04 AIR QUALITY

INTRODUCTION

This air quality impact analysis has been prepared to evaluate the potential air quality impacts of the Barrett Ranch East Project (Project) located in the northeastern portion of Sacramento County, California. It is based upon the Barrett Ranch East Project Air Quality Technical Report prepared by ESA (November 2014), included as Appendix B to this EIR.

The Sacramento Metropolitan Area is a federal ozone non-attainment area, and is one of the top ten worst air quality areas nationally.[1] In Sacramento County, pollutants of greatest concern are ozone precursors (hydrocarbons and nitrogen oxides), carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), and other visibility-reducing material.

The air quality impact analysis describes the existing air quality in the project area and evaluates potential short-term and long-term air quality impacts associated with the project. The analysis also describes the project's criteria pollutant, toxic air contaminant (TAC), and odor-related impacts. Also included is an analysis of the project's construction and operational emissions and impacts. Measures to mitigate or minimize pollutant emissions associated with the proposed project are included, where applicable.

AIR QUALITY SETTING

CLIMATE AND TOPOGRAPHY

The Project site is located in northern Sacramento County within the Sacramento Valley Air Basin (SVAB). The SVAB includes Sacramento County and all or portions of ten other counties including Placer, Shasta, Tehama, Colusa, Yolo, Solano, Butte, Yuba, Sutter, and Glenn. The SVAB is surrounded by the Coast Range to the west, the Cascade Range to the north, and Sierra Nevada mountains to the east. The winters are wet and cool and the summers are hot and dry.

Air pollution can be transported into the basin, but on smoggy days, air pollution emissions from within the basin are the most significant. The southern portions of the SVAB receive air pollution inflow, transported from the Bay Area or San Joaquin Valley air basins. On many summer days, a "delta breeze" blows toward Sacramento from the ocean through the Carquinez Strait. These winds can transport air pollution from the Bay Area to the SVAB. The delta breeze blows Sacramento's air pollution toward

[1] American Lung Association, State of the Air 2013, ranked #6 for ozone.

the north end of the Sacramento Valley and east into the Sierra Nevada foothills. On days when wind blows from the north, Sacramento air pollution can be transported to the south into the San Joaquin Valley Air Basin.

EXISTING AIR QUALITY

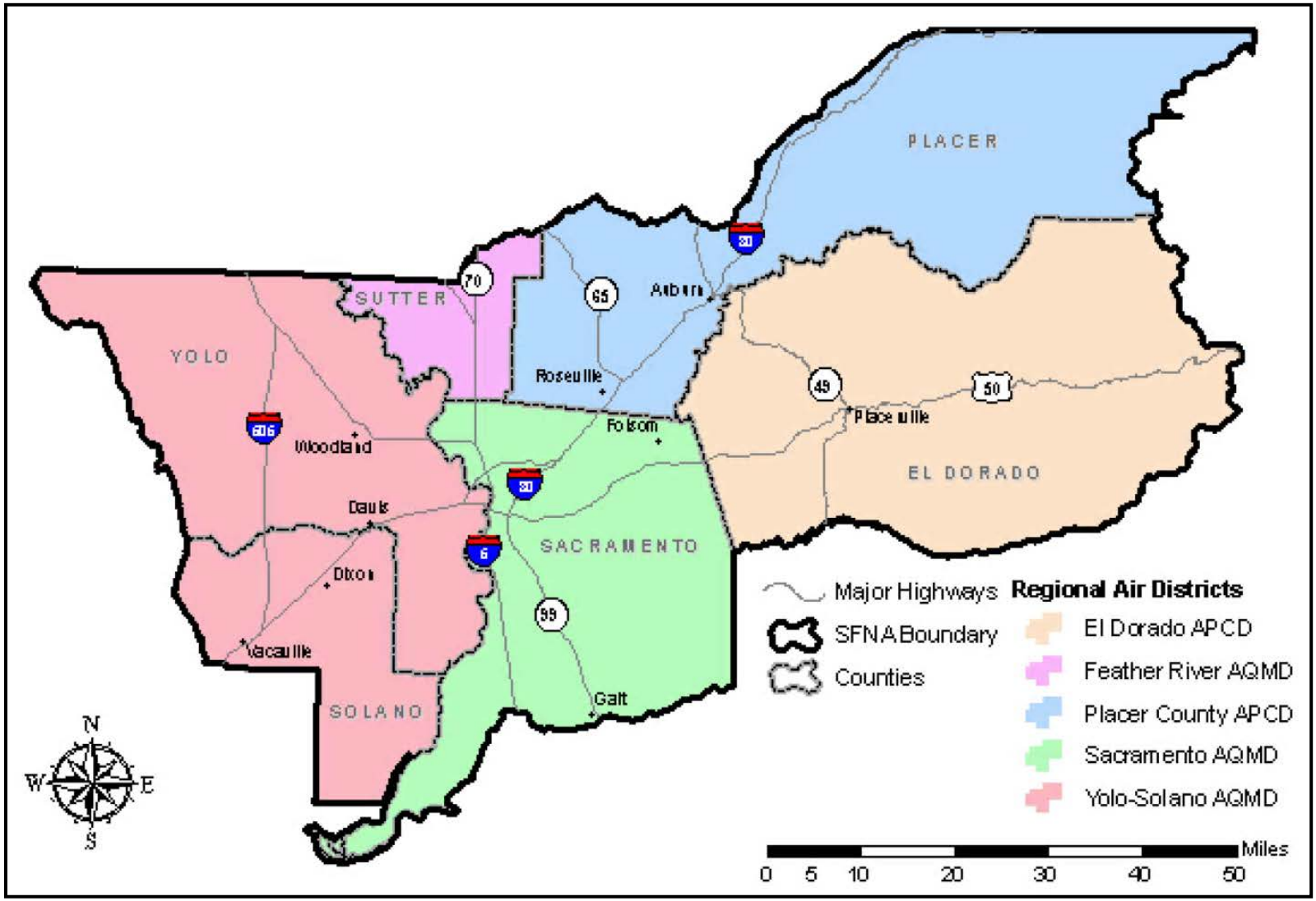
The Sacramento Federal Nonattainment Area for ozone (SFNA) is comprised of five air districts in the southern portion of the Sacramento air basin. The SFNA air districts include all of Sacramento and Yolo Counties, and portions of El Dorado, Placer, Sutter and Solano Counties (see **Plate AQ-1**). With two exceptions, this area is in attainment for all state and national ambient air quality standards (AAQS). However, the SFNA is designated a "severe" nonattainment area for the federal eight hour AAQS for ozone, and is a "serious" nonattainment area for the state one hour ozone standard. As a part of the SFNA, Sacramento County is out of compliance with the state and federal ozone standards.

