DRAFT

YUCCA VALLEY SENIOR HOUSING PROJECT

Air Quality and Greenhouse Gas Assessment

Prepared for:

RRM Design Group
232 Avenida Fabricante, Suite 112
San Clemente, CA 92676

Prepared by:

Impact Sciences, Inc.
234 E Colorado Boulevard, Suite 205
Pasadena, CA 91101
Tel: (626) 564-1500
Fax: (626) 564-1501

April 2011

SUMMARY

The air quality and climate change assessment for the proposed Yucca Valley Senior Housing Project ("project" or "proposed project"), located in Yucca Valley, unincorporated San Bernardino County, California, was prepared in accordance with the Mojave Desert Air Quality Management District's (MDAQMD) *California Environmental Quality Act (CEQA) and Federal Conformity Guidelines*[1] and other guidance provided by the MDAQMD. The proposed project consists of the development of a 75 unit senior housing project. Construction is anticipated to begin during the first quarter of 2012 and last 14 months. The proposed project would be operational in 2013.

The impacts associated with construction and operation of the proposed project were compared to the thresholds of significance established by the MDAQMD. Thresholds of significance during project construction are based on mass daily emission thresholds for volatile reactive organic compounds (VOCs), oxides of nitrogen (NO_X), carbon monoxide (CO), sulfur dioxide (SO_2), respirable particulate matter less than 10 microns in diameter (PM10), and fine particulate matter less than 2.5 microns in diameter (PM2.5). Thresholds of significance during project operation are based on mass daily emission thresholds for the air pollutants described above.

Based on the results of the air quality and climate change assessment, construction of the proposed project would exceed the MDAQMD criteria pollutant emissions threshold for VOC, primarily due to architectural coating activities. Operation of the project would not exceed any of the MDAQMD criteria pollutant emissions thresholds. Due to the project's proximity to State Route 62, on-site residents could potentially be exposed to elevated health impacts from motor vehicles. Mitigation measures **MM AQ-1** and **MM AQ-2** would be required to reduce construction-related VOC emissions and to reduce exposure to motor vehicle emissions from State Route 62. Implementation of these mitigation measures would reduce the project's air quality impacts to less than significant.

The proposed project would result in GHG emissions during construction and operation. However, the project would not exceed the draft threshold of significance under development by the SCAQMD. The project would also incorporate control measures that would reduce its GHG emissions beyond regulatory requirements. Because the project would not exceed the numerical threshold of significance and would include measures to reduce its GHG emissions, the project would not conflict with the State's ability to achieve GHG emission reductions pursuant to AB 32. Therefore, the project would result in a less than significant impact on GHG emissions and the global climate.

---

1 Mojave Desert Air Quality Management District, *CEQA and Federal Conformity Guidelines*, (2009).

Table of Contents

Section Page

Summary i

1.0 Introduction 3

2.0 Environmental Setting 3
- 2.1 Regional Climate 3
- 2.2 Regional Air Quality 4
- 2.3 Local Pollutant Concentrations 8
- 2.4 Greenhouse Gases 9

3.0 Regulatory Setting 15
- 3.1 Federal Regulations 15
- 3.2 State Regulations 16
- 3.3 Local Regulations 17
- 3.4 Greenhouse Gases 21

4.0 Methodology 27

5.0 Thresholds of Significance 28

6.0 Impact Analysis 30

7.0 Conclusion 41

List of Tables

Table Page

1 Ambient Air Quality Standards and Health Effects 5
2 Ambient Pollutant Concentrations Measured Near the Project Site 8
3 GHG Emissions in California 13
4 Comparison of Global Pre-Industrial and Current GHG Concentrations 15
5 Attainment Status – Mojave Desert Air Basin (MDAQMD) 16
6 MDAQMD Significance Thresholds 29
7 Estimated Construction Emissions 31
8 Estimated Operational Emissions 32
9 Estimated Construction Greenhouse Gas Emissions 37
10 Estimated Operational Greenhouse Gas Emissions 39

Appendix

A Criteria Pollutant and Greenhouse Gas Emission Calculations

1.0 INTRODUCTION

The proposed Yucca Valley Senior Housing Project ("project" or "proposed project") is located in the Town of Yucca Valley in San Bernardino County. The project site is approximately 2.5 acres and would result in the development of 75 senior housing dwelling units. The site is located on the north side of State Route 62 (Twentynine Palms Highway) and on the west side of Dumosa Avenue. Construction is anticipated to begin during the first quarter of 2012 and last 14 months. The proposed project would be operational in 2013.

This assessment provides an analysis of the project's potential to result in air quality and greenhouse gas (GHG) impacts. The analysis relies primarily on information contained in the Mojave Desert Air Quality Management District's (MDAQMD) *California Environmental Quality Act (CEQA) and Federal Conformity Guidelines*.[2] The MDAQMD has not yet adopted guidance for assessing the significance of GHG emissions from land use development projects. Therefore, based on consultations with MDAQMD staff, the project's GHG emissions are estimated and compared to the draft thresholds currently under development by the South Coast Air Quality Management District (SCAQMD) GHG CEQA Significance Threshold Working Group. Additional sources of information are relied upon as cited and discussed in this assessment.

2.0 ENVIRONMENTAL SETTING

2.1 Regional Climate

The project is located in the Mojave Desert Air Basin (MDAB). An air basin is a geographical region that shares the same air pollution concerns. The MDAB includes the desert portions of Los Angeles and San Bernardino Counties, the eastern desert portion of Kern County, and the northeastern desert portion of Riverside County. The MDAQMD has jurisdiction for air quality planning over the desert portion of San Bernardino County and the far eastern end of Riverside County. The region under the jurisdiction of the MDAQMD includes the incorporated communities of Adelanto, Apple Valley, Barstow, Blythe, Hesperia, Needles, Twentynine Palms, Victorville, and Yucca Valley.

The MDAB is an assemblage of mountain ranges interspersed with long broad valleys that often contain dry lakes. Many of the lower mountains which dot the vast terrain rise from 1,000 to 4,000 feet above the valley floor. Prevailing winds in the MDAB are out of the west and southwest, which are due to its proximity to coastal and central regions and the blocking nature of the Sierra Nevada mountains to the

---

2 Mojave Desert Air Quality Management District, *CEQA and Federal Conformity Guidelines*, (2009).

north. During the summer the MDAB is generally influenced by the Pacific Subtropical High cell that sits off the California coast, inhibiting cloud formation and encouraging daytime solar heating. The MDAB is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are weak and diffuse by the time they reach the desert. Most desert moisture arrives from infrequent warm, moist and unstable air masses from the south. The MDAB averages between three and seven inches of precipitation per year. The MDAB is classified as a dry-hot desert climate, with portions classified as dry-very hot desert, to indicate at least three months have maximum average temperatures over 100.4 degrees F. Due to the hot and dry climate, ozone and particulate matter pollution are of concern in the region.

2.2 Regional Air Quality

The determination of whether a region's air quality is healthful or unhealthful is evaluated by comparing contaminant levels in ambient air samples to federal and state standards. The United States Environmental Protection Agency (U.S. EPA) and the State of California have adopted health-based air quality standards, referred to as the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS) for the following seven criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (PM10), fine particulate matter (PM2.5), and lead (Pb). These standards were established to protect sensitive receptors from adverse health impacts due to exposure to air pollution with a margin of safety. The California standards are generally more stringent than the federal standards and in the case of PM10 and SO_2, much more stringent. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide and vinyl chloride, none of which have corresponding federal standards.

The CAAQS and NAAQS for each of the criteria pollutants and their effects on health are summarized in **Table 1, Ambient Air Quality Standards and Health Effects**. **Table 1** also sets forth the state ambient air quality standards and health effects applicable to sulfates, visibility reducing particles, hydrogen sulfide and vinyl chloride, even though such pollutants are generally not applicable to the proposed project.

Table 1
Ambient Air Quality Standards and Health Effects

Air Pollutant	Concentration/Averaging Time		Most Relevant Health Effects
	State Standard (CAAQS)	Federal Primary Standard (NAAQS)	
Ozone[1]	0.09 ppm, 1-hr. avg. 0.070 ppm, 8-hr avg.	0.075 ppm, 8-hr avg. (three-year average of annual 4th-highest daily maximum)	(a) Pulmonary function decrements and localized lung edema in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (e) Vegetation damage; and (f) Property damage
Nitrogen Dioxide[1]	0.18 ppm, 1-hr avg. 0.030 ppm, annual arithmetic mean	0.100 ppm, 1-hr avg. (three-year average of the 98th percentile of the daily maximum 1-hour average) 0.053 ppm, annual arithmetic mean	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extrapulmonary biochemical and cellular changes and pulmonary structural changes; and (c) Contribution to atmospheric discoloration
Carbon Monoxide	20 ppm, 1-hr avg. 9.0 ppm, 8-hr avg.	35 ppm, 1-hr avg. (not to be exceeded more than once per year) 9 ppm, 8-hr avg. (not to be exceeded more than once per year)	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; and (d) Possible increased risk to fetuses
Sulfur Dioxide[2]	0.25 ppm, 1-hr. avg. 0.04 ppm, 24-hr avg.	0.075 ppm, 1-hr avg. (three-year average of the 99th percentile)	Bronchoconstriction accompanied by symptoms, which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in person with asthma
Respirable Particulate Matter (PM10)	50 $\mu g/m^3$, 24-hr avg. 20 $\mu g/m^3$, annual arithmetic mean	150 $\mu g/m^3$, 24-hr avg. (not to be exceeded more than once per year on average over three years)	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function growth in children; and (c) Increased risk of premature death from heart or lung diseases in the elderly

Air Pollutant	Concentration/Averaging Time: State Standard (CAAQS)	Concentration/Averaging Time: Federal Primary Standard (NAAQS)	Most Relevant Health Effects
Fine Particulate Matter (PM2.5)	12 μg/m³, annual arithmetic mean	35 μg/m³, 24-hr avg. (three-year average of 98th percentile) 15 μg/m³, annual arithmetic mean (three-year average)	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function growth in children; and (c) Increased risk of premature death from heart or lung diseases in the elderly
Lead[3]	1.5 μg/m³, 30-day avg.	1.5 μg/m³, calendar quarter 0.15 μg/m³, three month rolling average	(a) Increased body burden, and (b) Impairment of blood formation and nerve conduction
Visibility-Reducing Particles	Reduction of visual range to less than 10 miles at relative humidity less than 70%, 8-hour avg. (10:00 AM–6:00 PM)	None	Visibility impairment on days when relative humidity is less than 70%.
Sulfates	25 μg/m³, 24-hr avg.	None	(a) Decrease in ventilatory function, (b) Aggravation of asthmatic symptoms, (c) Aggravation of cardio-pulmonary disease, (d) Vegetation damage, (e) Degradation of visibility, and (f) Property damage
Hydrogen Sulfide	0.03 ppm, 1-hr avg.	None	Odor annoyance
Vinyl Chloride[3]	0.01 ppm, 24-hr avg.	None	Known carcinogen

Source: South Coast Air Quality Management District, Final Program Environmental Impact Report for the 2007 Air Quality Management Plan, (2007) Table 3.1-1, p. 3.1-3.
μg/m³ = microgram per cubic meter.
ppm = parts per million by volume.

