the presence of a shallow marine layer. With very low average wind speeds, there is a limited capacity to disperse air contaminants horizontally. The dominant daily wind pattern is an onshore 8- to 12-mile–per-hour (mph) daytime breeze and an offshore 3 to 5 mph nighttime breeze. The typical wind flow pattern fluctuates only with occasional winter storms or strong northeasterly (Santa Ana) winds from the mountains and deserts northeast of the Basin. Summer wind flow patterns represent worst-case conditions because this is the period of higher temperatures and more sunlight, which result in ozone ($O_3$) formation.

Temperature normally decreases with altitude, and a reversal of this atmospheric state, where temperature increases with altitude, is called an inversion. The height from the Earth to the inversion base is known as the mixing height. Persistent low inversions and cool coastal air tend to create morning fog and low stratus clouds. Cloudy days are less likely in the eastern portions of the Basin and are about 25 percent more likely along the coast. The vertical dispersion of air pollutants in the Basin is limited by temperature inversions in the atmosphere close to the Earth's surface.

Inversions are generally lower in the nighttime when the ground is cooler than during daylight hours when the sun warms the ground and, in turn, the surface air layer. As this heating process continues, the temperature of the surface air layer approaches the temperature of the inversion base, causing heating along its lower edge. If enough warming takes place, the inversion layer becomes weak and opens up to allow the surface air layers to mix upward. This can be seen in the middle to late afternoon on a hot summer day when the smog appears to clear up suddenly. Winter inversions typically break earlier in the day, preventing excessive contaminant buildup.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problem is the accumulation of carbon monoxide (CO) and nitrogen oxides ($NO_X$) due to extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and $NO_X$ to form photochemical smog.

## Local Air Quality

The SCAQMD, together with the California Air Resources Board (ARB), maintains ambient air quality monitoring stations in the Basin. The air quality monitoring station closest to the project site is the Mission Viejo monitoring station. This station is approximately 8 miles (mi) to the north of the project site, and monitors air pollutant data for CO, hourly and 8-hour ozone, $PM_{10}$ and $PM_{2.5}$. Other criteria pollutant data was obtained from the Costa Mesa monitoring station. The air quality trends from these two stations are used to represent the ambient air quality in the project area. The ambient air quality data monitored at these stations within the past 3 years are listed in Table A.

As shown in Table A, the ambient air quality data indicates that CO, $PM_{10}$, $PM_{2.5}$, $NO_2$ and $SO_2$ levels are consistently below the relevant State and federal standards. The State and federal 8-hour $O_3$ standards were exceeded 8 to 19 times in the last 3 years, and the State 1-hour $O_3$ standard was exceeded two to five times over the last 3 years.

## Air Pollution Constituents and Attainment Status

The ARB coordinates and oversees both State and federal air pollution control programs in the State. The ARB oversees activities of local air quality management agencies and maintains air quality monitoring stations throughout the State in conjunction with the United States Environmental Protection Agency (EPA) and local air districts. The ARB has divided the State into 15 air basins based on meteorological and topographical factors of air pollution. Data collected at these stations

## Table A: Ambient Air Quality Monitored in the Project Vicinity

| Pollutant | Standard | 2014 | 2015 | 2016 |
|---|---|---|---|---|
| **Carbon Monoxide (CO) – Mission Viejo Monitoring Station** | | | | |
| Maximum 1-hour concentration (ppm) | | 1.2 | 1.4 | 1.3 |
| Number of days exceeded: | State: > 20 ppm | 0 | 0 | 0 |
| | Federal: > 35 ppm | 0 | 0 | 0 |
| Maximum 8-hour concentration (ppm) | | 0.8 | 0.7 | 0.7 |
| Number of days exceeded: | State: ≥ 9.0 ppm | 0 | 0 | 0 |
| | Federal: ≥ 9 ppm | 0 | 0 | 0 |
| **Ozone ($O_3$) – Mission Viejo Monitoring Station** | | | | |
| Maximum 1-hour concentration (ppm) | | 0.115 | 0.099 | 0.122 |
| Number of days exceeded: | State: > 0.09 ppm | 4 | 2 | 5 |
| Maximum 8-hour concentration (ppm) | | 0.088 | 0.088 | 0.126 |
| Number of days exceeded: | State: > 0.07 ppm | 10 | 8 | 19 |
| | Federal: > 0.07 ppm | 10 | 8 | 18 |
| **Coarse Particulates ($PM_{10}$) – Mission Viejo Monitoring Station** | | | | |
| Maximum 24-hour concentration (µg/m$^3$) | | 41 | 49 | 59 |
| Number of days exceeded: | State: > 50 µg/m$^3$ | 0 | NA | NA |
| | Federal: > 150 µg/m$^3$ | 0 | NA | 0 |
| Annual arithmetic average concentration ( µg/m$^3$) | | 19.8 | NA | NA |
| Exceeded for the year: | State: > 20 µg/m$^3$ | No | NA | NA |
| **Fine Particulates ($PM_{2.5}$) – Mission Viejo Monitoring Station** | | | | |
| Maximum 24-hour concentration (µg/m$^3$) | | 25.5 | 31.5 | 24.7 |
| Number of days exceeded: | Federal: > 35 µg/m$^3$ | 0 | 0 | 0 |
| Annual arithmetic average concentration (µg/m$^3$) | | 7.9 | 7.1 | 7.3 |
| Exceeded for the year: | State: > 12 µg/m$^3$ | No | No | No |
| | Federal: > 15 µg/m$^3$ | No | No | No |
| **Nitrogen Dioxide ($NO_2$) – Costa Mesa Monitoring Station** | | | | |
| Maximum 1-hour concentration (ppm) | | 0.061 | 0.052 | 0.060 |
| Number of days exceeded: | State: > 0.18 ppm | 0 | 0 | 0 |
| | Federal: > 0.10 ppm | 0 | 0 | 0 |
| Annual arithmetic average concentration (ppm) | | 0.010 | 0.011 | 0.010 |
| Exceeded for the year: | State: > 0.030 ppm | No | No | No |
| | Federal: > 0.053 ppm | No | No | No |
| **Sulfur Dioxide ($SO_2$) – Costa Mesa Monitoring Station** | | | | |
| Maximum 24-hour concentration (ppm) | | 0.0014 | 0.0011 | 0.0007 |
| Number of days exceeded: | State: > 0.04 ppm | 0 | 0 | 0 |
| Maximum 1-hour concentration (ppm) | | 0.0088 | 0.0045 | 0.0033 |
| Number of days exceeded: | State: > 0.25 ppm | 0 | 0 | 0 |
| | Federal: > 0.075 ppm | 0 | 0 | 0 |

Source 1: United States Environmental Protection Agency. AirData Air Quality Monitors. Website: http://www.epa.gov/airdata/ad_maps.html, accessed December 2017.

Source 2: California Air Resources Board. iADAM: Air Quality Data Statistics. Website: http://www.arb.ca.gov/adam, accessed December 2017.

µg/m$^3$ = micrograms per cubic meter

NA = Not Available

ppm = parts per million

are used by the ARB and EPA to classify air basins as attainment, nonattainment, nonattainment-transitional, or unclassified, based on air quality data for the most recent 3 calendar years compared with the ambient air quality standards (AAQS).

