Appendix H

Air Quality and Greenhouse Gas Emissions Technical Report

SINGLE-FAMILY RESIDENTIAL HAULED WATER INITIATIVE FOR NEW DEVELOPMENT

AIR QUALITY AND GREENHOUSE GAS EMISSIONS TECHNICAL REPORT

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A CalEEMod Output for the Proposed Project

SECTION ES
EXECUTIVE SUMMARY

This Air Quality and Greenhouse Gas Emissions Technical Report was undertaken by Sapphos Environmental, Inc. for the County of Los Angeles (County), to evaluate the proposed Single-Family Residential Hauled Water Initiative for New Development (proposed initiative), in the unincorporated territory of Los Angeles County. The proposed initiative would allow hauled water as the primary source of potable water for new development of single-family residences on existing vacant legal lots, or lots that are eligible for a certificate of compliance, where the property owner has demonstrated that there is no other feasible source of private or municipal potable water, or capability of developing an on-site well to provide potable water to the property, and only if the property lies outside of the boundaries of the local private and municipal water districts and is not eligible for service by the nearest public-community water purveyor.

As a result of the technical analysis undertaken in this report, the proposed initiative was determined to result in significant impacts to VOCs, NO_x, CO, PM_{10}, $PM_{2.5}$, and greenhouse gas emissions (Table ES-1, *Summary of Findings*).

TABLE ES-1
SUMMARY OF FINDINGS

	Daily Impacts	Emissions					
		VOCs	NO_x	CO	SO_x	$PM_{2.5}$	PM_{10}
Significant Impact?	Construction	Yes	Yes	Yes	No	Yes	No
	Operation	Yes	Yes	Yes	No	Yes	Yes
	Cumulative construction	Yes	Yes	Yes	No	Yes	No
	Cumulative operation	Yes	Yes	Yes	No	Yes	Yes
		Other Emission Impacts					
	Impacts to sensitive receptors	No					
	Toxic air contaminants	No					
	Odor	No					
	Greenhouse gas emissions	Yes					

The proposed initiative would result in significant impact to air quality, as a result of conflicts with the South Coast Air Quality Management District (SCAQMD) Air Quality Management Plan (AQMP), adopted in 2012, which demonstrates attainment of the federal 24-hour $PM_{2.5}$ standard by 2014 and implements the adopted 8-hour O_3 control plan, and the Antelope Valley Air Quality Management District (AVAQMD) Federal 8-hour Ozone Attainment Plan that was adopted in 2008.

The construction of the single-family homes and the hauled water trips to service the homes would cause a violation to the air quality standards. During the construction phase, the air quality impacts from constructing 184 single-family residences per year across Los Angeles County will contribute substantially to the amounts of O_3 precursors, CO, $PM_{2.5}$ (in SCAQMD), and NO_x emissions standard. For operations, the increased truck traffic from delivering hauled water and the additional passenger car trips would substantially increase the amounts of O_3 precursors, PM_{10}, $PM_{2.5}$, CO, and NO_x above the emissions standards.

When considered in conjunction with the four related projects (the Centennial Project, the High Desert Corridor Project, the Newhall Ranch Specific Plan, and the Northlake Specific Plan) the cumulative impacts of the proposed initiative to air quality would be expected to substantially increase the amounts of O_3 precursors (VOC), PM_{10}, $PM_{2.5}$, CO, and NO_x; constituting a significant impact in relation to SCAQMD and AVAQMD.

Based on the suggested 25,000 metric ton CO_{2e} threshold proposed by California Air Pollution Control Officer's Association (CAPCOA), greenhouse gas (GHG) emissions in the vicinity of the subareas would be expected to exceed this value during both construction and occupancy (supported by delivery of hauled water by truck) of single-family residences facilitated by the proposed initiative.

The proposed initiative is in conflict with the Community Climate Action Plan, which aims to reduce GHG emissions within the unincorporated areas of Los Angeles County. The proposed initiative would allow development in low density housing areas away from employment and transit and increase fuel use and transportation emissions above SCAQMD and AVAQMD significance thresholds from passenger car trips and hauled water truck trips. This would constitute a significant impact in relation to GHG emissions and violate the Plan since the proposed initiative is not aligned with the goals and policies of the Plan. The proposed initiative would also significantly contribute to the energy and water use by the County through the addition of approximately 3,680 new single-family residences.

In conclusion, construction-related air quality impacts would be significant even with the incorporation of mitigation measures. Compliance with SCAQMD Rule 403, *Fugitive Dust*, and Tier 4 emission standards for heavy construction equipment would help avoid and reduce construction-related emissions, but the cumulative impact is still significant. By 2035, impacts from the operation of the proposed initiative would be above the level of significance from the 588,000 additional passenger car vehicle miles traveled (VMT) and 4,300 water hauling truck VMT per day.

SECTION 1.0
INTRODUCTION

1.1 PURPOSE AND SCOPE

This Air Quality and Greenhouse Gas Emissions Technical Report was undertaken by Sapphos Environmental, Inc. for the County of Los Angeles (County), for the Single-Family Residential Hauled Water Initiative for New Development (proposed initiative). This technical report identifies relevant regulatory framework, baseline conditions in the proposed initiative study area as they relate to air quality, the potential for the proposed initiative to result in substantial adverse direct, indirect, and cumulative impacts on air quality and greenhouse gas (GHG) emissions from construction and occupancy of single-family residences facilitated by the approval of building permits relying on the use of hauled water as the primary source of potable water and the associated transport of hauled water, and measures or alternatives that would avoid or reduce significant impacts on air quality and greenhouse gas (GHG) emissions.

1.2 PROJECT LOCATION

The area that would be subject to the proposed initiative consists of 42,867 parcels in the unincorporated territory of Los Angeles County (see Figure 1.2-1, *Regional Vicinity Map*; and Figure 1.2-2, *Proposed Initiative Study Area Map*, at the end of this section).[1] The combined proposed initiative study area consists of approximately 340,461 acres or approximately 532 square miles.

Although this is a Countywide initiative, the parcels that would potentially be affected by the proposed initiative are located entirely within the 5th Supervisorial District in the northern one-third of the County, including areas located in the San Gabriel Mountains; in the Antelope Valley; areas located northeast of the City of Santa Clarita, north and south of California State Route 14; and, areas that are southwest of the City of Palmdale in the communities of Agua Dulce and Acton. The subject parcels have been categorized into seven subareas:

1. **Lake Hughes/Gorman/West of Lancaster:** The Lake Hughes/Gorman/West of Lancaster subarea is located in an area generally located west of State Highway 14 and north of the Angeles National Forest. This subarea consists of 15,166 parcels and encompasses approximately 195.4 square miles (125,041.4 acres). State Highway 138 bisects the subarea in an east-west direction, and State Highway 14 forms the eastern boundary of this subarea. This subarea is adjacent to the northwestern edge of the incorporated City of Lancaster.

2. **Lancaster Northeast:** The Lancaster Northeast subarea is located in an area generally east of State Highway 14 and north of East Avenue J. This subarea consists of 6,794 parcels and encompasses approximately 55.2 square miles (35,324.90 acres). State Highway 14 forms the western boundary and East Avenue J forms the southern boundary of this subarea. Edwards Air Force Base is located north of the study area. This subarea is adjacent to the northeastern edge of the incorporated City of Lancaster.

[1] Assessor's Parcels Numbers for the referenced parcels are on file at the Los Angeles County Department of Regional Planning.

3. **Antelope Valley Northeast:** The Antelope Valley Northeast subarea is located in an area generally located north of East Avenue E and east of 165th Street East in the far northeastern portion of Los Angeles County. This subarea consists of 1,938 parcels and encompasses approximately 22.7 square miles (14,528.23 acres). This subarea is relatively isolated and is located in the northeastern area of Los Angeles County. This subarea is located approximately 10.9 miles northeast of the incorporated City of Palmdale and approximately 11.3 miles northeast of the incorporated City of Lancaster.

4. **Lake Los Angeles/Llano/Valyermo/Littlerock:** The Lake Los Angeles/Llano/Valyermo/Littlerock subarea is located in an area generally south of East Avenue J, east of 47th Street East. This subarea consists of 14,822 parcels and encompasses approximately 168.8 square miles (108,067.33 acres). Avenue J forms the northern boundary, the Cities of Palmdale and Lancaster form the western boundary, and the San Bernardino County line forms the eastern boundary of this subarea. This subarea is adjacent to the eastern edge of the incorporated City of Palmdale.

5. **Acton:** The Acton subarea is located in an area generally east of Hubbard Road and West of 47th Street East. This subarea consists of 1,246 parcels and encompasses approximately 28.2 square miles (18,067.22 acres). The Angeles National Forest is located to the north and south of the subarea. This subarea is adjacent to the southwestern edge of the incorporated City of Palmdale.

6. **Castaic/Santa Clarita/Agua Dulce:** The Castaic/Santa Clarita/Agua Dulce subarea is located generally west of Hubbard Road and north of the 210 Freeway excluding Kagel Canyon. This subarea consists of 2,243 parcels and encompasses approximately 55.2 square miles (35,340.2 acres). This subarea is adjacent to the northern, western, and southern edges of the incorporated City of Santa Clarita and the northern edge of the incorporated City of Los Angeles.

7. **East San Gabriel Mountains:** The East San Gabriel Mountains subarea consists of parcels generally located within the Angeles National Forest east of State Highway 14, north of the 210 Freeway, south of the Pearblossom Highway, and west of the San Bernardino County line. This subarea consists of 658 parcels and encompasses approximately 6.4 square miles (4,092.26 acres). This subarea is adjacent to the northern edges of the San Gabriel and San Fernando Valleys.

The proposed initiative study area is located within 53 USGS 7.5-minute quadrangle maps (see Figure 1.2-3, *USGS 7.5-Minute Quadrangle Index*, at the end of this section):

- Acton
- Adobe Mountain
- Agua Dulce
- Alpine Butte
- Azusa
- Black Mountain
- Burnt Peak
- Chilao Flat
- Condor Peak
- Crystal Lake
- Del Sur
- El Mirage
- Fairmont Butte
- Frazier Mountain
- Glendora
- Green Valley
- Hi Vista
- Jackrabbit Hill
- Juniper Hills
- La Liebre Ranch
- Lake Hughes
- Lancaster East
- Lancaster West
- Lebec
- Liebre Mountain
- Little Buttes
- Littlerock
- Lovejoy Buttes
- Mescal Creek
- Mint Canyon
- Mount Baldy
- Mount San Antonio
- Mount Wilson
- Neenach School
- Newhall
- Oat Mountain
- Pacifico Mountain
- Palmdale
- Pasadena
- Redman
- Ritter Ridge
- Rogers Lake South
- Rosamond
- Rosamond Lake
- San Fernando
- Simi Valley East
- Sleepy Valley
- Sunland
- Val Verde
- Valyermo
- Warm Springs Mountain
- Waterman Mountain
- Whitaker Peak

The elevation of the overall proposed initiative study area ranges from 7,409 feet above sea level in the East San Gabriel Mountains subarea to 862 feet above sea level also in the East San Gabriel Mountains subarea (Figure 1.2-3).

1.3 PROJECT DESCRIPTION

The Los Angeles County Board of Supervisors has directed the consideration of a proposed initiative that would allow hauled water as the primary source of potable water for new development of single-family residences on existing vacant legal lots, or lots that are eligible for a certificate of compliance, where the property owner has demonstrated that there is no other feasible source of private or municipal potable water, or capability of developing an on-site well to provide potable water to the property, and only if the property lies outside of the boundaries of the local private and municipal water districts. The proposed initiative is proposed for parcels that are larger than 2,000 square feet in size, with slopes under 50 percent (26.6 degrees). The term vacant is used as identified by the County Assessor.

In order to determine which areas would be subject to the proposed initiative, the Los Angeles County Department of Regional Planning developed a geographic information system (GIS) suitability model in 2012 based on five criteria defined by the Task Force:

- Parcels located in the unincorporated territory of Los Angeles County
- Vacant parcels
- Parcels located in areas where there is no designated water purveyor
- Zoning and General Plan designation that allow for development of a single-family residence
- Parcel size greater than 2,000 square feet with slopes under 50 percent (26.6 degrees)

The model was re-run in 2015 to incorporate the recently adopted Antelope Valley Town and Country Plan and General Plan amendment.[2] From this process and refinements, 42,867 parcels were identified as subject to the proposed initiative.

1.3.1 Construction Scenario

Given the initiative as proposed, 42,867 parcels would become eligible to develop single-family residences on their properties as a consequence of being able to supply water through the use of water hauling trucks. Construction on the specific parcels would be at the parcel owner's discretion, as well as on their schedule, providing a significant challenge in attempting to accurately estimate a construction scenario for the proposed initiative.

Historical development trends from 1997 to 2014 and an anticipated growth factor of 25 percent were used to estimate the average number of building permits per year.[3] Of the eligible 42,867 parcels, the estimated parcel size is approximately four acres with an anticipated disturbance of 36 percent of the parcel. The reasonable worst-case scenario assumes the annual average rate of issuance of building permits over the 20-year 2015 to 2035 planning horizon would be approximately 32 per year in the Santa Clarita Valley and approximately 152 per year in the Antelope Valley for a total of 184 permits per year for both areas. The total anticipated building permits over the 20-year 2015 to 2035 planning horizon would be approximately 3,680. As a result, it is anticipated that the disturbance area for the single-family residences constructed on these parcels would be approximately 5,295 acres.

Construction of residences within the proposed initiative would require approximately 14 months. Approximately 20 workers would be expected to be on-site during peak construction activity periods. Approximately five workers would be expected to be on-site during non-peak construction activity periods. Site preparation and construction of the proposed initiative would be undertaken in accordance with all federal, State, and County building codes. Construction would be scheduled in compliance with County regulations.

The construction scenario is assumed as part of compliance with Los Angeles County Municipal Code regulations and standard practices for construction and development. Construction

[2] Los Angeles County. November 2014. Available at: http://planning.lacounty.gov/assets/upl/project/tnc_draft-20141103.pdf

[3] Southern California Association of Governments. 12 March 2012. 2012 Adopted RTP Growth Forecast. PDF available at: http://www.scag.ca.gov/Documents/2012AdoptedGrowthForecastPDF.pdf Main website: http://www.scag.ca.gov/DataAndTools/Pages/GrowthForecasting.aspx

equipment would be turned off when not in use. The construction contractor would be required to ensure that all construction, demolition, and grading equipment are properly maintained. All vehicles and compressors would utilize exhaust mufflers and engine enclosure covers (as designed by the manufacturer) at all times. All grading and earthwork would be performed under the observation of a geotechnical engineer to ensure proper subgrade preparation, selection of satisfactory materials, and placement and compaction of structural fills. Any unanticipated adverse conditions encountered would be evaluated by the project engineering geologist and the soils engineer, and the appropriate recommendation made and implemented.

1.3.2 Operations

According to the Traffic Impact Study conducted by Fehr & Peers Transportation Consultants, it is estimated that the proposed initiative in the operational phase will generate approximately 588,000 net passenger car VMT and approximately 4,300 net hauled water truck VMT per average day at full build-out of 3,680 parcels.[4] These estimates are likely to be a worst-case scenario, operating under the assumption of 5,000 gallons of water per residence per week for domestic use and 5,000 gallons of water per residence per year for fire supply.[5] At full build-out, the proposed initiative would result in 4,300 water truck VMT per day with 134 trucks traveling on average 31.8 miles round trip. It is assumed one truck could visit up to four parcels in a day, which equates to 134 trucks in operation daily to serve all 3,680 parcels. The residents on each parcel are estimated to take on average 10 daily trips of approximately 16 miles roundtrip in length for an additional 588,000 passenger car VMT daily.

1.4 DEFINITIONS

AAQS: Ambient air quality standards (AAQS) define the maximum amounts of a pollutant that can be present in outdoor air without causing harm to the public's health, as established by a public agency. This analysis references both the National AAQS (NAAQS) established pursuant to the federal Clean Air Act and the State of California (CAAQS) established pursuant to the State Clean Air Act.

AVAQMD: The Antelope Valley Air Quality Management District (AVAQMD) is the local agency with the primary responsibility for the control of non-vehicular sources of air pollution through the Antelope Valley.

CAPCOA: California Air Pollution Control Officer's Association (CAPCOA) is a nonprofit association of the air pollution control officers from all 35 local air quality agencies throughout California.

CARB: California Air Resources Board (CARB) is a part of the California Environmental Protection Agency and is responsible for attaining and maintaining healthy air quality, conducting air pollution research, and systematically solving air quality issues throughout the State.

CEQ: The Council on Environmental Quality (CEQ) is a division of the Executive Office of the President that coordinates federal environmental efforts in the United States and works closely with

[4] Fehr & Peers. June 2015. *Single-Family Residential Hauled Water Initiative for New Development: Traffic Analysis*. Prepared for: Los Angeles County Hauled Water Task Force.

[5] Fehr & Peers. June 2015. *Single-Family Residential Hauled Water Initiative for New Development: Traffic Analysis*. Prepared for: Los Angeles County Hauled Water Task Force.

agencies and other White House offices in the development of environmental and energy policies and initiatives.

CO: Carbon monoxide (CO) is a colorless, odorless gas formed by the incomplete combustion of fossil fuels.

CO_2: Carbon dioxide (CO_2) is a colorless, odorless, and nonflammable gas that is the most abundant greenhouse gas in the Earth's atmosphere after water vapor.

GHG: Greenhouse gases trap heat in the Earth's atmosphere, leading to an increase in global warming.
GWP: Global warming potential (GWP) is a relative measure of how much heat a greenhouse gas traps in the atmosphere.

H_2S: Hydrogen sulfide (H_2S) is a colorless gas with the foul characteristic odor of rotten eggs, and is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations.

IPCC: Intergovernmental Panel on Climate Change (IPCC) produces reports that support the United Nations Framework Convention on Climate Change (UNFCCC), which is the main international treaty on climate change.

MDAB: The Mojave Desert Air Basin (MDAB) is one of several geopolitical regional air basin areas designated by the state government of California, for the purpose of air quality management and air pollution control in Southern California. The MDAB is comprised of four air districts: the Kern County Air Pollution Control District, the Antelope Valley Air Quality Management District, the Mojave Desert Air Quality Management District, and the eastern portion of the South Coast Air Quality Management District.

N_2O: Nitrous oxide (N_2O) is a clear, colorless gas with a slightly sweet odor that is primarily produced by agricultural soil management including soil cultivation practices, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, and production of adipic and nitric acids.

NO_2: Nitrogen dioxide (NO_2) is a highly reactive, brownish-red gas that plays a major role in the formation of ground-level ozone and acid rain.

O_3: Ozone (O_3) is a colorless gas that is formed in the atmosphere when reactive organic gases react in the atmosphere in the presence of ultraviolet sunlight and is one of the main components of photochemical smog in urban areas.

$PM_{2.5}$: Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) with primary sources that include fuel combustion from motor vehicles, power generation, industrial facilities, residential fireplaces, and wood stoves.

PM_{10}: Particulate matter less than 10 microns in diameter (PM_{10}) with primary sources that include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning activities; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

Pb: Lead (Pb) in the atmosphere occurs as particulate matter with primary sources that include leaded gasoline, battery manufacture, paint, ink, ceramics, ammunition, and secondary Pb smelters.

ROG: Reactive organic gases (ROGs), also known as volatile organic compounds (VOCs) are emitted from incomplete combustion of hydrocarbons or other carbon-based fuels.

SCAB: The Southern California Air Basin (SCAB) is one of several geopolitical regional air basin areas designated by the state government of California, for the purpose of air quality management and air pollution control in Southern California. The SCAB district was created in 1969 and includes all of Orange County and the non-desert regions of Los Angeles, Riverside, and San Bernardino Counties.

SCAG: The Southern California Association of Governments (SCAG) is the nation's largest metropolitan planning organization, representing six counties, 191 cities, and more than 18 million residents. SCAG undertakes a variety of planning and policy initiatives to encourage a more sustainable Southern California now and in the future.

SCAQMD: South Coast Air Quality Management District (SCAQMD) is the air pollution agency responsible for regulating stationary sources of air pollution in the South Coast Air Basin. The SCAQMD develops, adopts and implements an Air Quality Management Plan for bringing the area into compliance with the clean air standards established by national and State governmental legislation.

SO_2: Sulfur dioxide (SO_2) is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Generally, the highest levels of SO_2 are found near large industrial complexes where coal and oil are used in power plants and industries.

SO_4^{-2}: Sulfates (SO_4^{-2}) are particulate products of combustion of sulfur-containing fossil fuels.

TACs: Toxic air contaminants (TACs) are airborne pollutants that potentially pose a hazard to human health or may be expected to result in an increased rate of mortality or serious illness.

VOC: Volatile organic compounds (VOCs), also known as reactive organic gases (ROGs), are emitted from incomplete combustion of hydrocarbons or other carbon-based fuels.

U.S. EPA: U.S. Environmental Protection Agency (U.S. EPA) is an agency of the U.S. federal government that was created for the purpose of protecting human health and the environment by writing and enforcing regulations based on laws passed by Congress. The Clean Air Act requires the U.S. EPA to establish national ambient air quality standards for certain common and widespread pollutants based on the latest science.