With respect to the state and federal 24-hour PM_{10} and $PM_{2.5}$ AAQS, Sacramento County is designated nonattainment, although the four remaining air districts in the Sacramento region are designated nonattainment for the state AAQS and unclassified/attainment areas for the federal AAQS.

Ambient air quality standards define clean air. Specifically, federal and state AAQS establish the concentration above which a pollutant is known to cause adverse health effects to sensitive groups within the population, such as children and the elderly. Because AAQS have been established for specific pollutants using health-based criteria, the pollutants for which standards have been set are known as "criteria" pollutants. For some of the criteria pollutants, the state standards are more stringent than the federal standards. The differences in the standards are due to variations in health studies and interpretations involved in the standard-setting process.

The amount of pollutants released and the atmosphere's ability to transport and dilute the pollutants affect a given pollutant's concentration in the atmosphere. Factors affecting transport and dilution include terrain, wind, atmospheric stability, and, for photochemical pollutants, sunlight. Sacramento's poor air quality can largely be attributed to emissions, geography, and meteorology.

Plate AQ-1: Sacramento Federal Nonattainment Area (SNFA) for Ozone



Source: Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan, December 19, 2008. Note that a revised Plan was transmitted by SMAQMD to the California Air Resources Board on November 20, 2013, but has not been approved. The map in the adopted plan and the proposed revision are identical.

REGULATORY SETTING

FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Ambient air quality is affected by pollutants emitted from stationary and mobile sources. Stationary sources are often divided into point and area sources. Point sources consist of one or more emission sources at a facility with an identified location and are usually associated with manufacturing and industrial processing plants. Area sources are widely distributed and consist of many small emission sources. Area source examples include lawnmowers and other landscape maintenance equipment, natural gas fired water and space heaters, and consumer products such as paints, hairspray, deodorant, and similar products with evaporative emissions. Mobile sources refer to emissions from motor vehicles, including tailpipe, evaporative, and fugitive emissions.

Air pollutants emitted by stationary and mobile sources are regulated by federal and state law. These regulated pollutants are known as “criteria air pollutants”, and are emitted as primary and secondary pollutants.

Primary criteria air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), and most forms of particulate matter (PM_{10} and $PM_{2.5}$) are primary air pollutants. Secondary criteria air pollutants are those formed by chemical and photochemical reactions in the atmosphere. Ozone and nitrogen dioxide are the principal secondary pollutants.

The U.S. Environmental Protection Agency has developed National Ambient Air Quality Standards (NAAQS) for the criteria air pollutants. At the state level, the California Air Resources Board has developed California Ambient Air Quality Standards (CAAQS). **Table AQ-1** shows the State and Federal air quality standards. Areas that meet or do not meet the NAAQS and/or CAAQS Standards (classified as nonattainment areas) are shown in **Table AQ-2.**

Table AQ-1: State and Federal Ambient Air Quality Standards

Pollutant	Symbol	Average Time	Standard, as parts per million		Standard, as micrograms per cubic meter		Violation Criteria	
			California	National	California	National	California	National
Ozone	O_3	1 hour	0.09	--	180	--	If exceeded	If exceeded more than 3 days in 3 years
		8 hours	0.070	0.075	137	--	If exceeded	If exceeded more than 3 days in 3 years
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded more than 1 day per year
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded more than 1 day per year
Nitrogen dioxide	NO_2	Annual arithmetic mean	0.030	0.053	57	100	If exceeded	If exceeded
		1 hour	0.18	0.100	339	188	If exceeded	
Sulfur dioxide	SO_2	24 hours	0.04	--	105	--	If exceeded	If exceeded more than 1 day per year
		3 hour	--	0.5	--	1,300	N/A	If exceeded more than 1 day per year
		1 hour	0.25	0.075	655	196	If exceeded	N/A
Hydrogen sulfide	H_2S	1 hour	0.03	--	42	--	If ≥	N/A
Vinyl chloride	C_2H_3Cl	24 hours	0.01	--	26	--	If ≥	N/A
Respirable particulate matter	PM_{10}	Annual arithmetic mean	--	--	20	--	If exceeded	N/A
		24 hours	--	--	50	150	If exceeded	If exceeded more than 1 day per year
Fine particulate matter	$PM_{2.5}$	Annual arithmetic mean	--	--	12	15	If exceeded	If exceeded over 3-year average
		24 hours	--	--	--	35	If exceeded	If exceeded over 3-year average
Sulfate particles	SO_4	24 hours	--	--	25	--	If ≥	N/A
Lead particles	Pb	Calendar Quarter	--	--	--	1.5	N/A	If exceeded more than 1 day per year
		Rolling 3-month average	--	--	--	0.15	If ≥	N/A
		30-day average	--	--	1.5	--	If ≥	N/A

NOTES: 1) All standards are based on measurements at 25 C and 1 atmosphere pressure. **2)** National standards shown are the primary (health effects) standards. **3)** N/A = not applicable.