Attainment areas may be:

- Attainment/unclassified ("unclassifiable" in some lists), which have never violated the air quality standard of interest or do not have enough monitoring data to establish attainment or nonattainment status;

- Attainment/maintenance (national ambient air quality standards [NAAQS] only), which violated an NAAQS that is currently in use (was nonattainment) in or after 1990, but now attains the standard and is officially re-designated as attainment by the EPA with a maintenance State Implementation Plan (SIP); or

- Attainment (usually only for California ambient air quality standards [CAAQS], but sometimes for NAAQS), which have adequate monitoring data to show attainment, have never been nonattainment, or, for NAAQS, have completed the official maintenance period.

Nonattainment areas are imposed with additional restrictions as required by the EPA. The air quality data are also used to monitor progress in attaining air quality standards. Table B lists the attainment status for the criteria pollutants in the Basin.

## Table B: Attainment Status of Criteria Pollutants in the South Coast Air Basin

| Pollutant | State | Federal |
|---|---|---|
| $O_3$ 1-hour | Nonattainment | N/A |
| $O_3$ 8-hour | Nonattainment | Extreme Nonattainment[1] |
| $PM_{10}$ | Nonattainment | Attainment/Maintenance |
| $PM_{2.5}$ | Nonattainment | Nonattainment |
| CO | Attainment | Attainment/Maintenance |
| $NO_2$ | Attainment | Unclassified/Attainment (1-hour)<br>Attainment/Maintenance (Annual) |
| $SO_2$ | Attainment | Unclassified/Attainment |
| Lead | Attainment[2] | Unclassified/Attainment[1] |
| All others | Attainment/Unclassified | Attainment/Unclassified |

Source: California Air Resources Board. Air Quality Standards and Area Designations. Website: http://www.arb.ca.gov/desig/desig.htm, accessed December 2017.

[1] Area has a design value of 0.175 ppm and above.

[2] Except in Los Angeles County.

CO = carbon monoxide
N/A = not applicable
$NO_2$ = nitrogen dioxide
$O_3$ = ozone
$PM_{10}$ = particulate matter less than 10 microns in size
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
$SO_2$ = sulfur dioxide

## Description of Global Climate Change and its Sources

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

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

Global surface temperatures have risen by 1.33°F ±0.32°F over the last 100 years. The rate of warming over the last 50 years is almost double that over the last 100 years (Intergovernmental Panel on Climate Change [IPCC] 2013). The latest projections, based on state-of-the-art climate models, indicate that temperatures in the State are expected to rise 3–10.5°F by the end of the century (State of California 2013). The prevailing scientific opinion on climate change is that "most of the warming observed over the last 60 years is attributable to human activities" (IPCC 2013). Increased amounts of carbon dioxide ($CO_2$) and other greenhouse gases (GHGs) are the primary causes of the human-induced component of warming. The observed warming effect associated with the presence of GHGs in the atmosphere (from either natural or human sources) is often referred to as "the greenhouse effect."[2]

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

2 The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse lets heat from sunlight in and reduces the amount of heat that escapes, GHGs like $CO_2$, $CH_4$, and $N_2O$ in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, the *naturally occurring* greenhouse effect is necessary to keep our planet at a comfortable temperature.

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

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

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

These gases vary considerably in terms of global warming potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. GWP is based on several factors, including the relative effectiveness of a gas in absorbing infrared radiation and the length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to $CO_2$, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of $CO_2$ over a specified time period. GHG emissions are typically measured in terms of metric tons[2] of "$CO_2$ equivalents" (MT $CO_2$e). For example, $N_2O$ is 265 times more potent at contributing to global warming than $CO_2$. Table C identifies the GWP for each GHG analyzed in this report.

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

### *Carbon Dioxide*

In the atmosphere, carbon generally exists in its oxidized form as $CO_2$. Natural sources of $CO_2$ include the respiration (breathing) of humans, animals, and plants; volcanic outgassing; decomposition of organic matter; and evaporation from the oceans. Human-caused sources of $CO_2$ include the combustion of fossil fuels and wood, waste incineration, mineral production, and

1 The GHGs listed are consistent with the definition in Assembly Bill 32 (Government Code 38505), as discussed later in this memo.

2 A metric ton is equivalent to approximately 1.1 tons.

## Table C: Global Warming Potential for Selected Greenhouse Gases

| Pollutant | Lifetime (Years) | Global Warming Potential (100-year)[1] |
|---|---|---|
| Carbon Dioxide ($CO_2$) | ~100[2] | 1 |
| Methane ($CH_4$) | 12 | 28 |
| Nitrous Oxide ($N_2O$) | 121 | 265 |

Source: ARB. First Update to the Climate Change Scoping Plan (2014).

[1] The 100-year global warming potential estimates are from Section 8.7.1.2 of The Global Warming Potential Concept in the IPCC 2013 Fifth Assessment Report (AR5). Website: http://www.ipcc.ch/report/ar5/wg1/, accessed December 2017.

[2] $CO_2$ has a variable atmospheric lifetime and cannot be readily approximated as a single number.

ARB = California Air Resources Board

$CO_2$ = carbon dioxide

IPCC = Intergovernmental Panel on Climate Change

deforestation. The Earth maintains a natural carbon balance, and when concentrations of $CO_2$ are upset, the system gradually returns to its natural state through natural processes. Natural changes to the carbon cycle work slowly, especially compared to the rapid rate at which humans are adding $CO_2$ to the atmosphere. Natural removal processes (e.g., photosynthesis by land- and ocean-dwelling plant species) cannot keep pace with this extra input of human-made $CO_2$, and consequently the gas is building up in the atmosphere. The concentration of $CO_2$ in the atmosphere has risen approximately 30 percent since the late 1800s[1].

The transportation sector remained the largest source of GHG emissions in 2014, representing 36 percent of the State's GHG emission inventory[2]. The largest emissions category within the transportation sector is on-road, which consists of passenger vehicles (cars, motorcycles, and light-duty trucks) and heavy-duty trucks and buses. Emissions from on-road sources constitute more than 92 percent of the transportation sector total. Industry and electricity generation were the State's second- and third-largest categories of GHG emissions, respectively.

### *Methane*

$CH_4$ is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources of $CH_4$ include fires, geologic processes, and bacteria that produce $CH_4$ in a variety of settings (most notably, wetlands) (EPA 2010). Anthropogenic sources include rice cultivation, livestock, landfills and waste treatment, biomass burning, and fossil fuel combustion (e.g., the burning of coal, oil, and natural gas). As with $CO_2$, the major removal process of atmospheric $CH_4$—a chemical breakdown in the atmosphere—cannot keep pace with source emissions, and $CH_4$ concentrations in the atmosphere are increasing.

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[1] California Environmental Protection Agency. Climate Action Team Report to Governor Schwarzenegger and the Legislature. Website: http://www.climatechange.ca.gov/climate_action_team/reports/2006report/2006-04-03_FINAL_CAT_REPORT.PDF, accessed December 2017.

[2] California Environmental Protection Agency. Air Resources Board. California GHG Emission Inventory. Website: https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2014/ghg_inventory_trends_00-14_20160617.pdf, accessed December 2017.