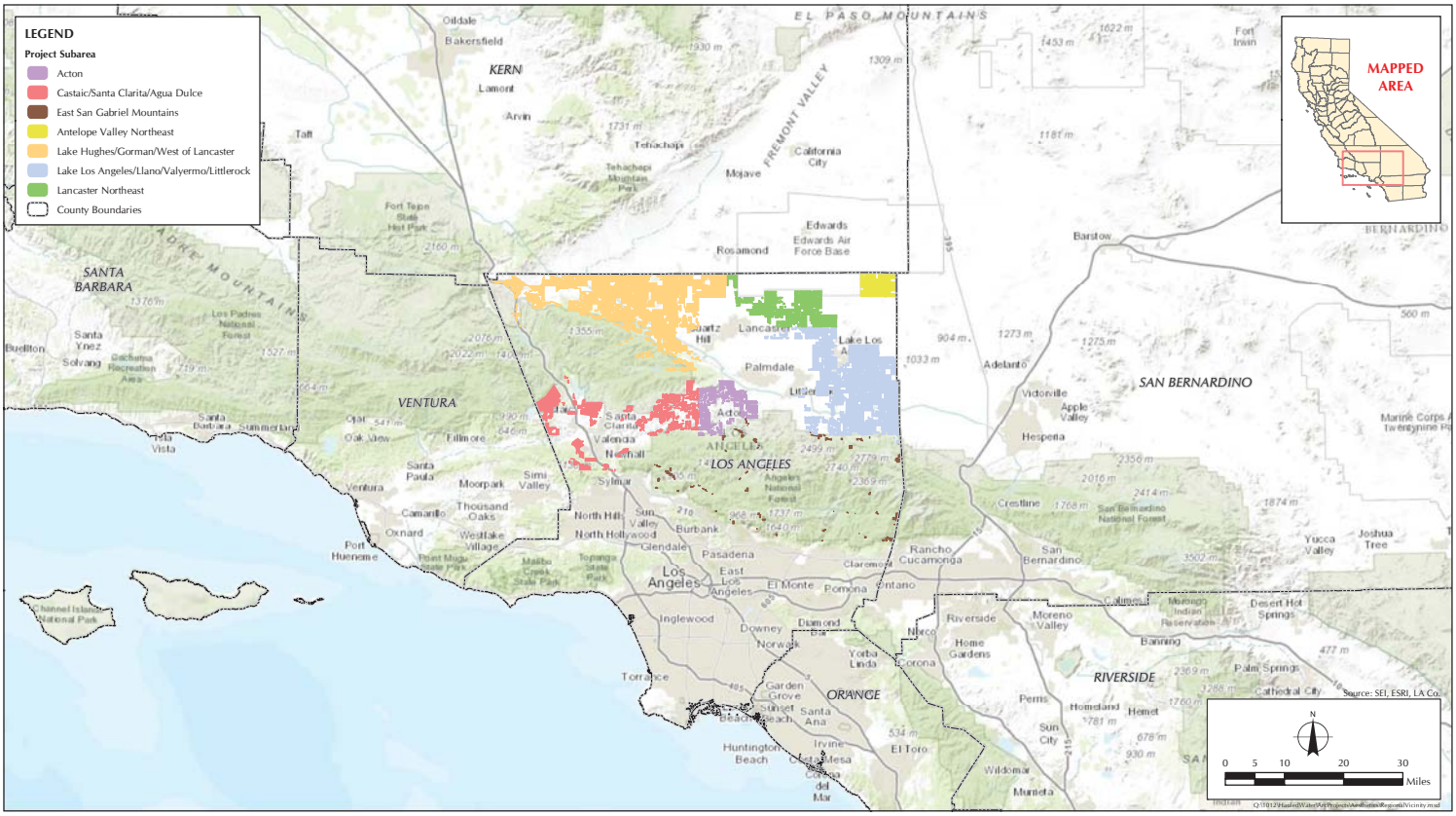

FIGURE 1.2-1
Regional Vicinity Map

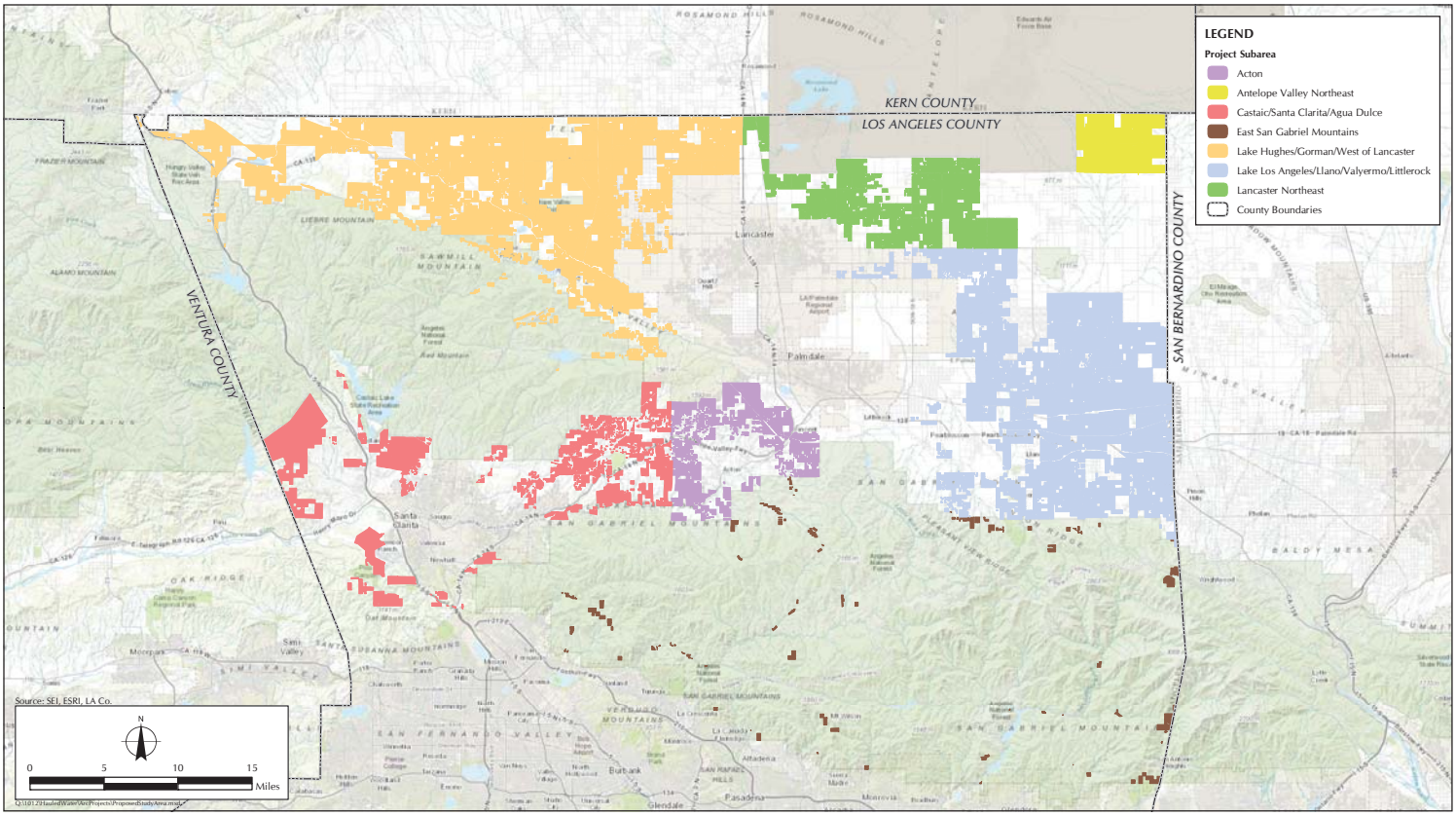

FIGURE 1.2-2
Proposed Initiative Study Area

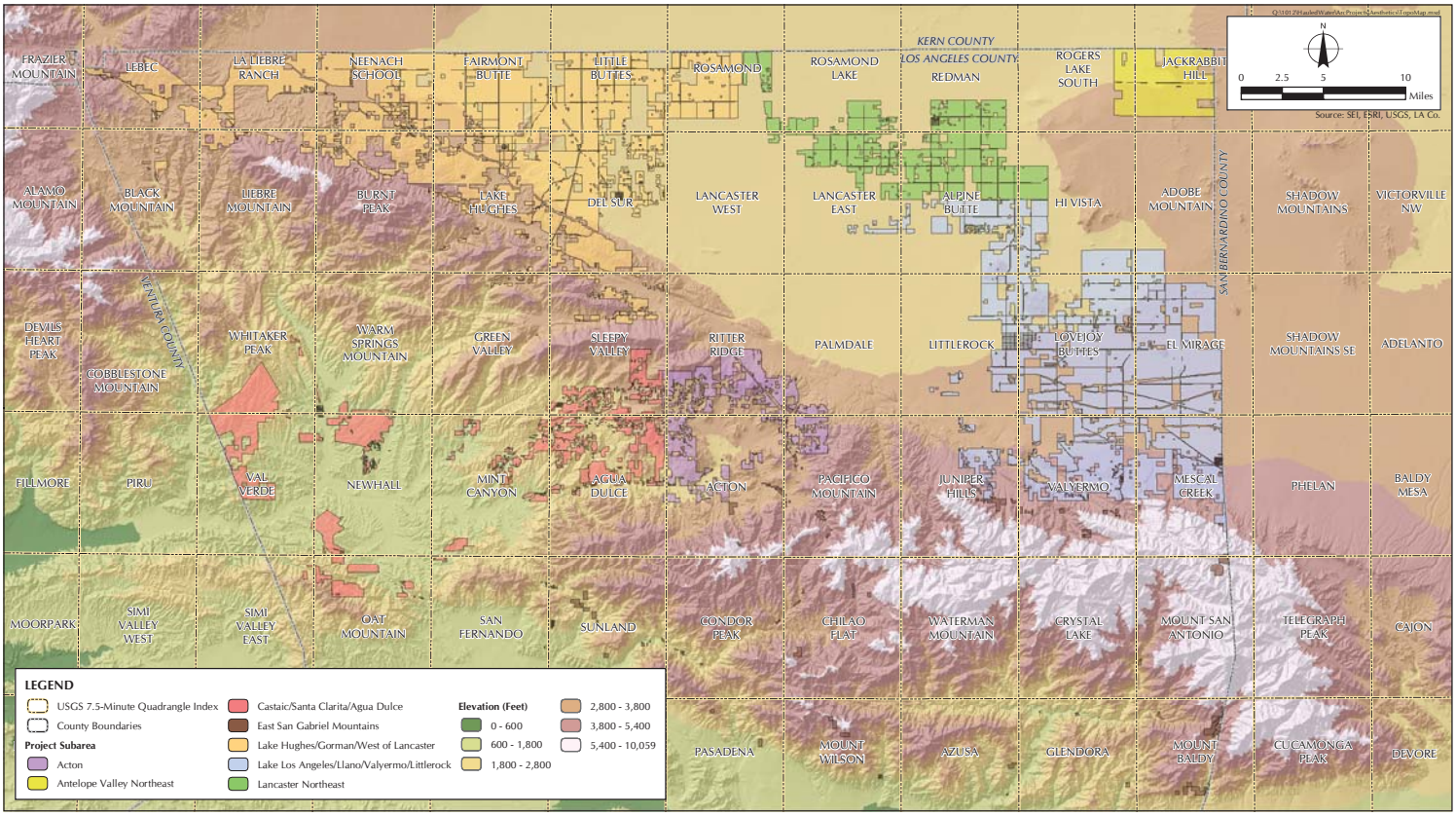

FIGURE 1.2-3
USGS 7.5-Minute Quadrangle Index

SECTION 2.0
BACKGROUND

The air quality and greenhouse gas (GHG) analysis provided in this section evaluates the air quality and GHG emissions impact level of significance associated with the construction, operation, and maintenance activities of the proposed Single-Family Residential Hauled Water Initiative (proposed initiative). The analysis contained herein focuses on GHG emissions and criteria pollutants designated by the federal Clean Air Act (CAA). Relevant regulatory framework is used to determine the consistency of the proposed initiative with federal and State laws that govern the regulation of air quality and to determine the level of significance of the proposed initiative's impacts to air quality. Mitigation measures are subsequently provided to reduce air quality impacts identified to be potentially significant. The information used in this analysis is based on a review of relevant literature and technical reports (see Section 3.0, *References*, for a list of reference materials consulted). The conclusion of this analysis is supported by air quality modeling results (Appendix A, *CalEEMod Output for the Proposed Initiative*).

2.1 POLLUTANTS AND THEIR EFFECTS

The analysis contained herein reviews criteria pollutants designated by the federal and California CAAs. Criteria air pollutants are defined as pollutants that are hazardous to human health and are regulated by federal and State ambient air quality standards or criteria for outdoor concentrations. The federal and State standards have been set at levels above which concentrations would be harmful to human health and are designed to protect the most sensitive persons from illness or discomfort. Criteria pollutants of concern include carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb). As defined by the federal CAA, "hazardous air pollutants" refers to a variety of pollutants generated or emitted by industrial production activities. Called toxic air contaminants (TACs) under the California CAA, 10 pollutants have been identified through ambient air quality data as posing the most substantial health risk in California. On April 2, 2007, the Supreme Court in *Massachusetts, et al. v. Environmental Protection Agency, et al.* (549 U.S. 1438; 127 S. Ct. 1438) ruled that the CAA gives the U.S. Environmental Protection Agency (EPA) the authority to regulate emissions of GHGs, including carbon dioxide (CO_2); methane (CH_4); nitrous oxide (N_2O); and fluorinated gases, such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride,[1] thereby legitimizing GHGs as air pollutants under the CAA.

GHGs trap energy from the sun and help maintain the temperature of the Earth's surface, creating a process known as the greenhouse effect. The sun emits solar radiation, providing energy to Earth. Six percent of the solar radiation emitted by the sun is reflected back by the atmosphere surrounding the Earth, 20 percent of the solar radiation is scattered and reflected by clouds, 19 percent of the solar radiation is absorbed by the atmosphere and clouds, 4 percent of the solar radiation is reflected back to the atmosphere by the Earth's surface, and 51 percent of the solar energy is absorbed by the Earth's surface. GHGs such as CO_2 and CH_4 are naturally present in the atmosphere. The presence of these gases prevents outgoing infrared radiation from escaping the Earth's surface and lower atmosphere, resulting in a warmer atmospheric layer known as the troposphere. Without these GHGs, Earth would be too cold to be habitable; however, an excess of GHGs in the atmosphere can result in global climate change by raising the Earth's mean

[1] U.S. Supreme Court. 2 April 2007. Massachusetts, et al. v. Environmental Protection Agency, et al. 549 U.S. 1438; 127 S. Ct. 1438. Washington, D.C.

temperature, resulting in environmental consequences related to snowpack losses, flood hazards, sea level rises, and fire hazards.

Global climate change results from a combination of three factors: (1) natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun; (2) natural processes within the Earth's climate system, such as changes in ocean circulation; and (3) anthropogenic activities, such as fossil fuel combustion, deforestation, reforestation, urbanization, and desertification, that alter the composition of atmospheric gases. In its 2007 climate change synthesis report to policymakers, the Intergovernmental Panel on Climate Change (IPCC) concluded, "global GHG emissions due to human activities have grown since pre-industrial times, with an increase of 70 percent between 1970 and 2004."[2] Therefore, significant attention is being given to the anthropogenic causes of the increased GHG emissions level. In the review of regulatory publications from California Air Pollution Control Officers Association (CAPCOA),[3] California Air Resources Board (CARB),[4] the California Attorney General,[5] and the Governor's Office of Planning and Research (OPR),[6] there exists a consensus on the close association between fossil fuel combustion, in conjunction with other human activities, and GHG emissions. In California, GHG emissions are largely contributed by the transportation sector, which was determined responsible for 35 percent of 1990 and 38 percent of 2004 GHG emissions statewide. After transportation followed the electricity generation sector, which was responsible for 25 percent of statewide emissions in both 1990 and 2004; the industrial sector, which was responsible for 24 percent of 1990 and 20 percent of 2004 statewide GHG emissions; and the commercial sector, which was responsible for three percent of statewide emissions in both 1990 and 2004.[7]

A detailed description of the characteristics and effects of criteria pollutants and GHGs are provided below to contextualize the analysis.

2.1.1 Carbon Monoxide

Carbon Monoxide (CO) is a colorless, odorless gas formed by the incomplete combustion of fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircrafts, and trains. In urban areas, automobile exhaust accounts for the majority of CO emissions. CO is a nonreactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions, including wind speed, topography, and atmospheric stability. CO produced by motor vehicle exhaust can be locally concentrated when surface-based temperature inversions are combined with calm

[2] Intergovernmental Panel on Climate Change. Approved 12–17 November 2007. Climate Change 2007: Synthesis Report, Summary for Policymakers, p. 5. Valencia, Spain. Available online at: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

[3] California Air Pollution Control Officers Association. January 2008. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. Sacramento, CA.

[4] California Air Resources Board. 24 October 2008. Preliminary Draft Staff Proposal: Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act. Available online at: http://www.opr.ca.gov/ceqa/pdfs/Prelim_Draft_Staff_Proposal_10-24-08.pdf

[5] California Department of Justice, Office of the Attorney General. Updated 9 December 2008. The California Environmental Quality Act Addressing Global Warming Impacts at the Local Agency Level. Sacramento, CA.

[6] California Governor's Office of Planning and Research. 19 June 2008. CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review. Technical Advisory. Sacramento, CA.

[7] California Air Resources Board. 16 November 2007. California 1990 Greenhouse Gas Emissions Level and 2020 Limit. Sacramento, CA.

atmospheric conditions, such as situations at dusk in urban areas between November and February.[8] The highest levels of CO typically occur during the colder months of the year when inversion conditions are more frequent. CO has a higher binding affinity to hemoglobin than oxygen (O_2), so it can replace O_2 in the blood, reducing the blood's ability to transport O_2 to vital organs. Low CO concentrations can cause fatigue in healthy persons and chest pain in persons with heart disease. At moderate concentrations, CO can cause angina, impaired vision, and reduced brain function. At high concentrations, CO can cause impaired vision and coordination, headaches, dizziness, confusion, and nausea. At very high concentrations, CO exposure can be fatal.

2.1.2 Reactive Organic Gases and Volatile Organic Compounds

Volatile organic compounds (VOCs), also known as reactive organic gases (ROGs), include any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate. Additionally, there is a list of excluded organic compounds considered to be non-reactive or low-reactive organic gases that are not held to be precursors to the formation of atmospheric ozone. The U.S. EPA and CARB maintain separate but similar lists of organic gases that are excluded as regulated VOCs, or ROGs, as termed by CARB.[9] VOCs are emitted from incomplete combustion of hydrocarbons or other carbon-based fuels. Combustion engine exhaust, oil refineries, and oil-fueled power plants are the primary sources of hydrocarbons. The evaporation of petroleum fuels, solvents, dry-cleaning solutions, and paint presents another potential source of hydrocarbons.

The primary health effects of hydrocarbons result from the formation of ozone and its related health effects (see Section 2.1.3, *Ozone*). High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. There are no separate federal or California ambient air quality standards for VOCs. Carcinogenic forms of VOCs are considered TACs. One example is benzene, a known carcinogen. The health effects of individual VOCs are described in Section 2.1.16.

2.1.3 Ozone

Ozone (O_3) is a colorless gas that is formed in the atmosphere when ROGs, which include VOCs and nitrogen oxides (NO_x), react in the atmosphere in the presence of ultraviolet sunlight. The primary sources of VOCs and NO_x are automobile exhaust emissions and industrial emissions. Ideal conditions for O_3 formation occur during summer and early fall on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. O_3 is one of the main components of photochemical smog in urban areas. Health effects associated with exposure to O_3 include increased respiratory and cardiovascular disease; increased symptoms of respiratory illness, such as a cough, phlegm, and wheeze; decreased lung function; increased bronchodilator usage; and increased daily mortalities.

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[8] Inversion is an atmospheric condition in which a layer of warm air traps cooler air near the surface of the earth, preventing the normal rising of surface air.

[9] California Air Resources Board, Planning and Technical Support Division, Emission Inventory Branch. Revised January 2009. "Definitions of VOC and ROG." Sacramento, CA. Available online at: http://www.arb.ca.gov/ei/speciate/voc_rog_dfn_1_09.pdf

2.1.4 Nitrogen Dioxide

Nitrogen Dioxide (NO_2) is a highly reactive, brownish-red gas that plays a major role in the formation of ground-level O_3 and acid rain. NO_2 is produced in the atmosphere from the reaction of atmospheric oxygen (O_2) with nitric oxide (NO). NO_x collectively refers to both NO and NO_2. The main sources of NO_2 include fuel combustion in industry and in motor vehicles. High concentrations of NO_2 can cause breathing difficulties and can result in a brownish-red cast to the atmosphere with reduced visibility. NO_2 is toxic to various animals and to humans because it can react with water to form nitric acid in the eyes, lungs, mucus membranes, and skin. Epidemiological studies have shown associations between NO_2 concentrations and chronic pulmonary fibrosis and daily mortalities from respiratory and cardiovascular causes. Some increase in bronchitis in children (two and three years old) has also been observed at concentrations below 0.3 parts per million (ppm).

2.1.5 Sulfur Dioxide

Sulfur Dioxide (SO_2) is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Generally, the highest levels of SO_2 are found near large industrial complexes where coal and oil are used in power plants and industries. In recent years, SO_2 concentrations have been reduced due to the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels. SO_2 causes its irritant effects by stimulating nerves in the lining of the nose and throat and the lungs' airways. This causes a reflex cough, irritation, and a feeling of chest tightness, which may lead to narrowing of the airways. Acute respiratory symptoms and diminished ventilator function in children can be caused by SO_2 emissions, which can also damage plants and erode metals. When SO_2 and NO_x react with water, oxygen, and oxidants, they form acidic compounds that can be deposited as dry particulate matter or in the wet form as acid rain, snow, or fog. Acid rain harms lakes, streams, trees, crops, and historic buildings and monuments.[10]

2.1.6 Particulate Matter

Particulate Matter (PM) consists of very small liquid and solid particles suspended in air, which can include smoke, soot, dust, salts, acids, and metals. PM can be formed when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. Fine particulate matter ($PM_{2.5}$) refers to particles that are 2.5 microns or less in diameter, which is roughly 1/28th the diameter of a human hair. PM_{10} refers to particles that are 10 microns or less in diameter, which is about 1/7th the thickness of a human hair. Primary sources of $PM_{2.5}$ emissions include fuel combustion from motor vehicles, power generation, industrial facilities, residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as SO_2, NO_x, and VOCs. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning activities; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-sized particles pose. When inhaled, small particles can penetrate the natural defenses of the human respiratory system and damage the respiratory tract. Elevated particulate levels have been strongly linked to premature deaths, hospital

[10] U.S. Environmental Protection Agency. Updated 11 June 2013. "Sulfur Dioxide (SO_2)—NAAQS Implementation." Washington, DC. Available online at: http://www.epa.gov/ttn/naaqs/so2/index.html

admissions, emergency room visits, and asthma attacks;[11] particulate matter inhalations can also significantly reduce development of lung function in children.[12] Components of particulate matter can include substances such as lead (Pb), sulfates (SO_4), and nitrates (NO_x), which can cause lung damage directly and can be absorbed into the blood stream and cause damage elsewhere in the body. Moreover, these substances can transport absorbed gases, such as chlorides or ammonium, into the lungs and cause injury. PM_{10} tends to collect in the upper portion of the respiratory system, whereas $PM_{2.5}$ can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle and produce haze in the atmosphere that reduces regional visibility.

2.1.7 Lead

Lead (Pb) in the atmosphere occurs as PM. Main sources of Pb emissions include leaded gasoline, battery manufacture, paint, ink, ceramics, ammunition, and secondary Pb smelters. Prior to 1978, mobile emissions were the primary source of atmospheric Pb. After the phase-out of leaded gasoline between 1978 and 1987, secondary Pb smelters, battery recycling, and manufacturing facilities became Pb emission sources of greater concern. Prolonged exposure to atmospheric Pb poses a serious threat to human health, effects of which include gastrointestinal disturbances, anemia, kidney disease, and, in severe cases, neuromuscular and neurological dysfunction. Infants and young children are particularly sensitive even to very low levels of Pb, and such exposure could result in decrements in neurobehavioral performance, including intelligence quotient performance, psychomotor performance, reaction time, and growth.

2.1.8 Sulfates

Sulfates (SO_4^{-2}) are particulate products of combustion of sulfur-containing fossil fuels. When SO or SO_2 are exposed to oxygen they precipitate out into sulfates (SO_3 or SO_4). Sulfates are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (that is, gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO_2) during the combustion process and is subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place relatively rapidly and completely in urban areas of California due to regional meteorological features. CARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in respiratory function, aggravation of asthmatic symptoms, and an increased risk of cardiopulmonary disease. Sulfates are particularly effective in degrading visibility, and, because they are usually acidic, can harm ecosystems and damage materials and property.[13]

2.1.9 Hydrogen Sulfide

Hydrogen sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. Exposure to low concentrations of H_2S may irritate the eyes, nose, and throat. It may also cause difficulty in breathing for some

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[11] California Air Resources Board. November 2007. Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution, November 2007. Available online at: http://www.arb.ca.gov/research/health/fs/pm_ozone-fs.pdf

[12] California Air Resources Board. November 2007. Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution, November 2007. Available online at: http://www.arb.ca.gov/research/health/fs/pm_ozone-fs.pdf

[13] California Air Resources Board. Updated 24 November 2009. "History of Sulfates Air Quality Standard." Web site. Available online at: http://www.arb.ca.gov/research/aaqs/caaqs/sulf-1/sulf-1.htm

asthmatics. Exposure to higher concentrations (above 100 ppm) of H_2S can cause olfactory fatigue, respiratory paralysis, and death. Brief exposures to high concentrations of H_2S (greater than 500 ppm) can cause a loss of consciousness. In most cases, the person appears to regain consciousness without any other effects. However, in many individuals, there may be permanent or long-term effects such as headaches, poor attention span, poor memory, and poor motor function. No health effects have been found in humans exposed to typical environmental concentrations of H_2S (0.00011 to 0.00033 ppm). Deaths due to inhaling large amounts of H_2S have been reported in a variety of different work settings, including sewers, animal processing plants, waste dumps, sludge plants, oil and gas well drilling sites, and tanks and cesspools.

2.1.10 Visibility-reducing Particles

This standard is a measure of visibility. Visibility is often characterized by visual range (VR). VR is the maximum distance at which a person can barely perceive a dark object. The ability to perceive an object is determined by the difference in contrast between the object and the background. A two-percent contrast is considered barely perceptible, but typically at least a five-percent change in contrast is needed. The less water vapor, sea salt particulate, and pollutants in the air, the greater the VR. VRs of up to about 150 miles (240 kilometers) can occur in clean desert areas where there is very low relative humidity. In coastal regions, the occurrence of sea salt particulate and water vapor can significantly reduce the maximum VR that could occur. The CARB does not yet have a measurement method that is accurate or precise enough to designate areas in the state as being in attainment or nonattainment. The entire state is unclassified.

2.1.11 Vinyl Chloride

Vinyl chloride monomer is a sweet smelling, colorless gas at ambient temperature. Landfills, publicly owned treatment works, and polyvinyl chloride (PVC) production are the major identified sources of vinyl chloride emissions in California. PVC can be fabricated into several products, such as pipes, pipefittings, and plastics. In humans, epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of liver angiosarcoma, which is a rare cancer, and have suggested a relationship between exposure and cancers of the lung and brain. There are currently no adopted ambient air standards for vinyl chloride.

Acute exposure of humans to high levels of vinyl chloride via inhalation in humans has resulted in effects on the central nervous system, such as dizziness, drowsiness, headaches, and giddiness. Vinyl chloride is reported to be slightly irritating to the eyes and respiratory tract in humans. Acute exposure to extremely high levels of vinyl chloride has caused loss of consciousness, irritation to the lungs and kidneys, and inhibition of blood clotting in humans and cardiac arrhythmias in animals. Tests involving acute exposure of mice to vinyl chloride have shown a high acute toxicity from inhalation exposure to the substance. Long-term exposure to vinyl chloride concentrations has been linked with chronic health effects:[14,15]

- Liver damage may result in humans from chronic exposure to vinyl chloride, through both inhalation and oral exposure.

[14] Agency for Toxic Substances and Disease Registry. Updated 2006. "Toxicological Profile for Vinyl Chloride."

[15] U.S. Environmental Protection Agency. Updated 6 November 2007. Technology Transfer Network Air Toxics Web Site: "Vinyl Chloride." Available online at: http://www.epa.gov/ttn/atw/hlthef/vinylchl.html

- A small percentage of individuals occupationally exposed to high levels of vinyl chloride in air have developed a set of symptoms termed *vinyl chloride disease*, which is characterized by Raynaud's phenomenon (fingers blanch and numbness and discomfort are experienced upon exposure to the cold), changes in the bones at the end of the fingers, joint and muscle pain, and scleroderma-like skin changes (thickening of the skin, decreased elasticity, and slight edema).

- Central nervous system effects (including dizziness, drowsiness, fatigue, headache, visual and/or hearing disturbances, memory loss, and sleep disturbances), as well as peripheral nervous system symptoms (peripheral neuropathy, tingling, numbness, weakness, and pain in fingers) have also been reported in workers exposed to vinyl chloride.

Several reproductive/developmental health effects from vinyl chloride exposure have been identified:[16,17]

- Several case reports suggest that male sexual performance may be affected by vinyl chloride. However, these studies are limited by lack of quantitative exposure information and possible co-occurring exposure to other chemicals.

- Several epidemiological studies have reported an association between vinyl chloride exposure in pregnant women and an increased incidence of birth defects, while other studies have not reported similar findings.

- Epidemiological studies have suggested an association between men occupationally exposed to vinyl chloride and miscarriages in their wives' pregnancies, although other studies have not supported these findings.

- Long-term exposure to vinyl chloride has also been identified as a cancer risk:

  - Inhaled vinyl chloride has been shown to increase the risk of a rare form of liver cancer (angiosarcoma of the liver) in humans.

  - Animal studies have shown that vinyl chloride, via inhalation, increases the incidence of angiosarcoma of the liver and cancer of the liver.

2.1.12 Carbon Dioxide

Carbon Dioxide (CO_2) is a colorless, odorless, and nonflammable gas that is the most abundant GHG in the Earth's atmosphere after water vapor. CO_2 enters the atmosphere through natural processes, such as respiration and forest fires, and through human activities such as the burning of fossil fuels (oils, natural gas, and coal) and solid waste, deforestation, and industrial processes. CO_2 absorbs terrestrial infrared radiation that would otherwise escape to space and, therefore, plays an important role in atmospheric warming. CO_2 has an atmospheric lifetime of up to 200 years and, therefore, is a more important GHG than water vapor, which has an atmospheric residence time of

[16] Agency for Toxic Substances and Disease Registry. Updated 2006. "Toxicological Profile for Vinyl Chloride."