Table AQ-2: Attainment Status

Pollutant	Attainment with State Standards	Attainment with Federal Standards
Ozone	Non-Attainment Classification = Serious (1 hour and 8 hour Standards)	Non-Attainment, Classification = Severe -15* (8 hour) Attainment (1 hour standard)
Particulate Matter 10 Micron	Non-Attainment (24 hour Standard and Annual Mean)	Attainment (24 hour standard)
Particulate Matter 2.5 Micron	Non-Attainment (Annual Standard)	Non-Attainment (24 hour Standard) and Unclassified/Attainment (Annual)
Carbon Monoxide	Attainment (1 hour and 8 hour Standards)	Attainment (1 hour and 8 hour Standards)
Nitrogen Dioxide	Attainment (1 hour Standard and Annual)	Unclassified/Attainment (1 hour and Annual)
Sulfur Dioxide	Attainment (1 hour and 24 hour Standards)	Attainment (1 hour)
Lead	Attainment (30 Day Standard)	Attainment (3-month rolling average)
Visibility Reducing Particles	Unclassified (8 hour Standard)	No Federal Standard
Sulfates	Attainment (24 hour Standard)	No Federal Standard
Hydrogen Sulfide	Unclassified (1 hour Standard)	No Federal Standard

* A formal request for voluntary reclassification from “serious” to “severe” for the 8-hour ozone nonattainment area with an associated attainment deadline of June 15, 2019, was approved by EPA effective June 4, 2010.

California Area Designations based upon AQ Data collected during 2001 – 2003.

As noted in **Table AQ-2**, above, the SVAB is in nonattainment for the federal and state ozone standards, the state PM_{10} standards, and the state and federal $PM_{2.5}$ standards. The Sacramento County portion of the SVAB is in attainment for the federal PM10 standards, and the state and federal CO standards (**Table AQ-3**).

Table AQ-3: State and National Ambient Air Quality Attainment Status (Sacramento County)

Pollutant	Attainment Status - SVAB
Ozone (O_3)	Nonattainment for NAAQS 8–hour; nonattainment for CAAQS 1-hour and 8-hour
Carbon monoxide (CO)	Attainment/maintenance for federal standards; unclassified for state standards
Nitrogen dioxide (NO_2)	Attainment
Sulfur dioxide (SO_2)	Attainment
Particulate matter (PM_{10})	Attainment for NAAQS; nonattainment for CAAQS
Particulate matter ($PM_{2.5}$)	Nonattainment for NAAQS; nonattainment for CAAQS
Sulfates	Attainment
Lead (Pb)	Attainment
Hydrogen sulfide	Unclassified

Source: California Air Resources Board, 2014a.

CRITERIA POLLUTANTS

OZONE

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials. Ozone is a severe eye, nose, and throat irritant. Ozone also attacks synthetic rubber, textiles, plants, and other materials; it causes extensive damage to plants, such as leaf discoloration and cell damage.

State standards for ozone have been set for a 1-hour averaging time. The state 1-hour ozone standard is 0.09 ppm, not to be exceeded. EPA recently replaced the 1-hour federal ozone standard with an 8-hour standard of 0.075 ppm, while ARB recently enacted a state 8-hour standard of 0.07 ppm.

Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone precursors, including reactive organic gases (ROGs) and oxides of nitrogen (NO_x), react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer pollution problem. ROG and NO_x are emitted by mobile sources, area sources, and stationary combustion equipment.

Table AQ-4 shows monitoring results for the ozone monitoring station closest to the proposed project. This station shows several violations of the state and federal ozone standards during the most recent three years of available monitoring data.

Table AQ-4: Ozone Monitoring Results

Ozone (O_3)	2011	2012	2013
Highest 8-hour average, ppm	0.078	**0080**	**0.072**
Days > state 8-hour standard	2	7	2
Days > federal 8-hour standard	1	4	0
Percent of year covered	90	92	87

Underlined values represent those in excess of applicable NAAQS.
Bold values represent those in excess of the applicable CAAQS.
Monitoring results for Sacramento – Goldenland Court monitoring station
Source: California Air Resources Board 2014b.

CARBON MONOXIDE

Carbon Monoxide (CO) is inert to plants and materials but can significantly affect human health. CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. Effects on humans range from slight headaches and nausea to death.

State and federal CO standards have been set for both 1- and 8-hour averaging times. The state 1-hour standard is 20 ppm, and the federal 1-hour standard is 35 ppm. Both the state and federal standards for the 8-hour averaging period are 9 ppm.

Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter when light winds combine with the formation of ground-level temperature inversions typically from evening through early morning. These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

The results from three years of CO monitoring are shown in **Table AQ-5**. No violations of either the state or federal CO standards were recorded at this monitoring station during these three years.

Table AQ-5: Carbon Monoxide Monitoring Results

Carbon Monoxide (CO)	2011	2012	2013
Highest 1-hour average, ppm	1.9	1.9	1.9
Highest 8-hour average, ppm	1.6	1.6	1.7

Notes: Monitoring results for Sacramento - Goldenland Court monitoring station.
Source: U.S. Environmental Protection Agency, 2014.

OXIDES OF NITROGEN

Oxides of Nitrogen ($NO_{x)}$ contribute to smog and can injure plants and animals and affect human health. NO_x contributes to acid rain, and reacts with ROG in the presence

of sunlight to form photochemical smog. NO_x concentrations appear brown in color because they absorb the blue-green area of the visible spectrum, greatly affecting visibility.

NO_x is emitted primarily by combustion sources, including both mobile and stationary sources. NO_x also is emitted by a variety of area sources, ranging from wildfires and prescribed fires to water-heating and space-heating systems powered by fossil fuels.

The state NO_x standard is 0.18 ppm for the 1-hour average and 0.03 ppm for the annual average. The federal NO_x standard is 0.053 ppm on an annual average and 0.100 ppm for the 1-hour average. No violations of the NOx standard were recorded in the SVAB during the three most recent years of available monitoring data.

PM10 AND PM2.5

Health concerns associated with suspended particulate matter (PM) focus on those particles small enough to reach the lungs when inhaled. PM can damage human health and retard plant growth, as well as reduce visibility, soil buildings and other structures, and corrode materials. PM_{10} and $PM_{2.5}$ emissions are generated by a wide variety of sources, including agriculture, industrial activities, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere.