[1] *On January 25, 2010, the U.S. EPA promulgated a new 1-hour NO_2 standard. The new 1-hour standard is 0.100 parts per million (188 micrograms per cubic meter [μg/m³]) and became effective on April 12, 2010.*

[2] *On June 3, 2010, the U.S. EPA issued a new 1-hour SO_2 standard. The new 1-hour standard is 0.075 parts per million (196 μg/m³). The U.S. EPA also revoked the existing 24-hour and annual standards citing a lack of evidence of specific health impacts from long-term exposures. The new 1-hour standard became effective 60 days after publication in the Federal Register.*

[3] *CARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.*

Generally, the sources for hydrogen sulfide emissions include decomposition of human and animal wastes and industrial activities, such as food processing, coke ovens, kraft paper mills, tanneries, and petroleum refineries. There are no such uses or sources associated with the proposed project. Similarly, the sources for vinyl chloride emissions include manufacturing of plastic products, hazardous waste sites, and landfills; and there are no such uses or sources associated with the proposed project. As a result, there is no need for any further evaluation of the hydrogen sulfide or vinyl chloride emissions associated

with this project. In addition, the lead, sulfate and visibility reducing particle standards have not been exceeded anywhere in the MDAB for a number of years. Unleaded transportation fuels and paint have virtually eliminated lead a concern for most residential and commercial land use developments. Therefore, due to the project's size and associated types of air pollution sources, the proposed project is not expected to have any direct impact on those pollutants. Accordingly, this air quality analysis will focus primarily on the criteria air pollutants summarized below.

- **Ozone (O_3).** Ozone is a gas that is formed when volatile organic compounds (VOCs) and nitrogen oxides (NO_X), both byproducts of internal combustion engine exhaust and other sources undergo slow photochemical reactions in the presence of sunlight. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable to the formation of this pollutant. Ozone or ozone precursor emissions may be transported into the MDAB from other air basins, such as the San Joaquin Valley Air Basin or South Coast Air Basin.

- **Volatile Organic Compounds (VOCs).** VOCs are compounds comprised primarily of atoms of hydrogen and carbon. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Adverse effects on human health are not caused directly by VOCs, but rather by reactions of VOCs to form secondary air pollutants, including ozone. VOCs are also referred to as reactive organic compounds (ROCs) or reactive organic gases (ROGs). VOCs themselves are not criteria pollutants; however, they contribute to the formation of O_3.

- **Nitrogen Dioxide (NO_2).** NO_2 is a reddish-brown, highly reactive gas that is formed in the ambient air through the oxidation of nitric oxide (NO). NO_2 is also a byproduct of fuel combustion. The principle form of NO_X produced by combustion is NO, but NO reacts quickly to form NO_2, creating the mixture of NO and NO_2 referred to as NO_X. NO_2 acts as an acute irritant and, in equal concentrations, is more injurious than NO. At atmospheric concentrations NO_X is only potentially irritating. NO_2 absorbs blue light, the result of which is a brownish-red cast to the atmosphere and reduced visibility.

- **Carbon Monoxide (CO).** CO is a colorless, odorless gas produced by the incomplete combustion of fuels. CO concentrations tend to be the highest during winter mornings, with little to no wind, when surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines, unlike ozone, and motor vehicles operating at slow speeds are the primary source of CO in the basin, the highest ambient CO concentrations are generally found near congested transportation corridors and intersections.

- **Sulfur dioxide (SO_2).** SO_2 is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high-sulfur-content fuel oils and coal and from chemical processes occurring at chemical plants and refineries. When sulfur dioxide oxidizes in the atmosphere, it forms sulfates (SO_4).

- **Respirable Particulate Matter (PM10).** PM10 consists of extremely small, suspended particles or droplets 10 microns or smaller in diameter. Some sources of PM10, like pollen and windstorms, are naturally occurring. However, in populated areas, most PM10 is caused by road dust, diesel soot, combustion products, abrasion of tires and brakes, and construction activities.

- **Fine Particulate Matter (PM2.5).** PM2.5 refers to particulate matter that is 2.5 microns or smaller in size. The sources of PM2.5 include fuel combustion from automobiles, power plants, wood burning, industrial processes, and diesel-powered vehicles such as buses and trucks. These fine particles are also formed in the atmosphere when gases such as sulfur dioxide, NO_X, and VOCs are transformed in the air by chemical reactions.

2.3 Local Pollutant Concentrations

The MDAQMD monitors air pollutant concentrations throughout the MDAB. The nearest air pollutant monitoring station to the project site is the Joshua Tree National Monument monitoring station, located approximately 12 miles to the south. However, this station only monitors O_3 concentrations. Other monitoring stations in the project vicinity are located at the Palm Springs-Fire Station (20 miles south), Lucerne Valley-Middle School (35 miles northwest), and Victorville-Park Avenue (55 miles northwest). These stations were used to provide pollutant concentrations for NO_2, CO, SO_2, PM10, and PM2.5. **Table 2, Ambient Pollutant Concentrations Measured Near the Project Site**, lists the ambient pollutant concentrations registered and the exceedances of the NAAQS and CAAQS that have occurred at these monitoring stations from 2007 through 2009, the most recent years for which data are available.

Table 2
Ambient Pollutant Concentrations Measured Near the Project Site

Pollutant	Standards[1]	Year		
		2007	2008	2009
OZONE (O_3)				
Maximum 1-hour concentration (ppm)		0.129	0.140	0.121
Maximum 8-hour concentration (ppm)		0.107	0.110	0.104
Number of days exceeding state 1-hour standard	0.09 ppm	37	36	24
Number of days exceeding state 8-hour standard	0.070 ppm	108	108	90
Number of days exceeding federal 8-hour standard	0.075 ppm	81	72	59
NITROGEN DIOXIDE (NO_2)				
Maximum 1-hour concentration (ppm)		0.073	0.081	0.065
Annual average concentration (ppm)		0.018	0.016	0.015
Number of days exceeding state 1-hour standard	0.18 ppm	0	0	0
CARBON MONOXIDE (CO)				
Maximum 1-hour concentration (ppm)		2.1	1.4	N/A
Maximum 8-hour concentration (ppm)		1.61	1.04	1.14
Number of days exceeding state 1-hour standard	20 ppm	0	0	0
Number of days exceeding state 8-hour standard	9.0 ppm	0	0	0
SULFUR DIOXIDE (SO_2)				
Maximum 1-hour concentration (ppm)		0.009	0.006	N/A
Maximum 24-hour concentration (ppm)		0.005	0.002	0.005
Number of days exceeding state 1-hour standard	0.25 ppm	0	0	0
Number of days exceeding state 24-hour standard	0.04 ppm	0	0	0

Pollutant	Standards[1]	Year 2007	2008	2009
RESPIRABLE PARTICULATE MATTER (PM10)				
Maximum 24-hour concentration, state (μg/m³)		212.0	62.0	81.0
Maximum 24-hour concentration, federal (μg/m³)		229.0	67.0	93.0
Annual average concentration (μg/m³)		27.8	N/A	15.4
Number of samples exceeding state standard	50 μg/m³	6	2	1
Number of samples exceeding federal standard	150 μg/m³	1	0	0
FINE PARTICULATE MATTER (PM2.5)				
Maximum 24-hour concentration (μg/m³)		28.0	17.0	20.0
Annual average concentration (μg/m³)		9.7	N/A	9.3
Number of samples exceeding federal 24-hour standard	35 μg/m³	0	0	0

N/A = not available.
Sources: U.S. Environmental Protection Agency, "AirData," http://www.epa.gov/oar/data/. 2011.
California Air Resources Board, "iADAM Air Quality Data Statistics," http://www.arb.ca.gov/adam/. 2011.
[1] *Parts by volume per million of air (ppm), micrograms per cubic meter of air (μg/m³), or annual arithmetic mean (aam).*

2.4 Greenhouse Gases

Construction and operation of the proposed project would result in emissions of pollutants known as greenhouse gases (GHGs), which are pollutants that trap heat in the Earth's atmosphere and may alter or change the global climate.

2.4.1 Climate Change and Greenhouse Gas Background

Global climate change refers to any significant change in climate measurements, such as temperature, precipitation, or wind, lasting for an extended period (i.e., decades or longer).[3] Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHG and other gases to the atmosphere from volcanic eruptions); and
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

[3] U.S. Environmental Protection Agency, "Glossary of Climate Change Terms," http://www.epa.gov /climatechange/glossary.html#Climate_change. 2008.

The natural process through which heat is retained in the troposphere[4] is called the "greenhouse effect." The greenhouse effect traps heat in the troposphere through a three-fold process as follows: (1) short-wave radiation in the form of visible light emitted by the Sun is absorbed by the Earth as heat; (2) long-wave radiation re-emitted by the Earth; and (3) GHGs in the atmosphere absorbing or trapping the long-wave radiation and re-emitting it back towards the Earth and into space. This third process is the focus of current climate change actions.

While water vapor and carbon dioxide (CO_2) are the most abundant GHG, other trace GHGs have a greater ability to absorb and re-radiate long-wave radiation. To gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each GHG based on its ability to absorb and re-emit long-wave radiation over a specific time period. The GWP of a gas is determined using CO_2 as the reference gas with a GWP of 1 over 100 years. For example, a gas with a GWP of 10 is 10 times more potent than CO_2 over 100 years. The use of GWP allows GHG emissions to be reported using CO_2 as a baseline. The sum of each GHG multiplied by its associated GWP is referred to as carbon dioxide equivalents (CO_2e). This essentially means that 1 metric ton of a GHG with a GWP of 10 has the same climate change impacts as 10 metric tons of CO_2.