[17] U.S. Environmental Protection Agency. Updated 6 November 2007. Technology Transfer Network Air Toxics Web Site: "Vinyl Chloride." Available online at: http://www.epa.gov/ttn/atw/hlthef/vinylchl.html

only a few days. CO_2 provides the reference point for the global warming potential (GWP) of other gases; thus, the GWP of CO_2 is equal to one. Global warming potential (GWP) is a relative measure of how much heat a greenhouse gas traps in the atmosphere.

2.1.13 Methane

Methane (CH_4) is a principal component of natural gas and consists of a single carbon atom bonded to four hydrogen atoms. It is formed and released to the atmosphere by biological processes from livestock and other agricultural practices and by the decay of organic waste in anaerobic environments such as municipal solid waste landfills. CH_4 is also emitted during the production and transport of coal, natural gas, and oil. CH_4 is about 21 times more powerful at warming the atmosphere than CO_2 (a GWP of 21).

The chemical lifetime of CH_4 in the atmosphere is approximately 12 years. The relatively short atmospheric lifetime of CH_4, coupled with its potency as a GHG, makes it a candidate for mitigating global warming over the short term. CH_4 can be removed from the atmosphere by a variety of processes, such as the oxidation reaction with hydroxyl radicals (OH), microbial uptake in soils, and reaction with chlorine (Cl) atoms in the marine boundary layer.

2.1.14 Nitrous Oxide

Nitrous Oxide (N_2O) is a transparent, colorless gas with a slightly sweet odor. N_2O has a long atmospheric lifetime (approximately 120 years) and heat-trapping effects about 310 times more powerful than CO_2 on a per molecule basis (a GWP of 310). N_2O is produced by both natural and human-related sources. The primary anthropogenic sources of N_2O are agricultural soil management like soil cultivation practices, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, and production of adipic and nitric acids. The natural process of producing N_2O ranges from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests.

2.1.15 Fluorinated Gases

Hydrofluorocarbons (HFCs), perfluorocarbons, and sulfur hexafluoride are synthetic, powerful GHGs that are emitted from a variety of industrial processes, including aluminum production, semiconductor manufacturing, electric power transmission, magnesium production and processing, and the production of HCFC-22. Fluorinated gases are being used as substitutes for ozone-depleting chlorofluorocarbons (CFCs). Fluorinated gases are typically emitted in small quantities; however, they have high GWPs of between 140 and 23,900.[18]

2.1.16 Toxic Air Contaminants

Toxic Air Contaminants (TACs) are airborne pollutants that potentially pose a hazard to human health or may be expected to result in an increased rate of mortality or serious illness. Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to brain and nervous system, and respiratory disorders. In addition, effects from TACs may be both chronic and acute on human health. Acute health effects are attributable to sudden exposure to high quantities of air toxics. These effects include nausea, skin irritation, respiratory illness, and, in some cases,

[18] California Climate Action Registry. January 2009. California Climate Action Registry General Reporting Protocol, Version 3.1. Los Angeles, CA.

death. Chronic health effects can result from low-dose, long-term exposure from routine releases of air toxics. The effect of major concern for this type of exposure is cancer, which requires a period of 10–30 years after exposure to develop.[19]

Hazardous air pollutants is a term used by the federal CAA that includes a variety of pollutants generated or emitted by industrial production activities. Called TACs under the CAA, 10 pollutants have been identified in the Toxic Air Contaminant Identification List through ambient air quality data as posing the most substantial health risk in California.[20] In 1998, California identified diesel engine PM (diesel PM or soot) as a TAC based on its potential to cause cancer, premature death, and other health problems.[21] Sources for diesel PM include exhaust from vehicles, diesel engines, and diesel-powered portable equipment. According to the CARB, diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the State's Proposition 65 or under the federal Hazardous Air Pollutants programs. California has adopted a comprehensive diesel risk reduction program. The U.S. EPA has adopted low-sulfur diesel fuel standards that will reduce diesel particulate matter substantially. These programs went into effect in June 2006.

In 1991, the District Board made a policy decision to make the State Air Toxics "Hot Spots" Information and Assessment Act (Act; AB 2588, 1987),[22] which is a state law requiring sources of toxics to do plans, inventories, source tests, and reports, a low priority for staff enforcement.[23]

TACs do not have ambient air quality standards since no safe levels of TACs can be determined. Instead, TAC impacts are evaluated by calculating the health risks associated with a given exposure. The requirements of the Act apply to facilities that use, produce, or emit toxic chemicals. Facilities that are subject to the toxic emission inventory requirements of the Act must prepare and submit toxic emission inventory plans and reports and periodically update those reports.

2.1.16.1 Health Effects and Risks of Toxic Air Contaminants

Acetaldehyde. Acetaldehyde is classified as a federal hazardous air pollutant and as a California TAC. Acetaldehyde is a carcinogen that also causes chronic non-cancer toxicity in the respiratory system. Symptoms of chronic intoxication of acetaldehyde in humans resemble those of alcoholism.

The primary acute effect of inhalation exposure to acetaldehyde is irritation of the eyes, skin, and respiratory tract in humans. At higher exposure levels, erythema, coughing, pulmonary edema, and necrosis may also occur. Acute inhalation of acetaldehyde resulted in a depressed respiratory rate

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[19] California Air Resources Board. Updated 30 March 2012. Air Quality Analysis Guidance Handbook. Sacramento, CA. Available online at: http://www.aqmd.gov/ceqa/hdbk.html

[20] California Air Resources Board. 18 July 2011. Toxic Air Contaminant Identification List. Sacramento, CA. Available online at: http://www.arb.ca.gov/toxics/id/taclist.htm

[21] California Air Resources Board. 25 January 2010. Diesel Programs and Activities. Sacramento, CA. Available online at: http://www.arb.ca.gov/diesel/diesel.htm

[22] California Air Resources Board. 25 April 2011. AB 2588 Air Toxics "Hot Spots" Program. Sacramento, CA. Available online at: http://www.arb.ca.gov/ab2588/ab2588.htm

[23] Great Basin Unified Air Pollution District. Accessed 4 January 2012. Major Past Policy Decisions. Bishop, CA. Available online at: http://www.gbuapcd.org/background.htm

and elevated blood pressure in experimental animals. Tests involving acute exposure of rats, rabbits, and hamsters have demonstrated acetaldehyde to have low acute toxicity from inhalation and moderate acute toxicity from oral or dermal exposure.[24]

Benzene. Benzene is highly carcinogenic and occurs throughout California. Benzene also has non-cancer–related health effects. Brief inhalation exposure to high concentrations can cause central nervous system depression. Acute effects include central nervous system symptoms of nausea, tremors, drowsiness, dizziness, headache, intoxication, and unconsciousness.[25]

Neurological symptoms of inhalation exposure to benzene include drowsiness, dizziness, headaches, and unconsciousness in humans. Ingestion of large amounts of benzene may result in vomiting, dizziness, and convulsions in humans. Exposure to benzene in liquid and vapor form may irritate the skin, eyes, and upper respiratory tract in humans. Redness and blisters may result from dermal exposure to benzene.

Chronic inhalation of certain levels of benzene causes blood disorders in humans; specifically, benzene affects bone marrow (the tissues that produce blood cells). Aplastic anemia, excessive bleeding, and damage to the immune system (by changes in blood levels of antibodies and loss of white blood cells) may develop. Increased incidence of leukemia (cancer of the tissues that form white blood cells) has been observed in humans who have been occupationally exposed to benzene.[26]

1,3-Butadiene. 1,3-butadiene has been identified as a carcinogen in California. At very high levels, butadiene vapors cause neurological effects, such as blurred vision, fatigue, headache, and vertigo. Dermal exposure of humans to 1,3-butadiene causes a sensation of cold, followed by a burning sensation, which may lead to frostbite.[27]

One epidemiological study reported that chronic (long-term) exposure to 1,3-butadiene by inhalation resulted in an increase in cardiovascular diseases, such as rheumatic and arteriosclerotic heart diseases, while other human studies have reported effects on the blood. A large epidemiological study of synthetic rubber industry workers demonstrated a consistent association between 1,3-butadiene exposure and occurrence of leukemia. Several epidemiological studies of workers in styrenebutadiene rubber factories have shown an increased incidence of respiratory, bladder, stomach, and lymphato-hematopoietic cancers. However, these studies are not sufficient to determine a causal association between 1,3-butadiene exposure and cancer, due to possible exposure to other chemicals and other confounding factors.[28]

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[24] U.S. Environmental Protection Agency. Revised January 2000. Technology Transfer Network Air Toxics Web Site: "Acetaldehyde." Available online at: http://www.epa.gov/ttn/atw/hlthef/acetalde.html

[25] U.S. Environmental Protection Agency. Revised January 2000. Technology Transfer Network Air Toxics Web Site: "Benzene." Available online at: http://www.epa.gov/ttn/atw/hlthef/benzene.html

[26] U.S. Environmental Protection Agency. Revised January 2000. Technology Transfer Network Air Toxics Web Site: "Benzene." Available online at: http://www.epa.gov/ttn/atw/hlthef/benzene.html

[27] U.S. Environmental Protection Agency. Revised March 2009. Technology Transfer Network Air Toxics Web Site: "1,3-butadiene." Available online at: http://www.epa.gov/ttn/atw/hlthef/butadien.html

[28] U.S. Environmental Protection Agency. Revised March 2009. Technology Transfer Network Air Toxics Web Site: "1,3-butadiene." Available online at: http://www.epa.gov/ttn/atw/hlthef/butadien.html

Carbon Tetrachloride. Carbon tetrachloride is a central nervous system depressant, which the U.S. EPA has classified as a Group B2, a probable human carcinogen.[29]

Acute inhalation and oral exposures to high levels of carbon tetrachloride have been observed primarily to damage the liver (swollen, tender liver, changes in enzyme levels, and jaundice) and kidneys (nephritis, nephrosis, and proteinurea) of humans. Depression of the central nervous system has also been reported. Symptoms of acute exposure in humans include headache, weakness, lethargy, nausea, and vomiting. Delayed pulmonary edema (fluid in lungs) has been observed in humans who have been exposed to high levels of carbon tetrachloride by inhalation and ingestion, but this is believed to be due to injury to the kidney rather than direct action of carbon tetrachloride on the lung. Chronic inhalation or oral exposure to carbon tetrachloride produces liver and kidney damage in humans and animals.[30]

Chromium, Hexavalent. In California, hexavalent chromium has been identified as a carcinogen. Epidemiological evidence suggests that exposure to inhaled hexavalent chromium may result in lung cancer.

The respiratory tract is the major target organ for chromium (VI) following inhalation exposure in humans. Other effects noted from acute inhalation exposure to very high concentrations of chromium (VI) include gastrointestinal and neurological effects, while dermal exposure causes skin burns in humans. Chronic inhalation exposure to chromium (VI) in humans results in effects on the respiratory tract, with perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, asthma, and nasal itching and soreness reported. Chronic human exposure to high levels of chromium (VI) by inhalation or oral exposure may produce effects on the liver, kidney, gastrointestinal and immune systems, and possibly the blood.[31]

Para-dichlorobenzene. In California, para-dichlorobenzene has been identified as a carcinogen. Acute exposure to 1,4-dichlorobenzene via inhalation in humans results in irritation to the eyes, skin, and throat. In addition, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans (for example, cerebellar ataxia, dysarthria, weakness in limbs, and hyporeflexia).[32]

Formaldehyde. The major toxic effects caused by acute formaldehyde exposure via inhalation are eye, nose, and throat irritation and effects on the nasal cavity. Other effects seen from exposure to high levels of formaldehyde in humans are coughing, wheezing, chest pains, and bronchitis. Chronic exposure to formaldehyde by inhalation in humans has been associated with respiratory symptoms and irritation of the eye, nose, and throat. Animal studies have reported effects on the nasal respiratory epithelium and lesions in the respiratory system from chronic inhalation exposure to formaldehyde.

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[29] U.S. Environmental Protection Agency. Revised January 2000. Technology Transfer Network Air Toxics Web Site: "Carbon Tetrachloride." Available online at: http://www.epa.gov/ttn/atw/hlthef/carbonte.html

[30] United States Environmental Protection Agency. Revised January 2000. Technology Transfer Network Air Toxics Web Site: Carbon Tetrachloride. Available online at: http://www.epa.gov/ttn/atw/hlthef/carbonte.html

[31] United States Environmental Protection Agency. Revised January 2000. Technology Transfer Network Air Toxics Web Site: Chromium Compounds. Available online at: http://www.epa.gov/ttn/atw/hlthef/chromium.html#ref1

[32] United States Environmental Protection Agency. Revised January 2000. Technology Transfer Network Air Toxics Web Site: 1,4-Dichlorobenzene (para-Dichlorobenzene). Available online at: http://www.epa.gov/ttn/atw/hlthef/dich-ben.html

Occupational studies have noted statistically significant associations between exposure to formaldehyde and increased incidence of lung and nasopharyngeal cancer. This evidence is considered to be "limited," rather than "sufficient," due to possible exposure to other agents that may have contributed to the excess cancers. U.S. EPA considers formaldehyde to be a probable human carcinogen and has ranked it in the U.S. EPA's Group B1.[33] In California, formaldehyde has been identified as a carcinogen.

Methylene Chloride. Case studies of methylene chloride poisoning during paint stripping operations have demonstrated that inhalation exposure to extremely high levels of methylene chloride can be fatal to humans. Acute inhalation exposure to high levels of methylene chloride in humans has affected the central nervous system including decreased visual, auditory, and psychomotor functions, but these effects are reversible once exposure ceases. Methylene chloride also irritates the nose and throat at high concentrations. The major effects from chronic inhalation exposure to methylene chloride in humans are effects on the central nervous system, such as headaches, dizziness, nausea, and memory loss. In addition, chronic exposure can lead to bone marrow, hepatic, and renal toxicity. U.S. EPA considers methylene chloride to be a probable human carcinogen and has ranked it in U.S. EPA's Group B2.[34] The State of California considers methylene chloride to be a carcinogen.

Perchloroethylene. In California, perchloroethylene has been identified as a carcinogen. Perchloroethylene vapors are irritating to the eyes and respiratory tract. Following chronic exposure, workers have shown signs of liver toxicity, as well as kidney dysfunction, and neurological disorders.[35]

Diesel Particulate Matter. Diesel exhaust and many individual substances contained in it (including arsenic, benzene, formaldehyde, and nickel) have the potential to contribute to mutations in cells that can lead to cancer. Long-term exposure to diesel exhaust particles poses the highest cancer risk of any TAC evaluated by the California Office of Environmental Health Hazard Assessment (OEHHA). CARB estimates that about 70 percent of the cancer risk that the average Californian faces from breathing TACs stems from diesel exhaust particles.

In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers, and equipment operators. The studies showed these workers were more likely than workers who were not exposed to diesel emissions to develop lung cancer. These studies provide strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. Using information from OEHHA's assessment, CARB estimates that diesel-particle levels measured in California's air in 2000 could cause 540 "excess" cancers (beyond what would occur if there were no diesel particles in the air) in a population of 1 million people over a 70-year lifetime.

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[33] U.S. Environmental Protection Agency. Revised January 2000. Technology Transfer Network Air Toxics Web Site: "Formaldehyde." Available online at: http://www.epa.gov/ttn/atw/hlthef/formalde.html

[34] U.S. Environmental Protection Agency. Revised January 2000. Technology Transfer Network Air Toxics Web Site: "Methylene Chloride (Dichloromethane)." Available online at: http://www.epa.gov/ttn/atw/hlthef/methylen.html

[35] U.S. Environmental Protection Agency. Revised January 2000. Technology Transfer Network Air Toxics Web Site: "Tetrachloroethylene (Perchloroethylene)." Available online at: httphttp://www.epa.gov/ttn/atw/hlthef/tet-ethy.html

Other researchers and scientific organizations, including the National Institute for Occupational Safety and Health, have calculated similar cancer risks from diesel exhaust as those calculated by OEHHA and CARB.[36]

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat and lungs; and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks.

Diesel engines are a major source of fine-particle pollution. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among people suffering from respiratory problems. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can reduce lung function in children. In California, diesel exhaust particles have been identified as carcinogens.

Arsenic. Arsenic, a naturally occurring element, is found throughout the environment; for most people, food is the major source of exposure. Acute (short-term) high-level inhalation exposure to arsenic dust or fumes has resulted in gastrointestinal effects (nausea, diarrhea, abdominal pain); central and peripheral nervous system disorders have occurred in workers acutely exposed to inorganic arsenic. Chronic (long-term) inhalation exposure to inorganic arsenic in humans is associated with irritation of the skin and mucous membranes. Chronic oral exposure has resulted in gastrointestinal effects, anemia, peripheral neuropathy, skin lesions, hyperpigmentation, and liver or kidney damage in humans. Inorganic arsenic exposure in humans, by the inhalation route, has been shown to be strongly associated with lung cancer, while ingestion of inorganic arsenic in humans has been linked to a form of skin cancer and also to bladder, liver, and lung cancer.[37]

Cadmium. Cadmium is a metal found in natural deposits such as ores containing other elements. Some people who drink water containing cadmium well in excess of the maximum contaminant level (MCL) for many years could experience kidney damage.

[36] California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, and the American Lung Association. Accessed on: 2 February 2010. "Health Effects of Diesel Exhaust." Web site. Available online at: http://www.oehha.org/public_info/facts/dieselfacts.html

[37] U.S. Environmental Protection Agency. Revised December 2012. Technology Transfer Network Air Toxics Web Site: "Arsenic Compounds." Washington, DC. Available online at: http://www.epa.gov/ttn/atw/hlthef/arsenic.html

SECTION 3.0
REGULATORY FRAMEWORK

This regulatory framework identifies the federal and state laws that govern the regulation of air quality and must be considered by the project proponent regarding decisions on projects that involve construction, operation, or maintenance activities that would result in air emissions.

3.1 FEDERAL

3.1.1 Federal Clean Air Act

The CAA was enacted in 1970 to foster growth in the economy and industry while improving human health and the environment. The CAA is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, the CAA authorizes the United States Environmental Protection Agency (U.S. EPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. The CAA requires the U.S. EPA to routinely review and update the NAAQS in accordance with the latest available scientific evidence. For example, the one-hour standard for O_3 was revoked in 2005 in favor of a new eight-hour standard that is intended to better protect public health.

National Ambient Air Quality Standards

The NAAQS were established by the U.S. EPA per the requirements of the CAA (Table 3.1.1-1, *National Ambient Air Quality Standards*). The NAAQS are used to identify thresholds for specific pollutants. Two types of air quality standards were established by the CAA: 1) primary standards; and 2) secondary standards. Primary standards define limits for the intention of protecting public health, which includes sensitive populations such as asthmatics, children and elderly. Secondary Standards define limits to protect public welfare to include protection against decreased visibility, damage to animals, crops, vegetation and buildings.

TABLE 3.1.1-1
NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant		Primary/Secondary	Averaging Time	Level
Carbon Monoxide		Primary	8-hour	9 ppm
			1-hour	35 ppm
Lead		Primary and secondary	Rolling 3 month average	0.15 $\mu g/m^3$
Nitrogen Dioxide		Primary	1-hour	100 ppb
		Primary and Secondary	Annual	53 ppb
Ozone		Primary and Secondary	8-hour	0.075 ppm
Particle Matter	$PM_{2.5}$	Primary	Annual	12 $\mu g/m^3$
		Secondary	Annual	15 $\mu g/m^3$
		Primary and Secondary	24-hour	35 $\mu g/m^3$
	PM_{10}	Primary and Secondary	24-hour	150 $\mu g/m^3$
Sulfur Dioxide		Primary	1-hour	75 ppb
		Secondary	3-hour	0.5 ppm

NOTE: As of October 2011.
SOURCE: U.S. Environmental Protection Agency. December 2012. National Ambient Air Quality Standards (NAAQS).

State Implementation Plans

Federal clean air laws require areas with unhealthy levels of ozone, inhalable particulate matter, carbon monoxide, nitrogen dioxide, and sulfur dioxide to develop plans, known as State Implementation Plans (SIPs). SIPs are comprehensive plans that describe how an area will attain NAAQS. The 1990 amendments to the federal CAA set deadlines for attainment based on the severity of an area's air pollution problem.

SIPs are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls. Many of California's SIPs rely on the same core set of control strategies, including emissions standards for cars and heavy trucks, fuel regulations, and limits on emissions from consumer products. State law makes CARB the lead agency for all purposes related to the SIP. CARB forwards SIP revisions to the U.S. EPA for approval and publication in the *Federal Register*. The Code of Federal Regulations Title 40, Chapter I, Part 52, Subpart F, Section 52.220, lists all of the items included in the California SIP.

Conformity Rule

Section 176(c) of the CAA states that a federal agency cannot issue a permit for or support an activity unless the agency determines it would conform to the most recent U.S. EPA-approved SIP. This means that projects using federal funds or requiring federal approval must not (1) cause or contribute to any new violation of a NAAQS, (2) increase the frequency or severity of any existing violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone.

Based on the present NAAQS attainment status of the Southern California Air Basin (SCAB), a federal action would conform to the State Implementation Plan if its annual emissions remain below 100 tons of CO and $PM_{2.5}$, 70 tons of PM_{10}, and 10 tons of NO_X or VOCs. These de minimis thresholds apply to the proposed construction and operation activities pertaining to the federal action. If the proposed action exceeds one or more of the de minimis thresholds, a more rigorous conformity determination is the next step in the conformity evaluation process. SCAQMD Rule 1901 adopts the guidelines of the General Conformity Rule.

3.1.2 Highway Diesel Rule (the "2007 Highway Rule")

To reduce emissions from off-road diesel equipment, the U.S. EPA established a series of increasingly strict emission standards for new engines. Locomotives and marine vessels are exempt from this rule. Manufacturers of off-road diesel engines would be required to produce engines with certain emission standards under the following compliance schedule:

- Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category
- Tier 2 standards were phased in from 2001 to 2006
- Tier 3 standards were phased in from 2006 to 2008
- Tier 4 standards, which likely will require add-on emissions control equipment to attain them, will be phased in from 2008 to 2015

In 2000, the U.S. EPA moved forward with its regulation to make heavy-duty trucks and buses run cleaner. The Highway Diesel Rule (the "2007 Highway Rule") was finalized in January 2001. Beginning with the 2007 model year, the harmful pollution from heavy-duty highway vehicles will be reduced by more than 90 percent. The U.S. EPA will require a 97 percent reduction in the sulfur content of highway diesel fuel from its current level of 500 parts per million (low sulfur diesel, or LSD) to 15 parts per million (ultra-low sulfur diesel, or ULSD).

3.1.3 Corporate Average Fuel Economy Standards

On April 1, 2010, the U.S. EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a new national program to reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the U.S. The U.S. EPA and NHTSA finalized a joint rule that established a national program consisting of new standards for model years 2012 through 2016 light-duty vehicles that would reduce greenhouse gas emissions and improve fuel economy. The U.S. EPA finalized the national greenhouse gas emissions standards under the CAA, and the NHTSA finalized the Corporate Average Fuel Economy standards under the Energy Policy and Conservation Act.

Furthermore, on August 9, 2011, the U.S. EPA and the NHTSA announced a new national program to reduce greenhouse gas emissions and improve fuel economy for new medium- and heavy-duty engines and vehicles sold in the U.S. The U.S. EPA and NHTSA finalized a joint rule that established a national program consisting of new standards for engines with model years 2014 through 2018. The agencies estimate that the combined standards will reduce CO_2 emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of vehicles built for the 2014 to 2018 model years.

3.1.4 Memorandum for Heads of Federal Departments and Agencies: Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions

In February 2010, the Council on Environmental Quality (CEQ) released a guidance memorandum on the ways in which federal agencies can improve their evaluation and disclosure of greenhouse gas emissions under the National Environmental Policy Act (NEPA) for proposed federal actions. The guidance identified a reference point of 25,000 metric tons per year (mty) for direct CO_{2e} greenhouse gas emissions as an indicator that further NEPA review may be warranted. This reference point, however, is not intended to be used as a threshold for determining a significant impact or effect on the environment due to greenhouse gas emissions. The guidance also does not propose a reference point for indirect greenhouse gas emissions.

3.2 STATE

3.2.1 California Clean Air Act

The California Clean Air Act of 1988 requires all air pollution control districts in the state to aim to achieve and maintain State ambient air quality standards for O_3, CO, and NO_2 by the earliest practicable date and to develop plans and regulations specifying how the districts will meet this goal. There are no planning requirements for the state PM_{10} standard. The CARB, which became part of the California EPA in 1991, is responsible for meeting State requirements of the federal Clean Air Act, administrating the California Clean Air Act, and establishing the California Ambient Air Quality Standards (CAAQS). The California Clean Air Act, amended in 1992, requires all air districts in the state to endeavor to achieve and maintain the CAAQS. The CAAQS are generally stricter than national standards for the same pollutants, but there is no penalty for non-attainment. California has also established State standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles, for which there are no national standards.

The California Air Resources Board (CARB), a department of the California Environmental Protection Agency (CalEPA), oversees air quality planning and control throughout California. It is primarily responsible for ensuring implementation of the 1989 amendments to the California Clean Air Act, responding to the federal CAA requirements to establish state ambient air quality standards, and for regulating emissions from motor vehicles and consumer products with the state. The CARB has established emissions standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. It also sets passenger vehicle fuel specifications to further reduce vehicular emissions.[1]

California Ambient Air Quality Standards

The federal CAA permits states to adopt additional or more protective air quality standards if needed. California has set standards for certain pollutants, such as particulate matter and ozone, which are more protective of public health than respective federal standards (Table 3.2.1-1, *California Ambient Air Quality Standards*). California has also set standards for some pollutants that are not addressed by federal standards.

[1] South Coast Air Quality Management District. Air Quality Guidance Handbook. Diamond Bar, CA. November 2001.

TABLE 3.2.1-1
CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant		Averaging Time	Level
Carbon Monoxide		8-hour	9 ppm
		1-hour	20 ppm
Lead		30 day average	1.5 μg/m^3
Nitrogen Dioxide		1-hour	0.18 ppm
		Annual	0.03 ppm
Ozone		8-hour	0.07 ppm
		1-hour	0.09 ppm
Particle Matter	$PM_{2.5}$	Annual	12 μg/m^3
	PM_{10}	24-hour	50 μg/m^3
		Annual	20 μg/m^3
Sulfur Dioxide		1-hour	0.25 ppm
		24-hour	0.04 ppm
Sulfates		24-hour	25 μg/m^3
Hydrogen Sulfide		1-hour	0.03 ppm
Vinyl Chloride		24-hour	0.01 ppm

NOTE: As of June, 2012
SOURCE: California Air Resources Board. November 2009. *California Ambient Air Quality Standards*.