The state PM_{10} standards are 50 µg/m^3 as a 24-hour average and 20 µg/m^3 as an annual geometric mean. The federal PM_{10} standard is 150 µg/m^3 as a 24-hour average.

The federal $PM_{2.5}$ standards are 35 µg/m^3 as a 24-hour average and 12 µg/m^3 as an annual average. The state $PM_{2.5}$ standard equals 12 µg/m^3 on an annual average.

Table AQ-6 shows the most recent three years of monitoring results for PM_{10} and $PM_{2.5}$ at the Del Paso Manor monitoring station. Violations of the PM_{10} and $PM_{2.5}$ air quality standards were recorded during 2011, 2012 and 2013.

Table AQ-6: Particulate Matter Monitoring Results

Particulate Matter (PM_{10})	**2011**	**2012**	**2013**
Highest 24-hour average, $\mu g/m^3$	**66.0**	43	**63.5**
Days > state standard[a]	2.0	0.0	4.0
Days > federal standard[a]	0.0	0.0	0.0
Percent of year covered	100	100	92
Particulate Matter ($PM_{2.5}$)	**2011**	**2012**	**2013**
Highest 24-hour average, $\mu g/m^3$	<u>54.3</u>	35.3	<u>53.8</u>
Days > federal standard[a]	9.5	0.0	13.0
Percent of year covered	95	100	93

Note: <u>Underlined values</u> represent those in excess of applicable NAAQS. **Bold values** represent those in excess of the applicable CAAQS. Based on Sacramento – Del Paso Manor monitoring station.

Source: California Air Resources Board, 2014b.

[a]Days over state or federal standards are estimated days.

SULFUR DIOXIDE

The major health concerns associated with inhalation of sulfur dioxide (SO_2) include effects on breathing, respiratory illness, alterations in pulmonary defenses, and aggravation of existing cardiovascular disease. Children, the elderly, and people with asthma, cardiovascular disease, or chronic lung diseases—such as bronchitis or emphysema—are most susceptible to adverse health effects from exposure to SO_2. SO_2 is a precursor to sulfates, which are associated with acidification of lakes and streams, accelerated corrosion of buildings and monuments, reduced visibility, and other adverse health effects.

EPA's health-based NAAQS for SO_2 is 0.03 ppm measured as an annual arithmetic mean concentration, 0.14 ppm measured over a 24-hour period, and 0.5 ppm measured over a 3-hour average period. California's SO_2 standard is 0.04 ppm measured over a 24-hour average period and 0.25 ppm measured over 1-hour.

SO_2 belongs to the family of gases called sulfur oxides (SO_X). These gases are formed when fuel containing sulfur (mainly coal and oil) is burned, and during metal smelting and other industrial processes. SO_X emissions are typically not a concern for land use development projects.

TOXIC AIR CONTAMINANTS

Concentrations of toxic air contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs), are also used as indicators of ambient air quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or

in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

According to The California Almanac of Emissions and Air Quality (CARB, 2009), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines (diesel PM or DPM). DPM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances.

SENSITIVE RECEPTORS

Some receptors are considered more sensitive than others to air pollutants. The reasons for greater than average sensitivity include health problems, proximity to emission sources, or duration of exposure to air pollutants. Sensitive receptors are typically defined as locations where human populations, especially children, seniors, or sick persons, are found, and there is reasonable expectation of continuous human exposure. Examples of land uses considered sensitive receptors are residences, hospitals, day cares, and schools.

The project's outer boundary is surrounded by single-family residential homes. In addition to the single-family homes, other nearby sensitive receptors includes the Antelope Community Park, Antelope High School and Barrett Ranch Elementary School.

Federal, State, and Local Agencies

Air quality in Sacramento County is regulated by several agencies, which include the U.S. Environmental Protection Agency (EPA), California Air Resources Board (ARB), and Sacramento Metropolitan Air Quality Management District (SMAQMD). Each of these agencies develops rules and/or regulations to attain the goals or directives imposed upon them through legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent. In general, air quality is evaluated based upon standards developed by federal and state agencies. Mobile sources of air pollutants are largely controlled by federal and state agencies, while local air pollution control districts (APCD) or air quality management districts (AQMD) regulate stationary sources.

Air pollution problems in Sacramento County are primarily the result of locally generated emissions. However, Sacramento County has been identified as a source of ozone precursor emissions that occasionally contribute to air quality problems in the San Joaquin Valley Air Basin and the Northern Sacramento Valley Air Basin. Consequently, the air quality planning for Sacramento County must not only correct local air pollution problems but must also reduce the impacts from the area on downwind air basins.

SACRAMENTO METROPOLITAN AIR QUALITY RULES AND REGULATIONS

SMAQMD regulates air quality in Sacramento County through its permit authority over stationary sources of emissions, through its vehicle and fuels management program,

and through planning and review activities. All projects are subject to SMAQMD Rules and Regulations in effect at the time of construction. Several SMAQMD Rules pertinent to the project include:

RULE 201: GENERAL PERMIT REQUIREMENTS. Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from SMAQMD prior to equipment operation. The applicant, developer or operator of a project that includes an emergency generator, boiler, or heater should contact the District early to determine if a permit is required, and to begin the permit application process. Portable construction equipment (e.g. generator, compressors, pile drives, lighting equipment, etc.) with an internal combustion engine over 50 horsepower are required to have a SMAQMD permit or a California Air Resources Board portable equipment registration.

RULE 403: FUGITIVE DUST. The developer or contractor is required to control dust emissions from earth moving activities or any other construction activity to prevent airborne dust from leaving the project site.

RULE 442: ARCHITECTURAL COATINGS. The developer or contractor is required to use coatings that comply with the volatile organic compound content limits specified in the rule.

The SMAQMD was created by state law to enforce local, state, and federal air pollution regulations within the Sacramento Valley Air Basin. The SMAQMD's overall mission is to achieve clean air goals by leading the Sacramento region in protecting public health and the environment through effective programs, community involvement, and public education. The SMAQMD interacts with local, state, and federal government agencies, the business community, environmental groups, and private citizens to achieve these goals. The SMAQMD regulates air pollutant emissions from stationary sources through permit limitations and inspection programs and oversees compliance with state and federal mandates by adopting rules and regulations as necessary.