### *Nitrous Oxide*

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

### *Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride*

HFCs are primarily used as substitutes for $O_3$-depleting substances regulated under the Montreal Protocol.[1] PFCs and $SF_6$ are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in the State; however, the rapid growth in the semiconductor industry, which is active in the State, has led to greater use of PFCs. However, there are no known project-related emissions of these three GHGs; therefore, these substances are not discussed further in this analysis.

## Emissions Sources and Inventories

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

### *Global Emissions*

Worldwide emissions of GHGs in 2012 totaled 29 billion metric tons of carbon dioxide equivalent per year (MT $CO_2e$/yr).[2] Global estimates are based on country inventories developed as part of the programs of the United Nations Framework Convention on Climate Change (UNFCCC).

### *United States Emissions*

In 2015, the United States emitted approximately 6.58 billion MT $CO_2e$. Total United States emissions have decreased by 2.3 percent from 2014 to 2015. This decrease was largely attributable to a decrease in emissions from fossil fuel combustion, which was a result of multiple factors including substitution from coal to natural gas consumption in the electric power sector; warmer winter conditions that reduced demand for heating fuel in the residential and commercial sectors;

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1 The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the $O_3$ layer by phasing out the production of several groups of halogenated hydrocarbons that are believed to be responsible for $O_3$ depletion and are also potent GHGs.

2 UNFCCC. GHG data from UNFCCC. Website: http://unfccc.int/ghg_data/ghg_data_unfccc/items/4146.php, accessed December 2017.

and a slight decrease in electricity demand. Greenhouse gas emissions in 2015 were 11.5 percent below 2005 levels (EPA 2017).

### *State of California Emissions*

According to ARB emission inventory estimates, the State emitted approximately 440.4 million metric tons of $CO_2e$ (MMT $CO_2e$) emissions in 2015. This is a decrease of 1.1 MMT $CO_2e$ from 2014 and a 9.1 percent decrease since 2004 (ARB 2017).

The ARB estimates that transportation was the source of approximately 39 percent of the State's GHG emissions in 2015, followed by electricity generation (both in State and out of State) at 19 percent and industrial sources at 23 percent. The remaining sources of GHG emissions were residential and commercial activities at 11 percent, agriculture at 8 percent, and other not specified sources at 1 percent (ARB 2017).

The ARB is responsible for developing the State GHG Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities in the State and supports the Assembly Bill (AB) 32 Climate Change Program. The ARB's current GHG emission inventory covers the years 1990–2014 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, and agricultural lands).

The ARB staff has projected Statewide unregulated GHG emissions for 2020, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions, at 509 MMT $CO_2e$. GHG emissions from the transportation and electricity sectors as a whole are expected to increase but remain at approximately 30 percent and 32 percent of total $CO_2e$ emissions, respectively (ARB 2014).

## REGULATORY SETTINGS

### Federal Regulations/Standards

Pursuant to the federal Clean Air Act (CAA) of 1970, the EPA established the NAAQS. The NAAQS were established for six major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the federal and State governments have established AAQS, or criteria, for outdoor concentrations in order to protect public health.

Data collected at permanent monitoring stations are used by the EPA to classify regions as "attainment" or "nonattainment," depending on whether the regions met the requirements stated in the primary NAAQS. Nonattainment areas are imposed with additional restrictions as required by the EPA. The EPA has designated the Southern California Association of Governments (SCAG) as the Metropolitan Planning Organization (MPO) responsible for ensuring compliance with the requirements of the CAA for the Basin.

In an effort to help federal agencies ensure the integrity of their environmental reviews and promote sound governmental decision making, the Council on Environmental Quality (CEQ) issued on January 14, 2011, final guidance on the "Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact." This guidance was

developed as part of CEQ's effort to modernize and reinvigorate federal agency implementation of the National Environmental Policy Act. The EPA established new national air quality standards for ground-level $O_3$ and $PM_{2.5}$ in 1997. On May 14, 1999, the Court of Appeals for the District of Columbia Circuit issued a decision ruling that the CAA, as applied in setting the new public health standards for $O_3$ and $PM_{2.5}$, was unconstitutional as an improper delegation of legislative authority to the EPA. On February 27, 2001, the United States Supreme Court upheld the way the government sets air quality standards under the CAA. The court unanimously rejected industry arguments that the EPA must consider financial cost, as well as health benefits, in writing standards. The justices also rejected arguments that the EPA took too much lawmaking power from Congress when it set tougher standards for $O_3$ and soot in 1997. Nevertheless, the court threw out the EPA's policy for implementing new $O_3$ rules, saying that the agency ignored a section of the law that restricts its authority to enforce such rules.

In April 2003, the EPA was cleared by the White House Office of Management and Budget to implement the 8-hour ground-level $O_3$ standard. The EPA issued the proposed rule implementing the 8-hour $O_3$ standard in April 2003. The EPA completed final 8-hour nonattainment status on April 15, 2004. The EPA revoked the 1-hour $O_3$ standard on June 15, 2005, and lowered the 8-hour $O_3$ standard from 0.08 parts per million (ppm) to 0.075 ppm on April 1, 2008.

The EPA issued the final $PM_{2.5}$ implementation rule in fall 2004. The EPA lowered the 24-hour $PM_{2.5}$ standard from 65 to 35 micrograms per cubic meter (µg/m3) and revoked the annual $PM_{10}$ standard on December 17, 2006. The EPA issued final designations for the 2006 24-hour $PM_{2.5}$ standard on December 12, 2008. The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the EPA has the authority to regulate $CO_2$ emissions under the CAA. While there currently are no adopted federal regulations for the control or reduction of GHG emissions, the EPA commenced several actions in 2009 that are required to implement a regulatory approach to GCC.

On September 30, 2009, the EPA announced a proposal that focuses on large facilities emitting over 25,000 tons of GHG emissions per year. These facilities would be required to obtain permits that would demonstrate they are using the best practices and technologies to minimize GHG emissions. On December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six GHGs ($CO_2$, $CH_4$, $N_2O$, HFCs, PFCs, and $SF_6$) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to GCC. This EPA action does not impose any requirements on industry or other entities. However, the findings are a prerequisite to finalizing the GHG emission standards for light-duty vehicles mentioned below.

### State Regulations/Standards

In 1967, the State Legislature passed the Mulford-Carrell Act, which combined two Department of Health bureaus (i.e., the Bureau of Air Sanitation and the Motor Vehicle Pollution Control Board), to establish the ARB. Since its formation, the ARB has worked with the public, the business sector, and local governments to find solutions to the State's air pollution problems.

The California Air Pollution Control Officers Association (CAPCOA) is a nonprofit association of the air pollution control officers from all 35 local air quality agencies throughout California. CAPCOA was

formed in 1976 to promote clean air and to provide a forum for sharing knowledge, experience, and information among the air quality regulatory agencies around the State. CAPCOA meets regularly with federal and State air quality officials to develop Statewide rules and to assure consistent application of rules and regulations. CAPCOA works with specialized task forces (including regulated industry) by participating actively in the legislative process, and continuing to coordinate local efforts with those of the State and federal air agencies. The goal is to protect public health while maintaining economic vitality. California adopted the CCAA in 1988. The ARB administers the CAAQS for the 10 air pollutants designated in the CCAA. These 10 State air pollutants are the six criteria pollutants designated by the federal CAA as well as four others: visibility-reducing particulates, H2S, sulfates, and vinyl chloride.