3.2.2 Executive Order S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. Recognizing that California is particularly vulnerable to the impacts of climate change, Executive Order S-3-05 establishes statewide climate change emission reduction targets to reduce $CO_{2equivalent}$ (CO_{2e}) to the 2000 level (473 million metric tons) by 2010, to the 1990 level (427 million metric tons of CO_{2e}) by 2020, and to 80 percent below the 1990 level (85 million metric tons of CO_{2e}) by 2050 (Table 3.2.2-1, *California Business-as-Usual GHG Emissions and Targets*).[2,3] The executive order directs the California EPA Secretary to coordinate and oversee efforts from multiple agencies (that is, Secretary of the Business, Transportation, and Housing Agency; Secretary of the Department of Food and Agriculture; Secretary of the Resources Agency; Chairperson of the Air Resources Board; Chairperson of the Energy Commission; and President of the Public Utilities Commission) to reduce GHG emissions to achieve the target levels. In addition, the California EPA Secretary is responsible for submitting biannual reports to the governor and State legislature that outline (1) progress made toward reaching the emission targets, (2) impacts of global warming on California's resources, and (3) measures and adaptation plans to mitigate these impacts. To further ensure accomplishment of the targets, the California EPA Secretary created a Climate Action Team

[2] California Governor. 1 June 2005. Executive Order S-3-05. Sacramento, CA.

[3] California Climate Action Team. 3 April 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature. Sacramento, CA.

composed of representatives from the aforementioned agencies to implement global warming emission reduction programs and report on the progress made toward meeting the statewide GHG targets established in this executive order. In December 2005, the first report was released, which stated, "the climate change emission reduction targets [could] be met without adversely affecting the California economy," and "when all [the] strategies are implemented, those underway and those needed to meet the Governor's targets, the economy will benefit."[4]

TABLE 3.2.2-1
CALIFORNIA BUSINESS-AS-USUAL GHG EMISSIONS AND TARGETS

Emission Level	GHG Emissions (Million Metric Tons of $CO_{2Equivalent}$)				
	1990	2000	2010	2020	2050
Business-as-usual Emissions	427	473	532	596	762*
Target Emissions	—	—	473	427	85

NOTE: * Business-as-usual emissions reflect the projected emissions under a scenario without GHG control measures, where California would continue to emit GHGs at the same per capita rate. The CARB has not yet projected 2050 emissions under a business-as-usual scenario. Therefore, 2050 business-as-usual emissions were calculated assuming a linear increase of emissions from 1990 to 2050.

3.2.3 Global Warming Solutions Act of 2006 (Assembly Bill 32)

Assembly Bill 32 (AB 32), also known as the Global Warming Solutions Act of 2006, is a California State Law that addresses climate change by establishing a comprehensive program to reduce greenhouse gas (GHG) emissions from all sources throughout the state. AB 32 requires that the California ARB develop regulations and market mechanisms to reduce California's GHG emissions to 1990 levels by 2020. To achieve this goal, AB 32 mandates that CARB establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved.

3.2.4 Clean Car Standards (Assembly Bill 1493)

AB 1493 (Pavley), enacted on July 22, 2002, required the California Air Resources Board (CARB) to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. Regulations adopted by CARB apply to 2009 and later model year vehicles. CARB estimates that the regulation will reduce climate change emissions from light duty passenger vehicle fleet by 18 percent in 2020 and 27 percent in 2030.

3.2.5 Toxic Air Contaminant Identification and Control Act of 1983 (Assembly Bill 1807)

In 1983, AB 1807 created the California Air Toxics Program to establish a two-step process of risk identification and risk management to address potential health effects associated with public exposure to toxic substances in the air. In the risk identification step, CARB and the Office of Environmental Health Hazard Assessment (OEHHA) determine if a substance should be formally identified, or "listed," as a toxic air contaminant (TAC) in California. Since inception of the

[4] California Climate Action Team. 3 April 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature. Sacramento, CA.

program, a number of such substances have been identified and listed. In 1993, the California Legislature amended the program to identify the 189 federal hazardous air pollutants (HAPs) as TACs. In 2014, OEHHA released an air toxics hot spots draft guidance manual that made adjustments based on new science about both increased childhood exposure to and sensitivity to air toxics.

In the risk management step, CARB reviews emission sources of an identified TAC to determine whether regulatory action is needed to reduce the risk. Based on results of that review, CARB has promulgated a number of airborne toxic control measures (ATCMs), both for mobile and stationary sources. In 2004, CARB adopted an ATCM to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel PM and other TACs. The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel-fueled commercial vehicles to idle for more than five minutes at any given time.

3.2.6 Air Toxics "Hot Spots" Information and Assessment Act of 1987 (Assembly Bill 2588)

The California Air Toxics Program is supplemented by the AB 2588 Air Toxics “Hot Spots” program, which was established by the California Legislature in 1987. Under this program, facilities are required to report their air toxics emissions, assess health risks, and notify nearby residents and workers of significant risks when present. In 1992, the AB 2588 program was amended by Senate Bill (SB) 1731 to require facilities that pose a significant health risk to the community to reduce their risk through implementation of a risk management plan.

3.2.7 Sustainable Communities Protection Act of 2008 (Senate Bill 375)

SB 375, also known as the Sustainable Communities Protection Act of 2008, outlines strategies for achieving the goals set forth in AB 32. Pursuant to SB 375, SCAG developed a Regional Transportation Plan (RTP) as part of its Sustainable Communities Strategy. As a way to significantly reduce greenhouse gas emissions in the future, the RTP focuses the majority of new housing and job growth in high-quality transit areas and other opportunity areas in existing main streets, downtowns, and commercial corridors, resulting in an improved jobs/housing balance and more opportunity for transit-oriented development.

3.2.8 Heavy-Duty Diesel Truck Idling Regulation

Beginning in 2008, CARB implemented the Heavy-Duty Diesel Truck Idling Regulation, requiring that heavy-duty trucks be equipped with a non-programmable engine system that shuts down the engine after five minutes to prevent long idling times or, as an alternative, meet a stringent NO_x idling emissions standard. Additionally, CARB has established diesel fuel regulations that limit sulfur emissions to 15 ppm for diesel sold in California for use in on-road and off-road motor vehicles.

3.2.9 Statewide Portable Equipment Registration Program

The CARB Statewide Portable Equipment Registration Program (PERP) establishes a uniform program to regulate portable engines and portable engine-driven equipment units. Once registered in this program, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts. The portable equipment, however, cannot reside at the same location for more than 12 months. Some construction-related equipment may be registered under PERP. Equipment would not reside at the same location for more than 12 months.

3.2.10 On-Road Heavy-Duty Diesel Vehicle Regulation

On December 12, 2008, CARB approved the on-road heavy-duty diesel vehicle (in use) regulation to significantly reduce PM and NO_x emissions from existing diesel vehicles operating in California. The regulation applies to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds that are privately or federally owned, and for privately and publicly owned school buses. Starting January 1, 2012, the regulation would phase in requirements for heavier trucks to reduce PM emissions with exhaust retrofit filters that capture pollutants before they are emitted to the air or by replacing vehicles with newer vehicles that are originally equipped with PM filters. Starting on January 1, 2015, lighter trucks with a GVWR of 14,001 to 26,000 pounds with engines that are 20 years or older would need to be replaced with newer trucks. Starting January 1, 2020, all remaining trucks and buses would need to be replaced so that they would all have 2010 model year engines or equivalent emissions by 2023. Heavier trucks and buses with a GVWR greater than 26,000 pounds would have two ways to comply. Fleets could comply with a compliance schedule by engine model year or use a phase-in option where engine replacement could be delayed by installing a PM filter on the existing engine.

3.2.11 Airborne Toxic Control Measure

Effective February 19, 2011, diesel-fueled portable engines with a rated brake horsepower of 50 or greater are subject to the CARB's Airborne Toxic Control Measure (ATCM). The ATCM imposes fuel and diesel particulate matter (DPM) emission requirements for in-use and new portable diesel engines. Diesel fleets are required to meet certain DPM standards by set compliance dates. By January 1, 2020, new emergency standby diesel engines will need to be certified to Tier 4 emission standards.

3.3 REGIONAL

3.3.1 AQMD Rule 403, Fugitive Dust

The SCAQMD and AVAQMD have adopted Rule 403, Fugitive Dust, which requires the implementation of best available fugitive dust control measures during construction and operational activities capable of generating fugitive dust emissions from on-site earth-moving activities, construction/demolition activities, and mobile equipment traveling on paved and unpaved roads.

3.3.2 Rule 1401, New Source Review of Toxic Air Contaminants and Rule 1402, Control of Toxic Air Contaminants from Existing Sources

The SCAQMD has adopted two rules for TACs to limit cancer and non-cancer health risks from facilities located within its jurisdiction. Rule 1401, *New Source Review of Toxic Air Contaminants*,

regulates new or modified facilities, and Rule 1402, *Control of Toxic Air Contaminants from Existing Sources*, regulates facilities that are already in operation. Rule 1402 incorporates requirements of the AB 2588 program, including implementation of risk reduction plans for significant risk facilities.

3.3.3 2012–2035 Southern California Association of Governments Regional Transportation Plan/Sustainable Communities Plan

The Southern California Association of Governments (SCAG) is a council of governments for the Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. As a regional planning agency, SCAG serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. SCAG also serves as the regional clearinghouse for projects requiring environmental documentation under federal and State law. In this role, SCAG reviews projects to analyze their impacts on SCAG's regional planning efforts.

Although SCAG is not an air quality management agency, it is responsible for several air quality planning issues. Specifically, as the designated Metropolitan Planning Organization (MPO) for the Southern California region, it is responsible, pursuant to Section 176(c) of the 1990 amendments to the CAA, for providing current population, employment, travel, and congestion projections for regional air quality planning efforts. It is required to quantify and document the demographic and employment factors influencing expected transportation demand, including land use forecasts. Pursuant to California Health and Safety Code Section 40460(b), SCAG is also responsible for preparing and approving the portions of the Basin's air quality management plans relating to demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. SCAG's method of accomplishing these requirements is through the preparation of demographic projections published in its 2012 Regional Transportation Plan (RTP), which was used by the SCAQMD in the preparation of its 2012 Air Quality Management Plan (AQMP), discussed below.

3.3.4 County of Los Angeles General Plan

The proposed initiative subareas are located within unincorporated Los Angeles County and subject to the County of Los Angeles General Plan (General Plan). The unincorporated Los Angeles County area comprises 2,650 square miles and has over one million people. On March 24, 2015, the Los Angeles County Board of Supervisors voted to approve the 2035 General Plan Update. The Los Angeles County 2035 General Plan accommodates new housing and jobs within the unincorporated areas in anticipation of population growth in the County and the region. The General Plan Update effort includes goals, policies, implementation programs, and ordinances.[5]

The Air Quality Element summarizes the air quality issues and outlines the goals and policies in the General Plan that will improve air quality and reduce greenhouse gas emissions. Of the 12 policies outlined in the Air Quality Element, the following 10 policies are applicable to the proposed initiative:

[5] Los Angeles County Department of Regional Planning. *2035 General Plan*. Available at: http://planning.lacounty.gov/generalplan

Goal AQ 1: Protection from exposure to harmful air pollutants.

- Policy AQ 1.1: Minimize the health risks to people from industrial toxic or hazardous air pollutant emissions, with an emphasis on local hot spots, such as existing point sources affecting immediate sensitive receptors.

- Policy AQ 1.3: Reduce particulate inorganic and biological emissions from construction, grading, excavation, and demolition to the maximum extent feasible.

- Policy AQ 1.4: Work with local air quality management districts to publicize air quality warnings, and to track potential sources of airborne toxics from identified mobile and stationary sources.

Goal AQ 2: The reduction of air pollution and mobile source emissions through coordinated land use, transportation and air quality planning.

- Policy AQ 2.1: Encourage the application of design and other appropriate measures when siting sensitive uses, such as residences, schools, senior centers, daycare centers, medical facilities, or parks with active recreational facilities within proximity to major sources of air pollution, such as freeways.

- Policy AQ 2.2: Participate in, and effectively coordinate the development and implementation of community and regional air quality programs.

Goal AQ 3: Implementation of plans and programs to address the impacts of climate change.

- Policy AQ 3.1: Facilitate implementation and maintenance of the Community Climate Action Plan to ensure that the County reaches it climate change and greenhouse gas emission reduction goals.

- Policy AQ 3.2: Reduce energy consumption in County operations by 20 percent by 2015.

- Policy AQ 3.3: Reduce water consumption in County operations.

- Policy AQ 3.4: Participate in local, regional, and state programs to reduce greenhouse gas emissions.

- Policy AQ 3.5: Encourage maximum amounts of energy conservation in new development and municipal operations.

Community Climate Action Plan

Climate action plans include an inventory of greenhouse gas emissions and measures for reducing future emissions to achieve a specific reduction target. Los Angeles County released a Climate Change Action Plan (CCAP) on July 2014 to mitigate and avoid greenhouse gas emissions

associated with community activities in unincorporated Los Angeles County. The CCAP addresses emissions from building energy, land use and transportation, water consumption, and waste generation. The measures and actions outlined in the CCAP tie together the County's existing climate change initiatives and provide a blueprint for a more sustainable future. Ultimately, the CCAP and associated greenhouse gas reduction measures will be incorporated into the Air Quality Element of the Los Angeles County General Plan 2035.

The CCAP identifies emissions related to community activities, establishes a greenhouse gas reduction target consistent with AB 32, and provides a roadmap for successfully implementing greenhouse gas reduction measures selected by the County. Importantly, the CCAP recognizes the County's leadership and role in contributing to statewide greenhouse gas emissions reductions. Actions undertaken as part of the CCAP will also result in important community co-benefits including improved air quality, energy savings, and increased mobility, as well as will enhance the resiliency of the community in the face of changing climatic conditions.

4.1 BASELINE CONDITIONS

4.1.1 Regional Climate

Southern California Air Basin

The regional climate significantly influences the air quality in the Southern California Air Basin (SCAB). Temperature, wind, humidity, precipitation, and the amount of sunshine influence the quality of the air. In addition, the SCAB is frequently subjected to an inversion layer that traps air pollutants. Temperature has an important influence on basin wind flow, pollutant dispersion, vertical mixing, and photochemistry.

Annual average temperatures throughout the SCAB vary from the low to middle 60 degrees Fahrenheit (°F). However, due to decreased marine influence, the eastern portion of the SCAB shows greater variability in average annual minimum and maximum temperatures. January is the coldest month throughout the SCAB, with average minimum temperatures of 47°F in downtown Los Angeles and 36°F in San Bernardino. All portions of the SCAB have recorded maximum temperatures above 100°F.

Although the climate of the SCAB can be characterized as semiarid, the air near the land surface is quite moist on most days because of the presence of a marine layer. This shallow layer of sea air is an important modifier of SCAB climate. Humidity restricts visibility in the SCAB, and the conversion of SO_2 to SO_4 is heightened in air with high relative humidity. The marine layer is an excellent environment for that conversion process, especially during the spring and summer months. The annual average relative humidity is 71 percent along the coast and 59 percent inland. Because the ocean effect is dominant, periods of heavy early morning fog are frequent, and low stratus clouds are a characteristic feature. These effects decrease with distance from the coast.

More than 90 percent of the SCAB's rainfall occurs from November through April. Annual average rainfall varies from approximately nine inches in Riverside to 14 inches in downtown Los Angeles. Monthly and yearly rainfall totals are extremely variable. Summer rainfall usually consists of widely scattered thundershowers near the coast and slightly heavier shower activity in the eastern portion of the region and near the mountains. Rainy days comprise 5 to 10 percent of all days in the SCAB with the frequency being higher near the coast. The influence of rainfall on the contaminant levels in the SCAB is minimal. Although some washout of pollution would be expected with winter rains, air masses that bring precipitation of consequence are very unstable and provide excellent dispersion that masks wash-out effects. Summer thunderstorm activity affects pollution only to a limited degree. If the inversion is not broken by a major weather system, high levels of contaminants can persist even in areas of light showers.

Mojave Desert Air Basin

The Mojave Desert Air Basin (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. These prevailing winds are due to the proximity of the MDAB to coastal and

central regions and the blocking nature of the Sierra Nevada Mountains to the north; air masses pushed onshore in Southern California by differential heating are channeled through the MDAB. The MDAB is separated from the Southern California coastal and central California valley regions by mountains (highest elevation approximately 10,000 feet), whose passes form the main channels for these air masses. The Antelope Valley is bordered in the northwest by the Tehachapi Mountains, separated from the Sierra Nevadas in the north by the Tehachapi Pass (3,800 feet). The Antelope Valley is bordered in the south by the San Gabriel Mountains, bisected by Soledad Canyon (3,300 feet).

During the summer the MDAB is generally influenced by a Pacific Subtropical High cell that sits off the 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 (from 16 to 30 days with at least 0.01 inch of precipitation). The MDAB is classified as a dry-hot desert climate (BWh), with portions classified as dry-very hot desert (BWh), to indicate at least three months have maximum average temperatures over 100.4°F.

4.1.2 Temperature Inversion

The vertical dispersion of air pollutants in the SCAB and MDAB is frequently restricted by the presence of a persistent temperature inversion in the atmospheric layers near the earth's surface. Normally, the temperature of the atmosphere decreases with altitude. However, when the temperature of the atmosphere increases with altitude, the phenomenon is termed an inversion. An inversion condition can exist at the surface or at any height above the ground. The bottom of the inversion, known as the mixing height, is the height of the base of the inversion.

In general, inversions in the SCAB and MDAB are lower before sunrise than during the daylight hours. As the day progresses, the mixing height normally increases as the warming of the ground heats the surface air layer. As this heating continues, the temperature of the surface layer approaches the temperature of the base of the inversion layer. When these temperatures become equal, the inversion layer's lower edge begins to erode, and if enough warming occurs, the layer breaks up. The surface layers are gradually mixed upward, diluting the previously trapped pollutants. The breakup of inversion layers frequently occurs during mid to late afternoon on hot summer days. Winter inversions usually break up by midmorning.

4.1.3 Regional Air Quality

Southern California, including the entirety of the proposed initiative study area, does not meet either the federal or state standards for ambient air quality. The Health and Safety Code (H&SC) section 39607(e) requires CARB to periodically review area designation criteria for CAAQS. These designation criteria provide the basis for CARB to designate areas of California as attainment, nonattainment, or unclassified for the State standards. CARB made the first area designations for CAAQS in 1989, and since then, has reviewed the designations each year, making changes as needed. As of 2012, the County has been designated as nonattainment for O_3, $PM_{2.5}$, PM_{10}, and Pb (Table 4.1.3-1, *CAAQS Attainment Status Los Angeles County*). The American Lung Association consistently gives the County failing grades in the amount of ozone and particulate pollution in the air. Although smog levels are impacted by seasons and weather patterns, smog is visible in the air on most days. Frequent sunny days and low rainfall contribute to O_3 formation, as well as high levels of fine particles and dust.

TABLE 4.1.3-1
CAAQS ATTAINMENT STATUS LOS ANGELES COUNTY

Pollutant	Designation
Ozone	Nonattainment
PM_{10}	Nonattainment
$PM_{2.5}$	Nonattainment / Unclassified
Carbon Monoxide	Attainment
Nitrogen Dioxide	Attainment
Sulfur Dioxide	Attainment
Sulfates	Attainment
Lead	Nonattainment
Hydrogen Sulfide	Unclassified
Visibility Reducing Particles	Unclassified

SOURCE: California Environmental Protection Agency, Air Resources Board. 2013. 2012 State Area Designations. Available online at: http://www.arb.ca.gov/desig/adm/adm.htm

In addition, the County is home to many diverse industries and the largest goods movement hub on the West Coast. In spite of emission controls that are among the most stringent in the country, power generation and petroleum refining continue to be among the County's largest stationary sources of air pollution.

The determination of whether a region's air quality is healthy or unhealthy is determined by comparing contaminant levels in ambient air samples to national and State standards. These standards were established to protect exposed sensitive receptors from adverse health effects with a margin of safety. Air quality of a region is considered to be in attainment/nonattainment of the State standards.

South Coast Air Basin

The South Coast Air Basin includes all of Orange County and the non-desert areas of Los Angeles, Riverside, and San Bernardino Counties, with an area of 6,800 square miles and a population of approximately 16 million people in 2011. The Los Angeles urban area (the nation's second largest), the Anaheim-Fullerton urban area, and the Riverside-San Bernardino urban area lie within the Basin's boundaries. About two-thirds of the Basin's population lives within Los Angeles County.

For the SCAB, the maximum pollutant concentrations measured at SCAQMD monitoring stations in 2011 exceeded the levels of the federal standards for ozone (O_3), $PM_{2.5}$, nitrogen dioxide (NO_2), and lead (Pb) (Table 4.1.3-2, *NAAQS Attainment Status South Coast Air Basin*). In 2011, a total of 125 days exceeded the levels of current short-term (24-hour average or less) federal standards for 8-hour O_3 or 24-hour $PM_{2.5}$ at one or more SCAB locations. The more stringent State 8-hour O_3 or 24-hour PM_{10} standards were exceeded on 137 days. While the SCAB exceeded the State annual and 24-hour PM_{10} standards, it did not exceed the 24-hour federal standard. The federal and State annual $PM_{2.5}$ standards were exceeded in the SCAB in 2011, with only one station exceeding the federal standard. While the State PM_{10} annual standard was exceeded, the revoked federal annual

PM_{10} standard was not. The other criteria pollutants, sulfur dioxide (SO_2), carbon monoxide (CO), and sulfate (SO_4), did not exceed federal or State standards.[1]

TABLE 4.1.3-2
NAAQS ATTAINMENT STATUS SOUTH COAST AIR BASIN

Criteria Pollutant	Standard	Designation
Ozone	1-Hour (0.12 ppm)	Nonattainment (Extreme)
	1997 8-Hour (0.08 ppm)	Nonattainment (Extreme)
	2008 8-Hour (0.075 ppm)	Nonattainment (Extreme)
Carbon Monoxide	1-Hour (35 ppm)	Attainment
	8-Hour (9 ppm)	Attainment
Nitrogen Dioxide	1-Hour (100 ppb)	Attainment
	Annual (0.053 ppm)	Attainment
Sulfur Dioxide	1-Hour (75 ppb)	Designation pending
	24-Hour (0.14 ppm)	Designation pending
	Annual (0.03 ppm)	Attainment
PM_{10}	24-Hour (150 $\mu g/m^3$)	Nonattainment (Serious)
$PM_{2.5}$	24-Hour (35 $\mu g/m^3$)	Nonattainment
	Annual (15.0 $\mu g/m^3$)	Nonattainment
Lead	3-Months Rolling (0.15 $\mu g/m^3$)	Nonattainment (Partial)

SOURCE: South Coast Air Quality Management District. 2012 AQMP. Appendix II, Current Air Quality. February 2013. Available at: http://www.aqmd.gov/aqmp/2012aqmp/Final-February2013/AppII.pdf

South Coast Air Quality Management District

The SCAQMD was established by State legislation effective February 1, 1977, and was assigned jurisdiction over air quality in the South Coast Air Basin (Basin). The SCAQMD covers approximately 10,743 square miles and is home to more than 16.8 million people – about half the population of the whole state of California. It is the second most populated urban area in the United States and one of the smoggiest.

The Castaic/Santa Clarita/Agua Dulce subarea, East San Gabriel Mountains, and the western portion of the Acton subarea are located within the SCAQMD boundary, and are therefore subject to the SCAQMD Air Quality Management Plan (AQMP). The most recent update to the AQMP was adopted in 2012 by the SCAQMD Board and the CARB. The AQMP demonstrates attainment of the federal 24-hour $PM_{2.5}$ standard by 2014 in the SCAB through adoption of all feasible measures. The current AQMP also updates the U.S. EPA-approved 8-hour ozone control plan with new measures designed to reduce reliance on the CAA Section 182(e)(5) long-term measures for NO_x and VOC reductions. In addition, the AQMP addresses several State and federal planning requirements, incorporating new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and new meteorological air quality models.

[1] South Coast Air Quality Management District. 2012 AQMP. Appendix II, Current Air Quality. February 2013. Available at: http://www.aqmd.gov/aqmp/2012aqmp/Final-February2013/AppII.pdf

Mojave Desert Air Basin

The MDAB encompasses approximately 21,480 square miles and includes the desert portions of San Bernardino County, Palo Verde Valley, Palmdale and Lancaster in the Antelope Valley. The MDAB is bordered by the SCAB and the Riverside County line to the south, Kern County line to the west, the Arizona and Nevada borders to the north and east, and the eastern portion of Riverside County to the southeast.

Antelope Valley Air Quality Management District

As shown in Table 4.1.3-3, *NAAQS and CAAQS Attainment Status for AVAQMD*, the AVAQMD portion of the MDAB is classified as non-attainment for the federal and State ozone standards and the State PM_{10} standard. All other criteria pollutants have been designated as attainment for the AVAQMD portion of the MDAB. The AVAQMD Federal 8-hour Ozone Attainment Plan, adopted in May 2008, demonstrates that the AVAQMD will meet the primary required federal ozone planning milestones by June 2021.

The Lake Hughes/Gorman/West of Lancaster subarea; the Lancaster Northeast subarea; the Antelope Valley Northeast subarea; the Lake Los Angeles/Llano/Valyermo/Littlerock subarea; and the eastern portion of the Acton subarea are all located within the AVAQMD, and are therefore subject to the AVAQMD Attainment Plan. The AVAQMD has adopted a single attainment plan for ozone by targeting NO_x and VOC pollutants.