Because the Sacramento Valley Air Basin is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$, the SMAQMD requires the implementation of the following Basic Construction Emission Control Practices (BCECPs), regardless of the project's significance determination under CEQA.

- Water all exposed surfaces two times daily. Exposed surfaces include, but are not limited to, soil piles, graded areas, unpaved parking areas, staging areas, and access roads;

- Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways should be covered;

- Use wet power vacuum street sweepers to remove any visible trackout mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited;

- Limit vehicle speeds on unpaved roads to 15 miles per hour (mph);

- All roadways, driveways, sidewalks, and parking lots to be paved should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used;

- Minimize idling time by either shutting equipment off when not in use or reducing time of idling to 5 minutes. Provide clear signage that posts this requirement for workers at the entrances to the site; and

- Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determine to be running in proper condition before it is operated.

SACRAMENTO COUNTY GENERAL PLAN

Local governments, such as Sacramento County, have the authority and responsibility to reduce air pollution through the land use decision-making authority allowed by their police power. Specifically, local governments are responsible for the mitigation of emissions resulting from land use decisions and for the implementation of transportation control measures as outlined in federal, state and local air quality attainment plans. In general, a first step toward implementation of a local government's responsibility is accomplished by identifying air quality goals, policies, and implementation measures in its general plan. Through capital improvement programs, local governments can fund infrastructure that contributes to improved air quality, by requiring such improvements as bus turnouts, energy-efficient street lights, and synchronized traffic signals. In accordance with CEQA requirements and the CEQA review process, local governments assess air quality impacts, require mitigation of potential air quality impacts by conditioning discretionary permits, and monitor and enforce implementation of such mitigation.

Sacramento County General Plan policies pertaining to air quality with respect to new development include:

AQ-1: New development shall be designed to promote pedestrian/bicycle access and circulation to encourage community residents to use alternative modes of transportation to conserve air quality and minimize direct and indirect emission of air contaminants.

AQ-2: Support Regional Transit's efforts to secure adequate funding so that transit is a viable transportation alternative. Development shall pay its fair share of the cost of transit facilities required to serve the project.

AQ-3: Buffers and/or other appropriate mitigation shall be established on a project-by-project basis and incorporated during review to provide for protection of sensitive

receptors from sources of air pollution or odor. The California Air Resources Board's "Air Quality and Land Use Handbook: A Community Health Perspective", and the AQMD's approved Protocol (Protocol for Evaluating the Location of Sensitive Land uses Adjacent to Major Roadways) shall be utilized when establishing these buffers.

AQ-4: Developments which meet or exceed thresholds of significance for ozone precursor pollutants as adopted by the Sacramento Metropolitan Air Quality Management District (SMAQMD), shall be deemed to have a significant environmental impact. An Air Quality Mitigation Plan shall be submitted to the County of Sacramento prior to project approval, subject to review and recommendation as to technical adequacy by the Sacramento Metropolitan Air Quality Management District.

AQ-5: Reduce emissions associated with evaporation and vehicle miles traveled by reducing the surface area dedicated to parking facilities; reduce vehicle emissions associated with "hunting" for on-street parking by implementing innovative parking solutions including shared parking, elimination of minimum parking requirements, creation of maximum parking requirements, and utilize performance pricing for publicly owned parking spaces both on- and off-street, as well as creating parking benefit districts.

AQ-8: Promote mixed-use development and provide for increased development intensity along existing and proposed transit corridors to reduce the length and frequency of vehicle trips.

AQ-10: Encourage vehicle trip reduction and improved air quality by requiring development projects that exceed the SMAQMD's significance thresholds for operational emissions to provide on-going, cost-effective mechanisms for transportation services that help reduce the demand for existing roadway infrastructure.

AQ-16: Prohibit the idling of on-and off-road engines when the vehicle is not moving or when the off-road equipment is not performing work for a period of time greater than five minutes in any one-hour period.

AQ-17: Promote optimal air quality benefits through energy conservation measures in new development.

AQ-19: Require all feasible reductions in emissions for the operation of construction vehicles and equipment on major land development and roadway construction projects.

AQ-20: Promote Cool Community strategies to cool the urban heat island, reduce energy use and ozone formation, and maximize air quality benefits by encouraging four main strategies including, but not limited to: plant trees, selective use of vegetation for landscaping, install cool roofing, and install cool pavements.

AQ-21: Support SMAQMD's particulate matter control measures for residential wood burning and fugitive dust.

CI-40: Whenever possible, the applicant/developer of new and infill development projects shall be conditioned to fund, implement, operate and/or participate in TSM programs to manage travel demand associated with the project.

CI-43: The County shall promote transit-supportive programs in new development, including employer-based trip-reduction programs (employer incentives to use transit or non-motorized modes), "guaranteed ride home" for commute trips, and car-share or bike-share programs.

CI-67: When feasible, incorporate lighter colored (higher albedo) materials and surfaces, such as lighter-colored pavements, and encourage the creation of tree canopy to reduce the built environment's absorption of heat to reduce the urban "heat island" effect.

LU-27: Provide safe, interesting and convenient environments for pedestrians and bicyclists, including inviting and adequately-lit streetscapes, networks of trails, paths and parks and open spaces located near residences, to encourage regular exercise and reduce vehicular emissions.

LU-37: Provide and support development of pedestrian and bicycle connections between transit stations and nearby residential, commercial, employment or civic uses by eliminating physical barriers and providing linking facilities, such as pedestrian overcrossings, trails, wide sidewalks and safe street crossings.

LU-40: Employ appropriate traffic-calming measures in areas where pedestrian travel is desirable but made unsafe by a high volume or excessive speed of automobile traffic. Preference shall be given to measures that slow traffic and improve pedestrian safety while creating the least amount of conflict with emergency responders.