The primary effect of global climate change has been a rise in the average global tropospheric temperature of 0.2° Celsius per decade, determined from meteorological measurements world-wide between 1990 and 2005.[5] Climate change modeling using 2000 emission rates shows that further warming is likely to occur, which would induce further changes in the global climate system during the current century.[6] Changes to the global climate system and ecosystems and to California could include:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures;[7]
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets;[8]

---

4 The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface to 10 to 12 kilometers.

5 Intergovernmental Panel on Climate Change, "Climate Change 2007: The Physical Science Basis, Summary for Policymakers," http://ipcc-wg1.ucar.edu/wg1/docs/WG1AR4_SPM_PlenaryApproved.pdf. 2007.

6 Ibid.

7 Ibid.

8 Ibid.

- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;[9]

- Declining Sierra snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years;[10]

- Increasing the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21st century;[11]

- Increasing the potential for erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Delta and associated levee systems due to the rise in sea level;[12]

- Increasing pest infestation making California more susceptible to forest fires;[13] and

- Increasing the demand for electricity by 1 to 3 percent by 2020 due to rising temperatures resulting in hundreds of millions of dollars in extra expenditures.[14]

State law defines GHGs to include the following compounds:[15]

- **Carbon Dioxide (CO_2).** CO_2 is primarily generated from fossil fuel combustion from stationary and mobile sources. CO_2 is the most widely emitted GHG and is the reference gas (GWP of 1) for determining the GWPs of other GHGs.

- **Methane (CH_4).** Methane is emitted from biogenic sources (i.e., resulting from the activity of living organisms), incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. The GWP of methane is 21.

- **Nitrous Oxide (N_2O).** Is produced by human-related sources including agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of nitrous oxide is 310.

---

9 Ibid.

10 California Environmental Protection Agency, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, (2006).

11 Ibid.

12 Ibid.

13 Ibid.

14 Ibid.

15 All Global Warming Potentials are given as 100-year values. Unless noted otherwise, all Global Warming Potentials were obtained from the Intergovernmental Panel on Climate Change. *Climate Change 1995: The Science of Climate Change – Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge (UK): Cambridge University Press, 1996.

- **Hydrofluorocarbons (HFCs).** HFCs typically are used as refrigerants in both stationary refrigeration and mobile air conditioning. The use of HFCs for cooling and foam-blowing is growing particularly as the continued phase-out of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) gains momentum. The GWPs of HFCs ranges from 140 for HFC-152a to 11,700 for HFC-23.

- **Perfluorocarbons (PFCs).** Perfluorocarbons are compounds consisting of carbon and fluorine. They are primarily created as a byproduct of aluminum production and semiconductor manufacturing. Perfluorocarbons are potent GHGs with a Global Warming Potential several thousand times that of carbon dioxide, depending on the specific PFC. Another area of concern regarding PFCs is their long atmospheric lifetime (up to 50,000 years).[16] The GWPs of PFCs range from 5,700 to 11,900.

- **Sulfur Hexafluoride (SF_6).** Sulfur hexafluoride is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. Sulfur hexafluoride has a GWP of 23,900. However, it is not prevalent in the atmosphere (4 parts per trillion [ppt] in 1990 versus 365 parts per million [ppm] of CO_2).[17]

The primary GHGs of concern relative to the proposed project are CO_2, CH_4, and N_2O. These three GHGs are generally emitted from combustion activities. HFCs are associated with refrigeration and air conditioning and are accounted for in this analysis with respect to motor vehicle air conditioning system leakage. The other GHGs listed above are related to specific industrial uses and not anticipated to be emitted in measurable or substantial quantities by the proposed project.

2.4.2 State of California Greenhouse Gas Emissions Inventory

The California Air Resources Board (CARB) compiles GHG inventories for the State of California. Based on the 2008 GHG inventory data (i.e., the latest year for which data are available), California emitted 474 $MMTCO_2e$ ***including*** emissions resulting from imported electrical power in 2008.[18] Based on the CARB inventory data and GHG inventories compiled by the World Resources Institute, California's total statewide GHG emissions rank second in the United States (Texas is number one) with emissions of 417 $MMTCO_2e$ ***excluding*** emissions related to imported electrical power.[19]

The primary contributors to GHG emissions in California are transportation, electric power production from both in-state and out-of-state sources, industry, agriculture and forestry, and other sources, which include commercial and residential activities. **Table 3, GHG Emissions in California**, provides a

---

16 Energy Information Administration, "Other Gases: Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride," http://www.eia.doe.gov/oiaf/1605/gg00rpt/other_gases.html. n.d.

17 U.S. Environmental Protection Agency, "High GWP Gases and Climate Change," http://www epa gov /highgwp/scientific.html#sf6. n.d.

18 California Air Resources Board, "California Greenhouse Gas 2000-2008 Inventory by Scoping Plan Category - Summary," http://www.arb.ca.gov/cc/inventory/data/data.htm. 2010.

19 Ibid.

summary of GHG emissions reported in California in 1990 and 2008 separated by categories defined by the United Nations Intergovernmental Panel on Climate Change (IPCC).

Table 3
GHG Emissions in California

Source Category	1990 ($MMTCO_2e$)	Percent of Total	2008 ($MMTCO_2e$)	Percent of Total
ENERGY	**386.41**	**89.2%**	**413.80**	**86.6%**
Energy Industries	157.33	36.3%	171.23	35.8%
Manufacturing Industries & Construction	24.24	5.6%	16.67	3.5%
Transport	150.02	34.6%	173.94	36.4%
Other (Residential/Commercial/Institutional)	48.19	11.1%	46.59	9.8%
Non-Specified	1.38	0.3%	0.00	0.0%
Fugitive Emissions from Oil & Natural Gas	2.94	0.7%	3.28	0.7%
Fugitive Emissions from Other Energy Production	2.31	0.5%	2.09	0.4%
INDUSTRIAL PROCESSES & PRODUCT USE	**18.34**	**4.2%**	**30.11**	**6.3%**
Mineral Industry	4.85	1.1%	5.35	1.1%
Chemical Industry	2.34	0.5%	0.06	0.0%
Non-Energy Products from Fuels & Solvent Use	2.29	0.5%	1.97	0.4%
Electronics Industry	0.59	0.1%	0.80	0.2%
Substitutes for Ozone Depleting Substances	0.04	0.0%	13.89	2.9%
Other Product Manufacture and Use	3.18	0.7%	1.66	0.3%
Other	5.05	1.2%	6.39	1.3%
AGRICULTURE, FORESTRY, & OTHER LAND USE	**19.11**	**4.4%**	**24.42**	**5.1%**
Livestock	11.67	2.7%	16.28	3.4%
Land	0.19	0.0%	0.19	0.0%
Aggregate Sources & Non-CO_2 Sources on Land	7.26	1.7%	7.95	1.7%
WASTE	**9.42**	**2.2%**	**9.41**	**2.0%**
Solid Waste Disposal	6.26	1.4%	6.71	1.4%
Wastewater Treatment & Discharge	3.17	0.7%	2.70	0.6%
EMISSIONS SUMMARY				
Gross California Emissions	433.29		477.74	
Sinks from Forests and Rangelands	-6.69		-3.98	
Net California Emissions	426.60		473.76	

Sources:

[1] *California Air Resources Board, "California Greenhouse Gas 1990-2004 Inventory by IPCC Category - Summary," http://www.arb.ca.gov/cc/inventory/archive/archive.htm. 2010.*

[2] *California Air Resources Board, "California Greenhouse Gas 2000-2008 Inventory by IPCC Category - Summary," http://www.arb.ca.gov/cc/inventory/data/data.htm. 2010.*

Between 1990 and 2008, the population of California grew by approximately 8.1 million (from 29.8 to 37.9 million).[20] This represents an increase of approximately 27.2 percent from 1990 population levels. In addition, the California economy, measured as gross state product, grew from $788 billon in 1990 to $1.8 trillion in 2008 representing an increase of approximately 128 percent (over twice the 1990 gross state product).[21] Despite the population and economic growth, California's net GHG emissions only grew by approximately 11 percent. The California Energy Commission (CEC) attributes the slow rate of growth to the success of California's renewable energy programs and its commitment to clean air and clean energy.[22]

2.4.3 Global Ambient CO_2, CH_4, and N_2O Concentrations

Air trapped by ice has been extracted from core samples taken from polar ice sheets to determine the global atmospheric variation of carbon dioxide, methane, and nitrous oxide from before the start of the industrialization, around 1750, to over 650,000 years ago. For that period, it was found that carbon dioxide concentrations ranged from 180 ppm to 300 ppm. For the period from around 1750 to the present, global carbon dioxide concentrations increased from a pre-industrialization period concentration of 280 ppm to 379 ppm in 2005, with the 2005 value far exceeding the upper end of the pre-industrial period range.[23] Recent values continue this upward trend. Global methane and nitrous oxide concentrations show similar increases for the same period (see **Table 4, Comparison of Global Pre-Industrial and Current GHG Concentrations**).

---

20 U.S. Census Bureau, "Data Finders," http://www.census.gov/. 2009; California Department of Finance, "E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-1008, with 2000 Benchmark," http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2009/. 2010.

21 California Department of Finance, "Financial & Economic Data: Gross Domestic Product, California," http://www.dof.ca.gov/HTML/FS_DATA/LatestEconData/FS_Misc.htm. 2010. Amounts are based on current dollars as of the data of the report (June 2, 2009).

22 California Energy Commission, *Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004*, (2006).

23 California Energy Commission, *Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004*, (2006).

Table 4
Comparison of Global Pre-Industrial and Current GHG Concentrations

Greenhouse Gas	Natural Range for Last 650,000 Years[1] (ppm)	Year 1750 Concentrations (Early Industrial Period)[1] (ppm)	Year 2005 Concentrations[1] (ppm)	Year 2010 Concentrations[2,3] (ppm)
Carbon Dioxide (CO_2)	180 to 300	280	379	390
Methane (CH_4)	0.320 to 0.790	0.715	1.774	1.870 / 1.745
Nitrous Oxide (N_2O)	0.180 to 0.260	0.270	0.319	0.323 / 0.322

Sources:

1 *Intergovernmental Panel on Climate Change, Climate Change 2007: The Physical Science Basis, (2007) 3, 100.*

2 *Dr. Pieter Tans, National Oceanic and Atmospheric Administration (NOAA)/Earth System Research Laboratory (ESRL), "Trends in Atmospheric Carbon Dioxide," http://www.esrl.noaa.gov/gmd/ccgg/trends. 2011.*

3 *Carbon Dioxide Information Analysis Center, "Recent Greenhouse Gas Concentrations," http://cdiac.ornl.gov/pns/current_ghg.html. 2011. The first value for CH_4 and N_2O represents Mace Head, Ireland, a mid-latitude Northern-Hemisphere site, and the second value represents Cape Grim, Tasmania, a mid-latitude Southern-Hemisphere site.*

3.0 REGULATORY SETTING

3.1 Federal Regulations

The U.S. EPA is responsible for enforcing the federal Clean Air Act (CAA) and the NAAQS. The U.S. EPA also has regulatory and enforcement jurisdiction over emission sources beyond state waters, and those sources that are under the exclusive authority of the federal government, such as aircraft, locomotives, and interstate trucking. As part of its enforcement responsibilities, the U.S. EPA requires each state with areas that do not meet the NAAQS to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the time frame identified in the SIP. The U.S. EPA formally classifies air basins as attainment or nonattainment based on whether the region meets or exceeds the NAAQS. The status of the SCCAB with respect to attainment with the PM10 and PM2.5 NAAQS is summarized in **Table 5, Attainment Status – Mojave Desert Air Basin (MDAQMD)**.