TABLE 4.1.3-3
NAAQS AND CAAQS
ATTAINMENT STATUS FOR AVAQMD

Criteria Pollutant	Standard	Designation
Ozone	8-Hour (Federal 84 ppb)	Nonattainment (Severe)
	8-Hour (Federal 75 ppb)	Nonattainment
	State	Nonattainment (Extreme)
Carbon Monoxide	Federal	Attainment
	State	Attainment
Nitrogen Dioxide	Federal	Attainment
	State	Attainment
Sulfur Dioxide	Federal	Attainment
	State	Attainment
PM_{10}	Federal	Unclassified
	State	Nonattainment
$PM_{2.5}$	Federal	Unclassified/attainment
	State	Unclassified
Lead	Federal	Attainment
	State	Attainment

SOURCE: Antelope Valley Air Quality Management District. AVAQMD Designations and Classifications. Accessed 29 May 2014. Available at: http://www.avaqmd.ca.gov/index.aspx?page=289.

4.1.4 Sensitive Receptors

Land uses identified to be sensitive receptors by SCAQMD in the Air Quality Handbook include residences, schools, playgrounds, child care centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes.

Residents

The area that would be subject to the proposed initiative consists of 42,867 parcels in the unincorporated area of Los Angeles County, all of which could potentially be developed into single-family residences. As these parcels are vacant and have yet to be developed, all 42,867 parcels shall be considered sensitive receptors.[2]

Using 2008 building footprint GIS data, buildings over 1,000 square feet within one-quarter mile of the 42,867 parcels were identified. (An assumption of over 1,000 square feet was used to qualify a building as a potential residence.) Using the assumption that a residence can only be built on certain zoning designations, there are 21,565 buildings over 1,000 square feet within one-quarter mile of all the proposed initiative subareas. The designations cover cities and unincorporated areas of Los Angeles County. The qualifying zoning designations for building a residence include: commercial recreation, heavy agricultural, light agricultural, limited multiple residence, mixed-use development – rural, residential agricultural, residential planned development, single-family residence, specific plan, and two-family residence.

Schools

There are 20 elementary schools, middle schools, and high schools located within one-quarter mile of the parcels within all the proposed initiative subareas with the exception of the Acton subarea and the Antelope Valley Northeast subarea (see Figure 4.1.4-1, *Schools within One-Quarter Mile of Proposed Initiative Subarea Parcels*, at the end of this section). Table 4.1.4-1, *Schools in Vicinity of Proposed Initiative Subareas*, indicates which schools are located adjacent to or in the vicinity of the proposed initiative subareas.

[2] The term vacant is used as identified by the County Assessor.

TABLE 4.1.4-1
SCHOOLS IN VICINITY OF PROPOSED INITIATIVE SUBAREAS

Subarea	School	Public/Private
Castaic/Santa Clarita/Agua Dulce	Agua Dulce Elementary School	Public
	Desert Canyon Academy	Private
	Mint Canyon Elementary School	Public
	Castaic Elementary School	Public
	Castaic Middle School	Public
Lake Hughes/Gorman/West of Lancaster	Hughes-Elizabeth Lakes Elementary School	Public
	Hughes-Elizabeth Lakes Middle School	Public
	Gorman Elementary School	Public
	Gorman Middle School	Public
	Del Sur Elementary School	Public
	Del Sur Middle School	Public
	Neenach Elementary School	Public
	Sommer Haven Church School	Private
	Shema Christian	Private
Lake Los Angeles/Llano/Valyermo/Littlerock	Almondale Middle School	Public
	Lake Los Angeles Elementary School	Public
	Vista San Gabriel Elementary School	Public
Lancaster Northeast	Eastside Elementary School	Public
East San Gabriel Mountains	Mount Baldy Elementary School	Public
	Hathaway-Sycamores NPS	Private

Medical Centers

There are no medical centers located within a one-quarter-mile buffer of all the proposed initiative subareas.

Parks

In addition to residential parcels, schools, and hospitals, parks are often considered sensitive receptors due to the likely presence of children. There are two neighborhood parks (approximately 10.73 acres), 15 community regional parks (approximately 737.51 acres), and 32 regional parks (approximately 46,307.70 acres) located within a one-quarter-mile buffer of all the proposed initiative's subareas (see Figure 4.1.4-2, *Parks within One-Quarter Mile of Proposed Initiative Subarea Parcels*, at the end of this section).

4.1.5 California Greenhouse Gas Emissions

The State of California Greenhouse Gas Inventory performed by CARB compiled statewide anthropogenic greenhouse gas emission and sinks. It includes estimates for carbon dioxide (CO_2), methane (CH_4), nitrogen oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). The current inventory covers the years 1990 to 2004, and is summarized in Table 4.1.5-1, *State of California Greenhouse Gas Emissions by Sector*.

TABLE 4.1.5-1
STATE OF CALIFORNIA GREENHOUSE GAS EMISSIONS BY SECTOR

Sector	Total 1990 Emissions ($MMTCO_{2e}$)	Percentage of Total 1990 Emissions	Total 2004 Emissions ($MMTCO_{2e}$)	Percentage of Total 2004 Emissions
Agriculture	23.4	5 percent	27.9	6 percent
Commercial	14.4	3 percent	12.8	3 percent
Electricity generation	110.6	26 percent	119.8	25 percent
Forestry (excluding sinks)	0.2	<1 percent	0.2	<1 percent
Industrial	103.0 percent	24 percent	96.2	20 percent
Residential	29.7	7 percent	29.1	6 percent
Transportation	150.7	35 percent	182.4	38 percent
Forestry sinks	(6.7)		(4.7)	

KEY: $MMTCO_{2e}$ = million metric tons of CO_2 equivalent.
SOURCE: California Air Resources Board. Revised 2 December 2009. Facts about California Greenhouse Gas Emissions Inventory. Available online at: http://www.arb.ca.gov/cc/factsheets/ghginv.pdf

Data sources used to calculate this greenhouse gas inventory include California and federal agencies, international organizations, and industry associations. The calculation methodologies are consistent with guidance from the IPCC. The 1990 emissions level is the sum total of sources and sinks from all sectors and categories in the inventory. The inventory is divided into seven broad categories in the inventory. These sectors include agriculture, commercial, electricity generation, forestry, industrial, residential, and transportation. Transportation and housing account for an estimated 44 percent of GHG emissions. When accounting for greenhouse gases, all types of greenhouse gas emissions are expressed in terms of CO_{2e} and are typically quantified in metric tons (MT) or millions of metric tons (MMT).

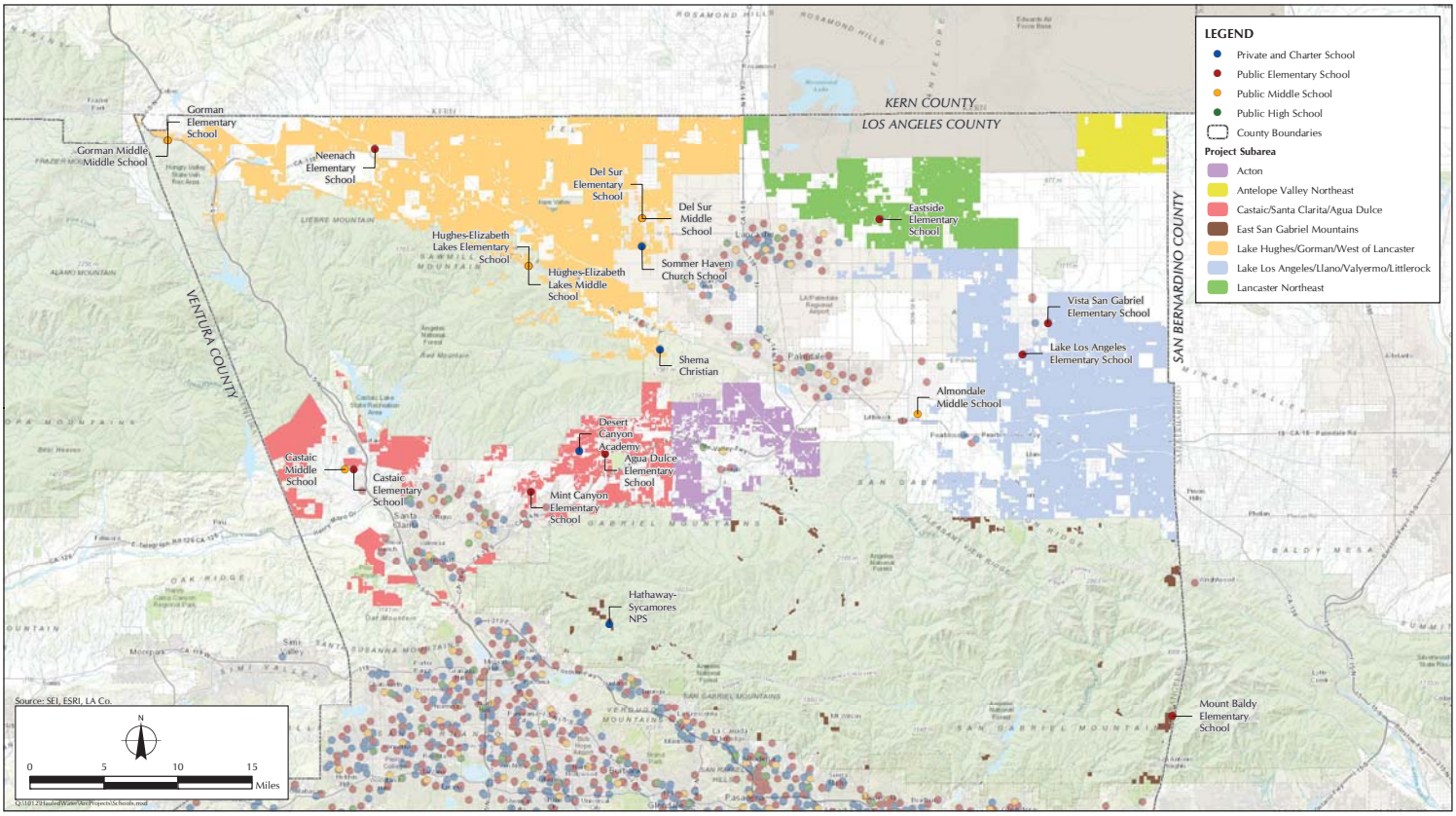

FIGURE 4.1.4-1

Schools within One-Quarter Mile of Proposed Initiative Subarea Parcels

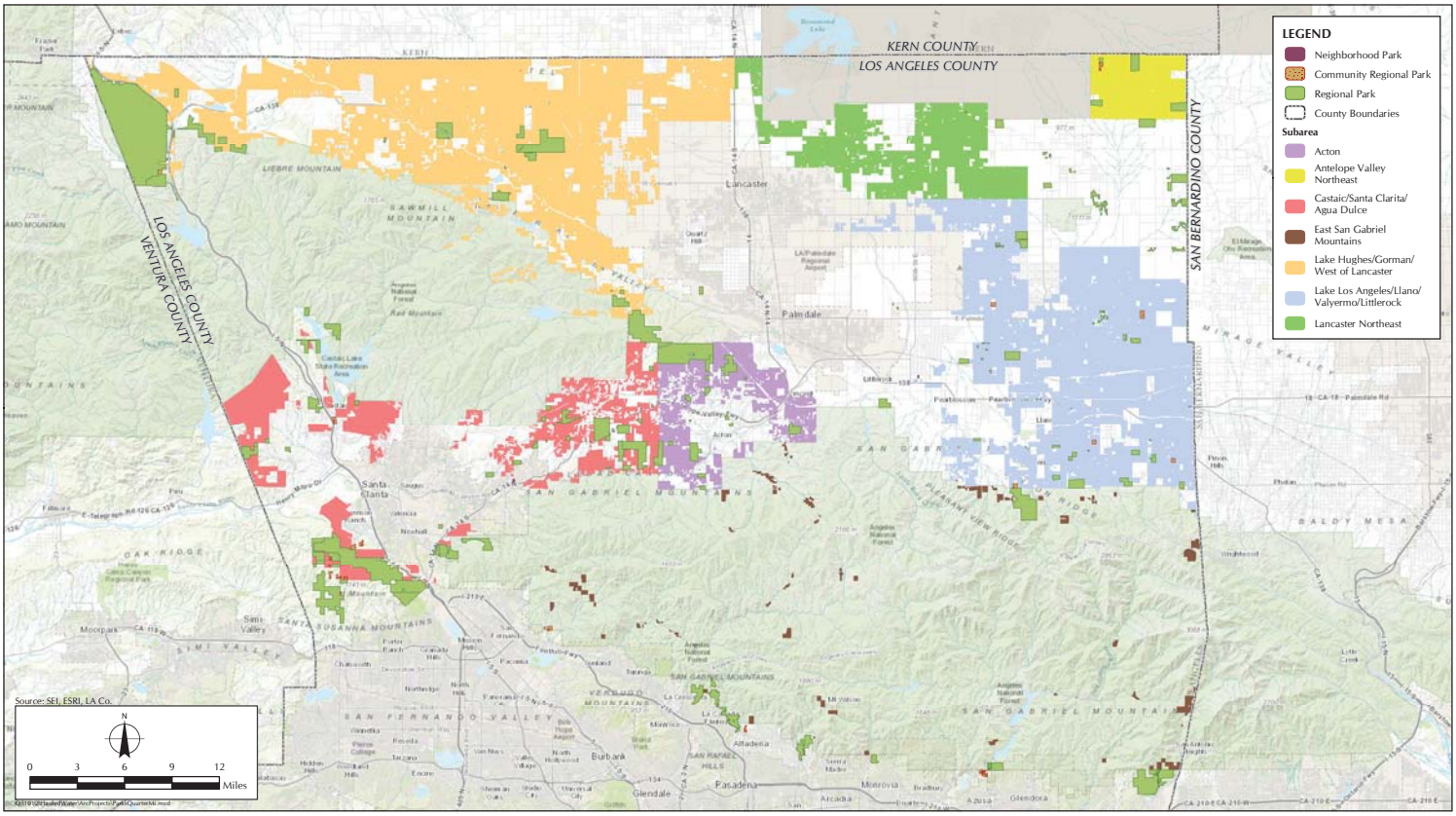

FIGURE 4.1.4-2

Parks within One-Quarter Mile of Proposed Initiative Subarea Parcels

SECTION 5.0
METHODS

The analysis of air quality impacts and GHG emissions associated with the proposed initiative was undertaken consistent with the guidelines provided in the SCAQMD Air Quality Handbook.

5.1 AIR QUALITY

The analysis of the potential for the proposed initiative to result in significant impacts to air quality was analyzed in accordance with the *SCAQMD CEQA Air Quality Handbook*.[1] Although the SCAQMD is responsible for regional air quality planning efforts, it does not have the authority to directly regulate air quality issues associated with new development projects within the SCAB. Instead, the *SCAQMD CEQA Air Quality Handbook* was published in 1993 to assist lead agencies, as well as consultants, project proponents, and other interested parties, in evaluating potential air quality impacts of projects proposed in the SCAB. The *SCAQMD CEQA Air Quality Handbook* provides standards, methodologies, and procedures for conducting air quality analyses in environmental impact reports (EIRs) and was used extensively in the preparation of this analysis.

List of Assumptions

- The area that would be subject to the proposed initiative consists of 42,867 parcels in the unincorporated area of Los Angeles County, all of which could potentially be developed into single-family residences. As these parcels are vacant and have yet to be developed, all 42,867 parcels shall be considered sensitive receptors.[2]

- Potential emission estimates from construction activities are based on emission factors and construction scenario information for development at the proposed initiative site. The total amount of construction, including duration and level of construction activity occurring at the proposed initiative site, would influence the estimated construction emissions and resulting potential impacts. Therefore, the emission forecasts are based on conservative assumptions about the construction scenario.

- CalEEMod Model assumes 184 single-family homes under construction simultaneously in any given year (2015–2035) since the maximum construction time is just over one year. While the model is for one single-family home, the emission values were multiplied by 184 to get the total construction emissions from the proposed initiative at one time. In addition, worker commute trips would vary throughout the construction period. This analysis used the highest estimated number of worker commute trips.

- CalEEMod Model assumes a typical construction scenario for a single-family home. The duration of construction is 14 months to construct a 4,000-square-foot home on an average four-acre lot. Of the four-acre lot, there is an estimated 36 percent disturbance or 1.44 acres. An estimated three people will occupy the home.

- Best practices for energy and water use were built into the CalEEMod Model.

[1] South Coast Air Quality Management District. SCAQMD CEQA Air Quality Handbook. 1993. http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook

[2] The term vacant is used as identified by the County Assessor.

- CalEEMod Model assumes a 2016 operation-year level of emissions. This value was multiplied over the 20-year time horizon in the analysis. Operational emissions assumed a full build out of 3,680 parcels by 2035. This is a conservative estimate because both heavy duty diesel construction equipment and light duty vehicles are expected to get cleaner in the next 20 years.

- The air and greenhouse gas emissions analysis is based upon the Fehr & Peers Traffic Analysis, which relies on the SCAG RTP Model. Mobile emissions were calculated from the number of trips and vehicle miles traveled by passenger vehicles and water hauling trucks.

CalEEMod Model

The California Emissions Estimator Model (CalEEMod 2013.2.2) was used to estimate construction and operational emissions associated with the proposed initiative. CalEEMod is a computer program that can be used to estimate emissions associated with land development projects in California such as residential neighborhoods, shopping centers, and office buildings; area sources such as gas appliances, wood stoves, fireplaces, and landscape maintenance equipment; and construction projects. The CalEEMod, version 2013.2.2, emissions model directly calculates criteria pollutant emissions, as well as GHG (CH_4, N_2O, and CO_2) emissions. The analysis of construction impacts to air quality is based on the construction scenario summarized in Section 2.7, Construction Scenario, of this report, which estimates 3,680 building permits over a 20-year horizon.

The air quality impacts from the proposed initiative can be separated into construction-related short-term impacts and operation-related long-term, permanent impacts. Both types of impacts may occur on a local or regional scale.

Construction-related short-term impacts relate to the construction of new single-family residences as part of the proposed initiative. In order to determine historical development trends, 17 years of building permit application data from 1997 through 2014 were reviewed to determine the average number of building permits issued per year for single-family residential development not associated with subdivision development. An anticipated growth factor of 25 percent has been applied based on Southern California Association of Governments (SCAG) projections for the unincorporated area of Los Angeles County from 2008 to 2035. The reasonable worst-case scenario assumes the annual average rate of issuance of building permits over the 20-year 2015 to 2035 planning horizon would be 184 permits per year. The greenhouse gas emissions for these homes were modeled using an estimate for the average square footage of each residence of 4,000 sq. ft., as well as a generic layout and construction schedule of 14 months, and assumptions regarding the construction vehicle traffic.

Operation-related long-term impacts can be classified as the following: the development of new single-family residences that require hauled water to be delivered on a monthly basis from private water purveyors would increase traffic due to the water-hauling trucks, and consequently emissions. The worst-case scenario of the existing traffic conditions (2015) was used in the analysis. Given the projected issuance of 184 building permits per year, at full build-out, the proposed initiative could potentially result in 4,300 water truck vehicle miles traveled per day. (This is the result of 134 water truck vehicle trips, traveling on average 31.8 miles per trip.) As new residences result in population increases, more private vehicles on the roads would result in increased

emissions as well. At full build-out, the proposed initiative has the potential to result in a permanent increase of 10 private vehicle trips per parcel, traveling on average 16 miles a day, for a cumulative total of 588,000 vehicle miles traveled per day in the proposed initiative subareas.

Toxic Air Contaminants

The greatest potential for toxic air contaminant (TAC) emissions during construction would be diesel particulate emissions associated with the use of heavy-duty equipment during construction. TAC emissions associated with construction of the proposed initiative have been analyzed by using the standard health risks assessment methodology to determine "Individual Cancer Risk" of a person continuously exposed to TACs over a 70-year lifetime.

The Office of Environmental Health Hazard Assessment (OEHHA) has developed a methodology for estimating health risks from TAC pollutants such as diesel exhaust from construction equipment. OEHHA has developed a diesel particulate matter (DPM) inhalation non-cancer (long-term) reference exposure level (REL) of 5 micrograms per cubic meter ($\mu g/m^3$). No non-cancer acute (short-term) REL has been established for DPM.

Odors

According to the SCAQMD CEQA Air Quality Handbook, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed initiative is for single-family residences so it does not fit into any of those categories. Odors from the proposed initiative are mainly generated from construction. Project impacts are evaluated in reference to SCAQMD Rule 402 and the potential to affect nearby sensitive receptors such as parks, schools, medical centers, and other residences.

5.2 GREENHOUSE GAS EMISSIONS

The analysis of greenhouse gas emissions was undertaken consistent with the August 2010 CAPCOA guidance on quantifying GHG emissions mitigation measures. The guidance was a resource tool for the local government to assess emission reductions from GHG mitigation measures.[3] The guidance listed various purposes for quantifying GHG emission reduction, including voluntary reductions of GHG emissions, reductions to mitigate current or future GHG emissions at a project level, reductions for regulatory compliance with command and control regulations, permitting programs, cap-and-trade programs, a mandatory reporting rule for specified stationary sources, and reductions to obtaining GHG emission credits. In addition, the guidance listed quantification concepts, approaches, and methodologies. Quantification methodologies for a selection of GHG emission reduction measures such as vegetation (including trees), construction equipment, and transportation were discussed. This guidance demonstrated State-recommended methods on how to quantify GHG emission mitigation measures that warrants consideration by the South Coast Air Quality Management District (SCAQMD).

[3] California Air Pollution Control Officers Association. August 2010. Quantifying Greenhouse Gas Mitigation Measures. Sacramento, CA. Available at: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

Short-Term Greenhouse Gas Emissions Inputs

The proposed initiative would include the construction of a number of single-family residential homes, with an average total lot size of four acres. The following factors were assumed in the technical analyses of air quality using the CalEEMod, version 2013.2.2, emission model:

1. Total construction of a single-family residence would take a maximum of 14 months.

2. The construction activities undertaken would be as follows:

Month 1–3:	Site Preparation
Month 3–6:	Grading
Month 6–12:	Building Construction
Month 12–13:	Paving
Month 13–14:	Architectural Coating

3. A maximum of 1.44 acres would be disturbed temporarily during the ground clearing, site preparation, and grading phases of construction.

4. The climate zone was set to 9 based on the CEC forecasting climate zones, and the wind speed was set to 2.2 meters per second.

6. One hundred percent of worker trips were assumed to occur on unpaved roads during ground clearing and site preparation construction phases.

7. Default parameters, such as the horsepower and the load factor, were used for all construction equipment anticipated to be used for the proposed initiative / proposed action.

8. For residential exterior architectural coating, the VOC was set to 100 g/L. For residential interior architectural coating, the VOC was set to 50 g/L.

9. Landscaping was not included as a phase of construction due to the minimal emissions that would be generated from basic landscaping equipment (i.e. lawnmower, weed-whacker).

Long-Term Greenhouse Gas Emissions Inputs

According to the Fehr & Peers Traffic Analysis[4], the average home requires 5,000 gallons of potable water per week and an extra 5,000 gallons for fire protection to be refilled once a year. At full build-out by 2035, the proposed initiative would result in 4,300 water truck VMT per day with 134 trucks traveling on average 31.8 miles round trip. It is assumed one truck could visit up to four parcels in a day, which equates to 134 trucks in operation daily to serve all 3,680 parcels. Private vehicle trips are estimated at 588,000 vehicle miles traveled per day in the proposed initiative subareas. Greenhouse gas emissions are calculated using these values.

[4] Fehr & Peers. June 2015. Single-Family Residential Hauled Water Initiative for New Development: Traffic Analysis. Prepared for: Los Angeles County Hauled Water Task Force.

6.1 SIGNIFICANCE CRITERIA

The air quality impacts associated with the proposed initiative can be separated into construction-related short-term impacts and operation-related long-term, permanent impacts. Both types of impacts may occur on a local or regional scale. The potential for the proposed initiative to result in impacts related to air quality and GHG emissions was analyzed in relation to the questions outlined in Appendix G of the State CEQA Guidelines:[1]

Air Quality

(a) Conflict with or obstruct implementation of the applicable air quality plan?

(b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

In the absence of specific guidance set forth by the County of Los Angeles regarding construction emissions, impacts to air quality were also evaluated in accordance with the most recent SCAQMD and AVAQMD significance thresholds for criteria pollutants (Table 6.1-1, *SCAQMD Air Quality Significance Thresholds*; and Table 6.1-2, *AVAQMD Air Quality Significance Thresholds*).

TABLE 6.1-1
SCAQMD AIR QUALITY SIGNIFICANCE THRESHOLDS

Pollutant	Construction (pounds/day)	Operation (pounds/day)
Nitrogen Oxides	100	55
VOC	75	55
PM_{10}	150	150
$PM_{2.5}$	55	55
Sulfur Oxides	150	150
Carbon Monoxide	550	550

SOURCE: SCAQMD *CEQA Handbook* (SCAQMD, 1993)

[1] California Code of Regulations. Title 14, Division 6, Chapter 3, Sections 15000–15387, Appendix G.

TABLE 6.1-2
AVAQMD AIR QUALITY SIGNIFICANCE THRESHOLDS

Pollutant	Construction (pounds/day)	Operation (pounds/day)
Nitrogen Oxides	137	137
VOC	137	137
PM_{10}	82	82
$PM_{2.5}$	82	82
Sulfur Oxides	137	137
Carbon Monoxide	548	548

SOURCE: AVAQMD *CEQA and Federal Conformity Guidelines* (AVAQMD, 2011)

(c) 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)?

(d) Expose sensitive receptors to substantial pollutant concentrations?

(e) Create objectionable odors affecting a substantial number of people?

Greenhouse Gases

(a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

(b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

In the absence of established GHG emission thresholds, this analysis will utilize the 25,000 metric tons of carbon dioxide equivalent ($MTCO_{2e}$) per year threshold recommended by the CAPCOA in January 2008.[2]

6.2 IMPACT ANALYSIS

This section analyzes the potential for the proposed initiative to have significant impacts to air quality and GHG emissions. Air quality impacts of a proposed initiative generally fall into four major categories:

[2] California Air Pollution Control Officers Association. January 2008. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. Sacramento, CA.

1. *Construction Impacts*—temporary impacts, including airborne dust from grading and dirt hauling; and gaseous emissions from heavy equipment, delivery and dirt hauling trucks, employee vehicles, and paints and coatings. Construction emissions vary substantially from day to day, depending on the level of construction phase and weather conditions.