### *California Climate Action Milestones*

In 1988, AB 4420 directed the California Energy Commission (CEC) to report on "how global warming trends may affect the State's energy supply and demand, economy, environment, agriculture, and water supplies" and offer "recommendations for avoiding, reducing and addressing the impacts." This marked the first statutory direction to a State agency to address climate change.

The California Climate Action Registry was created to encourage voluntary reporting and early reductions of GHG emissions with the adoption of Senate Bill (SB) 1771 in 2000. The CEC was directed to assist by developing metrics and identifying and qualifying third-party organizations to provide technical assistance and advice to GHG emission reporters. The next year, SB 527 amended SB 1771 to emphasize third-party verification.

SB 1771 also contained several additional requirements for the CEC, including (1) updating the State's GHG inventory from an existing 1998 report and continuing to update it every 5 years; (2) acquiring, developing, and distributing information on GCC to agencies and businesses; (3) establishing a State interagency task force to ensure policy coordination; and (4) establishing a climate change advisory committee to make recommendations on the most equitable and efficient ways to implement GCC requirements. In 2006, AB 1803 transferred preparation of the inventory from the CEC to the ARB by AB 1803. The ARB updates the inventory annually.

AB 1493, authored by Assembly Member Fran Pavley in 2002, directed the ARB to adopt regulations to achieve the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles. The so-called "Pavley" regulations, or Clean Car regulations, were approved by the ARB in 2004. On September 24, 2009, the ARB adopted amendments to the "Pavley" regulations that reduced GHG emissions in new passenger vehicles from 2009 through 2016. AB 1493 also directed the State's Climate Action Registry to adopt protocols for reporting reductions in GHG emissions from mobile sources prior to the operative date of the regulations.

The California Renewable Portfolio Standard Program, which requires electric utilities and other entities under the jurisdiction of the California Public Utilities Commission to meet 20 percent of their retail sales with renewable power by 2017, was established by SB 1078 in 2002. The Renewable Portfolio Standard was accelerated to 20 percent by 2010 by SB 107 in 2006. The program was subsequently expanded by the renewable electricity standard approved by the ARB in September 2010, requiring all utilities to meet a 33 percent target by 2020. The renewable

electricity standard is projected to reduce GHG emissions from the electricity sector by at least 12 MMT $CO_2e$ in 2020.

EO S-3-05 (June 2005) established GHG targets for the State (e.g., returning to year 2000 emission levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050). EO S-3-05 directed the Secretary of the California Environmental Protection Agency to coordinate efforts to meet the targets with the heads of other State agencies. This group became the Climate Action Team.

In 2006, the State Legislature passed the California Global Warming Solutions Act of 2006 (AB 32), which created a comprehensive, multiyear program to reduce GHG emissions in California. AB 32 required the ARB to develop a Scoping Plan that describes the approach California will take to reduce GHGs to achieve the goal of reducing emissions to 1990 levels by 2020. The Scoping Plan was first approved by the ARB in 2008 and must be updated every 5 years. The First Update to the Climate Change Scoping Plan was approved by the ARB on May 22, 2014. In 2016, the State Legislature passed SB 32, which codifies a 2030 GHG emissions reduction target of 40 percent below 1990 levels. With SB 32, the State Legislature passed companion legislation AB 197, which provides additional direction for developing the Scoping Plan. The ARB has prepared a second update to the Scoping Plan to reflect the 2030 target set by EO B-30-15 and codified by SB 32.

California is implementing the world's first Low Carbon Fuel Standard for transportation fuels, pursuant to both EO S-01-07 (signed January 2007) and AB 32. The standard requires a reduction of at least 10 percent in the CO intensity of the State's transportation fuels by 2020. This reduction is expected to reduce GHG emissions in 2020 by 17.6 MMT $CO_2e$. Also in 2007, AB 118 created the Alternative and Renewable Fuel and Vehicle Technology Program. The CEC and the ARB administer the program. This act provides funding for alternative fuel and vehicle technology research, development, and deployment in order to attain the State's climate change goals, achieve the State's petroleum reduction objectives and clean air and GHG emission reduction standards, develop public and private partnerships, and ensure a secure and reliable fuel supply.

In addition to vehicle emissions regulations and the Low Carbon Fuel Standard, the third effort to reduce GHG emissions from transportation is the reduction in the demand for personal vehicle travel (i.e., VMT). This measure was addressed in September 2008 through the Sustainable Communities and Climate Protection Act of 2008, or SB 375. The enactment of SB 375 initiated an important new regional land use planning process to mitigate GHG emissions by integrating and aligning planning for housing, land use, and transportation for California's 18 MPOs. The bill directed the ARB to set regional GHG emission reduction targets for most areas of the State. SB 375 also contained important elements related to federally mandated regional transportation plans and the alignment of State transportation and housing planning processes.

The ARB released the Final 2017 Climate Change Scoping Plan Update in November 2017. This Scoping Plan Update establishes a proposed framework of action for California to meet the target of 40 percent reduction in GHGs by 2030 compared to 1990 levels. This goal builds on California's success in establishing effective policies that have helped reduce emissions of GHGs while delivering substantial economic and environmental benefits. Further, the goal aligns California with the rest of the world in the global effort to fight climate change.

The first Scoping Plan was required by AB 32, the Global Warming Solutions Act, and was adopted in 2008. Under that plan, California set in place a range of effective programs to slash GHGs from cars, trucks, fuels, industry, and electrical generation, and the State is well on its way to achieving the goal of AB 32 to reach 1990 levels of GHGs by 2020. The 2017 Climate Change Scoping Plan Update builds on those programs and takes aim at the 2030 target established by SB 32 (Pavley). That bill, and related laws, is designed specifically to continue California's leadership in the fight against climate change and guide the State toward an equitable clean energy economy and prosperous future. To reach that future, the 2017 Climate Change Scoping Plan Update draws on the successes and the lessons learned from the first chapter of California's efforts to fight climate change under AB 32. The 2017 Climate Change Scoping Plan Update builds on key programs such as the Cap-and-Trade Regulation; the Low Carbon Fuel Standard; and much cleaner cars, trucks, and freight movement, powering the State off cleaner renewable energy, and strategies to reduce methane emissions from agricultural and other wastes by using methane to meet energy needs.

## REGIONAL AIR QUALITY PLANNING FRAMEWORK

The 1976 Lewis Air Quality Management Act established SCAQMD and other air districts throughout the State. The federal CAA Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the federal standards in nonattainment areas of the State.

The ARB is responsible for incorporating air quality management plans for local air basins into a SIP for EPA approval. Significant authority for air quality control within them has been given to local air districts that regulate stationary-source emissions and develop local nonattainment plans.

### SCAQMD Rules

The project is required to comply with regional rules that assist in reducing short-term air pollutant emissions. SCAQMD Rule 403 requires that fugitive dust be controlled with best available control measures (BACMs) so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site. Applicable dust suppression techniques from Rule 403 are summarized below. Implementation of these dust suppression techniques can reduce the fugitive dust generation (and thus the $PM_{10}$ component). Compliance with these rules would reduce impacts on nearby sensitive receptors.

- **SCAQMD Rule 403 Measures**
    - Water active sites at least three times daily (locations where grading is to occur will be thoroughly watered prior to earthmoving).
    - All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least 2 ft of freeboard in accordance with the requirements of California Vehicle Code (CVC) Section 23114 (freeboard means vertical space between the top of the load and top of the trailer).
    - Traffic speeds on all unpaved roads shall be reduced to 15 mph or less.