In response to rapid population growth and the associated rise in motor vehicle operations, the 1990 Clean Air Act Amendments addressed tailpipe emissions from automobiles, heavy-duty engines, and diesel fuel engines. The amendments established more stringent standards for hydrocarbons, NO_X, and CO emissions in order to reduce the ozone and carbon monoxide levels in heavily populated areas. Under the 1990 Clean Air Act, new fuels were required to be less volatile, contain less sulfur (regarding diesel fuel), and have higher levels of oxygenates (oxygen-containing substances to improve fuel

combustion). The U.S. EPA also has regulatory and enforcement jurisdiction over emission sources beyond state waters (outer continental shelf), and those that are under the exclusive authority of the federal government, such as aircraft, locomotives, and interstate trucking. Due to the lack of a substantial reduction in hazardous emissions under the 1977 Clean Air Act, the 1990 Clean Air Act Amendments listed 189 hazardous air pollutants (HAPs), which are carcinogenic, mutagenic, and/or reproductive toxicants, to be reduced. The 1990 Clean Air Act Amendments impacts major stationary sources and area emissions sources requiring use of Maximum Achievable Control Technology (MACT) to reduce HAP emissions and their associated health impacts.

Table 5
Attainment Status – Mojave Desert Air Basin (MDAQMD)

Pollutant	State	Federal
Ozone (O_3)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment	Unclassified/Attainment
Nitrogen Dioxide (NO_2)	Attainment	Unclassified/Attainment
Sulfur Dioxide (SO_2)	Attainment	Unclassified/Attainment
Respirable Particulates (PM10)	Nonattainment	Nonattainment
Fine Particulates (PM2.5)	Nonattainment	Unclassified/Attainment
Lead (Pb)	Attainment	Unclassified
Sulfates (SO_4)	Attainment	—
Hydrogen Sulfide (H_2S)	Unclassified	—
Vinyl Chloride	Unclassified	—
Visibility-Reducing Particles	Unclassified	—

Sources:
California Air Resources Board, "Area Designations Maps / State and National," http://www.arb.ca.gov/desig/adm/adm.htm. 2011.
U.S. Environmental Protection Agency, "Air Quality Maps," http://www.epa.gov/region9/air/maps/index.html. 2011.

3.2 State Regulations

CARB oversees air quality planning and control throughout California. It is primarily responsible for ensuring the implementation of the California Clean Air Act, responding to the federal Clean Air Act planning requirements applicable to the state, and regulating emissions from motor vehicles and consumer products within the state. In addition, CARB also sets health based air quality standards and control measures for toxic air contaminants (TACs). Much of CARB's research goes toward automobile emissions, as they are primary contributors to air pollution in California. Under the Clean Air Act, CARB has the authority to establish more stringent standards for vehicles sold in California and for various types of equipment available commercially. It also sets fuel specifications to further reduce vehicular emissions.

The California Clean Air Act established a legal mandate for air basins to achieve the CAAQS by the earliest practical date. Health and Safety Code Section 39607(e) requires CARB to establish and periodically review area designation criteria. These designation criteria provide the basis for CARB to designate areas of the state as attainment, nonattainment, or unclassified according to state standards. CARB makes area designations for ten criteria pollutants: O_3, CO, NO_2, SO_2, PM10, PM2.5, sulfates, lead, hydrogen sulfide, and visibility-reducing particles.[24] Air quality of a region is considered to be in attainment of the state standards if the measured ambient air pollutant levels for O_3, CO, NO_2, PM10, PM2.5, SO_2 (1- and 24-hour), and lead are not exceeded, and all other standards are not equaled or exceeded at any time in any consecutive three-year period. The status of the portion of the MDAB in which the project is located is summarized in **Table 5**.

3.3 Local Regulations

3.3.1 Mojave Desert Air Quality Management District

The management of air quality in the portion of the MDAB in which the project is located is the responsibility of the MDAQMD. The MDAQMD is responsible for bringing air quality in the areas under its jurisdiction into conformity with federal and state air quality standards, monitoring ambient air pollutant levels, and for developing and implementing attainment strategies to ensure that future emissions will be within federal and state standards.

The MDAQMD primarily regulates emissions from stationary sources such as manufacturing and power generation. Mobile sources such as buses, automotive vehicles, trains, and airplanes are largely out of the MDAQMD's jurisdiction and are up to CARB and the U.S. EPA to regulate. In order to achieve air quality standards, the MDAQMD adopts air quality attainment plans that serve as a guideline to bring pollutant concentrations into attainment with federal and state standards. The MDAQMD determines if certain rules and control measures are appropriate for their specific region according to technical feasibility, cost effectiveness, and the severity of nonattainment. Once the MDAQMD has adopted rules, control measures, and permit programs, it is responsible for implementing and enforcing compliance with those rules, control measures, and programs.

---

24 California Air Resources Board, "Area Designations (Activities and Maps)," http://www.arb.ca.gov/desig/desig.htm. 2010. According to California Health and Safety Code, Section 39608, "state board, in consultation with the districts, shall identify, pursuant to subdivision (e) of Section 39607, and classify each air basin which is in attainment and each air basin which is in nonattainment for any state ambient air quality standard." Section 39607(e) states that the State shall "establish and periodically review criteria for designating an air basin attainment or nonattainment for any state ambient air quality standard set forth in Section 70200 of Title 17 of the California Code of Regulations. California Code of Regulations, Title 17, Section 70200 does not include vinyl chloride; therefore, CARB does not make area designations for vinyl chloride.

MDAQMD CEQA and Federal Conformity Guidelines

The MDAQMD prepared the 2009 *California Environmental Quality Act (CEQA) And Federal Conformity Guidelines* to assist local government agencies and consultants in preparing environmental documents for projects subject to CEQA.[25] The SCAQMD is in the process of developing an *Air Quality Analysis Guidance Handbook* to replace the *CEQA Air Quality Handbook*. The documents describe the criteria that MDAQMD uses when reviewing and commenting on the adequacy of environmental documents. The handbook recommends thresholds of significance in order to determine if a project will have a significant adverse environmental impact.

MDAQMD Air Quality Attainment Plans

The MDAQMD has adopted state and federal attainment plans for the region within its jurisdiction. The most recent such plan that was approved by U.S. EPA is the MDAQMD *2004 Ozone Attainment Plan* adopted in 2004. The MDAQMD has reviewed and updated all elements of the ozone plan in its *2008 Federal 8-Hour Ozone Attainment Plan*. The revised plan demonstrates that the portion of the MDAQMD designated as a federal 8-hour ozone non-attainment area (FONA) will be in attainment of the 8-hour NAAQS for ozone by 2021. The plan includes the latest planning assumptions regarding population, vehicle activity and industrial activity and addresses all existing and forecast ozone precursor producing activities within the MDAQMD through the year 2020. The plan includes all necessary information to allow general and transportation conformity findings to be made within the MDAQMD.

The MDAQMD has also adopted its *Mojave Desert Planning Area Federal Particulate Matter (PM10) Attainment Plan* in 1995. The U.S. EPA designated a major portion of the San Bernardino County area as a PM10 nonattainment area. The designation was based on a number of violations which occurred in the populated areas of the MDAQMD during the period 1989-1991. In consideration of the location of the observed violations and the sources of PM10, this Plan identifies a smaller nonattainment area surrounding the heavily populated cities and towns in the MDAQMD. This region includes the Victor Valley, Morongo Basin, Barstow, and Lucerne Valley, and is referred to as the Mojave Desert Planning Area (MDPA). Fugitive dust from local sources and occasionally by region-wide wind blown dust during moderate to high wind episodes contribute to the region's PM10 issues. The Plan requires local sources to be controlled with strategies that focus on unpaved road travel, construction, and local disturbed areas in the populated areas, and certain stationary sources operating in the rural Lucerne Valley. According to the Plan, it is not feasible to implement control measures to reduce dust from regional wind events.

---

[25] Mojave Desert Air Quality Management District, *California Environmental Quality Act (CEQA) And Federal Conformity Guidelines*, (2009).

MDAQMD Rules and Regulations

The MDAQMD is responsible for limiting the amount of emissions that can be generated throughout the MDAB by various stationary, area, and mobile sources. Specific rules and regulations have been adopted by the MDAQMD Governing Board, which limit the emissions that can be generated by various uses/activities and that identify specific pollution reduction measures which must be implemented in association with various uses and activities. These rules not only regulate the emissions of the federal and state criteria pollutants but also toxic air contaminants and acutely hazardous materials. The rules are also subject to ongoing refinement by the MDAQMD. The following rules listed below are several of the key rules that are generally applicable to the proposed project.

- **Rule 403 (Fugitive Dust)** – This rule requires fugitive dust emissions to be minimized beyond the property line of the source. This rule also requires that every reasonable precaution be made to prevent visible particulate matter from being deposited on public roadways.

- **Rule 403.2 (Fugitive Dust Control for the MPDA)** – This rule requires fugitive dust sources to implement best management practices to reduce to reduce fugitive dust emissions during construction/demolition, unpaved road travel, weed abatement, limestone processing, and other dust-generating activities.

- **Rule 1113 (Architectural Coatings)** – This rule requires manufacturers, distributors, and end-users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

Stationary sources are subject to MDAQMD rules are regulated through the MDAQMD's permitting process. Through this permitting process, the MDAQMD monitors the amount of stationary emissions being generated and uses this information in developing air quality attainment plans. The proposed project would be subject to MDAQMD rules and regulations to reduce specific emissions and to mitigate potential air quality impacts; however, the project would not include any permitted stationary sources.[26]Southern California Association of Governments

The Southern California Association of Governments is a council of governments for the Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura and serves as the region's Metropolitan Planning Organization (MPO). Although SCAG is not an air quality management agency, it is responsible for several air quality planning issues. Specifically, as the designated MPO for the Southern California region, it is responsible, pursuant to Section 176(c) of the 1990 amendments to the Clean Air

---

26 MDAQMD Rule 219 (Equipment not requiring a permit) lists specific equipment that does not require an MDAQMD permit. Among these include natural-gas fired boilers (e.g., water heaters) less than 2,000,000 British thermal units (Btu) per hour.