2. *Operational Regional Impacts*—primarily gaseous emissions from natural gas and electricity usage and vehicles traveling to and from a project site.

3. *Operational Local Impacts*—increases in pollutant concentrations, primarily carbon monoxide, resulting from traffic increases in the immediate vicinity of a project, as well as any toxic and odor emissions generated on site.

4. *Cumulative Impacts*—air quality changes resulting from the incremental impact of the project when added to other projects in the vicinity.

6.2.1 Construction Phase

Construction of the proposed initiative has the potential to create air quality and GHG emission impacts through the use of heavy-duty construction equipment, and through vehicle trips generated from construction workers traveling to and from the proposed initiative site. Fugitive dust emissions would primarily result from site preparation activities (i.e., grading), whereas NO_x and GHG emissions would primarily result from delivery and hauling of construction materials and equipment, the use of heavy-duty construction equipment, and the construction workers' commute trips to and from the proposed initiative site. The assessment of construction air quality impacts considers each of these potential sources during each part of the construction phase. Although construction emissions can vary substantially from day to day, depending on the level of activity and the specific type of operation, and the fact that fugitive dust emissions can vary based on the prevailing weather conditions, the analysis considers a worst-case scenario with concurrent use of construction equipment to ensure that impacts are not underestimated.

Construction Scenario

The construction scenario for a typical single-family residence is fully described earlier in Section 1.3.1, *Construction Scenario*.

Construction Impacts

During construction of the proposed initiative, there is a potential to create air quality impacts through the use of heavy-duty construction equipment and through vehicle trips generated from construction workers traveling to and from the proposed initiative site. Mobile emissions, primarily NO_x, would result from the use of heavy construction equipment. During the finishing phase, paving operations and the application of architectural coatings (i.e., paints) and other building materials would release VOCs.

Construction emissions are expected to result from the following activities:

- Site preparation including ground clearing, grading, and trenching
- Delivery of construction materials to and from the project site

- Fuel combustion by on-site construction equipment
- Construction worker commute trips

Construction Emissions

The daily regional construction emissions for the proposed initiative were estimated using the CalEEMod, version 2013.2.2, emissions model for the simultaneous construction of 184 single-family residences across Los Angeles County (Table 6.2.1-1, *Estimated Daily Regional On-Site Construction Emissions*). The eligible 42,867 parcels are split between the SCAQMD and the AVAQMD with approximately eight percent of the parcels in SCAQMD and 92 percent in AVAQMD.

TABLE 6.2.1-1
ESTIMATED DAILY REGIONAL ON-SITE CONSTRUCTION EMISSIONS

Off-Road Emission Sources	Construction Emissions (Pounds/Day)					
	VOCs	NOx	CO	SOx	$PM_{2.5}$	PM_{10}
Site Preparation	27.51	293.28	218.43	<1	36.12	56.03
Grading	48.70	516.99	333.11	<1	53.34	80.46
Building Construction	152.55	1638.54	741.63	<1	66.35	71.12
Paving	18.16	206.78	129.61	<1	9.27	10.06
Architectural Coating	235.81	145.49	115.55	<1	12.05	12.05
SCAQMD Significance Threshold	**75**	**100**	**550**	**150**	**55**	**150**
Significant?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**No**
AVAQMD Significance Threshold	**137**	**137**	**548**	**137**	**82**	**82**
Significant?	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**

SOURCE: Sapphos Environmental, Inc., Appendix B, *CalEEMod Output for the Proposed initiative*.

As is indicated in Table 6.2.1-1, the proposed initiative would have a significant impact on air quality for VOCs, NO_x, CO, and $PM_{2.5}$ in the SCAQMD region. The proposed initiative would have a significant impact on VOCs, NO_x, and CO in the AVAQMD region. Considering that construction equipment will meet stricter emission standards in the future and given the 20-year time horizon for this project, this analysis constitutes a worst-case scenario using emissions calculated in 2016. Tier 4 emission standards for off-road diesel engines are expected to reduce exhaust emissions by 90 percent.[3] Additionally due to the conservative nature of the assumptions made in the development of the model (See 5.0 *Methods*), actual emissions from construction are likely to be less than the estimated emissions.

Toxic Air Contaminants

The Office of Environmental Health Hazard Assessment (OEHHA) has developed a methodology for estimating health risks from TAC pollutants such as diesel exhaust from construction equipment. Although a cancer risk factor has been established for DPM, the OEHHA Health Risk

[3] U.S. Environmental Protection Agency. 11 August 2014. "Non-road diesel engines." Available at: http://www.epa.gov/oms/nonroad-diesel.htm

Assessment (HRA) cancer risk factors assume a continuous exposure over a 70-year timeframe. Because the construction schedule estimated that the phases which require the most heavy-duty diesel equipment usage, such as site grading and excavation, would last for a much shorter duration (i.e., approximately three months), construction of the proposed initiative would not result in a long-term (i.e., 70-year) substantial source of TAC emissions. Additionally, the SCAQMD CEQA guidance document does not recommend an HRA for short-term construction emissions. Therefore, the HRA is not meaningful to evaluate long-term cancer impacts from construction activities that occur over a relatively short duration. In addition, there would be no residual emissions after construction and no corresponding individual cancer risk. As such, the proposed initiative would not expose sensitive receptors to substantial pollutant concentrations and project-related TAC emissions impacts during construction would be less than significant.

Odors

During the proposed initiative's construction phase, activities associated with the operation of construction equipment, the application of asphalt, the application of architectural coatings and other interior and exterior finishes, and roofing may produce discernible odors typical of most construction sites. SCAQMD and AVAQMD's Rule 1113, *Architectural Coatings* limits the amount of volatile organic compounds from architectural coatings and solvents to further reduce the potential for odiferous emissions. Exterior and interior coatings were assumed to contain low VOC emissions in the modeling. Although these odors could be a source of nuisance to adjacent uses, they are temporary and intermittent in nature. In addition, as construction-related emissions dissipate away from the construction area, the odors associated with these emissions would also decrease and would be quickly diluted. Therefore, impacts associated with objectionable odors during construction would be less than significant.

6.2.2 Operational Impacts

Operation and Maintenance Emissions

Operation and maintenance emissions at the proposed initiative site are likely to result from energy consumption at the single-family residence and on-road mobile sources associated with private vehicle trips and the delivery of hauled water each week. Additionally, operational emissions will be generated from area sources including consumer products that contain solvents, landscaping that uses fuel-powered equipment, and on-site emergency generators. The CalEEMod emissions model was used to calculate emissions from operational equipment and from mobile-source emissions (Table 6.2.2-1, *Estimated Daily Operational Emissions*). Table 6.2.2-1 shows the total amount of operational emissions expected by 2035 with 3,680 new single-family residences developed.

TABLE 6.2.2-1
ESTIMATED DAILY OPERATIONAL EMISSIONS

Emission Sources	Air Pollutants (Pounds/Day)					
	VOCs	NO_x	CO	SO_x	$PM_{2.5}$	PM_{10}
Area	332.67	3.61	308.02	1.66	1.66	1.66
Energy	2.98	25.47	10.82	<1	2.06	2.06
Mobile (Hauled Water Truck Trips)	.17	1.93	1.99	<1	.08	.21
Mobile (Passenger Trips)	222.27	557.15	3540.16	5.89	112.61	407.38
Total	**558.09**	**588.16**	**3860.99**	**7.70**	**116.41**	**411.31**
SCAQMD Significance Threshold	**75**	**100**	**550**	**150**	**55**	**150**
Significant?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**
AVAQMD Significance Threshold	**137**	**137**	**548**	**137**	**82**	**82**
Significant?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**

SOURCE: Sapphos Environmental, Inc., Appendix B, *CalEEMod Output for the Proposed initiative*.

As is indicated in Table 6.2.2-1, the proposed initiative is expected to have significant operational air quality impacts. Daily operational emissions are above the SCAQMD and AVAQMD significance thresholds for all criteria air pollutants except SO_x. Passenger mobile trips is the largest contributor to the operational emissions as there is an expected 588,000 additional passenger VMT daily made by 2035 at full build-out on 3,680 parcels. The 4,300 daily truck VMT generated by this proposed initiative are responsible for a relatively small amount of emissions compared to the passenger trips generated from the new single-family residences. As such, mitigation measures related to air quality are required for operation of the proposed initiative.

It is important to note that the estimated emissions are likely to be higher than actual emissions from the proposed initiative due to the conservative assumptions used for emission modeling and emission factors from 2016. In the next 20 years, it is likely that there will be technological advances and stricter regulations reducing the operational household and mobile emissions. For example, passenger mobile emissions are expected to decline significantly with CAFE standards reaching an average 54.5 mpg for all cars by 2025.

Local Operational Impacts

Carbon Monoxide

CO is considered a localized problem and requires additional analysis when a proposed initiative is likely to expose sensitive receptors to localized levels of CO concentrations from vehicles, which are known as CO "hotspots." The SCAQMD recommends an evaluation of potential localized CO impacts when a project causes the level of service (LOS) at a study street intersection to worsen from C to D, or if a project increases the volume-to-capacity (V/C) ratio at any street intersection rated D or worse by two percent or more. According to the *Single-Family Residential Hauled Water Initiative for New Development: Traffic Analysis*, conducted by Fehr & Peers in May 2015,[4]

[4] Fehr & Peers. 22 May 2015. *Single-Family Residential Hauled Water Initiative for New Development: Traffic Analysis*. Santa Monica, CA.

planned roadway capacity is adequate to handle future volumes within acceptable operating conditions. See Table 8, *Roadway Segment LOS – Existing and Existing Plus Project (2015)*, and Table 9, *Roadway Segment LOS – Cumulative Year Plus Project (2035), in the Traffic Analysis*.

Toxic Air Contaminants

Toxic air contaminants are pollutants that cause adverse health effects, but do not have an associated federal or State ambient air quality standard. The primary sources of TAC emissions related with the proposed initiative's operations are DPM from passenger vehicles and trucks. The SCAQMD recommends that HRAs be conducted for substantial sources of DPM (e.g. truck stops and warehouse distribution facilities) and has provided guidance for analyzing mobile source diesel emissions.[5] Because the emissions from the proposed initiative are dispersed across Los Angeles County, each construction site or parcel location would experience only a fraction of the total proposed initiative's emissions. Therefore, potential TAC impacts to nearby sensitive receptors are not anticipated to be significant. A HRA is not necessary.

In California, TACs are regulated by the Air Toxics Program. CARB mandates that airborne toxic control measures limit diesel fueled commercial vehicles (delivery trucks) to idle for no more than five minutes at any given time. This rule would apply to the hauled water trucks that will need to shut off their main engine while filling and delivering water. The increase in air toxic impacts from mobile sources of DPM emissions has the potential to be substantial cumulatively because the proposed initiative includes 588,000 new daily passenger VMT and 4,300 new daily truck VMT. Water haulers shall adhere to California's Commercial Vehicle Idling Regulations, which states that heavy duty diesel vehicles over 10,000 lbs. shall not idle for more than five minutes at any given time.[6]

Odors

According to the *SCAQMD CEQA Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed initiative does not include any uses identified by the SCAQMD or AVAQMD as being associated with odors as construction is typical for a single-family residence and are short term. Garbage collection areas for the proposed initiative would be covered and situated away from the property line and sensitive receptors locations. Good housekeeping practices would be sufficient to prevent nuisance odors. Therefore, the proposed initiative would not result in the creation of objectionable odors and potential odor impacts would be less than significant.

6.2.3 Greenhouse Gas Emissions

The proposed initiative's global climate change impacts were analyzed quantitatively considering the operational scenario, size, and location. To quantify the amount of GHG emissions contributed by construction and operation of the proposed initiative, the CalEEMod emissions model and the California Climate Action Registry's General Reporting Protocol were used. The proposed initiative would be expected to have the potential to result in significant impacts related to global climate

[5] South Coast Air Quality Management District. Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions. December 2002.

[6] California Air Resources Board. Facts about California's Commercial Vehicle Idling Regulations. 23 May 2013. Available at: http://www.arb.ca.gov/msprog/truck-idling/factsheet.pdf

change if the proposed initiative conflicts with the goal of reducing California's GHG emissions to the 1990 levels (427 million metric tons CO_{2e}, which is equivalent to approximately 10 tons CO_{2e} per capita) by 2020 as required by AB 32. Based on the suggested thresholds proposed by the CAPCOA,[7,8] the proposed initiative would be expected to have the potential to result in significant impacts related to global climate change if the proposed initiative emits more than 25,000 metric tons of CO_{2e} per year.

Quantitative Analysis of Greenhouse Gas Emission Impacts

Based on emissions modeling, unmitigated construction activities would result in the emission of a maximum of approximately 105,108 metric tons of CO_{2e} (Table 6.2.3-1, *Unmitigated CO_2 and CO_{2e} Emissions*). Operation of the proposed initiative would result in the emission of approximately 105,108 metric tons of CO_{2e} per year in 2035 and beyond (Table 6.2.3-1). The operational GHG emissions can be attributed to mobile sources including passenger trips for the residences and hauled water truck trips associated with the development of 3,680 parcels. As is indicated in Table 6.2.3-1, the proposed initiative's construction and operational emissions are expected to exceed the recommended CAPCOA threshold of 25,000 metric tons of CO_{2e} per year; thus warranting the implementation of mitigation measures.

TABLE 6.2.3-1
UNMITIGATED CO_2 and CO_{2e} EMISSIONS

Emission Sources	CO_2 Emissions (Metric Tons/Year)	CO_{2e} Emissions (Metric Tons/Year)
Construction Emissions	27,375	27,471
Operational Emissions	103,573	105,108
CAPCOA Recommended Threshold*	**25,000**	**25,000**
Significant?	**Yes**	**Yes**

NOTE: *In the absence of established GHG emission thresholds, this analysis will utilize the 25,000 metric tons of carbon dioxide equivalent ($MTCO_{2e}$) per year threshold recommended by the California Air Pollution Control Officers Association (CAPCOA) in January 2008

6.3 CUMULATIVE IMPACTS

Within Los Angeles County, the cumulative impacts encompass this proposed initiative and others listed in the updated Antelope Valley Area Plan as well as the current 2012 SCAG RTP. Related projects in the vicinity include the Centennial Project and the High Desert Corridor Project.

6.3.1 Construction

According to the SCAQMD, construction projects that exceed the SCAQMD's recommended daily thresholds for project-specific impacts would cause a cumulatively considerable increase in emissions for those pollutants for which the Basin is in non-attainment. Because there is an

[7] California Air Pollution Control Officers Association. January 2008. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. Sacramento, CA.

[8] U.S. Department of Energy, Energy Information Administration. Voluntary Reporting of Greenhouse Gases Program. Washington, D.C. Available at: http://www.eia.gov/oiaf/1605/

expected 184 single-family residences under construction simultaneously each year for the next 20 years according to the proposed initiative, daily emissions of VOCs, NO_x, CO, and $PM_{2.5}$ are anticipated to be significant in the absence of mitigation measures. Therefore, the proposed initiative has the potential to have significant impacts in relation to generating a cumulatively considerable net increase in emissions of VOCs, NO_x, CO, and $PM_{2.5}$, thus requiring the consideration of mitigation measures.

Similar to the proposed initiative, the greatest potential for TAC emissions at each related project would involve diesel particulate emissions associated with heavy equipment operations during grading and excavation activities. According to the SCAQMD's methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of TACs over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology. Additionally, the SCAQMD CEQA Air Quality Handbook does not require an HRA for short-term cancer impacts from construction activities which occur over a relatively short duration. As such, cumulative toxic emission impacts during construction would be less than significant.

Also similar to the proposed initiative, potential sources that may emit odors during construction activities at each related project would include the use of roofing materials, architectural coatings, and solvents. SCAQMD Rule 1113 limits the amount of volatile organic compounds from architectural coatings and solvents. Via mandatory compliance with SCAQMD rules, it is anticipated that construction activities or materials used in the construction of the related project would not create objectionable odors. Thus, odor impacts from the related project are anticipated to be less than significant individually, as well as cumulatively in conjunction with the proposed initiative.

6.3.2 Operation

There are two related projects that have been identified in the vicinity of the proposed initiative site. If an individual project results in air emissions of criteria pollutants that exceed the SCAQMD's or AVAQMD's recommended daily thresholds for project-specific impacts, then the project would also result in a cumulatively considerable net increase of these criteria pollutants. As discussed above, peak daily emissions of operation-related pollutants would exceed SCAQMD and AVAQMD's regional significance thresholds for VOCs, NO_x, CO, $PM_{2.5}$ and PM_{10}. By applying the SCAQMD's cumulative air quality methodology, implementation of the proposed initiative would result in a cumulatively considerable net increase of any criteria pollutant for which the Basin in non-attainment. The South Coast Basin is currently in nonattainment for ozone for which VOCs are a precursor, $PM_{2.5}$ and PM_{10}. The Mojave Desert Air Basin is currently in nonattainment for ozone and PM_{10}. Cumulative impacts would occur. Therefore, the emissions of non-attainment pollutants and precursors generated through operation of the proposed initiative in excess of the SCAQMD project-level thresholds would be significant.

6.3.3 Toxic Air Contaminants

With respect to TAC emissions, the proposed initiative would not represent a substantial source of TAC emissions. Based on recommended screen-level siting distance for TAC sources, as set forth in CARB's Land Use Guidelines, the proposed initiative and the related projects would likely generate minimal TAC emissions related to the use of diesel truck idling, consumer products, and landscaping maintenance activities, among other things. Pursuant to AB 1807, which directs CARB to identify substances as TAC and adopt airborne toxic control measures to control such

substances, the SCAQMD has adopted numerous rules (primarily Regulation XIV) that specifically address TAC emissions. These SCAQMD rules have resulted in and will continue to result in substantial Basin-wide TAC emission reductions. As such, cumulative TAC emissions during long-term operations would be less than significant. Furthermore, the proposed initiative would not result in any new sources of TACs beyond those that have been identified under CARB's Land Use Guidelines, and thus would not contribute to a cumulative impact.

6.3.4 Odors

With respect to potential odor impacts, neither the proposed initiative nor any of the related projects (residences, multi-modal link, freeway extension) have a high potential to generate odor impacts. Furthermore, any related project that may have the potential to general objectionable odors would be required by SCAQMD/AVAQMD Rule 402, *Nuisance*, to impact BACT to limit objectionable odor impacts to a less than significant level. Thus, potential odor impacts from the related project are anticipated to be both individually and cumulatively less than significant.

SECTION 7.0
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APPENDIX A
CALEEMOD OUTPUT FOR THE PROPOSED PROJECT

1012-055 Single-Family Residential Hauled Water Initiative for New Development

Los Angeles-Mojave Desert County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	1.00	Dwelling Unit	4.00	4,000.00	3

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2016
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2016 operation year will give worst case scenario

Land Use - Assume 4000 SF floor area of Residence.
Estimated population based on floor plan of proposed residence.
Assume 4 acre average lot size.

Construction Phase - Construction scenario has 14 months total. No demo, but a hypothetical demo added here to represent the hauled water delivery trips.

Off-road Equipment - Estimated air compressor time to 2 hrs/day.

Trips and VMT - Construction scenario based off of Kumar Single Family Residence Project
Site Prep: 5 worker trips, 10 hauling trips
Grading: 5 worker trips, 10 hauling trips
Building Construction: 20 worker trips, 30 vendor trips, 10 hauling trips
Paving: 5 worker trips
AC: 5 worker trips

Hauled water trips from Fehr and Peers report- Assume full build out on hauled water delivery trips with 134 trucks per day with each traveling 31.8 roundtrip miles.

On-road Fugitive Dust - 25mph mean vehicle speed

Architectural Coating - Low VOC estimate

Off-road Equipment - Construction scenario based off of Kumar Single Family Residence Project
1 dozer for 5 days at 8 hr/day = 40 hrs/65 days site prep =0.6 hrs/day
1 backhoe for 10 days at 8hr/day = 80 hrs/ 65 days site prep =1.2 hr/day

Off-road Equipment - Construction scenario based off of Kumar Single Family Residence Project
1 dozer for 5 days at 8hr/day = 40 hrs/ 90 days grading = .44 hr/day
1 grader for 5 days at 8hr/day = 40 hrs/ 90 days grading = .44 hr/day
1 bobcat for 5 days at 8hr/day = 40 hrs/90 days grading = .44 hr/day

Off-road Equipment - Based off Kumar single family residence construction scenario:
3 dump trucks for 10 days at 8 hr/day = 80 hr/180 days construction = 0.44 hr/day
12 concrete off-highway trucks for 5 days at 8 hr/day = 40 hr/180 days construction for =0.22 hr/day
30 vendor trips to deliver materials. 30 truck trips to deliver material is estimated at 2 trucks/day at 2 hr/day
Added one backhoe/tractor for an hour/day. Added one forklift for an hour/day. Added one generator set for an hour/day.

Off-road Equipment - Estimated an hour/day for cement mixer, paving equipment, and surfacing eqiupment for a total of 30 hours per equipment type

Off-road Equipment -

Grading - 36% disturbance from MFR 2 (4 acres *.36=1.44 acres disturbed)

Vechicle Emission Factors -

Vechicle Emission Factors -

Vechicle Emission Factors -

Consumer Products -

Area Coating -

Landscape Equipment -

Energy Use -

Solid Waste -

Area Mitigation - Low VOC used

Energy Mitigation - Assumed to exceed title 24 energy standards by 10%. Install high efficiency lighting to get a 50% lighting energy reduction.

Water Mitigation - Low flow faucets, toilets, and showers assumed. Assume water conservation strategy for outdoor landscaping equal to ~20% reduction.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00

tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	50
tblConstructionPhase	NumDays	18.00	27.00
tblConstructionPhase	NumDays	230.00	158.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	8.00	93.00
tblConstructionPhase	NumDays	18.00	27.00
tblConstructionPhase	NumDays	5.00	65.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblGrading	AcresOfGrading	2.33	1.44
tblGrading	AcresOfGrading	0.00	1.44
tblLandUse	LandUseSquareFeet	1,800.00	4,000.00
tblLandUse	LotAcreage	0.32	4.00
tblOffRoadEquipment	HorsePower	167.00	208.00
tblOffRoadEquipment	HorsePower	253.00	125.00
tblOffRoadEquipment	LoadFactor	0.40	0.43
tblOffRoadEquipment	LoadFactor	0.30	0.42
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	12.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	6.00	2.00
tblOffRoadEquipment	UsageHours	6.00	1.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.40
tblOffRoadEquipment	UsageHours	6.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.40
tblOffRoadEquipment	UsageHours	8.00	0.60
tblOffRoadEquipment	UsageHours	7.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.40
tblOffRoadEquipment	UsageHours	8.00	1.20
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00

tblProjectCharacteristics	OperationalYear	2014	2016
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblRoadDust	MeanVehicleSpeed	40	25
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	HaulingTripNumber	0.00	134.00
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	VendorTripNumber	0.00	30.00
tblTripsAndVMT	WorkerTripNumber	8.00	5.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	8.00	5.00
tblTripsAndVMT	WorkerTripNumber	0.00	5.00
tblVehicleTrips	HO_TL	7.90	16.00
tblVehicleTrips	HS_TL	7.10	16.00
tblVehicleTrips	HW_TL	16.80	16.00
tblVehicleTrips	ST_TR	10.08	10.00
tblVehicleTrips	SU_TR	8.77	10.00
tblVehicleTrips	WD_TR	9.57	10.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	6.9400e-003	0.0652	0.0662	8.0000e-005	0.0328	3.5400e-003	0.0364	0.0166	3.2500e-003	0.0199	0.0000	6.8586	6.8586	1.3900e-003	0.0000	6.8878
2016	0.1296	1.0117	0.9885	1.6800e-003	0.0544	0.0385	0.0928	0.0185	0.0359	0.0544	0.0000	148.9513	148.9513	0.0232	0.0000	149.4378
Total	**0.1366**	**1.0769**	**1.0546**	**1.7600e-003**	**0.0872**	**0.0420**	**0.1292**	**0.0352**	**0.0391**	**0.0743**	**0.0000**	**155.8099**	**155.8099**	**0.0246**	**0.0000**	**156.3256**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	6.9400e-003	0.0652	0.0662	8.0000e-005	0.0162	3.5400e-003	0.0198	7.8700e-003	3.2500e-003	0.0111	0.0000	6.8586	6.8586	1.3900e-003	0.0000	6.8878
2016	0.1296	1.0117	0.9885	1.6800e-003	0.0462	0.0385	0.0847	0.0143	0.0359	0.0501	0.0000	148.9512	148.9512	0.0232	0.0000	149.4377
Total	**0.1366**	**1.0769**	**1.0546**	**1.7600e-003**	**0.0625**	**0.0420**	**0.1045**	**0.0221**	**0.0391**	**0.0613**	**0.0000**	**155.8098**	**155.8098**	**0.0246**	**0.0000**	**156.3255**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**28.37**	**0.00**	**19.14**	**37.08**	**0.00**	**17.55**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0221	9.0000e-005	7.5300e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0121	0.0121	1.0000e-005	0.0000	0.0124
Energy	1.6000e-004	1.3700e-003	5.8000e-004	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	5.6532	5.6532	1.3000e-004	5.0000e-005	5.6710
Mobile	0.0101	0.0302	0.1578	2.7000e-004	0.0195	3.1000e-004	0.0198	5.1900e-003	2.9000e-004	5.4800e-003	0.0000	21.4804	21.4804	1.1800e-003	0.0000	21.5052
Waste						0.0000	0.0000		0.0000	0.0000	0.2497	0.0000	0.2497	0.0148	0.0000	0.5596
Water						0.0000	0.0000		0.0000	0.0000	0.0207	0.7267	0.7474	2.1400e-003	5.0000e-005	0.8089
Total	**0.0323**	**0.0317**	**0.1659**	**2.8000e-004**	**0.0195**	**4.6000e-004**	**0.0199**	**5.1900e-003**	**4.4000e-004**	**5.6300e-003**	**0.2704**	**27.8724**	**28.1428**	**0.0182**	**1.0000e-004**	**28.5571**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0163	9.0000e-005	7.5300e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0121	0.0121	1.0000e-005	0.0000	0.0124
Energy	1.5000e-004	1.2600e-003	5.4000e-004	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	4.9151	4.9151	1.1000e-004	4.0000e-005	4.9309
Mobile	0.0101	0.0302	0.1578	2.7000e-004	0.0195	3.1000e-004	0.0198	5.1900e-003	2.9000e-004	5.4800e-003	0.0000	21.4804	21.4804	1.1800e-003	0.0000	21.5052
Waste						0.0000	0.0000		0.0000	0.0000	0.2497	0.0000	0.2497	0.0148	0.0000	0.5596
Water						0.0000	0.0000		0.0000	0.0000	0.0207	0.6594	0.6801	2.1400e-003	5.0000e-005	0.7416
Total	**0.0265**	**0.0316**	**0.1658**	**2.8000e-004**	**0.0195**	**4.5000e-004**	**0.0199**	**5.1900e-003**	**4.3000e-004**	**5.6200e-003**	**0.2704**	**27.0671**	**27.3375**	**0.0182**	**9.0000e-005**	**27.7497**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**18.16**	**0.35**	**0.02**	**0.00**	**0.00**	**2.17**	**0.05**	**0.00**	**2.27**	**0.18**	**0.00**	**2.89**	**2.86**	**0.11**	**10.00**	**2.83**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2015	12/15/2015	6	65	
2	Grading	Grading	12/16/2015	4/1/2016	6	93	
3	Building Construction	Building Construction	4/2/2016	10/3/2016	6	158	
4	Paving	Paving	10/4/2016	11/3/2016	6	27	
5	Architectural Coating	Architectural Coating	11/4/2016	12/5/2016	6	27	
6	Hauled Water Delivery Trips	Demolition	12/6/2016	12/30/2016	6	22	