METHODOLOGY

Air quality modeling was conducted for all aspects of the project that meet or exceed the screening thresholds. The California Emissions Estimator Model (CalEEMod version 2013.2.2) was used to estimate the project's construction and operational emissions. Both project-specific information and model default values were used for construction equipment, estimated vehicle trips and estimates for energy and water consumption. The AERMOD atmospheric dispersion modeling system was used with the CalEEMod results to estimate the project's dispersion of PM_{10} and $PM_{2.5}$ particulates. Modeling results are included in the Air Quality Technical Report, and included in Appendix B of this EIR.

The technical study prepared for this document referenced previously is included as Appendix B, and incorporated by reference:

- ESA, *Barrett Ranch East Project, Air Quality Technical Report* (November 2014)

Construction Impact Methodology

As noted above, CalEEMod2013.2.2 was used to estimate emissions resulting from project construction. Construction of the project will likely proceed in phases, based on economic conditions. As a worst case for construction emissions, this analysis assumes that construction would begin in 2016 and to be completed by the end of 2019, with 2020 representing the first full year of project operation. Emissions were estimated for each year of construction. A detailed list of the assumptions used to estimate construction emissions is included in Appendix B of this EIR.

Toxic Air Contaminants

As explained above, the California Air Resources Board classifies diesel particulate matter (DPM) as a toxic air contaminant (TAC). DPM is generated during construction by on- and off-road construction vehicles. DPM is also generated in substantial quantities by high-volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic.

Health risks from TACs are a function of the concentration of emissions and the duration of exposure. The primary source of TACs during construction is DPM from construction equipment exhaust. The evaluation of TACs from construction is conducted qualitatively due to the short- term nature of construction and the distance of construction from the closest sensitive receptors.

Operational Impact Methodology

Criteria Pollutant Emissions

The project would generate operational emissions of the criteria pollutants, including ozone precursors (ROG and NOx), CO, PM10, PM2.5, and SOx. SOx emissions are typically a minor source of emissions and are not considered a concern with land use development projects. Therefore, SOx emissions are not analyzed in this EIR.

On-road vehicle emissions generated by the project were estimated using CalEEMod. Trip generation information was provided by the traffic consultant (Kimley-Horn and Associates, Inc. (2014) (Appendix J). The CalEEMod model was also used to estimate area source emissions. Area sources include emissions associated with burning natural gas for space and water heating, gasoline combustion to operate landscape maintenance machinery, and evaporative emissions from the use of architectural coatings.

Odors

Odor analyses typically evaluate the potential for a proposed project to generate odors and for the proposed project to be affected by odors from nearby sources of odors. The project is not considered an odor source.

SIGNIFICANCE CRITERIA

A project may be deemed to have a significant effect on the environment if it will violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. SMAQMD has adopted significance thresholds for CEQA projects within the District. The adopted significance thresholds for criteria pollutants of the greatest concern in the Sacramento area are shown below in **Table AQ-7**.

Table AQ-7: SMAQMD Significance Thresholds

	ROG[1] (lbs/day)	NO_x (lbs/day)	CO ($\mu g/m^3$)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)
Construction (short-term)	None	85	CAAQS[2]	80[3]	82[3]
Operational (long-term)	65	65	CAAQS	80[3]	82[3]

1. Reactive Organic Gas

2. California Ambient Air Quality Standards (see **Table AQ-8**).

3. Only applies to projects for which all feasible best available control technology (BACT) and best management practices (BMPs) have been applied. Projects that fail to apply all feasible BACT/BMPs must meet a significance threshold of 0 lbs/day.

There is no adopted threshold for incremental increases in cancer risk, although there is a stationary-source permitting threshold: an incremental increase in cancer risk greater than 10-in-one-million at any offsite receptor. For the purposes of this EIR, this amount is used a screening threshold to establish potentially significant increases in cancer risk.

Short-term impacts are associated with project construction, and long-term impacts are associated with mobile and area emissions during operation of a completed project. The analysis below focuses on ozone precursors and particulate matter (ROG, NO_x, PM_{10} and $PM_{2.5}$), consistent with the SMAQMD Guidelines. Sulfur dioxide, lead, and other constituents are not evaluated because these pollutants generally are not emitted in significant quantities by a development project, and are typically associated with a point source – e.g., a power plant. The project does not include a point source. The SMAQMD Guidelines explain:

1. For construction activities, carbon monoxide, sulfur dioxide, and lead are of less concern because construction activities are not likely to generate substantial quantities of these CAPs (p. 3-1);

2. For most land use projects pollutants such as sulfur dioxide and lead are of less concern because operational activities are not likely to generate substantial quantities of these CAPs and the Sacramento Valley Air basin has been in attainment for these CAPs for multiple years (p. 4-1); and

3. Except for carbon monoxide, land use development projects do not typically have the potential to result in localized concentrations of CAPs that exceed or contribute to an exceedance of the respective AAQS (p. 4-14).

Table AQ-8: CAAQS

Pollutant	Concentration Thresholds
PM_{10}	50 µg/m3 24-hour standard; 20 µg/m3 Annual Arithmetic Mean
$PM_{2.5}$	12 µg/m3 Annual Arithmetic Mean
CO	20 ppm 1- hour standard; 9 ppm 8- hour standard
NO_2	0.18 ppm 1- hour standard; 0.03 ppm Annual Arithmetic Mean
SO_2	0.25 ppm 1- hour standard; 0.04 ppm 24- hour standard
Lead	1.5 µg/m3 30-day average
Visibility-Reducing Particles	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more due to particles when relative humidity is less than 70 percent
Sulfates	25 µg/m3 24-hour standard
H_2S	42 µg/m3 or 0.03 ppm 1-hour standard
Vinyl Chloride	26 µg/m3 or 0.01 ppm 24-hour standard

Cumulative Thresholds - Criteria Pollutants

The SMAQMD's approach for cumulative impacts is that if a project's emissions would be less than the individual project thresholds of significance, then the project would not be expected to result in a cumulatively considerable contribution to significant cumulative impacts.