## REGIONAL AIR QUALITY MANAGEMENT PLAN

SCAQMD and SCAG are responsible for formulating and implementing the Air Quality Management Plan (AQMP) for the Basin. The main purpose of an AQMP is to bring the area into compliance with federal and State air quality standards. SCAQMD prepares a new AQMP every 3 years, updating the previous plan and 20-year horizon.

The latest plan is the 2016 AQMP, which incorporates the latest scientific and technological information and planning assumptions, including the 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and updated emission inventory methodologies for various source categories. The 2016 AQMP included the integrated strategies and measures needed to meet the NAAQS, implementation of new technology measures, and demonstrations of attainment of the 1-hour and 8-hour ozone NAAQS as well as the latest 24-hour and annual $PM_{2.5}$ standards. Key elements of the 2016 AQMP include:

- Calculation and credit for co-benefits from other planning efforts (e.g., climate, energy, and transportation);
- A strategy with fair-share emission reductions at the federal, State, and local levels;
- Investment in strategies and technologies meeting multiple air quality objectives;
- Identification of new partnerships and significant funding for incentives to accelerate deployment of zero and near zero technologies;
- Enhanced socioeconomic assessment, including an expanded environmental justice analysis;
- Attainment of the 24-hour $PM_{2.5}$ standard in 2019 with no additional measures;
- Attainment of the annual $PM_{2.5}$ standard by 2025 with implementation of a portion of the ozone strategy; and
- Attainment of the 1-hour ozone standard by 2022 with no reliance on “black box” future technology (CAA Section 182(e)(5) measures);

### Local Policies

#### *City of San Juan Capistrano General Plan*

The City’s General Plan is intended to guide City Council members to make land use decisions. The General Plan establishes the basis for zoning and other land use regulations, and provides guidance in the evaluation of development proposals. Additionally, it creates the framework for economic development, transportation improvements, and balancing residents’ desires with regard to sustainability, City services, parks and historic preservation. The Conservation and Open Space Element (December 1999, revised May 2002) of the City’s General Plan establishes policies that focus on the protection and enhancement of open space and natural resources to ensure a high

quality living environment for years to come. The relevant goal and policies listed in the conservation and open space element include:

- **Goal 6:** Improve Air Quality
- **Policy 6.1.** Cooperate with the South Coast Air Quality Management District and Southern California Association of Governments in their efforts to implement the regional Air Quality Management Plan.
- **Policy 6.2.** Cooperate and participate in regional air quality management planning, programs, and enforcement measures.
- **Policy 6.3.** Implement City-wide traffic flow improvements.
- **Policy 6.4.** Achieve a greater balance between jobs and housing in San Juan Capistrano.
- **Policy 6.5.** Integrate air quality planning with land use and transportation planning.
- **Policy 6.6.** Promote energy conservation and recycling by the public and private sectors.

#### *City of San Juan Capistrano Sustainability Resolution*

The City adopted a resolution approving a Sustainability Charter for the City of San Juan Capistrano on December 18, 2007. On August 5, 2008 the City Council passed a resolution supporting legislation for Extended Producer Responsibility (EPR). EPR, also known as Product Stewardship, is a policy approach that shifts California's product waste management costs to producers and users in order to reduce public costs and drive improvements in product design that promote environmental sustainability.

## THRESHOLDS OF SIGNIFICANCE

### Pollutants with Regional Effects

SCAQMD has established daily emissions thresholds for construction and operation of a proposed project in the Basin. The emissions thresholds were established based on the attainment status of the Basin with regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety (EPA), these emissions thresholds are regarded as conservative and would overstate an individual project's contribution to health risks.

### Regional Thresholds for Construction Emissions

The following CEQA significance thresholds for construction emissions have been established for the Basin:

- 75 pounds per day (lbs/day) of VOC
- 100 lbs/day of $NO_X$
- 550 lbs/day of CO

- 150 lbs/day of $PM_{10}$
- 55 lbs/day of $PM_{2.5}$
- 150 lbs/day of sulfur oxides ($SO_X$)

Projects in the Basin with construction-related emissions that exceed any of these emission thresholds are considered to be significant under SCAQMD guidelines.

### Regional Thresholds for Operational Emissions

The following CEQA significance thresholds for operational emissions have been established for the Basin:

- 55 lbs/day of VOCs
- 55 lbs/day of $NO_X$
- 550 lbs/day of CO
- 150 lbs/day of $PM_{10}$
- 55 lbs/day of $PM_{2.5}$
- 150 lbs/day of $SO_X$

Projects in the Basin with operational emissions that exceed any of these emission thresholds are considered to be significant under SCAQMD guidelines.

The phase-out of leaded gasoline started in 1976. Since gasoline no longer contains lead, the project is not anticipated to result in air quality impacts related to lead; therefore, no further discussion related to lead is provided in this analysis.

### Thresholds for Localized Impacts Analysis

SCAQMD published its *Final Localized Significance Threshold Methodology* in July 2008, recommending that all air quality analyses include an assessment of both construction and operational impacts on the air quality of nearby sensitive receptors from emissions of CO, $NO_X$, $PM_{10}$, and $PM_{2.5}$. Localized significance thresholds (LSTs) represent the maximum emissions from a project site that are not expected to result in an exceedance of the NAAQS or CAAQS. LSTs are based on the ambient concentrations of that pollutant within the project's Source Receptor Area (SRA) and the distance to the nearest sensitive receptor. For this project, the appropriate SRA is Capistrano Valley (Area 21).

If the total acreage disturbed is less than or equal to 5 acres per day, then the SCAQMD's screening look-up tables can be used to determine if a project has the potential to result in a significant impact. In the case of CO and $NO_2$, because ambient levels are below the NAAQS and CAAQS, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a State or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. This would apply to $PM_{10}$ and $PM_{2.5}$, both of which are nonattainment pollutants (SCAQMD 2006). For these two, the significance criteria are the pollutant concentration

thresholds presented in SCAQMD Rules 403 and 1301. The Rule 403 threshold of 10.4 µg/$m^3$ applies to construction emissions. The Rule 1301 threshold of 2.5 µg/$m^3$ applies to operational activities.

Based on the SCAQMD recommended methodology[1] and the construction equipment planned, no more than 5.0 acres[2] would be disturbed on any one day; thus, the 5.0-acre LSTs have been used for construction emissions. On-site operational emissions would occur from stationary and mobile sources. However, on-site vehicle emissions are the largest source of emissions, and it is assumed that the on-site travel routes for the proposed project would occupy up to 5 acres of the surface area. Therefore, the 5-acre thresholds would apply during project operations.