Acres of Grading (Site Preparation Phase): 1.44

Acres of Grading (Grading Phase): 1.44

Acres of Paving: 0

Residential Indoor: 8,100; Residential Outdoor: 2,700; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	1	0.60	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	1.20	97	0.37
Grading	Graders	1	0.40	174	0.41
Grading	Rubber Tired Dozers	1	0.40	255	0.40
Grading	Tractors/Loaders/Backhoes	1	0.40	97	0.37
Building Construction	Dumpers/Tenders	3	0.40	16	0.38
Building Construction	Forklifts	1	1.00	89	0.20
Building Construction	Generator Sets	1	1.00	84	0.74
Building Construction	Off-Highway Trucks	12	0.20	400	0.38
Building Construction	Other Material Handling Equipment	2	2.00	208	0.43
Building Construction	Tractors/Loaders/Backhoes	1	1.00	97	0.37
Building Construction	Welders	1	1.00	46	0.45
Paving	Cement and Mortar Mixers	1	1.00	9	0.56
Paving	Paving Equipment	1	1.00	130	0.36
Paving	Surfacing Equipment	1	1.00	125	0.42
Architectural Coating	Air Compressors	1	2.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	2	5.00	0.00	10.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	5.00	0.00	10.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	21	20.00	30.00	10.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	5.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Hauled Water Delivery Trips	0			134.00	16.80	6.60	31.80			HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0154	0.0000	0.0154	8.1500e-003	0.0000	8.1500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.8600e-003	0.0518	0.0386	4.0000e-005		2.9500e-003	2.9500e-003		2.7100e-003	2.7100e-003	0.0000	3.5135	3.5135	1.0500e-003	0.0000	3.5355
Total	**4.8600e-003**	**0.0518**	**0.0386**	**4.0000e-005**	**0.0154**	**2.9500e-003**	**0.0184**	**8.1500e-003**	**2.7100e-003**	**0.0109**	**0.0000**	**3.5135**	**3.5135**	**1.0500e-003**	**0.0000**	**3.5355**

3.2 Site Preparation - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3000e-004	1.3100e-003	1.6700e-003	0.0000	9.0000e-005	2.0000e-005	1.1000e-004	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.3370	0.3370	0.0000	0.0000	0.3371
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.2000e-004	1.5400e-003	0.0158	2.0000e-005	2.0300e-003	2.0000e-005	2.0500e-003	5.4000e-004	2.0000e-005	5.6000e-004	0.0000	1.9321	1.9321	1.3000e-004	0.0000	1.9348
Total	**9.5000e-004**	**2.8500e-003**	**0.0175**	**2.0000e-005**	**2.1200e-003**	**4.0000e-005**	**2.1600e-003**	**5.6000e-004**	**4.0000e-005**	**6.0000e-004**	**0.0000**	**2.2691**	**2.2691**	**1.3000e-004**	**0.0000**	**2.2719**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					6.9500e-003	0.0000	6.9500e-003	3.6700e-003	0.0000	3.6700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.8600e-003	0.0518	0.0386	4.0000e-005		2.9500e-003	2.9500e-003		2.7100e-003	2.7100e-003	0.0000	3.5135	3.5135	1.0500e-003	0.0000	3.5355
Total	**4.8600e-003**	**0.0518**	**0.0386**	**4.0000e-005**	**6.9500e-003**	**2.9500e-003**	**9.9000e-003**	**3.6700e-003**	**2.7100e-003**	**6.3800e-003**	**0.0000**	**3.5135**	**3.5135**	**1.0500e-003**	**0.0000**	**3.5355**

3.2 Site Preparation - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3000e-004	1.3100e-003	1.6700e-003	0.0000	9.0000e-005	2.0000e-005	1.1000e-004	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.3370	0.3370	0.0000	0.0000	0.3371
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.2000e-004	1.5400e-003	0.0158	2.0000e-005	2.0300e-003	2.0000e-005	2.0500e-003	5.4000e-004	2.0000e-005	5.6000e-004	0.0000	1.9321	1.9321	1.3000e-004	0.0000	1.9348
Total	**9.5000e-004**	**2.8500e-003**	**0.0175**	**2.0000e-005**	**2.1200e-003**	**4.0000e-005**	**2.1600e-003**	**5.6000e-004**	**4.0000e-005**	**6.0000e-004**	**0.0000**	**2.2691**	**2.2691**	**1.3000e-004**	**0.0000**	**2.2719**

3.3 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0148	0.0000	0.0148	7.7800e-003	0.0000	7.7800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.4000e-004	0.0100	6.4300e-003	1.0000e-005		5.4000e-004	5.4000e-004		5.0000e-004	5.0000e-004	0.0000	0.6092	0.6092	1.8000e-004	0.0000	0.6130
Total	**9.4000e-004**	**0.0100**	**6.4300e-003**	**1.0000e-005**	**0.0148**	**5.4000e-004**	**0.0153**	**7.7800e-003**	**5.0000e-004**	**8.2800e-003**	**0.0000**	**0.6092**	**0.6092**	**1.8000e-004**	**0.0000**	**0.6130**

3.3 Grading - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0000e-005	2.0000e-004	2.5000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0507	0.0507	0.0000	0.0000	0.0507
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8000e-004	3.3000e-004	3.4100e-003	1.0000e-005	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.4161	0.4161	3.0000e-005	0.0000	0.4167
Total	**2.0000e-004**	**5.3000e-004**	**3.6600e-003**	**1.0000e-005**	**5.1000e-004**	**0.0000**	**5.1000e-004**	**1.4000e-004**	**0.0000**	**1.4000e-004**	**0.0000**	**0.4669**	**0.4669**	**3.0000e-005**	**0.0000**	**0.4675**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					6.6400e-003	0.0000	6.6400e-003	3.5000e-003	0.0000	3.5000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.4000e-004	0.0100	6.4300e-003	1.0000e-005		5.4000e-004	5.4000e-004		5.0000e-004	5.0000e-004	0.0000	0.6092	0.6092	1.8000e-004	0.0000	0.6130
Total	**9.4000e-004**	**0.0100**	**6.4300e-003**	**1.0000e-005**	**6.6400e-003**	**5.4000e-004**	**7.1800e-003**	**3.5000e-003**	**5.0000e-004**	**4.0000e-003**	**0.0000**	**0.6092**	**0.6092**	**1.8000e-004**	**0.0000**	**0.6130**

3.3 Grading - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0000e-005	2.0000e-004	2.5000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0507	0.0507	0.0000	0.0000	0.0507
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8000e-004	3.3000e-004	3.4100e-003	1.0000e-005	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.4161	0.4161	3.0000e-005	0.0000	0.4167
Total	**2.0000e-004**	**5.3000e-004**	**3.6600e-003**	**1.0000e-005**	**5.1000e-004**	**0.0000**	**5.1000e-004**	**1.4000e-004**	**0.0000**	**1.4000e-004**	**0.0000**	**0.4669**	**0.4669**	**3.0000e-005**	**0.0000**	**0.4675**

3.3 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0148	0.0000	0.0148	7.7800e-003	0.0000	7.7800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.1300e-003	0.0543	0.0352	4.0000e-005		2.9200e-003	2.9200e-003		2.6900e-003	2.6900e-003	0.0000	3.3980	3.3980	1.0200e-003	0.0000	3.4195
Total	**5.1300e-003**	**0.0543**	**0.0352**	**4.0000e-005**	**0.0148**	**2.9200e-003**	**0.0177**	**7.7800e-003**	**2.6900e-003**	**0.0105**	**0.0000**	**3.3980**	**3.3980**	**1.0200e-003**	**0.0000**	**3.4195**

3.3 Grading - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-004	9.4000e-004	1.3700e-003	0.0000	8.0000e-005	2.0000e-005	1.0000e-004	2.0000e-005	1.0000e-005	4.0000e-005	0.0000	0.2830	0.2830	0.0000	0.0000	0.2830
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.7000e-004	1.6800e-003	0.0172	3.0000e-005	2.4700e-003	2.0000e-005	2.4900e-003	6.6000e-004	2.0000e-005	6.8000e-004	0.0000	2.2645	2.2645	1.5000e-004	0.0000	2.2675
Total	**9.7000e-004**	**2.6200e-003**	**0.0186**	**3.0000e-005**	**2.5500e-003**	**4.0000e-005**	**2.5900e-003**	**6.8000e-004**	**3.0000e-005**	**7.2000e-004**	**0.0000**	**2.5475**	**2.5475**	**1.5000e-004**	**0.0000**	**2.5506**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					6.6400e-003	0.0000	6.6400e-003	3.5000e-003	0.0000	3.5000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.1300e-003	0.0543	0.0352	4.0000e-005		2.9200e-003	2.9200e-003		2.6900e-003	2.6900e-003	0.0000	3.3980	3.3980	1.0200e-003	0.0000	3.4195
Total	**5.1300e-003**	**0.0543**	**0.0352**	**4.0000e-005**	**6.6400e-003**	**2.9200e-003**	**9.5600e-003**	**3.5000e-003**	**2.6900e-003**	**6.1900e-003**	**0.0000**	**3.3980**	**3.3980**	**1.0200e-003**	**0.0000**	**3.4195**

3.3 Grading - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-004	9.4000e-004	1.3700e-003	0.0000	8.0000e-005	2.0000e-005	1.0000e-004	2.0000e-005	1.0000e-005	4.0000e-005	0.0000	0.2830	0.2830	0.0000	0.0000	0.2830
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.7000e-004	1.6800e-003	0.0172	3.0000e-005	2.4700e-003	2.0000e-005	2.4900e-003	6.6000e-004	2.0000e-005	6.8000e-004	0.0000	2.2645	2.2645	1.5000e-004	0.0000	2.2675
Total	**9.7000e-004**	**2.6200e-003**	**0.0186**	**3.0000e-005**	**2.5500e-003**	**4.0000e-005**	**2.5900e-003**	**6.8000e-004**	**3.0000e-005**	**7.2000e-004**	**0.0000**	**2.5475**	**2.5475**	**1.5000e-004**	**0.0000**	**2.5506**

3.4 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0655	0.7035	0.3184	7.6000e-004		0.0305	0.0305		0.0285	0.0285	0.0000	70.3801	70.3801	0.0198	0.0000	70.7964
Total	**0.0655**	**0.7035**	**0.3184**	**7.6000e-004**		**0.0305**	**0.0305**		**0.0285**	**0.0285**	**0.0000**	**70.3801**	**70.3801**	**0.0198**	**0.0000**	**70.7964**

3.4 Building Construction - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	1.1100e-003	1.6200e-003	0.0000	9.0000e-005	2.0000e-005	1.0000e-004	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.3331	0.3331	0.0000	0.0000	0.3332
Vendor	0.0297	0.1871	0.4211	4.8000e-004	0.0136	2.7600e-003	0.0164	3.8500e-003	2.5400e-003	6.3900e-003	0.0000	43.0142	43.0142	3.1000e-004	0.0000	43.0207
Worker	6.9500e-003	0.0134	0.1379	2.4000e-004	0.0198	1.7000e-004	0.0200	5.2500e-003	1.5000e-004	5.4100e-003	0.0000	18.1159	18.1159	1.1600e-003	0.0000	18.1403
Total	**0.0368**	**0.2016**	**0.5606**	**7.2000e-004**	**0.0335**	**2.9500e-003**	**0.0365**	**9.1200e-003**	**2.7100e-003**	**0.0118**	**0.0000**	**61.4633**	**61.4633**	**1.4700e-003**	**0.0000**	**61.4942**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0655	0.7035	0.3184	7.6000e-004		0.0305	0.0305		0.0285	0.0285	0.0000	70.3801	70.3801	0.0198	0.0000	70.7963
Total	**0.0655**	**0.7035**	**0.3184**	**7.6000e-004**		**0.0305**	**0.0305**		**0.0285**	**0.0285**	**0.0000**	**70.3801**	**70.3801**	**0.0198**	**0.0000**	**70.7963**

3.4 Building Construction - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	1.1100e-003	1.6200e-003	0.0000	9.0000e-005	2.0000e-005	1.0000e-004	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.3331	0.3331	0.0000	0.0000	0.3332
Vendor	0.0297	0.1871	0.4211	4.8000e-004	0.0136	2.7600e-003	0.0164	3.8500e-003	2.5400e-003	6.3900e-003	0.0000	43.0142	43.0142	3.1000e-004	0.0000	43.0207
Worker	6.9500e-003	0.0134	0.1379	2.4000e-004	0.0198	1.7000e-004	0.0200	5.2500e-003	1.5000e-004	5.4100e-003	0.0000	18.1159	18.1159	1.1600e-003	0.0000	18.1403
Total	**0.0368**	**0.2016**	**0.5606**	**7.2000e-004**	**0.0335**	**2.9500e-003**	**0.0365**	**9.1200e-003**	**2.7100e-003**	**0.0118**	**0.0000**	**61.4633**	**61.4633**	**1.4700e-003**	**0.0000**	**61.4942**

3.5 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.3300e-003	0.0152	9.5100e-003	2.0000e-005		7.4000e-004	7.4000e-004		6.8000e-004	6.8000e-004	0.0000	1.4304	1.4304	4.2000e-004	0.0000	1.4392
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.3300e-003**	**0.0152**	**9.5100e-003**	**2.0000e-005**		**7.4000e-004**	**7.4000e-004**		**6.8000e-004**	**6.8000e-004**	**0.0000**	**1.4304**	**1.4304**	**4.2000e-004**	**0.0000**	**1.4392**

3.5 Paving - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	5.7000e-004	5.8900e-003	1.0000e-005	8.5000e-004	1.0000e-005	8.5000e-004	2.2000e-004	1.0000e-005	2.3000e-004	0.0000	0.7739	0.7739	5.0000e-005	0.0000	0.7750
Total	**3.0000e-004**	**5.7000e-004**	**5.8900e-003**	**1.0000e-005**	**8.5000e-004**	**1.0000e-005**	**8.5000e-004**	**2.2000e-004**	**1.0000e-005**	**2.3000e-004**	**0.0000**	**0.7739**	**0.7739**	**5.0000e-005**	**0.0000**	**0.7750**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.3300e-003	0.0152	9.5100e-003	2.0000e-005		7.4000e-004	7.4000e-004		6.8000e-004	6.8000e-004	0.0000	1.4304	1.4304	4.2000e-004	0.0000	1.4392
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.3300e-003**	**0.0152**	**9.5100e-003**	**2.0000e-005**		**7.4000e-004**	**7.4000e-004**		**6.8000e-004**	**6.8000e-004**	**0.0000**	**1.4304**	**1.4304**	**4.2000e-004**	**0.0000**	**1.4392**

3.5 Paving - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	5.7000e-004	5.8900e-003	1.0000e-005	8.5000e-004	1.0000e-005	8.5000e-004	2.2000e-004	1.0000e-005	2.3000e-004	0.0000	0.7739	0.7739	5.0000e-005	0.0000	0.7750
Total	**3.0000e-004**	**5.7000e-004**	**5.8900e-003**	**1.0000e-005**	**8.5000e-004**	**1.0000e-005**	**8.5000e-004**	**2.2000e-004**	**1.0000e-005**	**2.3000e-004**	**0.0000**	**0.7739**	**0.7739**	**5.0000e-005**	**0.0000**	**0.7750**

3.6 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0156					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6600e-003	0.0107	8.4800e-003	1.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004	0.0000	1.1490	1.1490	1.4000e-004	0.0000	1.1518
Total	**0.0173**	**0.0107**	**8.4800e-003**	**1.0000e-005**		**8.8000e-004**	**8.8000e-004**		**8.8000e-004**	**8.8000e-004**	**0.0000**	**1.1490**	**1.1490**	**1.4000e-004**	**0.0000**	**1.1518**

3.6 Architectural Coating - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	5.7000e-004	5.8900e-003	1.0000e-005	8.5000e-004	1.0000e-005	8.5000e-004	2.2000e-004	1.0000e-005	2.3000e-004	0.0000	0.7739	0.7739	5.0000e-005	0.0000	0.7750
Total	**3.0000e-004**	**5.7000e-004**	**5.8900e-003**	**1.0000e-005**	**8.5000e-004**	**1.0000e-005**	**8.5000e-004**	**2.2000e-004**	**1.0000e-005**	**2.3000e-004**	**0.0000**	**0.7739**	**0.7739**	**5.0000e-005**	**0.0000**	**0.7750**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0156					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6600e-003	0.0107	8.4800e-003	1.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004	0.0000	1.1490	1.1490	1.4000e-004	0.0000	1.1518
Total	**0.0173**	**0.0107**	**8.4800e-003**	**1.0000e-005**		**8.8000e-004**	**8.8000e-004**		**8.8000e-004**	**8.8000e-004**	**0.0000**	**1.1490**	**1.1490**	**1.4000e-004**	**0.0000**	**1.1518**

3.6 Architectural Coating - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	5.7000e-004	5.8900e-003	1.0000e-005	8.5000e-004	1.0000e-005	8.5000e-004	2.2000e-004	1.0000e-005	2.3000e-004	0.0000	0.7739	0.7739	5.0000e-005	0.0000	0.7750
Total	**3.0000e-004**	**5.7000e-004**	**5.8900e-003**	**1.0000e-005**	**8.5000e-004**	**1.0000e-005**	**8.5000e-004**	**2.2000e-004**	**1.0000e-005**	**2.3000e-004**	**0.0000**	**0.7739**	**0.7739**	**5.0000e-005**	**0.0000**	**0.7750**

3.7 Hauled Water Delivery Trips - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.7 Hauled Water Delivery Trips - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0300e-003	0.0226	0.0258	8.0000e-005	1.8300e-003	4.1000e-004	2.2300e-003	5.0000e-004	3.7000e-004	8.7000e-004	0.0000	7.0352	7.0352	5.0000e-005	0.0000	7.0362
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.0300e-003**	**0.0226**	**0.0258**	**8.0000e-005**	**1.8300e-003**	**4.1000e-004**	**2.2300e-003**	**5.0000e-004**	**3.7000e-004**	**8.7000e-004**	**0.0000**	**7.0352**	**7.0352**	**5.0000e-005**	**0.0000**	**7.0362**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.7 Hauled Water Delivery Trips - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0300e-003	0.0226	0.0258	8.0000e-005	1.8300e-003	4.1000e-004	2.2300e-003	5.0000e-004	3.7000e-004	8.7000e-004	0.0000	7.0352	7.0352	5.0000e-005	0.0000	7.0362
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.0300e-003**	**0.0226**	**0.0258**	**8.0000e-005**	**1.8300e-003**	**4.1000e-004**	**2.2300e-003**	**5.0000e-004**	**3.7000e-004**	**8.7000e-004**	**0.0000**	**7.0352**	**7.0352**	**5.0000e-005**	**0.0000**	**7.0362**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0101	0.0302	0.1578	2.7000e-004	0.0195	3.1000e-004	0.0198	5.1900e-003	2.9000e-004	5.4800e-003	0.0000	21.4804	21.4804	1.1800e-003	0.0000	21.5052
Unmitigated	0.0101	0.0302	0.1578	2.7000e-004	0.0195	3.1000e-004	0.0198	5.1900e-003	2.9000e-004	5.4800e-003	0.0000	21.4804	21.4804	1.1800e-003	0.0000	21.5052

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	10.00	10.00	10.00	51,699	51,699
Total	10.00	10.00	10.00	51,699	51,699

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	16.00	16.00	16.00	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.488044	0.071100	0.171983	0.163629	0.062769	0.009916	0.004878	0.011869	0.001121	0.001035	0.007693	0.000708	0.005255

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	3.4526	3.4526	8.0000e-005	2.0000e-005	3.4595
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	4.0629	4.0629	1.0000e-004	2.0000e-005	4.0711
NaturalGas Mitigated	1.5000e-004	1.2600e-003	5.4000e-004	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	1.4625	1.4625	3.0000e-005	3.0000e-005	1.4714
NaturalGas Unmitigated	1.6000e-004	1.3700e-003	5.8000e-004	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5903	1.5903	3.0000e-005	3.0000e-005	1.6000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	29800.9	1.6000e-004	1.3700e-003	5.8000e-004	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5903	1.5903	3.0000e-005	3.0000e-005	1.6000
Total		**1.6000e-004**	**1.3700e-003**	**5.8000e-004**	**1.0000e-005**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**1.5903**	**1.5903**	**3.0000e-005**	**3.0000e-005**	**1.6000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	27406.5	1.5000e-004	1.2600e-003	5.4000e-004	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	1.4625	1.4625	3.0000e-005	3.0000e-005	1.4714
Total		**1.5000e-004**	**1.2600e-003**	**5.4000e-004**	**1.0000e-005**		**1.0000e-004**	**1.0000e-004**		**1.0000e-004**	**1.0000e-004**	**0.0000**	**1.4625**	**1.4625**	**3.0000e-005**	**3.0000e-005**	**1.4714**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	7294.75	4.0629	1.0000e-004	2.0000e-005	4.0711
Total		**4.0629**	**1.0000e-004**	**2.0000e-005**	**4.0711**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	6198.95	3.4526	8.0000e-005	2.0000e-005	3.4595
Total		**3.4526**	**8.0000e-005**	**2.0000e-005**	**3.4595**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use Low VOC Cleaning Supplies

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0163	9.0000e-005	7.5300e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0121	0.0121	1.0000e-005	0.0000	0.0124
Unmitigated	0.0221	9.0000e-005	7.5300e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0121	0.0121	1.0000e-005	0.0000	0.0124

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	6.2600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0156					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.4000e-004	9.0000e-005	7.5300e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0121	0.0121	1.0000e-005	0.0000	0.0124
Total	**0.0221**	**9.0000e-005**	**7.5300e-003**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0121**	**0.0121**	**1.0000e-005**	**0.0000**	**0.0124**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.5600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0145					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.4000e-004	9.0000e-005	7.5300e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0121	0.0121	1.0000e-005	0.0000	0.0124
Total	**0.0163**	**9.0000e-005**	**7.5300e-003**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0121**	**0.0121**	**1.0000e-005**	**0.0000**	**0.0124**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Reclaimed Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.6801	2.1400e-003	5.0000e-005	0.7416
Unmitigated	0.7474	2.1400e-003	5.0000e-005	0.8089

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.065154 / 0.0410754	0.7474	2.1400e-003	5.0000e-005	0.8089
Total		**0.7474**	**2.1400e-003**	**5.0000e-005**	**0.8089**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.065154 / 0.0328603	0.6801	2.1400e-003	5.0000e-005	0.7416
Total		**0.6801**	**2.1400e-003**	**5.0000e-005**	**0.7416**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.2497	0.0148	0.0000	0.5596
Unmitigated	0.2497	0.0148	0.0000	0.5596

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	1.23	0.2497	0.0148	0.0000	0.5596
Total		**0.2497**	**0.0148**	**0.0000**	**0.5596**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	1.23	0.2497	0.0148	0.0000	0.5596
Total		**0.2497**	**0.0148**	**0.0000**	**0.5596**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

1012-055 Single-Family Residential Hauled Water Initiative for New Development

Los Angeles-Mojave Desert County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	1.00	Dwelling Unit	4.00	4,000.00	3

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2016
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2016 operation year will give worst case scenario

Land Use - Assume 4000 SF floor area of Residence.
Estimated population based on floor plan of proposed residence.
Assume 4 acre average lot size.

Construction Phase - Construction scenario has 14 months total. No demo, but a hypothetical demo added here to represent the hauled water delivery trips.

Off-road Equipment - Estimated air compressor time to 2 hrs/day.

Trips and VMT - Construction scenario based off of Kumar Single Family Residence Project
Site Prep: 5 worker trips, 10 hauling trips
Grading: 5 worker trips, 10 hauling trips
Building Construction: 20 worker trips, 30 vendor trips, 10 hauling trips
Paving: 5 worker trips
AC: 5 worker trips

Hauled water trips from Fehr and Peers report- Assume full build out on hauled water delivery trips with 134 trucks per day with each traveling 31.8 roundtrip miles.