Act, for providing current population, employment, travel, and congestion projections for regional air quality planning efforts.

3.3.2 Town of Yucca Valley

The Town of Yucca Valley Comprehensive General Plan defines goals and policies related to air quality. The specific policies of the General Plan that are particularly relevant to the proposed project are as follows:

Air Quality Element

Goal — Preservation and enhancement of the Mojave Desert region's air quality, in order to assure long-term availability of clean and healthful air in the Town of Yucca Valley, for the protection of the health and welfare of the community as a whole.

- Policy 3 — Town land use planning shall include efforts to separate sensitive land uses from sources of air pollution.
  - Program 3.B — Include buffer zones within residential and other sensitive receptor site plans to separate those uses from highways, arterial, point sources and hazardous material locations.
- Policy 5 — Promote the safe and efficient movement of people and materials into and through the Town as a means of reducing the impact of automobiles on local air quality.
  - Program 5.D — Initiate and encourage the use of alternative (clean) energy sources for transportation, heating, and cooling. The Town shall also initiate pilot studies and/or demonstration programs in order to promote these uses.
  - Program 5.E — Take appropriate action to limit the excessive production of smoke in both residential and commercial areas.
- Policy 6 — All development proposals brought before the Town will be reviewed for potential adverse effects on air quality and will be required to mitigate any significant impacts.

Program 6.A Conduct and initial study for all applications which have the potential to affect air quality.

Policy 7 Due to the fact that some land uses support populations that are especially sensitive to air contaminants, such as schools and hospitals, the Town of Yucca Valley shall develop and support regulations with this sensitivity in mind.

Program 7.A Formulate standards for the regulation of location and protection of sensitive receptors from excessive and hazardous emissions.

3.4 Greenhouse Gases

3.4.1 U.S. Environmental Protection Agency

On September 15, 2009, the U.S. EPA and the Department of Transportation's (DOT) National Highway Traffic Safety Administration (NHTSA) issued a joint proposal to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. The proposed standards would be phased in and would require passenger cars and light-duty trucks to comply with a declining emissions standard. In 2012, passenger cars and light-duty trucks would have to meet an average emissions standard of 295 grams of CO_2 per mile and 30.1 miles per gallon.[27] By 2016, the vehicles would have to meet an average standard of 250 grams of CO_2 per mile and 35.5 miles per gallon.[28] The final standards were adopted by the U.S. EPA and DOT on April 1, 2010.

On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) in the atmosphere threaten the public health and welfare of current and future generations.

---

27 U.S. Environmental Protection Agency, "EPA and NHTSA Propose Historic National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks," http://epa.gov/otaq/climate /regulations/420f09047a.htm. 2009.

28 U.S. EPA, "EPA and NHTSA Propose Historic Nation Program," 2009.

- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

While these findings do not impose additional requirements on industry or other entities, this action is a prerequisite to finalizing the U.S. EPA's proposed GHG emissions standards for light-duty vehicles, which were jointly proposed by the U.S. EPA and the NHTSA. On April 1, 2010, the U.S. EPA and NHTSA issued final rules requiring that by the 2016 model-year, manufacturers must achieve a combined average vehicle emission level of 250 grams CO_2 per mile, which is equivalent to 35.5 miles per gallon as measured by U.S. EPA standards.

3.4.2 State of California

The State of California has enacted regulations that target reductions in GHG emissions. The major regulations, policies, and legislation are provided below in approximate chronological order.

Title 24 Building Standards Code

The CEC first adopted Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the state. Although not originally intended to reduce GHG emissions, increased energy efficiency and reduced consumption of electricity, natural gas, and other fuels would result in fewer GHG emissions from residential and nonresidential buildings subject to the standard. The standards are updated periodically to allow for the consideration and inclusion of new energy efficiency technologies and methods. The latest revisions were adopted in 2008 and became effective on January 1, 2010.

Part 11 of the Title 24 Building Standards Code is referred to as the California Green Building Standards Code (CALGreen Code). The purpose of the CALGreen Code is to "improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: 1) Planning and design; 2) Energy efficiency; 3) Water efficiency and conservation; 4) Material conservation and resource efficiency; and 5) Environmental air quality."[29] The CALGreen Code is not intended to substitute for or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California Building Standards Commission (CBSC). The CBSC has released a *2010 Draft California Green Building*

---

29 California Building Standards Commission, 2008 California Green Building Standards Code, (2009) 3.

Standards Code on its website.[30] Part 11 of the Title 24 Building Standards Code became effective on January 1, 2011. Unless otherwise noted in the regulation, all newly constructed buildings in California are subject to the requirements of the CALGreen Code.

Assembly Bill 1493

In response to the transportation sector's contribution of more than half of California's CO_2 emissions, Assembly Bill 1493 (AB 1493, Pavley) was enacted on July 22, 2002. AB 1493 requires CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles whose primary use is noncommercial personal transportation. CARB adopted the standards in September 2004. The new standards would phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22 percent in greenhouse gas emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30 percent.

However, before these regulations could go into effect, the U.S. EPA had to grant California a waiver under the federal CAA, which ordinarily preempts state regulation of motor vehicle emission standards. On June 30, 2009, the U.S. EPA formally approved California's waiver request. On September 15, 2009, the U.S. EPA and the Department of Transportation's (DOT) National Highway Traffic Safety Administration (NHTSA) issued a joint proposal to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. The proposed standards would be phased in and would require passenger cars and light-duty trucks to comply with a declining emissions standard. In 2012, passenger cars and light-duty trucks would have to meet an average emissions standard of 295 grams of CO_2 per mile and 30.1 miles per gallon.[31] By 2016, the vehicles would have to meet an average standard of 250 grams of CO_2 per mile and 35.5 miles per gallon.[32] These standards were formally adopted by the U.S. EPA and DOT on April 1, 2010. In light of the U.S. EPA and NHTSA standards, California—and states adopting California emissions standards—have agreed to defer to the proposed national standard through model year 2016 if granted a waiver by the U.S. EPA. The 2016 endpoint of the two standards is similar, although the national standard ramps up slightly more slowly than required under the California standard. The

---

30 California Building Standards Commission, "CALGreen," http://www.bsc.ca.gov/CALGreen/default.htm. 2010.

31 U.S. Environmental Protection Agency, "EPA and NHTSA Propose Historic National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks," http://epa.gov/otaq/climate /regulations/420f09047a.htm. 2009.

32 U.S. EPA, "EPA and NHTSA Propose Historic Nation Program," 2009.

Pavley standards require additional reductions in CO_2 emissions beyond 2016 (referred to as Phase II standards), which have not yet been defined.

Executive Order S-3-05 and the Climate Action Team

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals: GHG emissions should be reduced to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050. The Secretary of California Environmental Protection Agency (CalEPA) is required to coordinate efforts of various agencies in order to collectively and efficiently reduce GHGs. Some of the agency representatives involved in the GHG reduction plan include the Secretary of the Business, Transportation and Housing Agency, the Secretary of the Department of Food and Agriculture, the Secretary of the Resources Agency, the Chairperson of CARB, the Chairperson of the CEC, and the President of the Public Utilities Commission. Representatives from these agencies comprise the Climate Action Team.

Assembly Bill 32

In furtherance of the goals established in Executive Order S-3-05, the Legislature enacted Assembly Bill 32 (AB 32, Nuñez and Pavley), the California Global Warming Solutions Act of 2006, which Governor Schwarzenegger signed on September 27, 2006. AB 32 represents the first enforceable statewide program to limit GHG emissions from all major industries with penalties for noncompliance. AB 32 requires the State to undertake several actions – the major requirements are discussed below:

CARB Early Action Measures

CARB is responsible for carrying out and developing the programs and requirements necessary to achieve the goals of AB 32—the reduction of California's GHG emissions to 1990 levels by 2020. The first action under AB 32 resulted in CARB's adoption of a report listing three specific early action greenhouse gas emission reduction measures on June 21, 2007. On October 25, 2007, CARB approved an additional six early action GHG reduction measures under AB 32. CARB has adopted regulations for all early action measures. The original three adopted early action regulations meeting the narrow legal definition of "discrete early action GHG reduction measures" include:

- A low-carbon fuel standard to reduce the "carbon intensity" of California fuels;
- Reduction of refrigerant losses from motor vehicle air conditioning system maintenance to restrict the sale of "do-it-yourself" automotive refrigerants; and
- Increased methane capture from landfills to require broader use of state-of-the-art methane capture technologies.

The additional six early action regulations adopted on October 25, 2007, also meeting the narrow legal definition of "discrete early action GHG reduction measures," include:

- Reduction of aerodynamic drag, and thereby fuel consumption, from existing trucks and trailers through retrofit technology;
- Reduction of auxiliary engine emissions of docked ships by requiring port electrification;
- Reduction of perfluorocarbons from the semiconductor industry;
- Reduction of propellants in consumer products (e.g., aerosols, tire inflators, and dust removal products);
- Require that all tune-up, smog check and oil change mechanics ensure proper tire inflation as part of overall service in order to maintain fuel efficiency; and
- Restriction on the use of sulfur hexafluoride (SF_6) from non-electricity sectors if viable alternatives are available.

State of California 1990 Greenhouse Gas Inventory

As required under AB 32, on December 6, 2007, CARB approved the 1990 greenhouse gas emissions inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was set at 427 $MMTCO_2e$. The inventory revealed that in 1990 transportation, with 35 percent of the state's total emissions, was the largest single sector generating carbon dioxide, followed by industrial emissions, 24 percent; imported electricity, 14 percent; in-state electricity generation, 11 percent; residential use, 7 percent; agriculture, 5 percent; commercial uses, 3 percent; and forestry emissions (excluding sinks) less than 1 percent. These figures represent the 1990 values. AB 32 does not require individual sectors to meet their individual 1990 GHG emissions inventory; the total statewide emissions are required to meet the 1990 threshold by 2020.

Climate Change Scoping Plan

As indicated above, AB 32 requires CARB to adopt a scoping plan indicating how reductions in significant GHG sources will be achieved through regulations, market mechanisms, and other actions. CARB released the *Climate Change Scoping Plan* in October 2008, which contained an outline of the proposed State strategies to achieve the 2020 GHG emission limits. The CARB Governing Board approved the *Climate Change Scoping Plan* on December 11, 2008. The *Climate Change Scoping Plan* indicates how emissions reductions will be achieved from significant sources of GHGs via regulations, market mechanism, and other actions. The *Climate Change Scoping Plan* identifies 18 recommended strategies the state should implement to achieve AB 32. As of October 2010, CARB has identified ongoing

programs and has adopted regulations for 29 individual measures to reduce GHG emissions in accordance with the *Climate Change Scoping Plan* strategies. CARB will continue to draft additional rule language and conduct public workshops and rulemaking procedures through 2011 and is scheduled to finalize regulations by January 1, 2012.

Key elements of the *Climate Change Scoping Plan* include the following recommendations:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

Under the *Climate Change Scoping Plan*, approximately 85 percent of the State's emissions are subject to a cap-and-trade program where covered sectors are placed under a declining emissions cap. The emissions cap incorporates a margin of safety whereby the 2020 emissions limit will still be achieved even in the event that uncapped sectors do not fully meet their anticipated emission reductions. Emissions reductions will be achieved through regulatory requirements and the option to reduce emissions further or purchase allowances to cover compliance obligations. It is expected that emission reductions from the cap-and-trade program will account for a significant portion of the reductions required by AB 32.

Executive Order S-1-07

On January 18, 2007, California set a new Low Carbon Fuel Standard (LCFS) for transportation fuels sold within the state. Executive Order S-1-07 sets a declining standard for GHG emissions measured in CO_2-equivalent grams per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10 percent by 2020. The LCFS will apply to refiners, blenders, producers, and importers of transportation fuels and will use market-based mechanisms to allow these providers to choose how they reduce emissions during the "fuel cycle" using

the most economically feasible methods. CARB identified the LCSF as an early action item under AB 32 and the final regulation was adopted on April 23, 2009.

Senate Bill 97

In August 2007 the legislature enacted SB 97 (Dutton), which directed the Governor's Office of Planning and Research (OPR) to develop guidelines under CEQA for the mitigation of greenhouse gas emissions. In its work to formulate CEQA Guideline Amendments for GHG emissions, OPR submitted the *Proposed Draft CEQA Guideline Amendments for Greenhouse Gas Emissions* to the Secretary for Natural Resources on April 13, 2009. The Natural Resources Agency conducted formal rulemaking procedures and adopted the final CEQA Guideline Amendments on December 30, 2009.

4.0 METHODOLOGY

The air quality and GHG assessment of the proposed project utilized state-approved air quality models and guidelines as tools to create the analytical basis for the analysis. The California Emissions Estimator Model (CalEEMod)[33] was used to analyze the proposed project emissions during construction and operation. CalEEMod is a program that calculates air emissions from land use sources and incorporates CARB's EMFAC2007 model for on-road vehicle emissions and the OFFROAD2007 model for off-road vehicle emissions. The model also incorporates factors specific to the project region, such as VOC content in architectural coating and vehicle fleet mixes. During project construction, the model can analyze emissions that occur during different phases, such as building construction and architectural coating, concurrently or separately.

Site-specific or project-specific data were used in the CalEEMod model where available. The project applicant provided the estimated construction schedule and information. The number and type of construction equipment, vendor trips (e.g., transport of building materials) and worker trips was based on default assumptions provided in the CalEEMod model. Construction of the proposed project would begin during the first quarter of 2012 and would last 14 months. Construction includes grading, trenching, building construction, asphalt paving, and architectural coating. The proposed project would be operational in 2013.

---

33 Environ, "CalEEMod, version 2011.1.1," http://www.caleemod.com/.

5.0 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the *State CEQA Guidelines*, the proposed project would have a significant impact on air quality if it would:

- conflict with or obstruct implementation of the applicable air quality plan;
- violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

The Natural Resources Agency adopted amendments to *State CEQA Guidelines* pursuant to Senate Bill (SB) 97. The amendments include criteria for evaluating the significance of a project's GHG emissions.[34] According to the adopted amendments, a project would have a significant effect on the environment if:

- The project generates greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.
- The project conflicts with any applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The *CEQA Guidelines* Section 15064.7 provides the significance criteria established by the applicable air quality management district or air pollution control district, when available, may be relied upon to make determinations of significance. The MDAQMD *CEQA and Federal Conformity Guidelines* provides significance thresholds for assessing the significance of criteria air pollutants from construction and operation. Exceedance of the MDAQMD thresholds could result in a potentially significant air quality impact.

The MDAQMD has not yet adopted guidance for assessing the significance of GHG emissions from land use development projects. Therefore, based on consultations with MDAQMD staff, the project's GHG emissions are estimated and compared to the draft thresholds currently under development by the South Coast Air Quality Management District (SCAQMD) GHG CEQA Significance Threshold Working Group.

---

34 The adopted amendments are available at the following website: http://ceres.ca.gov/ceqa/guidelines/. 2009.

Based on the above, the project would result in a potentially significant impact to air quality if it:

- Generates total criteria pollutant emissions emissions during construction or operation (direct and indirect) in excess of the thresholds given in **Table 6, MDAQMD Significance Thresholds**; and/or,
- Causes or contributes to a violation of any ambient air quality standard when added to the local background; and/or,
- Does not conform with the applicable attainment or maintenance plan(s); and/or,
- Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1; and/or
- Exposes sensitive receptors to objectionable odors affecting a substantial number of people.

Table 6
MDAQMD Significance Thresholds

Criteria Pollutant	Annual Threshold (Tons)	Daily Threshold (Pounds)
Volatile Organic Compounds (VOC)	25	137
Nitrogen Oxides (NO_x)	25	137
Carbon Monoxide (CO)	100	548
Sulfur Oxides (SO_x)	25	137
Respirable Particulate Matter (PM10)	15	82
Fine Particulate Matter (PM2.5)	15	82

Source: Mojave Desert Air Quality Management District, CEQA and Federal Conformity Guidelines, *(2009) 10.*
Note: The MDAQMD has adopted significance thresholds for H_2S and lead; however, as discussed previously, the project would not emit either of these pollutants at sufficient quantities that would exceed the thresholds.

The project would result in a potentially significant impact to GHG emissions and the global climate if it:

- Generates GHG emissions, either directly or indirectly, in excess of the draft thresholds currently under development by the South Coast Air Quality Management District (SCAQMD) GHG CEQA Significance Threshold Working Group; and/or
- Conflicts with any applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

6.0 IMPACT ANALYSIS

Threshold: Conflict with or obstruct implementation of the applicable air quality plan

According to the MDAQMD *CEQA and Federal Conformity Guidelines*, a project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable MDAQMD rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and is consistent with the growth forecasts in the applicable plan(s). Conformity with growth forecasts can be established by demonstrating that the project is consistent with the land use plan that was used to generate the growth forecast. The proposed project is covered under the MDAQMD 2008 *Federal 8-Hour Ozone Attainment Plan* ("Attainment Plan"). The Attainment Plan based its assumptions on growth forecasts contained in the SCAG *2008 Regional Transportation Plan* ("2008 RTP") population growth projections.[35] The SCAG's 2008 RTP projected a population of 23,415 people for Yucca Valley in 2010 and a population projection of 26,514 people in 2015. The California Department of Finance estimated a population of 21,292 people residing in Yucca Valley in 2010.[36] The proposed project, using default CalEEMod assumptions, would house 215 people.[37] This added to the estimated 21,292 residents of Yucca Valley would result in a population of 21,507, which would not exceed the SCAG's 2010 and 2011 projections. Therefore, the proposed project would not conflict with or obstruct implementation of MDAQMD air quality plans. The proposed project would have a less than significant impact with respect to this criterion.

Mitigation Measures: No mitigation measures are recommended.

Level of Significance after Mitigation Measures: Less than significant impact.

Threshold: Violate any air quality standard or contribute substantially to an existing or projected air quality violation

Air quality within the project area is regulated by MDAQMD. Construction activities have the potential to cause short-term significant impacts with respect to air quality standards. According to MDAQMD, a project's construction emissions are considered to cause a significant impact to air quality if they would exceed the MDAQMD thresholds of significance for the criteria pollutants (VOC, NO_x, CO, SO_x, PM10,

---

35 Southern California Association of Governments, *2008 Regional Transportation Plan – Growth Projections by City*, (2008).

36 California Department of Finance, *E-4 Population Estimates for Cities, Counties and State, 2001-2010, with 2000 Benchmark*, (2010).

37 The default rate is 2.87 persons per dwelling unit. The Senior Housing project would likely house fewer than this number. Therefore, this analysis is generally conservative and impacts would likely be less than what is reported in this document.

and PM2.5). The construction emissions associated with the proposed project were estimated using the CalEEMod emissions estimator model. CalEEMod is a program that calculates air emissions from land use sources and incorporates the CARB's EMFAC2007 model for on-road vehicle emissions and the OFFROAD2007 model for off-road vehicle emissions. The model also incorporates factors specific to the Basin and the MDAQMD, such as VOC content in architectural coating and vehicle fleet mixes. During project construction, the model can analyze emissions that occur during different phases, such as building construction and architectural coating.

Site-specific or project-specific data were used in the CalEEMod model where available. The project Applicant provided the estimated construction schedule. The number and types of construction equipment, vendor trips (e.g., transport of building materials), and worker trips were based on values provided in the CalEEMod model. The existing project site is vacant; therefore demolition would not occur during development. In addition, grading amounts were based on default values provided in the CalEEMod model. In order to account for dust suppression in the CalEEMod model, it was assumed that the project contractor would comply with MDAQMD Rules 403 and 403.2 by applying water a minimum of twice daily for dust suppression. The emission reduction percentage association with Rule 403 dust suppression was based on data from the MDAQMD. **Table 7, Estimated Construction Emissions**, shows the construction emissions that would occur from the proposed project.

Table 7
Estimated Construction Emissions

	Maximum Emissions in Pounds per Day[1]					
Construction Year	**VOC**	**NO_X**	**CO**	**SO_X**	**PM10**	**PM2.5**
2012	8.86	66.77	43.42	0.07	6.85	5.34
2013	215.85	60.68	49.09	0.08	5.84	4.49
MDAQMD Threshold:	**137**	**137**	**548**	**137**	**82**	**82**
Exceeds Threshold?	**YES**	NO	NO	NO	NO	NO

Source: Impact Sciences, Inc.
Totals in table may not appear to add exactly due to rounding in the computer model calculations.
[1] *PM10 and PM2.5 fugitive dust emissions incorporate watering as a control measure.*

As shown in **Table 7**, construction emissions would exceed MDAQMD's threshold of significance for VOC during architectural coating. Therefore construction of the proposed project would have a significant impact on air quality of the region. Mitigation Measure **MM AQ-1**, described below, would be implemented, which would reduce VOC emissions from architectural coating applications to less than significant.

Operational emissions would be generated by both stationary and mobile sources as a result of normal day-to-day activities on the project site after occupation. Stationary emissions would be generated by the consumption of natural gas for space and water heating devices (including residential use water heater and boilers). Mobile emissions would be generated by the motor vehicles traveling to and from the project site.

The project would construct a 75 unit senior housing project, resulting in new vehicle trips to and from the site. According to MDAQMD, a project's operational emissions are considered to cause a significant impact to air quality in the region if they would exceed the MDAQMD thresholds of significance for the criteria pollutants. The operational emissions associated with the proposed project were estimated using the CalEEMod model. CalEEMod can estimate mobile and area source emissions associated with land uses specific to a given operational year and location. The proposed project would be operational in 2013; therefore, 2013 was used to estimate operational emissions. Default trip generation rates from the Institute of Transportation Engineers *8th Edition Trip Generation Report* were used to estimate motor vehicle emissions.[38] **Table 8, Estimated Operational Emissions**, shows the pollutant emissions associated with the proposed residential land use on the project site.

As shown in **Table 8**, operational emissions associated with implementation of the proposed project would not exceed the MDAQMD thresholds for significance for any pollutant. Projects that generate emissions below the thresholds of significance would not be considered to contribute a substantial amount of air pollutant to regional air quality. Therefore, operational emissions associated with the proposed project would be considered a less than significant impact.

Table 8
Estimated Operational Emissions

Emissions Source	Emissions in Pounds per Day					
	VOC	NOx	CO	SOx	PM10	PM2.5
Summertime Emissions[1]						
Operational (Mobile) Sources	2.45	13.90	23.16	0.03	2.97	0.50
Area Sources	43.87	0.78	64.88	0.06	8.53	8.53
Energy (Natural Gas)	0.05	0.43	0.36	0.00	0.03	0.03
Summertime Emissions Total	**46.37**	**15.11**	**88.40**	**0.09**	**11.53**	**9.06**
MDAQMD Threshold	**137**	**137**	**548**	**137**	**82**	**82**
Exceeds Threshold?	NO	NO	NO	NO	NO	NO

38 Institute of Transportation Engineers (ITE), *8th Edition Trip Generation Report*, (2008). The ITE trip rate for senior adult housing-attached is 3.48 trips per dwelling unit.

Emissions Source	Emissions in Pounds per Day					
	VOC	NOx	CO	SOx	PM10	PM2.5
Wintertime Emissions[2]						
Operational (Mobile) Sources	2.34	14.11	21.46	0.02	2.98	0.51
Area Sources	43.87	0.78	64.88	0.06	8.53	8.53
Energy (Natural Gas)	0.05	0.43	0.36	0.00	0.03	0.03
Wintertime Emissions Total	**46.26**	**15.35**	**86.70**	**0.08**	**11.54**	**9.07**
MDAQMD Threshold	**137**	**137**	**548**	**137**	**82**	**82**
Exceeds Threshold?	NO	NO	NO	NO	NO	NO

Source: Impact Sciences, Inc.
Totals in table may not appear to add exactly due to rounding in the computer model calculations.
[1] *Summertime Emissions" are representative of the conditions that may occur during the ozone season (May 1 to October 31).*
[2] *Wintertime Emissions" are representative of the conditions that may occur during the balance of the year (November 1 to April 30).*

Mitigation Measures: The following mitigation measure is required to be implemented during project construction:

MM AQ-1 The proposed project shall utilize low-VOC architectural coating and paint for all exterior and interior applications. The VOC content for all architectural coatings and paint shall be limited to a weighted average of 150 grams of VOC per liter or less.

Level of Significance after Mitigation Measures: The emissions calculations assumed a default VOC content of 250 grams of per VOC per liter. The use of low-VOC architectural coatings and paint limited to 150 grams of VOC per liter or less would reduce the maximum daily VOC emissions to approximately 133.6 pounds per day, which is less than the MDAQMD threshold of significance. Therefore, impacts would be mitigated to less than significant with the implementation of MM AQ-1.

Threshold: **Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)**

The MDAQMD classifies cumulative impacts as direct and indirect project emissions. If a project related air quality impact is individually less than significant, the impacts of reasonably anticipated future activities, probably future projects, and past projects are included based on similar air quality impacts, transport considerations and geographic location. Currently the MDAQMD's approach towards assessing cumulative impacts is based on the fact that the MDAQMD *Attainment Plan* forecasts attainment of ambient air quality standards in accordance with the requirements of the California CAA, which takes into account the SCAG's forecasted future regional growth. Therefore, if all projects are individually consistent with the growth assumptions within the MDAQMD's *Attainment Plan*, then the future development would not impede the attainment of ambient air quality standards. As discussed above, the

SCAG's 2008 RTP projected a population of 23,415 people for Yucca Valley in 2010 and a population projection of 26,514 people in 2015.[39] The California Department of Finance estimated a population of 21,292 people residing in Yucca Valley in 2010.[40] The proposed project, using default CalEEMod assumptions, would house 215 people. This added to the estimated 21,292 residents of Yucca Valley would result in a population of 21,507, which would not exceed the SCAG's 2010 and 2011 projections. Therefore, the proposed project would not conflict with or obstruct implementation of MDAQMD air quality plans. The proposed project would have a less than significant impact with respect to this criterion.

Mitigation Measures: No mitigation measures are recommended.

Level of Significance after Mitigation Measures: Less than significant impact.

Threshold: Expose sensitive receptors to substantial pollutant concentrations

Sensitive receptors are defined as persons who could potentially remain at a location for a specific length of time (e.g., 1 hour, 8 hours, or 24 hours) depending on the pollutant being analyzed. Residences, hospitals, and convalescent facilities are considered as sensitive receptors. Commercial and industrial facilities and other land uses may be considered sensitive receptors if it is possible that an individual could remain in a particular location for the aforementioned lengths of time.

The proposed residential project is located to the north of and at the corner of California State Route 62 (Twentynine Palms Highway) and Dumosa Avenue in the town of Yucca Valley, California. Surrounding land uses include residential and commercial land uses to the west, and commercial land uses to the north, east and south of the project site. Regional access to the proposed project site is provided by the Twentynine Palms Highway. The Twentynine Palms Highway is the major east-west route traveled by heavy-duty diesel-fueled vehicles, as well as other motor vehicles. CARB has determined that health effects are generally elevated near heavily traveled roadways. The primary pollutant of concern near freeways and heavily traveled roadways is diesel particulate matter (DPM) since it is identified by the State of California as a toxic air contaminant (TAC) based on its potential to cause cancer, premature death, and other health problems.

---

39 Southern California Association of Governments, *2008 Regional Transportation Plan – Growth Projections by City*, (2008).

40 California Department of Finance, *E-4 Population Estimates for Cities, Counties and State, 2001-2010, with 2000 Benchmark*, (2010).

The CARB *Air Quality and Land Use Handbook* recommends lead agencies, where possible, avoid locating new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day. CARB based this recommendation on 2002 studies of impacts along the San Diego (I-405) Freeway and the Long Beach (I-710) Freeway. These studies, cited by CARB in its *Air Quality and Land Use Handbook*, found a substantial reduction in pollutant concentrations, relative exposure, and health risk beyond 300 feet from I-405 and I-710.[41]

According to data from the California Department of Transportation (CalTrans), State Route 62 (also known as the Twentynine Palms Highway) in Yucca Valley, near the intersection with State Route 247, had approximately 1,682 annual average daily truck trips in 2009.[42] As a comparison, the I-405 Freeway near the Route 2 Junction at Santa Monica Boulevard had 9,528 annual average daily truck trips and the I-710 Freeway in Long Beach near Del Amo Boulevard had 23,295 annual average daily truck trips in 2009. This suggests that State Route 62, which has a much lower number of diesel-fueled truck trips than either I-405 and I-710, would result in less severe health impacts than CARB analyzed in its *Air Quality and Land Use Handbook*. Additionally, according to data from CalTrans, State Route 62 had approximately 28,500 annual average daily vehicle trips (automobiles and trucks) in 2009, which is much less than the 100,000 screening level for urban roads and the 50,000 screening level for rural roads. However, the proposed project proximity would pose some risk to on-site residents. Therefore, the project is considered to have a potentially significant impact with respect to this criterion and mitigation measures are recommended.

Mitigation Measures: The following mitigation measure is required to be incorporated as part of the project design.

MM AQ-2 Development of the proposed project shall include the following features that minimize the health impacts associated with its proximity to State Route 62. These measures include, but are not limited to:[43]

- Installing passive electrostatic, or similarly effective, in-door air filtering systems;
- Changing the location of building air intakes to minimize exposure to roadway TACs;

---

41 Calfornia Air Resources Board, *Air Quality and Land Use Handbook: A Community Health Perspective*, (2005) 8-9.

42 California Department of Transportation, "Traffic Counts," http://traffic-counts.dot.ca.gov/. 2011.

43 Sacramento Metropolitan Air Quality Management District, "Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways," http://www.airquality.org/ceqa/SLUMajorRoadway/SLURecommendedProtocol2.2-Mar2009.pdf. 2009.

- Ensuring that windows nearest to the freeway or major roadway do not open to reduce particulate matter exposure; and
- Planting pollution-absorbing trees and vegetation between the roadway and buildings.

Level of Significance after Mitigation Measures: Incorporation of the above mitigation measure would reduce impacts to less than significant.

Threshold: Create objectionable odors affecting a substantial number of people

Land uses primarily associated with odorous emissions include waste transfer and recycling stations, wastewater treatment plants, landfills, composting operations, petroleum operations, food and byproduct processes, factories, and agricultural activities, such as livestock operations. The proposed project does not consist of these types of land uses. The residential land use associated with the proposed project is not expected to be a source of persistent odors. Construction of the project is temporary and is not expected to cause an odor nuisance. Refuse associated with operation of the proposed project will be disposed of in accordance with applicable regulations. In addition, the project is not located downwind and in close proximity to these sources of odors. Therefore, it is not anticipated the project residents would be adversely affected by off-site odorous emissions. Consequently, no significant impacts from odors are anticipated from the proposed project.

Mitigation Measures: No mitigation measures are recommended.

Level of Significance after Mitigation Measures: Less than significant impact.

Threshold: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment

The proposed project consists of the development of a 75 unit senior housing project on 2.5 acres. Construction activity was modeled based on the construction schedule, equipment types, and activity levels described above under the air quality discussion. The proposed project would result in short-term emissions of GHGs during construction—that is, the emissions would occur only during active construction and would cease after the project was built. The other primary GHGs (hydrofluourocarbons, perfluorocarbons, and sulfur hexafluoride) are typically associated with specific industrial sources and would not be emitted by the proposed project. The emissions of CO_2, CH_4, and N_2O were estimated using the CalEEMod model.

The construction activities required to facilitate buildout of the proposed project would include the use of heavy-duty construction equipment. The vast majority of construction equipment (e.g., backhoes, cranes,

rubber-tired loaders, scrapers, and haul trucks) rely on fossil fuels, primarily diesel, as an energy source. The combustion of fossil fuels in construction equipment results in GHG emissions of CO_2 and much smaller amounts of CH_4 and N_2O. Emissions of GHG would also result from the combustion of fossil fuels from haul trucks and vendor trucks delivering materials, and construction worker vehicles commuting, to and from the proposed project site. Typically, light-duty and medium-duty automobiles and trucks would be used for worker trips and heavy-duty trucks would be used from vendor trips. The vast majority of motor vehicles used for worker trips rely on gasoline as an energy source while motor vehicles used for vendor trips rely on diesel as an energy source. The combustion of gasoline in motor vehicles results in GHG emissions of CO_2 and smaller amounts of CH_4 and N_2O. The combustion of diesel in heavy-duty trucks results in GHG emissions of CO_2 and smaller amounts of CH_4 and N_2O. The combustion of diesel in heavy-duty trucks results in GHG emissions of CO_2 and much smaller amounts of CH_4 and N_2O. **Table 9, Estimated Construction Greenhouse Gas Emissions**, lists the estimated GHG emissions associated with construction of the proposed project.

Table 9
Estimated Construction Greenhouse Gas Emissions

GHG Emissions Source	Emissions (Metric Tons CO_2e/year)
Construction Year 2012	526
Construction Year 2013	109
One-Time Total GHG Emissions	**636**
Annualized over Project Lifetime	**21**

Source: Impact Sciences, Inc. Emissions
Totals in table may not appear to add exactly due to rounding.

Unlike federally- and state-regulated criteria pollutants, which predominantly affect local and regional air quality, GHGs tend to remain in the atmosphere for longer periods of time and have global impacts. As previously discussed, the current recommended methodology for evaluating the global warming potential of GHGs is to estimate the climate change impacts of GHGs using the warming potential of CO_2 over a 100-year period as a baseline. Although GHGs are generated during construction and are accordingly considered one-time emissions, it is important to include construction-related GHG emissions when assessing all of the long-term GHG emissions associated with a project. Therefore, current CEQA practice is to annualize construction-related GHG emissions over a project's lifetime in order to include these emissions as part of a project's annualized lifetime total emissions, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies. A project lifetime has generally been defined as 30 years. In accordance with this methodology,

the estimated proposed project's construction GHG emissions have been annualized over a 30-year period and are included in the annualized operational GHG emissions discussed below.

The proposed project would be operational in 2013 and would result in direct annual emissions of GHGs. These emissions, primarily CO_2, CH_4, and N_2O, are the result of fuel combustion from building heating systems and motor vehicles. Building and motor vehicle air conditioning systems may use HFCs (and HCFCs and CFCs to the extent that they have not been completely phased out at later dates); however, these emissions are not quantified since they would only occur through accidental leaks. It is not possible to estimate the frequency of accidental leaks without some level of speculation. It should be noted that CARB is in the process of adopting regulations that would reduce emissions of these refrigerants from stationary refrigeration and air-conditioning systems by requiring persons subject to the rule to reclaim, recover, or recycle refrigerant and to properly repair or replace faulty refrigeration and air conditioning equipment.[44]

Direct emissions of GHGs emitted from operation of the proposed project are primarily due to natural gas combustion, hearth (fireplace) emissions, landscaping equipment, and mobile source emissions. Natural gas, hearth, and landscaping equipment GHG emissions were calculated using CalEEMod using default assumptions for a retirement community land use type. Mobile source emissions were calculated using CalEEMod, based on the Institute of Transportation and Engineering *8th Edition trip generation rates*.[45]

The proposed project would also result in indirect GHG emissions due to the electricity demand. The emission factor for CO_2 due to electrical demand from Southern California Edison, the electrical utility that would serve the proposed project. Emission factors for CO_2 are based on CARB's *Local Government Operations Protocol*.[46] Emission factors for CH_4 and N_2O are based on U.S. EPA values.[47] The emission factors take into account the current mix of energy sources used to generate electricity and the relative carbon intensities of these sources, and includes natural gas, coal, nuclear, large hydroelectric, and other renewable sources of energy.

---

44 California Air Resources Board, "Stationary Equipment Refrigerant Management Program," http://www.arb.ca.gov/cc/reftrack/reftrack.htm. 2011. This regulation is an early action measure under AB 32.

45 Institute of Transportation and Engineering (ITE), *8th Edition Trip Generation Rates*, (2008). The ITE trip rate for senior adult housing-attached is 3.48 trips per dwelling unit.

46 California Air Resources Board, *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.1, (2010) 208.

47 U.S. Environmental Protection Agency, "E-Grid," http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html. nd.

Electricity consumption was based on default data found in CalEEMod for a retirement community. In addition to electrical demand, the project would also result in indirect GHG emissions due to water consumption, wastewater treatment, and solid waste generation. GHG emissions from water consumption are due to the electricity needed to convey, treat, and distribute water. The annual electrical demand factors for potable water were obtained from the CEC.[48] The default CalEEMod water consumption was used for the retirement community land use type. GHG emissions from wastewater are due to the electricity needed to treat wastewater and the treatment process itself, which primarily releases CH_4 into the atmosphere. The CalEEMod default wastewater generation rate was also used. GHG emission factors for wastewater treatment were obtained from the U.S. EPA.[49] GHG emissions from solid waste generation are due to the decomposition of organic material, which releases CH_4 into the atmosphere. The GHG emission factor for solid waste generation was based on IPCC methods for quantifying GHG emissions from solid waste and waste disposal rates were based on Calrecycle data.[50]

The annual GHG emissions associated with the operation of the proposed project are provided below in **Table 10, Estimated Operational Greenhouse Gas Emissions**. Modeling calculations are provided in **Appendix A.**

Table 10
Estimated Operational Greenhouse Gas Emissions

GHG Emissions Source	Emissions (Metric Tons CO_2e/year)
Annualized Construction Emissions	21
Operational (Mobile) Sources	526
Area Sources	180
Energy (Electricity and Natural Gas)	190
Waste	8
Water	33
Total Annual Emissions	**958**
Significance Threshold	**3,000**
Exceeds Threshold?	NO

Source: Impact Sciences, Inc. Emissions
Totals in table may not appear to add exactly due to rounding.

48 California Energy Commission, *Refining Estimates of Water-Related Energy Use in California, PIER Final Project Report* (CEC-500-2006-118), (2006) 22. Prepared by Navigant Consulting, Inc.

49 U.S. Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors, AP-42,* Fifth Edition, Volume I, Chapter 4.3.5, (1998).

50 IPCC, *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. 2006.

Direct and indirect operational emissions associated with the proposed project are compared with the SCAQMD's threshold of significance for land use projects, which is 3,000 $MTCO_2e$ per year. As shown in **Table 10**, the proposed project would emit less than 3,000 $MTCO_2e$ and result in a less than significant impact with respect to GHG emissions.

Mitigation Measures: No mitigation measures are recommended.

Level of Significance after Mitigation Measures: Less than significant impact.

Threshold: Conflict with any applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases

AB 32 is the State of California's primary GHG emissions regulation, as previously discussed. The MDAQMD has not yet adopted any significance thresholds or plan for GHG emissions in its jurisdiction. As a result guidance from the SCAQMD has been used in this analysis. The SCAQMD GHG significance threshold was designed to ensure compliance with AB 32 emissions reductions requirements in the South Coast air Basin. Therefore if a proposed project emits below the draft significance threshold it can be assumed to comply with AB 32 within the SCAQMD jurisdiction. For this analysis, the SCAQMD's threshold was applied to this project per discussions with MDAQMD staff. As the project would emit less than 3,000 $MTCO_2e$ of GHG per year, the proposed project would not conflict with the State's ability to achieve the reduction targets under AB 32.

Nonetheless, the proposed project would incorporate GHG control measures that would reduce the project's GHG emissions beyond regulatory requirements.. The proposed project would comply with and exceed the Title 24 building standards by 20 percent and would meet the CALGreen Tier 1 Standards. The project would also install cool roofs that meet a Solar Reflective Index (SRI) of at least 64 with a thermal emittance of 0.75.[51] The project would also install Energy Star appliances and dual pane insolated windows. These project control measures would reduce GHG emissions, reduce cooling energy requirements, and reduce its overall contribution to the urban heat island effect. Therefore, the proposed project would not conflict with the State's ability to achieve GHG reductions pursuant to AB 32 and result in a less than significant impact on climate change.

Mitigation Measures: No mitigation measures are recommended.

Level of Significance after Mitigation Measures: Less than significant impact.

---

51 SRI is defined so that a standard black (solar reflectance of 0.05, thermal emittance of 0.90) is 0 and a standard white (solar reflectance of 0.80, thermal emittance 0.90) is 100.

7.0 CONCLUSION

The air quality and GHG assessment for the proposed project, located in the Town of Yucca Valley, California, was prepared in accordance with the MDAQMD's *CEQA and Federal Conformity Guidelines* and other data provided by the MDAQMD. The project's construction emissions would exceed the thresholds of significance for criteria pollutants for VOC, primarily due to architectural coating activities. The project's operational emissions would not exceed the thresholds of significance for criteria pollutant emissions. Due to the project's proximity to State Route 62, on-site residents could potentially be exposed to elevated health impacts from motor vehicles. Mitigation measures **MM AQ-1** and **MM AQ-2** would be required to reduce construction-related VOC emissions and to reduce exposure to motor vehicle emissions from State Route 62. Implementation of these mitigation measures would reduce the project's air quality impacts to less than significant.

The proposed project would result in GHG emissions during construction and operation. However, the project would not exceed the draft threshold of significance under development by the SCAQMD. The project would also incorporate control measures that would reduce its GHG emissions beyond regulatory requirements. Because the project would not exceed the numerical threshold of significance and would include measures to reduce its GHG emissions, the project would not conflict with the State's ability to achieve GHG emission reductions pursuant to AB 32. Therefore, the project would result in a less than significant impact on GHG emissions and the global climate.

APPENDIX A

Criteria Pollutant and Greenhouse Gas Emission Calculations