Sensitive receptors include residences, schools, hospitals, and similar uses that are sensitive to adverse air quality. Existing residences are located immediately to the north and west of the project boundary. SCAQMD LST Methodology (SCAQMD 2003) specifies, "Projects with boundaries located closer than 25 meters to the nearest receptor should use the LSTs for receptors located at 25 meters." The nearest single family residence is 10 feet (3 meters) to the north of the project site. Therefore, the following emissions thresholds apply during project construction and operation:

- **Construction LSTs, 5-acre, 82-foot (ft) (25 m) distance**
  - 197 lbs/day of $NO_X$
  - 1,804 lbs/day of CO
  - 12 lbs/day of $PM_{10}$
  - 8 lbs/day of $PM_{2.5}$

- **Operation LSTs, 5-acre, 82 ft (25 m) distance**
  - 197 lbs/day of $NO_X$
  - 1,804 lbs/day of CO
  - 3 lbs/day of $PM_{10}$
  - 2 lbs/day of $PM_{2.5}$

## GLOBAL CLIMATE CHANGE

*State CEQA Guidelines* Section 15064(b) provides that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further states that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

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1 SCAQMD. *Fact Sheet for Applying CalEEMod to Localized Significance Thresholds*. Website: www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf (accessed December 2017).

2 A maximum disturbance of 5.0 acres would occur during the grading phase from the use of three rubber-tired dozers, two scrapers and two tractors for 7 hours per day.

A project would normally have a significant effect on the environment if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Currently, there is no Statewide GHG emissions threshold that has been used to determine potential GHG emissions impacts of a project. Threshold methodology and thresholds are still being developed and revised by air districts in the State. Therefore this environmental issue remains unsettled and must be evaluated on a case-by-case basis until such time as SCAQMD adopts significance thresholds and GHG emissions impact methodology. In the absence of a climate action plan for the City, SCAQMD thresholds, when adopted, would apply to future development in the City.

To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, SCAQMD convened a GHG CEQA Significance Threshold Stakeholder Working Group (Working Group).[1] Based on the last Working Group meeting (Meeting No. 15) held in September 2010, SCAQMD proposed an analysis methodology using a tiered approach for the evaluation of GHG emissions for development projects where SCAQMD is not the lead agency (SCAQMD 2010). The applicable tier for this residential development project is Tier 3 (if GHG emissions are less than 3,500 MT $CO_2e$/yr, project-level and cumulative GHG emissions are less than significant).

## AIR QUALITY IMPACT ANALYSIS

### Short-Term (Construction) Emissions

Emissions of pollutants would occur during construction of the proposed project from soil disturbance and equipment exhaust. Major sources of emissions during construction include: (1) exhaust emissions from construction equipment and vehicles; and (2) fugitive dust generated by grading activities, construction vehicles, and equipment traveling over exposed surfaces.

Peak daily emissions associated with the on-site construction equipment, on-road haul trucks and vendor trips, and fugitive dust emissions during each of the construction tasks were calculated using the most recent version of the California Emission Estimator Model (CalEEMod, Version 2016.3.2). The default construction duration and equipment hours were changed in CalEEMod based on information received from the construction contractor. The construction equipment list in CalEEMod is used to calculate on-site emissions for each phase of construction. The total peak-day construction emissions are summarized in Table D and detailed in the attachment to this

[1] South Coast Air Quality Management District. Greenhouse Gases (GHG) CEQA Significance Thresholds. Website: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ghg-significance-thresholds/, accessed December 2017.

memorandum. The emissions listed in Table D represent the maximum daily emissions generated during each phase of construction.

Since on-site construction operations must comply with dust control and other measures prescribed by SCAQMD Rule 403, compliance with these rules is assumed in Table D. Table D shows that construction emissions would not exceed the SCAQMD daily emissions thresholds; therefore, no mitigation is required.

## Fugitive Dust

Fugitive dust emissions are generally associated with land clearing and exposure of soils to the air and wind, as well as cut-and-fill grading operations. Dust generated during construction varies substantially on a project-by-project basis, depending on the level of activity, the specific operations, and weather conditions at the time of construction. All specific development projects will be required to comply with SCAQMD Rule 403 to control fugitive dust. The $PM_{10}$ and $PM_{2.5}$ portions of the fugitive dust emissions are included in Table D. As indicated in Table D, compliance with SCAQMD Rule 403 would ensure that fugitive dust ($PM_{10}$ and $PM_{2.5}$) emissions would be less than significant.

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

| Construction Phase | Total Regional Pollutant Emissions, lbs/day | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $NO_X$ | CO | $SO_2$ | Fugitive $PM_{10}$ | Exhaust $PM_{10}$ | Fugitive $PM_{2.5}$ | Exhaust $PM_{2.5}$ |
| Site Preparation | 5.8 | 64.2 | 31.7 | 0.1 | 8.5 | 2.9 | 4.1 | 2.7 |
| Grading | 4.5 | 50.3 | 32.6 | 0.1 | 4.1 | 2.2 | 1.7 | 2.0 |
| Building Construction | 3.3 | 27.9 | 26.0 | 0.1 | 2.9 | 1.2 | 0.8 | 1.1 |
| Paving | 1.5 | 11.2 | 15.0 | 0.0 | 0.2 | 0.6 | 0.0 | 0.5 |
| Architectural Coatings | 15.9 | 1.6 | 3.0 | 0.0 | 0.5 | 0.1 | 0.1 | 0.1 |
| **Peak Daily** | **19.2**[1] | **64.2** | **32.6** | **0.1** | **11.4** | | **6.8** | |
| **SCAQMD Thresholds** | **75.0** | **100.0** | **550.0** | **150.0** | **150.0** | | **55.0** | |
| **Significant Emissions?** | **No** | **No** | **No** | **No** | **No** | | **No** | |

Source: Compiled by LSA Associates, Inc. (December 2017).

[1] Peak daily emissions of VOCs occur during overlap of Building Construction and Architectural Coatings Phase

CO = carbon monoxide
lbs/day = pounds per day
$NO_x$ = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
$PM_{10}$ = particulate matter less than 10 microns in size
SCAQMD = South Coast Air Quality Management District
$SO_x$ = sulfur oxides
VOC = volatile organic compounds

## Localized Significance

SCAQMD has issued guidance on applying CalEEMod modeling results to LST analyses.1 Table E shows that the construction emission rates would not exceed the LSTs for the adjacent single family residences less than 82 ft (25 m) from the project site.

[1] South Coast Air Quality Management District. *Fact Sheet for Applying CalEEMod to Localized Significance Thresholds*. Website: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf, accessed December 2017.

Table E shows that the calculated emissions rates for the proposed on-site construction activities are below the LSTs for CO, $NO_X$, $PM_{10}$, and $PM_{2.5}$ at the nearest sensitive receptors, which are adjacent residences approximately 15 m (50 feet) to the north and west of the project site. Therefore, the proposed project would not cause any short-term localized air quality impacts, and no mitigation is required.

## Table E: Summary of On-Site Construction Emissions, Localized Significance

| Construction | Emission Rates (lbs/day) | | | |
|---|---|---|---|---|
| | $NO_X$ | CO | $PM_{10}$ [1] | $PM_{2.5}$ [1] |
| On-Site Emissions | 66.0 | 48.0 | 11.0 | 6.7 |
| **Localized Significance Threshold** | **197.0** | **1,804.0** | **12.0** | **8.0** |
| **Exceed Significance?** | **No** | **No** | **No** | **No** |

Source: Compiled by LSA Associates, Inc. (December 2017).
Note: SRA – Capistrano Valley Area, 5.0 acres, receptors at 15 meters
[1] Total $PM_{10}$ and $PM_{2.5}$ daily emissions with fugitive dust mitigation measures implemented.
CO = carbon monoxide
lbs/day = pounds per day
$NO_X$ = nitrogen oxides
$PM_{10}$ = particulate matter less than 10 microns in size
$PM_{2.5}$ = particulate matter less than 2.5 microns in size

Table F shows the calculated emissions for the proposed operational activities compared with the appropriate LSTs. By design, the localized impacts analysis only includes on-site sources; however, the CalEEMod outputs do not separate on-site and off-site emissions for mobile sources. For a worst-case scenario assessment, the emissions shown in Table F include all on-site project-related stationary sources and 5 percent of the project-related new mobile sources, which is an estimate of the amount of project-related new vehicle traffic that would occur on site. A total of 5 percent is considered conservative because the average trip lengths assumed are 14.7 miles (mi) for home to work, 5.9 mi for home to shopping, and 8.7 mi for other types of trips. The average on-site distance driven is unlikely to be even 1,000 ft, which is approximately 2.2 percent of the total miles traveled. Considering the total trip length included in CalEEMod, a 5 percent assumption is conservative.

## Table F: Long-Term Operational Localized Impacts Analysis

| Emissions Sources | Pollutant Emissions (lbs/day) | | | |
|---|---|---|---|---|
| | $NO_X$ | CO | $PM_{10}$ | $PM_{2.5}$ |
| On-Site Emissions | 3.7 | 18.0 | 1.0 | 0.5 |
| **LST Thresholds** | **197.0** | **1,804.0** | **3.0** | **2.0** |
| **Significant Emissions?** | **No** | **No** | **No** | **No** |

Source: Compiled by LSA Associates, Inc. (December 2017).
Note 1: Column totals may not add due to rounding from the model results.
Note 2: SRA – Capistrano Valley Area, 5 acres, receptors at 15 meters.
CO = carbon monoxide
lbs/day = pounds per day
LST = localized significance thresholds
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
$PM_{10}$ = particulate matter less than 10 microns in size
SRA = Source Receptor Area

Table F shows that the operational emission rates would not exceed LSTs for the existing single family residences located less than 25 m from the project site.

## Odors

Odor complaints are most commonly associated with agricultural land uses, wastewater treatment plants, food processing plants, chemical plans, composting, refineries, and landfills, etc. Objectionable odors may be emitted during the operation of diesel-fueled equipment during construction of the proposed project. However, these odors would be limited to the project site during construction and would disperse quickly. Operations associated with the proposed residential project would not involve any activities that would emanate objectionable odors. Therefore, odors associated with the proposed project would not be a significant impact.

## Long-Term (Operational) Emissions

Long-term air pollutant emission impacts are those associated with stationary sources and mobile sources involving any project-related changes. The proposed project would result in net increases in both stationary- and mobile-source emissions. The stationary-source emissions would come from area and energy sources.

Based on trip generation factors provided in the *Trip Generation Memorandum* prepared for the proposed project (LSA 2018), the project's 1,699 daily trips are entered in CalEEMod. Long-term operational emissions associated with the proposed project are shown in Table G.

### Table G: Opening Year Regional Operational Emissions

| Source | Pollutant Emissions, lbs/day | | | | | |
|---|---|---|---|---|---|---|
| | VOC | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| **Proposed Project** | | | | | | |
| Area | 7.9 | 3.2 | 16.0 | 0.0 | 0.3 | 0.3 |
| Energy | 0.1 | 1.2 | 0.5 | 0.0 | 0.1 | 0.1 |
| Mobile | 2.6 | 11.0 | 36.0 | 0.1 | 13.0 | 3.6 |
| **Total Project Emissions** | **10.7** | **15.2** | **52.8** | **0.2** | **13.4** | **4.0** |
| **SCAQMD Thresholds** | **55.0** | **55.0** | **550.0** | **150.0** | **150.0** | **55.0** |
| **Significant?** | **No** | **No** | **No** | **No** | **No** | **No** |

Source: Compiled by LSA Associates, Inc. (December 2017).
Note: Column totals may not add due to rounding from the model results.
CO = carbon monoxide
lbs/day = pounds per day
$NO_X$ = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
$PM_{10}$ = particulate matter less than 10 microns in size
SCAQMD = South Coast Air Quality Management District
$SO_X$ = sulfur oxides oxides
VOC = volatile organic compounds

Area sources include architectural coatings, consumer products, hearths, and landscaping. The defaults in CalEEMod were changed to assume that all hearths are gas operated in compliance with SCAQMD Rule 445. Energy sources include natural gas consumption for heating and cooking. Table G shows that the net change in all criteria pollutants as a result of the proposed project would not exceed the corresponding SCAQMD daily emission thresholds for any criteria pollutants.

None of the SCAQMD emission thresholds for criteria pollutants would be exceeded by the project-related increases. Therefore, project-related long-term air quality impacts would be less than significant.

## Air Quality Management Plan Consistency

A consistency determination plays an essential role in local agency project review by linking local planning and unique individual projects to the air quality plans. A consistency determination fulfills the CEQA goal of fully informing local agency decision-makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are addressed. Only new or amended General Plan elements, Specific Plans, and significantly unique projects need to undergo a consistency review due to the air quality plan strategy being based on projections from local General Plans.

Projects are considered consistent with, and would not conflict with or obstruct implementation of the AQMP, if the growth in socioeconomic factors (e.g., population, employment) is consistent with the underlying regional plans used to develop the AQMP. The future emissions forecasts are primarily based on demographic and economic growth projections provided by SCAG. Thus, demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry) developed by SCAG for their 2016 Regional Transportation Plan were used to estimate future emissions in the Final 2016 AQMP (SCAQMD 2016).

Pursuant to the methodology provided in Chapter 12 of the 1993 SCAQMD *CEQA Air Quality Handbook,* consistency with the 2016 AQMP is affirmed when a project (1) does not increase the frequency or severity of an air quality standards violation or cause a new violation and (2) is consistent with the growth assumptions in the AQMP. Consistency review is presented as follows:

1. The project would result in short-term construction and long-term operational pollutant emissions that are all less than the CEQA significance emissions thresholds established by SCAQMD, as demonstrated above; therefore, the project could not result in an increase in the frequency or severity of any air quality standards violation and will not cause a new air quality standard violation.

2. The *CEQA Air Quality Handbook* indicates that consistency with AQMP growth assumptions must be analyzed for new or amended General Plan elements, Specific Plans, and significant projects. Significant projects include airports, electrical generating facilities, petroleum and gas refineries, designation of oil drilling districts, water ports, solid waste disposal sites, and offshore drilling facilities; therefore, the proposed project is not defined as significant.

The project would allow for the development of 180 residential units, which is consistent with the growth projections anticipated for the South Coast Air Basin in the AQMP. The project site is designated Agri-business on the City's General Plan, but is classified as Specific Plan/Precise Plan (SP/PP) on the City's Zoning Map. As such, the project would require approval of a General Plan Amendment (GPA) to change the designation of the property to SP/PP. The SP/PP designation applies to areas regulated by a specific plan or precise plan adopted prior to development. Approval of the Farm Specific Plan and GPA requested as part of the project would also ensure consistency with the existing zoning classification for the site. Therefore, based on the consistency analysis presented above, the proposed project is consistent with the current regional AQMP.

## LONG-TERM MICROSCALE (CO HOT SPOT) ANALYSIS

Vehicular trips associated with the proposed project would contribute to congestion at intersections and along roadway segments in the project vicinity. Localized air quality impacts would occur when emissions from vehicular traffic increase as a result of the proposed project. The primary mobile-source pollutant of local concern is CO, a direct function of vehicle idling time and, thus, of traffic flow conditions. CO transport is extremely limited; under normal meteorological conditions, it disperses rapidly with distance from the source. However, under certain extreme meteorological conditions, CO concentrations near a congested roadway or intersection may reach unhealthful levels, affecting local sensitive receptors (residents, school children, the elderly, hospital patients, etc.).

Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service or with extremely high traffic volumes. In areas with high ambient background CO concentrations, modeling is recommended, to determine a project's effect on local CO levels.

When the SCAQMD *CEQA Air Quality Handbook* (SCAQMD 1993) was published, the Basin was designated nonattainment under the CAAQS and NAAQS for CO. With the turnover of older vehicles, introduction of cleaner fuels, and implementation of control technology on industrial facilities, CO concentrations in the Basin have steadily declined. In 2007, the Basin was redesignated as attainment for CO under both the CAAQS and NAAQS. As identified within SCAQMD's 2003 AQMP (SCAQMD 2003), peak carbon monoxide concentrations in the Basin were a result of unusual meteorological and topographical conditions and not a result of congestion at a particular intersection.

An assessment of project-related impacts on localized ambient air quality requires that future ambient air quality levels be projected. Existing CO concentrations in the immediate project vicinity are not available. Ambient CO levels monitored at the Mission Viejo Monitoring Station showed a highest recorded 1-hour concentration of 1.4 ppm (the State standard is 20 ppm) and a highest 8-hour concentration of 0.8 ppm (the State standard is 9 ppm) during the past 3 years (Table A). The highest CO concentrations would normally occur during peak traffic hours; hence, CO impacts calculated under peak traffic conditions represent a worst-case analysis. Reduced speeds and vehicular congestion at intersections result in increased CO emissions. In the existing setting as well as in the buildout scenario, all intersections in the project area would continue to operate at the existing LOS. Further, all intersections in the project area have a LOS of C or better in the existing as well as buildout scenarios (LSA 2018).

Therefore, the project can be implemented in the buildout scenario with no significant peak-hour intersection impacts. Given the extremely low level of CO concentrations in the project area and the lack of traffic impacts at any intersections, project-related vehicles are not expected to contribute significantly to CO concentrations exceeding the State or federal CO standards. Because no CO hot spot would occur, there would be no project-related impacts on CO concentrations.

## Greenhouse Gas Impact Analysis

### *Construction GHG Emissions*

During construction of the proposed project, GHGs would be emitted through the operation of construction equipment and from worker and vendor vehicles, each of which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as $CO_2$, $CH_4$, and $N_2O$. Furthermore, $CH_4$ is emitted during the fueling of heavy equipment. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change. Table H lists the annual GHG emissions from project construction.

### Table H: Construction Greenhouse Gas Emissions

| Construction Phase | | Total Regional Pollutant Emissions (MT/yr) | | | |
|---|---|---|---|---|---|
| | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| 2019 | Site Preparation | 50.0 | 0.0 | 0.0 | 51.0 |
| 2020 | Site Preparation | 33.0 | 0.0 | 0.0 | 33.0 |
| | Grading | 211.0 | 0.1 | 0.0 | 213.0 |
| | Building Construction | 548.0 | 0.1 | 0.0 | 549.0 |
| 2021 | Building Construction | 805.0 | 0.1 | 0.0 | 808.0 |
| | Architectural Coatings | 7.0 | 0.0 | 0.0 | 7.0 |
| 2022 | Building Construction | 347.0 | 0.0 | 0.0 | 348.0 |
| | Paving | 59.0 | 0.0 | 0.0 | 59.0 |
| | Architectural Coatings | 36.0 | 0.0 | 0.0 | 36.0 |
| **Total Construction Emissions** | | **2,096.0** | **0.3** | **0.0** | **2,104.0** |
| **Amortized over 30 years** | | **70.0** | **0.0** | **0.0** | **70.0** |

Source: Compiled by LSA Associates, Inc. (December 2017).
Note: Column totals may not add due to rounding from the model results.
$CH_4$ = methane
$CO_2$ = carbon dioxide
$CO_2e$ = carbon dioxide equivalent
MT/yr = metric tons per year
$N_2O$ = nitrous oxide

Per the SCAQMD guidance,[1] due to the long-term nature of the GHGs in the atmosphere, instead of determining significance of construction emissions alone, the total construction emissions are amortized over 30 years (an estimate of the life of the project), added to the operational emissions, and compared to the applicable GHG significance threshold. Amortized construction GHG emissions from Table H (70.0 MT $CO_2e$/yr) have been added to the operational GHG emissions in Table I below.

[1] South Coast Air Quality Management District, Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans. Website: http://www.aqmd.gov/docs/default-source/ceqa/ handbook/ greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2, accessed December 2017.

## Table I: Operational Greenhouse Gas Emissions

| Source | Pollutant Emissions, MT/year | | | | | |
|---|---|---|---|---|---|---|
| | Bio- $CO_2$ | NBio- $CO_2$ | Total $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Construction emissions amortized over 30 years | 0 | 70 | 70 | 0 | 0 | 70 |
| **Operational Emissions** | | | | | | |
| Area Sources | 0 | 46 | 46 | 0 | 0 | 47 |
| Energy Sources | 0 | 708 | 708 | 0 | 0 | 711 |
| Mobile Sources | 0 | 2,177 | 2,178 | 0 | 0 | 2,180 |
| Waste Sources | 43 | 0 | 43 | 3 | 0 | 106 |
| Water Usage | 4 | 75 | 79 | 0 | 0 | 91 |
| **Total Project Emissions** | **47** | **3,006** | **3,053** | **3** | **0** | **3,204** |
| | | | | | **SCAQMD Threshold** | **3,500** |
| | | | | | **Level of Significance Exceeded** | **No** |

Source: Compiled by LSA Associates, Inc. (December 2017).
Note: Column totals may not add due to rounding from the model results.
Bio-$CO_2$ = biologically generated $CO_2$ MT = metric tons
$CH_4$ = methane $N_2O$ = nitrous oxide
$CO_2$ = carbon dioxide NBio-$CO_2$ = Non-biologically generated $CO_2$
$CO_2e$ = carbon dioxide equivalent

### *Operational GHG Emissions*

The project consists of construction and operation of single family residences and a park. The total annual GHG emissions including amortized construction emissions from the project would be 3,204 MT $CO_2e$/yr. The GHG emission estimates presented in Table I show the emissions associated with the proposed project at opening. The attachment to this memorandum includes the CalEEMod outputs.

Therefore, annual GHG emissions would be below the screening threshold of 3,500 MT $CO_2e$/yr for residential projects, and GHG emissions would be considered to have a less than significant impact. The proposed project would not impede or interfere with achieving the State's emission reduction objectives in AB 32 (and EO S-03-05). Therefore, no mitigation is required.

Attachments: A – References
B – Figures 1 and 2
C – CalEEMod Modeling Runs

# ATTACHMENT A

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# ATTACHMENT B

# FIGURES 1–2

Figure 1: Regional Project Location

Figure 2: Project Vicinity

# ATTACHMENT C

# CALEEMOD MODELING RUNS