Impacts And Analysis

This section identifies and discusses the proposed project's air quality impacts, as described in the Air Quality Technical Report prepared for the project. This report includes an Operational Air Quality Mitigation Plan (AQMP) for the project (included in Appendix B of this EIR) which is also incorporated by reference.

Impact: Construction Emissions

Level of Impact: Less than Significant

There are two main pollutants of concern with construction: particulate matter (dust and diesel particles, i.e. PM_{10} and $PM_{2.5}$) and ozone precursors (ROG and NOx). Construction activities associated with the proposed project would generate pollutant emissions from the following construction activities: (1) site preparation, (2) grading, (3) trenching, (4) internal road construction, (5) building construction; and 6) application of architectural coatings. These construction activities would temporarily create emissions of dust, fumes, equipment exhaust, and other air contaminants. The amount of emissions generated on a daily basis would vary, depending on the intensity and types of construction activities occurring simultaneously at the time. As previously stated, the project will be constructed from 2016 through 2019. This four-year period represents a worst-case estimate from an emissions standpoint. Actual construction could take longer.

Ozone precursors: The CalEEMod results showed that project emissions of ozone precursors would not exceed applicable thresholds. The worst-case daily construction emissions are summarized in **Table AQ-9** (refer to **Appendix B** , Air Quality Technical Report, for a detailed summary of the CalEEMod modeling assumptions, inputs, and outputs). The estimates shown in **Table AQ-9** assume full build-out of the project's residences, shopping center and parks.

Table AQ-9: Maximum Daily Construction Emissions without Basic Construction Emission Control Practices

	ROG (lbs/day)	NOx (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)
Maximum Daily – 2016	7.3	75.8	94.6	13.6
Maximum Daily – 2017	6.5	38.9	94.3	11.9
Maximum Daily – 2018	5.6	34.5	94.0	11.6
Maximum Daily – 2019	337.1	31.2	93.8	11.4
Construction Significance Threshold	None	85	80	82
Construction Threshold Exceed	No	No	Yes	No

Unmitigated emissions estimated using CalEEMod2013.2.2.

As shown in **Table AQ-9**, the maximum daily construction emissions generated by the project would not exceed SMAQMD's significance thresholds for ozone precursors in 2016 through 2019. Accordingly, ROG and NOx-related air quality impacts from construction would be ***less than significant***.

Particulate Emissions: The Air Quality Technical Report prepared for the project predicts that project construction would result in the daily disturbance of up to 75 acres per day, or 25% of total project acreage. All projects that involve construction activities are required to implement SMAQMD's Basic Construction Emission Control Practices, regardless of significance determination. In order to account for these standard practices construction emission were quantified using CalEEMod. The results of this modeling, referred to as mitigated results, are shown below in **Table AQ-10**. With implementation of the SMAQMD's Basic Construction Emission Control Practices, the maximum daily PM_{10} and $PM_{2.5}$ emissions would not exceed SMAQMD's significance thresholds for construction emissions.

Table AQ-10: Maximum Daily Construction Emissions with Construction Emission Control Practices

	ROG (lbs/day)	NOx (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)
Maximum Daily – 2016	7.3	75.8	60.6	8.7
Maximum Daily – 2017	6.5	38.9	60.4	8.5
Maximum Daily – 2018	5.6	34.5	60.0	8.2
Maximum Daily – 2019	337.1	31.2	59.8	8
Construction Significance Threshold	None	85	80	82
Exceed Construction Threshold?	No	No	No	No

Mitigated emissions estimated using CalEEMod2013.2.2

Onsite PM_{10} emissions from construction were further modeled using the AERMOD dispersion model. The dispersion modeling found that the project's worst-case daily PM_{10} emissions during site preparation and grading would result in a maximum concentration of 1.6µg/m3 at the maximally exposed receptor. This level would not exceed SMAQMD's threshold of 2.5µg/m3 for the 24-hour average (five percent of the 50 µg/m3 PM10 24-hour standard). The dispersion modeling also shows that the project's worst-case annual PM_{10} emissions would result in a maximum concentration of 0.25 µg/m3 at the maximally exposed receptor, which would not exceed SMAQMD's threshold of 1.0 µg/m3 for the annual average (five percent of the 20 µg/m3 annual PM10 standard) (details of this modeling analysis, including modeling assumptions, are included in the Air Quality Technical Study). Impacts are less than significant.

Toxic Air Contaminant Emissions: Off-road heavy-duty diesel equipment would result in short-term emissions of diesel PM (DPM) during site preparation (e.g., excavation and grading); paving; installation of utilities, materials transport and handling; building construction; and other miscellaneous activities. DPM is considered the source of a majority of the health risks that are attributed to TACs.

Construction hours are assumed to take place for eight hours a day, Monday through Friday for four years. No construction activities are expected to take place during the weekends and major holidays. Although construction is conservatively estimated to last four years, exposure of sensitive receptors to DPM would be for only brief periods when excavation and grading activities are being conducted near individual residents.

The Project would not result in significant construction-related health risks because:

- Construction activities are intermittent in nature;
- Construction periods in any one location are relatively short-term; and
- Basic Construction Emission Control Practices would substantially reduce DPM emissions.

Odors: Construction activities could generate odors associated with diesel equipment exhaust. However, such odors would be temporary, intermittent, and would not occur in the same location for more than a few days at a time. This impact would be ***less than significant.***

MITIGATION MEASURE

None required.

IMPACT: OPERATIONAL EMISSIONS

LEVEL OF IMPACT: SIGNIFICANT AND UNAVOIDABLE

Criteria Pollutant Emissions: The proposed project would result in long-term regional emissions of criteria air pollutants associated with vehicle emissions, natural gas consumption, landscaping equipment, etc. **Table AQ-11: Daily Operational Emissions (pounds per day)** below shows the mitigated and unmitigated CalEEMod estimates for project operational emissions.

Table AQ-11: Daily Operational Emissions (pounds per day)

	Unmitigated			**Mitigated[1]**		
	ROG	**NOx**	**NO_xe[2]**	**ROG**	**NOx**	**NO_xe[2]**
Operational Maximum Event	75.4	58.3	83.4	68.1	31.8	54.5 (34.4% below unmitigated)
Operational Significance Threshold	65	65	N/A	65	65	(15% below unmitigated)
Exceed Operational Threshold?	**Yes**	No	N/A	**Yes**	No	No

[1]Mitigated emissions include implementation of the project's Air Quality Mitigation Plan.

[2]NOxe emissions equal total NOx plus 1/3 of ROG emissions.

As shown in **Table AQ-11** above, even with the mitigation measures included in the AQMP, the project's ROG emissions would exceed SMAQMD's significance threshold. Though these emissions remain in excess of the significance threshold, implementation of the AQMP would reduce the project's NO_xe emissions by 34.3 percent. This reduction would exceed the SMAQMD's minimum emission reduction requirements of 15 percent for projects located in an area covered by the SIP by 19.3

percent. Although all feasible mitigation has been included, ROG emissions would still exceed the SMAQMD's significance threshold; therefore, this impact is significant and unavoidable.

MITIGATION MEASURE

AQ-1. To mitigate operations-related emissions, the following shall apply:

> The Operational Air Quality Mitigation Plan included in Appendix C of the Air Quality Technical Study (located within Appendix B of this EIR) shall be implemented for the project. Mitigation measures in this Plan include, but are not limited to reductions in vehicle trips and vehicle miles traveled resulting from the projects density, proximity to adjacent land uses and job centers, and its transit, bicycle, and walkability characteristics. An additional feature of this Plan is an energy efficiency measure that would reduce natural gas combustion emissions generated by the project by requiring all buildings in the project to be constructed to exceed 2008 Title 24 building energy standards by a minimum of 20%.

IMPACT: CUMULATIVE IMPACTS

LEVEL OF IMPACT: SIGNIFICANT AND UNAVOIDABLE (CRITERIA AIR POLLUTANTS, OPERATIONAL PHASE)

A cumulative impact arises when two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant impacts, meaning that the project's incremental effects must be viewed in connection with the effects of past, current, and probable future projects.

Criteria Air Pollutants: As explained above, SMAQMD uses project specific thresholds to assess whether a project would have a cumulatively significant contribution to air pollution. With Basic Construction Emission Control Practices, PM10 emissions during construction are less than significant. Consequently, the project's construction activities would not result in cumulative criteria pollutant impacts. However, because the project's operational emissions of criteria pollutants would be significant, the project would result in a ***significant and unavoidable*** cumulative criteria pollutant impact.

Toxic Air Contaminants: As explained above, the project would not result in significant TAC impacts or health risks during project construction or operation. Accordingly, the project's TAC impacts would be ***less than significant***.

Odors: The project would not generate significant odor impacts during project construction or operation. Accordingly, the project's impacts associated with odor generation would be ***less than significant***.

MITIGATION MEASURE

See AQ-1.

COMMERCIAL PROJECT ALTERNATIVE

IMPACT: CONSTRUCTION EMISSIONS

LEVEL OF IMPACT: LESS THAN SIGNIFICANT

Construction activities associated with the proposed project would generate pollutant emissions from the following construction activities: (1) site preparation, (2) grading, (3) trenching, (4) internal road construction, (5) building construction; and 6) application of architectural coatings. These construction activities would temporarily create emissions of dust, fumes, equipment exhaust, and other air contaminants. The amount of emissions generated on a daily basis would vary, depending on the intensity and types of construction activities occurring simultaneously at the time.

Construction emissions for the commercial project alternative will be substantially the same as described in the preferred project scenario. Impacts related to construction emission are ***less than significant***.

MITIGATION MEASURE

None required.

IMPACT: OPERATIONAL EMISSIONS

LEVEL OF IMPACT: LESS THAN SIGNIFICANT

Criteria Pollutant Emissions: The commercial project alternative would result in commercial uses in place of some of the proposed multi-family housing. The commercial use is expected to generate less traffic than the multi-family use. Using the trip rates that were provided in the Supplemental Traffic Impact Analysis that was prepared for the commercial alternative, CalEEMod was used to estimate the operational emission from the commercial project alternative. The results are shown in **Table AQ-12** below.

Table AQ-12: Commercial Alternative Daily Operational Emissions (pounds/day)

	ROG	NOx	PM10	PM2.5
Operational Maximum Event	57.1	36.4	32.0	9.2
Operational Significance Threshold	65	65	80	82
Operational Threshold Exceeded	No	No	No	No

The commercial project alternative would result in long-term regional emissions of criteria air pollutants associated with vehicle emissions, natural gas consumption, landscaping equipment, etc. As shown in **Table AQ-12**, implementation of the commercial alternative would not result in long-term regional emissions of ROG or NO_x that exceed SMAQMD's significance threshold. Therefore, impacts related to the project's operational emissions are less than significant.

Mitigation Measure

None required.

Impact: Cumulative Impacts

Level of Impact: Less than Significant

A cumulative impact arises when two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant impacts, meaning that the project's incremental effects must be viewed in connection with the effects of past, current, and probable future projects.

Criteria Air Pollutants: As explained above, SMAQMD uses project specific thresholds to assess whether a project would have a cumulatively significant contribution to air pollution. With Basic Construction Emission Control Practices, PM_{10} emissions during construction are less than significant. Consequently, the project's construction activities would not result in cumulative criteria pollutant impacts. The operational emissions of criteria pollutants for the commercial alternative would not exceed SMAQMD's significance threshold; therefore, the alternative would result in ***less than significant*** cumulative criteria pollutant impacts.

Toxic Air Contaminants: As explained above, the project would not result in significant TAC impacts or health risks during project construction or operation. Accordingly, the project's TAC impacts would be ***less than significant***.

Odors: The project would not generate significant odor impacts during project construction or operation. Accordingly, the project's impacts associated with odor generation would be ***less than significant***.

Mitigation Measure

None required.