On-road Fugitive Dust - 25mph mean vehicle speed

Architectural Coating - Low VOC estimate

Off-road Equipment - Construction scenario based off of Kumar Single Family Residence Project
1 dozer for 5 days at 8 hr/day = 40 hrs/65 days site prep =0.6 hrs/day
1 backhoe for 10 days at 8hr/day = 80 hrs/ 65 days site prep =1.2 hr/day

Off-road Equipment - Construction scenario based off of Kumar Single Family Residence Project
1 dozer for 5 days at 8hr/day = 40 hrs/ 90 days grading = .44 hr/day
1 grader for 5 days at 8hr/day = 40 hrs/ 90 days grading = .44 hr/day
1 bobcat for 5 days at 8hr/day = 40 hrs/90 days grading = .44 hr/day

Off-road Equipment - Based off Kumar single family residence construction scenario:
3 dump trucks for 10 days at 8 hr/day = 80 hr/180 days construction = 0.44 hr/day
12 concrete off-highway trucks for 5 days at 8 hr/day = 40 hr/180 days construction for =0.22 hr/day
30 vendor trips to deliver materials. 30 truck trips to deliver material is estimated at 2 trucks/day at 2 hr/day
Added one backhoe/tractor for an hour/day. Added one forklift for an hour/day. Added one generator set for an hour/day.

Off-road Equipment - Estimated an hour/day for cement mixer, paving equipment, and surfacing eqiupment for a total of 30 hours per equipment type

Off-road Equipment -

Grading - 36% disturbance from MFR 2 (4 acres *.36=1.44 acres disturbed)

Vechicle Emission Factors -

Vechicle Emission Factors -

Vechicle Emission Factors -

Consumer Products -

Area Coating -

Landscape Equipment -

Energy Use -

Solid Waste -

Area Mitigation - Low VOC used

Energy Mitigation - Assumed to exceed title 24 energy standards by 10%. Install high efficiency lighting to get a 50% lighting energy reduction.

Water Mitigation - Low flow faucets, toilets, and showers assumed. Assume water conservation strategy for outdoor landscaping equal to ~20% reduction.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00

tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	50
tblConstructionPhase	NumDays	18.00	27.00
tblConstructionPhase	NumDays	230.00	158.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	8.00	93.00
tblConstructionPhase	NumDays	18.00	27.00
tblConstructionPhase	NumDays	5.00	65.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblGrading	AcresOfGrading	2.33	1.44
tblGrading	AcresOfGrading	0.00	1.44
tblLandUse	LandUseSquareFeet	1,800.00	4,000.00
tblLandUse	LotAcreage	0.32	4.00
tblOffRoadEquipment	HorsePower	167.00	208.00
tblOffRoadEquipment	HorsePower	253.00	125.00
tblOffRoadEquipment	LoadFactor	0.40	0.43
tblOffRoadEquipment	LoadFactor	0.30	0.42
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	12.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	6.00	2.00
tblOffRoadEquipment	UsageHours	6.00	1.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.40
tblOffRoadEquipment	UsageHours	6.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.40
tblOffRoadEquipment	UsageHours	8.00	0.60
tblOffRoadEquipment	UsageHours	7.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.40
tblOffRoadEquipment	UsageHours	8.00	1.20
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00
tblOnRoadDust	MeanVehicleSpeed	40.00	25.00

tblProjectCharacteristics	OperationalYear	2014	2016
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblRoadDust	MeanVehicleSpeed	40	25
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	HaulingTripNumber	0.00	134.00
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	VendorTripNumber	0.00	30.00
tblTripsAndVMT	WorkerTripNumber	8.00	5.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	8.00	5.00
tblTripsAndVMT	WorkerTripNumber	0.00	5.00
tblVehicleTrips	HO_TL	7.90	16.00
tblVehicleTrips	HS_TL	7.10	16.00
tblVehicleTrips	HW_TL	16.80	16.00
tblVehicleTrips	ST_TR	10.08	10.00
tblVehicleTrips	SU_TR	8.77	10.00
tblVehicleTrips	WD_TR	9.57	10.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	0.1818	1.6739	1.7928	2.0900e-003	0.5417	0.0919	0.6336	0.2685	0.0845	0.3530	0.0000	202.7221	202.7221	0.0401	0.0000	203.5639
2016	1.3067	11.3122	10.2266	0.0191	0.4322	0.4236	0.8558	0.1848	0.3947	0.5123	0.0000	1,867.3864	1,867.3864	0.2971	0.0000	1,873.6247
Total	**1.4885**	**12.9861**	**12.0193**	**0.0212**	**0.9739**	**0.5155**	**1.4894**	**0.4533**	**0.4793**	**0.8653**	**0.0000**	**2,070.1085**	**2,070.1085**	**0.3372**	**0.0000**	**2,077.1886**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	0.1818	1.6739	1.7928	2.0900e-003	0.2804	0.0919	0.3722	0.1305	0.0845	0.2151	0.0000	202.7221	202.7221	0.0401	0.0000	203.5639
2016	1.3067	11.3122	10.2266	0.0191	0.4322	0.4236	0.8558	0.1176	0.3947	0.5123	0.0000	1,867.3864	1,867.3864	0.2971	0.0000	1,873.6247
Total	**1.4885**	**12.9861**	**12.0193**	**0.0212**	**0.7126**	**0.5155**	**1.2281**	**0.2481**	**0.4793**	**0.7273**	**0.0000**	**2,070.1085**	**2,070.1085**	**0.3372**	**0.0000**	**2,077.1886**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**26.83**	**0.00**	**17.55**	**45.27**	**0.00**	**15.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1225	9.8000e-004	0.0837	0.0000		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		0.1486	0.1486	1.5000e-004		0.1517
Energy	8.8000e-004	7.5200e-003	3.2000e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6055	9.6055	1.8000e-004	1.8000e-004	9.6639
Mobile	0.0604	0.1514	0.9620	1.6000e-003	0.1090	1.7300e-003	0.1107	0.0290	1.5800e-003	0.0306		141.0881	141.0881	7.1600e-003		141.2385
Total	**0.1838**	**0.1599**	**1.0488**	**1.6500e-003**	**0.1090**	**2.7900e-003**	**0.1118**	**0.0290**	**2.6400e-003**	**0.0317**		**150.8421**	**150.8421**	**7.4900e-003**	**1.8000e-004**	**151.0541**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0904	9.8000e-004	0.0837	0.0000		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		0.1486	0.1486	1.5000e-004		0.1517
Energy	8.1000e-004	6.9200e-003	2.9400e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004		8.8337	8.8337	1.7000e-004	1.6000e-004	8.8875
Mobile	0.0604	0.1514	0.9620	1.6000e-003	0.1090	1.7300e-003	0.1107	0.0290	1.5800e-003	0.0306		141.0881	141.0881	7.1600e-003		141.2385
Total	**0.1516**	**0.1593**	**1.0486**	**1.6400e-003**	**0.1090**	**2.7400e-003**	**0.1117**	**0.0290**	**2.5900e-003**	**0.0316**		**150.0704**	**150.0704**	**7.4800e-003**	**1.6000e-004**	**150.2776**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**17.51**	**0.38**	**0.02**	**0.61**	**0.00**	**1.79**	**0.04**	**0.00**	**1.89**	**0.16**	**0.00**	**0.51**	**0.51**	**0.13**	**11.11**	**0.51**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2015	12/15/2015	6	65	
2	Grading	Grading	12/16/2015	4/1/2016	6	93	
3	Building Construction	Building Construction	4/2/2016	10/3/2016	6	158	
4	Paving	Paving	10/4/2016	11/3/2016	6	27	
5	Architectural Coating	Architectural Coating	11/4/2016	12/5/2016	6	27	
6	Hauled Water Delivery Trips	Demolition	12/6/2016	12/30/2016	6	22	

Acres of Grading (Site Preparation Phase): 1.44

Acres of Grading (Grading Phase): 1.44

Acres of Paving: 0

Residential Indoor: 8,100; Residential Outdoor: 2,700; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	1	0.60	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	1.20	97	0.37
Grading	Graders	1	0.40	174	0.41
Grading	Rubber Tired Dozers	1	0.40	255	0.40
Grading	Tractors/Loaders/Backhoes	1	0.40	97	0.37
Building Construction	Dumpers/Tenders	3	0.40	16	0.38
Building Construction	Forklifts	1	1.00	89	0.20
Building Construction	Generator Sets	1	1.00	84	0.74
Building Construction	Off-Highway Trucks	12	0.20	400	0.38
Building Construction	Other Material Handling Equipment	2	2.00	208	0.43
Building Construction	Tractors/Loaders/Backhoes	1	1.00	97	0.37
Building Construction	Welders	1	1.00	46	0.45
Paving	Cement and Mortar Mixers	1	1.00	9	0.56
Paving	Paving Equipment	1	1.00	130	0.36
Paving	Surfacing Equipment	1	1.00	125	0.42
Architectural Coating	Air Compressors	1	2.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	2	5.00	0.00	10.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	5.00	0.00	10.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	21	20.00	30.00	10.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	5.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Hauled Water Delivery Trips	0			134.00	16.80	6.60	31.80			HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4752	0.0000	0.4752	0.2508	0.0000	0.2508			0.0000			0.0000
Off-Road	0.1495	1.5939	1.1871	1.1300e-003		0.0906	0.0906		0.0834	0.0834		119.1680	119.1680	0.0356		119.9151
Total	**0.1495**	**1.5939**	**1.1871**	**1.1300e-003**	**0.4752**	**0.0906**	**0.5658**	**0.2508**	**0.0834**	**0.3342**		**119.1680**	**119.1680**	**0.0356**		**119.9151**

3.2 Site Preparation - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.5600e-003	0.0379	0.0422	1.1000e-004	2.6900e-003	6.7000e-004	3.3600e-003	7.4000e-004	6.2000e-004	1.3500e-003		11.4422	11.4422	8.0000e-005		11.4439
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0287	0.0421	0.5635	8.4000e-004	0.0639	5.6000e-004	0.0644	0.0169	5.1000e-004	0.0175		72.1120	72.1120	4.4300e-003		72.2049
Total	**0.0322**	**0.0800**	**0.6057**	**9.5000e-004**	**0.0666**	**1.2300e-003**	**0.0678**	**0.0177**	**1.1300e-003**	**0.0188**		**83.5541**	**83.5541**	**4.5100e-003**		**83.6488**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2138	0.0000	0.2138	0.1129	0.0000	0.1129			0.0000			0.0000
Off-Road	0.1495	1.5939	1.1871	1.1300e-003		0.0906	0.0906		0.0834	0.0834	0.0000	119.1680	119.1680	0.0356		119.9151
Total	**0.1495**	**1.5939**	**1.1871**	**1.1300e-003**	**0.2138**	**0.0906**	**0.3045**	**0.1129**	**0.0834**	**0.1963**	**0.0000**	**119.1680**	**119.1680**	**0.0356**		**119.9151**

3.2 Site Preparation - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.5600e-003	0.0379	0.0422	1.1000e-004	2.6900e-003	6.7000e-004	3.3600e-003	7.4000e-004	6.2000e-004	1.3500e-003		11.4422	11.4422	8.0000e-005		11.4439
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0287	0.0421	0.5635	8.4000e-004	0.0639	5.6000e-004	0.0644	0.0169	5.1000e-004	0.0175		72.1120	72.1120	4.4300e-003		72.2049
Total	**0.0322**	**0.0800**	**0.6057**	**9.5000e-004**	**0.0666**	**1.2300e-003**	**0.0678**	**0.0177**	**1.1300e-003**	**0.0188**		**83.5541**	**83.5541**	**4.5100e-003**		**83.6488**

3.3 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3175	0.0000	0.3175	0.1673	0.0000	0.1673			0.0000			0.0000
Off-Road	0.1348	1.4344	0.9191	9.1000e-004		0.0776	0.0776		0.0713	0.0713		95.9243	95.9243	0.0286		96.5257
Total	**0.1348**	**1.4344**	**0.9191**	**9.1000e-004**	**0.3175**	**0.0776**	**0.3951**	**0.1673**	**0.0713**	**0.2386**		**95.9243**	**95.9243**	**0.0286**		**96.5257**

3.3 Grading - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.4900e-003	0.0265	0.0295	8.0000e-005	9.9000e-003	4.7000e-004	0.0104	2.4800e-003	4.3000e-004	2.9200e-003		7.9972	7.9972	6.0000e-005		7.9984
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0287	0.0421	0.5635	8.4000e-004	0.0639	5.6000e-004	0.0644	0.0169	5.1000e-004	0.0175		72.1120	72.1120	4.4300e-003		72.2049
Total	**0.0311**	**0.0686**	**0.5930**	**9.2000e-004**	**0.0738**	**1.0300e-003**	**0.0748**	**0.0194**	**9.4000e-004**	**0.0204**		**80.1092**	**80.1092**	**4.4900e-003**		**80.2033**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1429	0.0000	0.1429	0.0753	0.0000	0.0753			0.0000			0.0000
Off-Road	0.1348	1.4344	0.9191	9.1000e-004		0.0776	0.0776		0.0713	0.0713	0.0000	95.9243	95.9243	0.0286		96.5257
Total	**0.1348**	**1.4344**	**0.9191**	**9.1000e-004**	**0.1429**	**0.0776**	**0.2204**	**0.0753**	**0.0713**	**0.1466**	**0.0000**	**95.9243**	**95.9243**	**0.0286**		**96.5257**

3.3 Grading - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.4900e-003	0.0265	0.0295	8.0000e-005	9.9000e-003	4.7000e-004	0.0104	2.4800e-003	4.3000e-004	2.9200e-003		7.9972	7.9972	6.0000e-005		7.9984
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0287	0.0421	0.5635	8.4000e-004	0.0639	5.6000e-004	0.0644	0.0169	5.1000e-004	0.0175		72.1120	72.1120	4.4300e-003		72.2049
Total	**0.0311**	**0.0686**	**0.5930**	**9.2000e-004**	**0.0738**	**1.0300e-003**	**0.0748**	**0.0194**	**9.4000e-004**	**0.0204**		**80.1092**	**80.1092**	**4.4900e-003**		**80.2033**

3.3 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3175	0.0000	0.3175	0.1673	0.0000	0.1673			0.0000			0.0000
Off-Road	0.1299	1.3753	0.8913	9.1000e-004		0.0740	0.0740		0.0680	0.0680		94.8258	94.8258	0.0286		95.4265
Total	**0.1299**	**1.3753**	**0.8913**	**9.1000e-004**	**0.3175**	**0.0740**	**0.3915**	**0.1673**	**0.0680**	**0.2353**		**94.8258**	**94.8258**	**0.0286**		**95.4265**

3.3 Grading - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.3500e-003	0.0225	0.0284	8.0000e-005	2.1300e-003	4.1000e-004	2.5400e-003	5.8000e-004	3.8000e-004	9.5000e-004		7.9047	7.9047	5.0000e-005		7.9059
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0252	0.0378	0.5068	8.4000e-004	0.0639	5.3000e-004	0.0644	0.0169	4.8000e-004	0.0174		69.5517	69.5517	4.0500e-003		69.6368
Total	**0.0275**	**0.0602**	**0.5352**	**9.2000e-004**	**0.0660**	**9.4000e-004**	**0.0669**	**0.0175**	**8.6000e-004**	**0.0184**		**77.4564**	**77.4564**	**4.1000e-003**		**77.5427**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1429	0.0000	0.1429	0.0753	0.0000	0.0753			0.0000			0.0000
Off-Road	0.1299	1.3753	0.8913	9.1000e-004		0.0740	0.0740		0.0680	0.0680	0.0000	94.8258	94.8258	0.0286		95.4265
Total	**0.1299**	**1.3753**	**0.8913**	**9.1000e-004**	**0.1429**	**0.0740**	**0.2169**	**0.0753**	**0.0680**	**0.1433**	**0.0000**	**94.8258**	**94.8258**	**0.0286**		**95.4265**

3.3 Grading - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.3500e-003	0.0225	0.0284	8.0000e-005	2.1300e-003	4.1000e-004	2.5400e-003	5.8000e-004	3.8000e-004	9.5000e-004		7.9047	7.9047	5.0000e-005		7.9059
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0252	0.0378	0.5068	8.4000e-004	0.0639	5.3000e-004	0.0644	0.0169	4.8000e-004	0.0174		69.5517	69.5517	4.0500e-003		69.6368
Total	**0.0275**	**0.0602**	**0.5352**	**9.2000e-004**	**0.0660**	**9.4000e-004**	**0.0669**	**0.0175**	**8.6000e-004**	**0.0184**		**77.4564**	**77.4564**	**4.1000e-003**		**77.5427**

3.4 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8291	8.9051	4.0306	9.6200e-003		0.3865	0.3865		0.3606	0.3606		982.0356	982.0356	0.2766		987.8435
Total	**0.8291**	**8.9051**	**4.0306**	**9.6200e-003**		**0.3865**	**0.3865**		**0.3606**	**0.3606**		**982.0356**	**982.0356**	**0.2766**		**987.8435**

3.4 Building Construction - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3800e-003	0.0132	0.0167	5.0000e-005	1.1100e-003	2.4000e-004	1.3500e-003	3.0000e-004	2.2000e-004	5.3000e-004		4.6528	4.6528	3.0000e-005		4.6535
Vendor	0.3394	2.2429	4.1520	6.0500e-003	0.1757	0.0348	0.2104	0.0495	0.0320	0.0815		602.4913	602.4913	4.2500e-003		602.5805
Worker	0.1006	0.1510	2.0272	3.3600e-003	0.2555	2.1100e-003	0.2576	0.0678	1.9300e-003	0.0697		278.2067	278.2067	0.0162		278.5472
Total	**0.4414**	**2.4072**	**6.1960**	**9.4600e-003**	**0.4322**	**0.0371**	**0.4694**	**0.1176**	**0.0341**	**0.1517**		**885.3508**	**885.3508**	**0.0205**		**885.7811**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8291	8.9051	4.0306	9.6200e-003		0.3865	0.3865		0.3606	0.3606	0.0000	982.0356	982.0356	0.2766		987.8435
Total	**0.8291**	**8.9051**	**4.0306**	**9.6200e-003**		**0.3865**	**0.3865**		**0.3606**	**0.3606**	**0.0000**	**982.0356**	**982.0356**	**0.2766**		**987.8435**

3.4 Building Construction - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3800e-003	0.0132	0.0167	5.0000e-005	1.1100e-003	2.4000e-004	1.3500e-003	3.0000e-004	2.2000e-004	5.3000e-004		4.6528	4.6528	3.0000e-005		4.6535
Vendor	0.3394	2.2429	4.1520	6.0500e-003	0.1757	0.0348	0.2104	0.0495	0.0320	0.0815		602.4913	602.4913	4.2500e-003		602.5805
Worker	0.1006	0.1510	2.0272	3.3600e-003	0.2555	2.1100e-003	0.2576	0.0678	1.9300e-003	0.0697		278.2067	278.2067	0.0162		278.5472
Total	**0.4414**	**2.4072**	**6.1960**	**9.4600e-003**	**0.4322**	**0.0371**	**0.4694**	**0.1176**	**0.0341**	**0.1517**		**885.3508**	**885.3508**	**0.0205**		**885.7811**

3.5 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0987	1.1238	0.7044	1.1500e-003		0.0547	0.0547		0.0504	0.0504		116.7989	116.7989	0.0340		117.5125
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.0987**	**1.1238**	**0.7044**	**1.1500e-003**		**0.0547**	**0.0547**		**0.0504**	**0.0504**		**116.7989**	**116.7989**	**0.0340**		**117.5125**

3.5 Paving - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0252	0.0378	0.5068	8.4000e-004	0.0639	5.3000e-004	0.0644	0.0169	4.8000e-004	0.0174		69.5517	69.5517	4.0500e-003		69.6368
Total	**0.0252**	**0.0378**	**0.5068**	**8.4000e-004**	**0.0639**	**5.3000e-004**	**0.0644**	**0.0169**	**4.8000e-004**	**0.0174**		**69.5517**	**69.5517**	**4.0500e-003**		**69.6368**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0987	1.1238	0.7044	1.1500e-003		0.0547	0.0547		0.0504	0.0504	0.0000	116.7989	116.7989	0.0340		117.5125
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.0987**	**1.1238**	**0.7044**	**1.1500e-003**		**0.0547**	**0.0547**		**0.0504**	**0.0504**	**0.0000**	**116.7989**	**116.7989**	**0.0340**		**117.5125**

3.5 Paving - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0252	0.0378	0.5068	8.4000e-004	0.0639	5.3000e-004	0.0644	0.0169	4.8000e-004	0.0174		69.5517	69.5517	4.0500e-003		69.6368
Total	**0.0252**	**0.0378**	**0.5068**	**8.4000e-004**	**0.0639**	**5.3000e-004**	**0.0644**	**0.0169**	**4.8000e-004**	**0.0174**		**69.5517**	**69.5517**	**4.0500e-003**		**69.6368**

3.6 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.1588					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1228	0.7907	0.6280	9.9000e-004		0.0655	0.0655		0.0655	0.0655		93.8160	93.8160	0.0111		94.0483
Total	**1.2816**	**0.7907**	**0.6280**	**9.9000e-004**		**0.0655**	**0.0655**		**0.0655**	**0.0655**		**93.8160**	**93.8160**	**0.0111**		**94.0483**

3.6 Architectural Coating - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0252	0.0378	0.5068	8.4000e-004	0.0639	5.3000e-004	0.0644	0.0169	4.8000e-004	0.0174		69.5517	69.5517	4.0500e-003		69.6368
Total	**0.0252**	**0.0378**	**0.5068**	**8.4000e-004**	**0.0639**	**5.3000e-004**	**0.0644**	**0.0169**	**4.8000e-004**	**0.0174**		**69.5517**	**69.5517**	**4.0500e-003**		**69.6368**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.1588					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1228	0.7907	0.6280	9.9000e-004		0.0655	0.0655		0.0655	0.0655	0.0000	93.8160	93.8160	0.0111		94.0483
Total	**1.2816**	**0.7907**	**0.6280**	**9.9000e-004**		**0.0655**	**0.0655**		**0.0655**	**0.0655**	**0.0000**	**93.8160**	**93.8160**	**0.0111**		**94.0483**

3.6 Architectural Coating - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0252	0.0378	0.5068	8.4000e-004	0.0639	5.3000e-004	0.0644	0.0169	4.8000e-004	0.0174		69.5517	69.5517	4.0500e-003		69.6368
Total	**0.0252**	**0.0378**	**0.5068**	**8.4000e-004**	**0.0639**	**5.3000e-004**	**0.0644**	**0.0169**	**4.8000e-004**	**0.0174**		**69.5517**	**69.5517**	**4.0500e-003**		**69.6368**

3.7 Hauled Water Delivery Trips - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**0.0000**			**0.0000**

3.7 Hauled Water Delivery Trips - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1740	1.9333	1.9942	7.0000e-003	0.1692	0.0368	0.2060	0.0464	0.0339	0.0802		705.4522	705.4522	4.6900e-003		705.5507
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total	**0.1740**	**1.9333**	**1.9942**	**7.0000e-003**	**0.1692**	**0.0368**	**0.2060**	**0.0464**	**0.0339**	**0.0802**		**705.4522**	**705.4522**	**4.6900e-003**		**705.5507**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**0.0000**			**0.0000**

3.7 Hauled Water Delivery Trips - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1740	1.9333	1.9942	7.0000e-003	0.1692	0.0368	0.2060	0.0464	0.0339	0.0802		705.4522	705.4522	4.6900e-003		705.5507
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total	**0.1740**	**1.9333**	**1.9942**	**7.0000e-003**	**0.1692**	**0.0368**	**0.2060**	**0.0464**	**0.0339**	**0.0802**		**705.4522**	**705.4522**	**4.6900e-003**		**705.5507**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0604	0.1514	0.9620	1.6000e-003	0.1090	1.7300e-003	0.1107	0.0290	1.5800e-003	0.0306		141.0881	141.0881	7.1600e-003		141.2385
Unmitigated	0.0604	0.1514	0.9620	1.6000e-003	0.1090	1.7300e-003	0.1107	0.0290	1.5800e-003	0.0306		141.0881	141.0881	7.1600e-003		141.2385

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	10.00	10.00	10.00	51,699	51,699
Total	10.00	10.00	10.00	51,699	51,699

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	16.00	16.00	16.00	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.488044	0.071100	0.171983	0.163629	0.062769	0.009916	0.004878	0.011869	0.001121	0.001035	0.007693	0.000708	0.005255

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	8.1000e-004	6.9200e-003	2.9400e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004		8.8337	8.8337	1.7000e-004	1.6000e-004	8.8875
NaturalGas Unmitigated	8.8000e-004	7.5200e-003	3.2000e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6055	9.6055	1.8000e-004	1.8000e-004	9.6639

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	81.6464	8.8000e-004	7.5200e-003	3.2000e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6055	9.6055	1.8000e-004	1.8000e-004	9.6639
Total		**8.8000e-004**	**7.5200e-003**	**3.2000e-003**	**5.0000e-005**		**6.1000e-004**	**6.1000e-004**		**6.1000e-004**	**6.1000e-004**		**9.6055**	**9.6055**	**1.8000e-004**	**1.8000e-004**	**9.6639**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	0.0750864	8.1000e-004	6.9200e-003	2.9400e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004		8.8337	8.8337	1.7000e-004	1.6000e-004	8.8875
Total		**8.1000e-004**	**6.9200e-003**	**2.9400e-003**	**4.0000e-005**		**5.6000e-004**	**5.6000e-004**		**5.6000e-004**	**5.6000e-004**		**8.8337**	**8.8337**	**1.7000e-004**	**1.6000e-004**	**8.8875**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use Low VOC Cleaning Supplies

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0904	9.8000e-004	0.0837	0.0000		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		0.1486	0.1486	1.5000e-004		0.1517
Unmitigated	0.1225	9.8000e-004	0.0837	0.0000		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		0.1486	0.1486	1.5000e-004		0.1517

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0343					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0856					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.6300e-003	9.8000e-004	0.0837	0.0000		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		0.1486	0.1486	1.5000e-004		0.1517
Total	**0.1225**	**9.8000e-004**	**0.0837**	**0.0000**		**4.5000e-004**	**4.5000e-004**		**4.5000e-004**	**4.5000e-004**		**0.1486**	**0.1486**	**1.5000e-004**		**0.1517**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Consumer Products	0.0792					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.6300e-003	9.8000e-004	0.0837	0.0000		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		0.1486	0.1486	1.5000e-004		0.1517
Architectural Coating	8.5700e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.0904**	**9.8000e-004**	**0.0837**	**0.0000**		**4.5000e-004**	**4.5000e-004**		**4.5000e-004**	**4.5000e-004**		**0.1486**	**0.1486**	**1.5000e-004**		**0.1517**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Reclaimed Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation