APPENDIX B – AIR QUALITY ASSESSMENT

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VALLEY CLEAN INFRASTRUCTURE PLAN (VCIP)

PROGRAM-LEVEL AIR QUALITY ASSESSMENT

Fresno County, California

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INTRODUCTION

This report assesses the potential air quality impacts associated with projects constructed under the Valley Clean Infrastructure Plan (VCIP or Plan) proposed in Fresno County, California. The planning area is approximately 136,000 acres. Development projects of this type in the San Joaquin Valley are most likely to c generate emissions during construction, with minor emissions generated during operation from the few workers that visit the site intermittently for maintenance. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has published the Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI) that was used to conduct this air quality analysis (SJVAPCD 2015). Existing air quality conditions are described, potential construction period air quality impacts assessed, potential build-out operational air quality impacts (at both a local and regional scale) described, and mitigation measures necessary to reduce or eliminate air quality impacts identified as significant listed.

PROJECT DESCRIPTION

The proposed VCIP provides a blueprint for the development of clean energy facilities and supporting infrastructure with an overall generating and delivery capacity of up to 21,000 MW on approximately 136,000 acres of repurposed farmland within the Fresno County portion of Westlands Water District (District), as shown in Figure 1. The VCIP includes an "Energy Resource Plan" and an "Infrastructure Plan."

The VCIP Energy Resource Plan consists of clean energy development in the form of: 1) solar photovitalic (PV) generating facilities, and 2) stand-alone energy storage facilities, all of which would be developed within defined "Development Focus Areas" (DFAs) consisting of District-owned land and private lands of participating landowners.

The VCIP Infrastructure Plan includes the elements for conveyance of solar generation to the state's load centers: 1) gen-tie lines, 2) collection substations, and 3) connector transmission lines.

Each project that is part of the VCIP is likely to be constructed within a 12- month period beginning in 2029 and lasting through 2038. The first full year of facility operation is expected to be 2039.

In order to deliver VCIP renewable generation to load centers in northern and southern California, new bulk delivery transmission lines are needed. These 500-kV transmission lines would be subject to the state's transmission planning and approval processes and are anticipated to be constructed, owned, and operated by public utilities, government utilities, or merchant transmission owners. These bulk delivery transmission lines are not part of the VCIP.

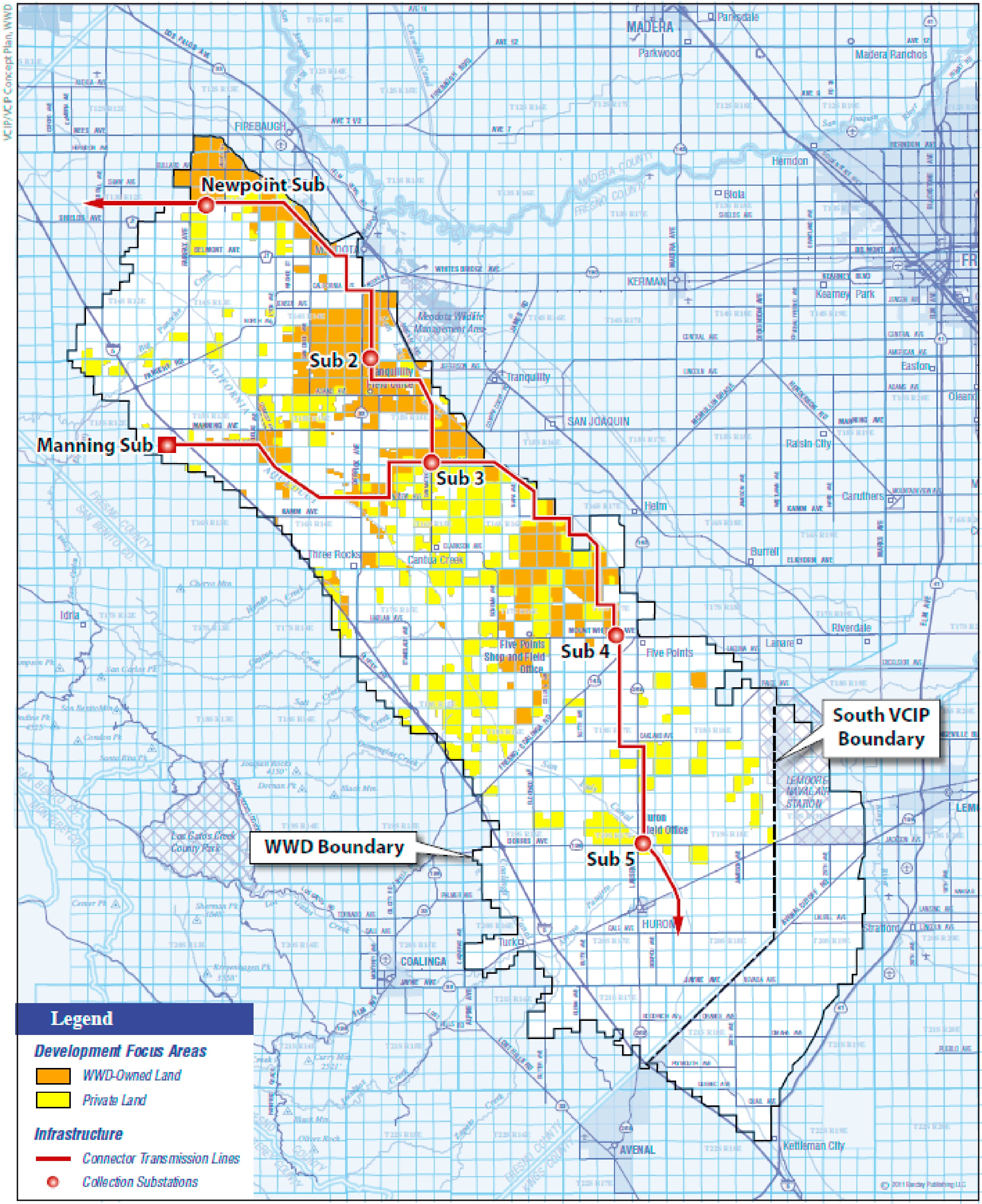

Figure 1. VICP Concept Plan

SETTING

Topographic Considerations

The plan area is located in the western portion of Fresno County, which lies in the southwestern portion of the San Joaquin Valley Air Basin. The California Air Resources Board (CARB) defines the boundaries of the basin by the San Joaquin Valley within the Sierra Nevada Mountains to the east, the Coast Ranges in the west, and the Tehachapi mountains in the south. The valley is basically flat with a slight downward gradient to the northwest. The valley opens to the ocean at the Carquinez Strait where the San Joaquin-Sacramento Delta empties into San Francisco Bay. The San Joaquin Valley, thus, could be considered a "bowl" with the primary opening to the north. The surrounding topographic features restrict air movement through and out of the basin and, as a result, impede the dispersion of air pollutants from the basin. Wind flow is usually down the valley from the north, but the Tehachapi Mountains block or restrict the southward progression of airflow. The Sierra Nevada is a substantial barrier from the usual winds that have a general westerly flow. The topographical features result in weak airflow. The flow is further restricted vertically by inversion layers that are common in the San Joaquin Valley Air Basin throughout the year. An inversion layer is created when a mass of warm dry air sits over cooler air near the ground, preventing vertical dispersion of pollutants from the air mass below. During the summer, the San Joaquin Valley experiences daytime temperature inversions at elevations from 1,500 to 3,000 feet above the valley floor. Airflow is considerably restricted since mountain ranges surrounding the valley are generally above the inversion. These inversions lead to a buildup of ozone and ozone precursor pollutants (i.e., volatile organic compounds and oxides of nitrogen). During the fall and winter months, strong surface-based inversions occur from 500 to 1,000 feet above the valley floor (SJVAPCD 2015). Wintertime inversions trap very stable air near the surface and lead primarily to a buildup of particulate matter air pollutants. Very light winds are also characteristic of these wintertime surface-based inversions.

Air Basin Characteristics

The climate of the project area is characterized by hot dry summers and cool, mild winters. Clear days are common from spring through fall. Daytime temperatures in the summer often approach or exceed 100 degrees, with lows in the 60s. In the winter, daytime temperatures are usually in the 50s, with lows around 35 degrees. Radiation fog is common in the winter and may persist for days. Partly to mostly cloudy days are common in winter, as most precipitation received in the Valley falls from November through April.

Winds are predominantly up-valley (flowing from the north) in all seasons, but more so in the summer and spring months (SJVAPCD 2015). In this flow, winds are usually from the north end of the Valley and flow in a south-southeasterly direction, through Tehachapi Pass, into the Southeast Desert Air Basin. Annually, up-valley wind flow (i.e., northwest flow with marine air) is most common, occurring about 40 percent of the time. This type of flow is usually trapped below marine and subsidence inversions, restricting outflow through the Sierra Nevada and Tehachapi Mountains. The occurrence of this wind flow is almost 70 percent of the time in summer, but less than 20 percent of the time in winter. Winter and fall are characterized by mostly light and variable wind flow. Pacific storm systems do bring southerly flows to the valley during late fall and winter. Light and variable winds, less than 10 miles per hour (mph), are common in the colder months.

Superimposed on this seasonal regime is the diurnal wind cycle. In the Valley, this cycle takes the form of a combination of a modified sea breeze-land breeze and mountain-valley regimes. The sea breeze-land breeze regime typically has a modified sea breeze flowing into the Valley from the north during the late day and evening and then a land breeze flowing out of the Valley late at night and early in the morning. The mountain-valley regime has an upslope (mountain) flow during the day and a down slope (valley) flow at night. These effects create a complexity of regional wind flow and pollutant transport within the Valley.

The pollution potential of the San Joaquin Valley is very high. The San Joaquin Valley has one of the most severe air pollution problems in the State. Surrounding elevated terrain in conjunction with temperature inversions frequently restrict lateral and vertical dilution of pollutants. Abundant sunshine and warm temperatures in late spring, summer, and early fall are ideal conditions for the formation of ozone, where the Valley frequently experiences unhealthy air pollution days. Low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high respirable particulate matter (PM_{10}) concentrations.

Regulatory Setting

The federal and California Clean Air Acts have established ambient air quality standards for different pollutants. National ambient air quality standards (NAAQS) were established by the Federal Clean Air Act of 1970 (amended in 1977 and 1990) for six "criteria" pollutants. These criteria pollutants now include carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), respirable particulate matter with a diameter less than 10 microns (PM_{10}), sulfur dioxide (SO_2), and lead (Pb). In 1997, The Environmental Protection Agency (EPA) added fine particulate matter ($PM_{2.5}$) as a criteria pollutant. The air pollutants for which standards have been established are considered the most prevalent air pollutants known to be hazardous to human health. California ambient air quality standards (CAAQS) include the NAAQS pollutants and also hydrogen sulfide, sulfates, vinyl chloride, and visibility reducing particles. These additional CAAQS pollutants tend to have unique sources and are not typically included in environmental air quality assessments. In addition, lead concentrations have decreased dramatically since it was removed from motor vehicle fuels.

Federal Regulations

At the federal level, the United States Environmental Protection Agency (US EPA) administers and enforces air quality regulations. Federal air quality regulations were developed from implementation of the Federal Clean Air Act. If an area does not meet NAAQS over a three-year period, EPA designates it as a "nonattainment" area for that particular pollutant. EPA requires states that have areas that do not comply with the NAAQS to prepare and submit air quality plans showing how the standards would be met. If the states cannot show how the standards would be met, then they must show progress toward meeting the standards. These plans are referred to as the State Implementation Plan (SIP)[1]. The SIP is a collection of regulations and documents used by the state and SJVAPCD to implement, maintain, and enforce the NAAQS, and to fulfill other requirements of the Clean Air Act.

EPA also has programs for identifying and regulating hazardous air pollutants. The Clean Air Act requires EPA to set standards for these pollutants and sharply reduce emissions. The US EPA also sets standards to control emissions of hazardous air pollutants through mobile source control programs. These include programs that reformulated gasoline, national low emissions vehicle standards, Tier 2 motor vehicle emission standards, gasoline sulfur control requirements, and heavy-duty engine standards.

The San Joaquin Valley Air Basin is subject to major air quality planning programs required by the federal Clean Air Act (CAA) (1977, last amended in 1990, 42 United States Code [USC] 7401 *et seq.*) to address ozone and particulate matter air pollution. The CAA requires that regional planning and air pollution control agencies prepare a regional Air Quality Plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled in order to achieve all standards within the deadlines specified in the Clean Air Act. These plans are submitted to the State, which after approval, submits them to US EPA as the SIP.

State Regulations

The California Clean Air Act (CCAA) of 1988, amended in 1992, outlines a program for areas in the State to attain the CAAQS by the earliest practical date. CARB is the state air pollution control agency and is a part of the California EPA. The California Clean Air Act sets more stringent air quality standards for all of the pollutants covered under national standards, and additionally regulates levels of vinyl chloride, hydrogen sulfide, sulfates, and visibility-reducing particulates. If an area does not meet CAAQS, CARB designates the area as a nonattainment area. The San Joaquin Valley Air Basin does not meet the CAAQS for ozone, PM_{10}, and $PM_{2.5}$. CARB requires regions that do not meet CAAQS for ozone to submit clean air plans that describe efforts to attain the standard or show progress toward attainment.

In addition to the US EPA, CARB further regulates the amount of air pollutants that can be emitted by new motor vehicles sold in California. Motor vehicle emissions standards have always been more stringent than federal standards since they were first imposed in 1961. CARB has also developed Inspection and Maintenance (I/M) and "Smog Check" programs with the California Bureau of Automotive Repair. Inspection programs for trucks and buses have also been implemented. CARB also sets standards for motor vehicle fuels sold in California.

San Joaquin Valley

The San Joaquin Valley Air Pollution Control District (SJVAPCD or Air District) is made up of eight counties in California's Central Valley: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings Tulare and the San Joaquin Valley portion of Kern. The primary role of the SJVAPCD is to

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[1] U.S. EPA see https://www.epa.gov/air-quality-implementation-plans/sip-requirements-clean-air-act accessed March 31, 2025

develop plans and implement control measures in the San Joaquin Valley to control air pollution. Rules and regulations have been developed by SJVAPCD to control air pollution from a wide range of air pollution sources. In March 2007, an Indirect Source Review (ISR) rule (Rule 9510) was adopted that controls air pollution from new land developments. SJVAPCD also conducts public education and outreach efforts such as the Spare the Air, Wood Burning, and Smoking Vehicle voluntary programs.

Fresno County General Plan.

The Fresno County General Plan (2024) is a comprehensive, long-term framework for the protection of the county's agricultural, natural, and cultural resources and for development in the county. Applicable goals and policies presented in the General Plan are as follows:

Open Space and Conservation

GOAL OS-A To protect and enhance the water quality and quantity in Fresno County's streams, creeks, and groundwater basins.

Policy OS-A.21 **Best Management Practices.** The County shall continue to require the use of feasible and practical best management practices (BMPs) to protect streams from the adverse effects of construction activities and urban runoff.

GOAL OS-G To improve air quality and minimize the adverse effects of air pollution in Fresno County.

Policy OS-G.2 **Air Quality Impact Assessment.** The County shall ensure that air quality impacts identified during the CEQA review process are fairly and consistently mitigated. The County shall require projects to comply with the County's adopted air quality impact assessment and mitigation procedures.

Policy OS-G.11 **Sensitive Receptors.** The County shall continue, through its land use planning processes, to avoid inappropriate location of residential uses and sensitive receptors in relation to uses that include, but are not limited to, industrial and manufacturing uses and any other uses which have the potential for creating a hazardous or nuisance effect.

Policy OS-G.14 **Fugitive Dust Control Measures.** The County shall include fugitive dust control measures as a requirement for subdivision maps, site plans, and grading permits. This will assist in implementing the SJVAPCD's particulate matter of less than ten (10) microns (PM_{10}) regulation (Regulation VIII). Enforcement actions can be coordinated with the Air District's Compliance Division.

Policy OS-G.15 **Access Road Standards.** The County shall require all access roads, driveways, and parking areas serving new commercial and industrial development to be constructed with materials that minimize particulate emissions and are appropriate to the scale and intensity of use.

National and State Ambient Air Quality Standards

The CAA and CCAA promulgate, respectively, national and State ambient air quality standards. Air quality standards have been established by US EPA (i.e., NAAQS) and California (i.e., CAAQS) for specific air pollutants most pervasive in urban environments. The NAAQS and CAAQS are shown in Table 1. Ambient standards specify the concentration of pollutants to which the public may be exposed without adverse health effects. Individuals vary in their sensitivity to air pollutants, and standards are set to protect more pollution-sensitive populations (e.g., children and the elderly). National and State standards are reviewed and updated periodically based on new health studies. California standards tend to be more stringent than the national standards. For planning purposes, regions like the San Joaquin Valley Air Basin are given an air quality status designation by the federal and State regulatory agencies. Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated “attainment” on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards within an air basin, it is designated “nonattainment” for that pollutant. US EPA designates areas as “unclassified” when insufficient data are available to determine the attainment status. These areas are typically considered to be in attainment of the standard.

Criteria Air Pollutants and their Health Effects

The primary criteria air pollutants that would be emitted by potential VICP projects include ozone (O_3) precursors (nitrogen oxides or NO_x and reactive organic compounds or ROG), carbon monoxide (CO), and suspended particulate matter (PM_{10} and $PM_{2.5}$). Other criteria pollutants, such as lead (Pb) and sulfur dioxide (SO_2), would not be appreciably emitted by the projects identified in the proposed VCIP, and air quality standards for them are being met throughout the San Joaquin Valley Air Basin. A description of each pollutant is provided below, as described by SJVAPCD (2015) and the Bay Area Air Quality Management District (2022).

Ozone (O_3)

CARB describes the ozone and health impacts (CARB 2016a). While O_3 serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing ultraviolet radiation potentially harmful to humans, when it reaches elevated concentrations in the lower atmosphere (troposphere) it can be harmful to the human respiratory system and to sensitive species of plants. Ozone concentrations build to peak levels during periods of light winds, bright sunshine, and high temperatures. Short-term O_3 exposure can reduce lung function in children, make persons susceptible to respiratory infection, and produce symptoms that cause people to seek medical treatment for respiratory distress. Long-term exposure can impair lung defense mechanisms and lead to emphysema and chronic bronchitis. A healthy person exposed to high concentrations may become nauseated or dizzy, may develop headache or cough, or may experience a burning sensation in the chest.

Table 1 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1-hour	0.09 ppm (180 µg/m^3)	—
	8-hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3) (3-year average of annual 4th highest daily maxima)
Carbon Monoxide	8-hour	9.0 ppm (10,000 µg/m^3)	9 ppm (10,000 µg/m^3)
	1-hour	20 ppm (23,000 µg/m^3)	35 ppm (40,000 µg/m^3)
Nitrogen dioxide	Annual Average	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)
	1-hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3) (3-year average of annual 98th percentile daily maxima)
Sulfur dioxide			
	24-hour	0.04 ppm (105 µg/m^3)	—
	3-hour	—	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3) (3-year average of annual 99th percentile daily maxima)
Respirable particulate matter (10 micron)	24-hour	50 µg/m^3	150 µg/m^3
	Annual Arithmetic Mean	20 µg/m^3	—
Fine particulate matter (2.5 micron)	Annual Arithmetic Mean	12 µg/m^3	12.0 µg/m^3 (3-year average)
	24-hour	—	35 µg/m^3 (3-year average of annual 98th percentile daily concentrations)
Sulfates	24-hour	25 µg/m^3	—
Lead	30-day	1.5 µg/m^3	—
	3 Month Rolling Average	—	0.15 µg/m^3

Source: California Air Resources Board (http://www.arb.ca.gov), accessed 11/07/2024
SO_2 Federal 24 hour and annual standards are not applicable in the SJVAPCD.
µg/m^3 = micrograms per cubic meter
ppm = parts per million

Ozone is formed in the atmosphere by a complex series of photochemical reactions that involve "ozone precursors" that consist of two families of pollutants: NO_x and ROG, which are emitted from a variety of stationary and mobile sources[2]. While NO_2, an oxide of nitrogen, is another criteria pollutant itself, ROGs are not in that category, but are included in this discussion as O_3

[2] Stationary air pollutant sources are those regulated by SVAPCD and mobile sources are those regulated by U.S. EPA and CARB that include cars, trucks, trains, aircraft, watercraft, construction equipment, lawn equipment, etc…

precursors. In 2007, CARB adopted an 8-hour health-based standard for O_3 of 0.070 parts per million (ppm)[3]. The U.S. EPA revised the 8-hour NAAQS for O_3 from 0.080 ppm in 2008 and reduced it again in 2015 to 0.070 ppm (US EPA 2015, 2023)[4].

Carbon Monoxide (CO)

CARB describes carbon monoxide and the health effects (CARB 2016b). Carbon monoxide or CO is a colorless, odorless, poisonous gas. Carbon monoxide's health effects are related to its affinity for hemoglobin in the blood. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause dizziness and fatigue, and causes reduced lung capacity, impaired mental abilities and central nervous system function, and induces angina (chest pain caused by reduced blood flow to the heart) in persons with serious heart disease. Primary sources of CO in ambient air are exhaust emissions from on-road vehicles, such as passenger cars and light-duty trucks, and residential wood burning. The monitored CO levels in the Valley during the last 10 years have been well below ambient air quality standards.

Nitrogen Dioxide (NO_2)

As described by CARB (2016c), the major health effect from exposure to high levels of NO_2 is the risk of acute and chronic respiratory disease. Nitrogen dioxide is a combustion by-product, but it can also form in the atmosphere by chemical reaction. Nitrogen dioxide is a reddish-brown colored gas often observed during the same conditions that produce high levels of O_3 and can affect regional visibility. Nitrogen dioxide is one compound in a group of compounds consisting of oxides of nitrogen (NO_x). As described above, NO_x is an O_3 precursor compound. Monitored levels of NO_2 in the San Joaquin Valley are below ambient air quality standards.

Particulate Matter (PM)

CARB describes unhealthy particulate matter and the health effects (CARB 2016d). Respirable (inhalable) particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$) consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled and cause adverse health effects. $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health because minute particles can penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Children are more susceptible to the health risks of $PM_{2.5}$ because their immune and respiratory systems are still developing. These fine particulates have been demonstrated to decrease lung function in children. Certain components of PM are linked to higher rates of lung

[3] This is the running average of 8 consecutive 1-hour average concentrations of the pollutant. The NAAQS and CAAQS are based on various averaging periods that depend on the air pollutant, which include 1-, 3-, 8-, and 24-hour averaging periods as well as 30-day, quarterly and annual averaging periods (see Table 1).

[4] NAAQS. *National Ambient Air Quality Standards for Ozone.* Available at: https://www.federalregister.gov/documents/2015/10/26/2015-26594/national-ambient-air-quality-standards-for-ozone Accessed on 07/25/2023.

cancer. Very small particles of certain substances (e.g., sulfates and nitrates) can also directly cause lung damage or can contain absorbed gases (e.g., chlorides or ammonium) that may be injurious to health.

Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as mining, demolition, and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. In addition to health effects, particulates also can damage materials and reduce visibility. Dust comprised of large particles (diameter greater than 10 microns) settles out rapidly and is more easily filtered by human breathing passages. This type of dust is considered more of a soiling nuisance rather than a health hazard.

The current State PM_{10} standard, approved in 2002, is 20 micrograms per cubic meter ($\mu g/m^3$) for an annual average. The State 24-hour average standard is 50 $\mu g/m^3$. $PM_{2.5}$ standards were first promulgated by the U.S. EPA in 1997 and were revised in 2006 to lower the 24-hour $PM_{2.5}$ standard to 35 $\mu g/m^3$ for 24-hour exposures (Federal Register, Vol. 71, No. 10, January 17, 2006). That same action by U.S. EPA also revoked the annual PM_{10} standard due to lack of scientific evidence correlating long-term exposures of ambient PM_{10} with health effects. The CAAQS has only an annual average $PM_{2.5}$ standard, which is set at 12.0 $\mu g/m^3$, which is similar to the NAAQS (CARB 2016f).

In 2024, the U.S. EPA strengthened the annual $PM_{2.5}$ standard from 12.0 $\mu g/m^3$ to 9.0 $\mu g/m^3$, based on an integrated assessment of an extensive body of new scientific evidence, which improved the body of knowledge regarding $PM_{2.5}$-related health effects. CARB staff will be submitting nonattainment area designations for the new annual $PM_{2.5}$ standard to U.S. EPA by February 7, 2025.

Toxic Air Contaminants

Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred to as Hazardous Air Pollutants (HAPs) under the CAA and Toxic Air Contaminants (TACs) under the CCAA. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods. They are regulated at the local, state, and federal level.

HAPs are the air contaminants identified by US EPA as known or suspected to cause cancer, serious illness, birth defects, or death. Many of these contaminants originate from human activities, such as fuel combustion and solvent use. Mobile source air toxics (MSATs) are a subset of the 188 HAPs[5]. EPA identified nine compounds with contributions from mobile sources that are among the cancer risk drivers or contributors and non-cancer hazard contributors, based on the 2011 National Air Toxics Assessment (NATA)[6]. The Federal Highway Administration (FHWA 2023) identifies these

[5] See U.S. EPA https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications accessed March 31, 2025

[6] See U.S. EPA https://www.epa.gov/national-air-toxics-assessment/2014-nata-assessment-results accessed on

as 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. FHWA considers these the priority mobile source air toxics,

California developed a program under the Toxic Air Contaminant Identification and Control Act (Assembly Bill [AB] 1807, Tanner 1983), also known as the Tanner Toxics Act, to identify, characterize and control TACs. Subsequently, AB 2728 (Tanner, Chapter 1047 statutes of 1983, Health and Safety Code sections 39660, et seq.) incorporated all 188 HAPs into the AB 1807 process. TACs include all HAPs plus other containments identified by CARB. These are a broad class of compounds known to cause morbidity or mortality (cancer risk). TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter (DPM) near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level.

Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986), which became law in 1986, is a voter initiative law that prohibits the exposure of individuals to chemicals known to cause cancer or reproductive toxicity without emitters first giving clear and reasonable warning and prohibits discharge of these chemicals into drinking water. This law requires that the Governor revise and republish at least once per year the list of chemicals known to the State to cause cancer or reproductive toxicity within the meaning of the Act (Health and Safety Code section 25249.8). The list is published in Title 27, California Code of Regulations, section 27001.

The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly), described by CARB (2016e), was enacted in 1987, and requires stationary sources to report the types and quantities of certain substances routinely released into the air. The goals of the Air Toxics "Hot Spots" Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels.

Particulate matter from diesel exhaust is the predominant TAC in urban air and is estimated to represent about 70 percent of the cancer risk from TACs, based on the statewide average reported by CARB (2012). According to 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 chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by CARB, and are listed as carcinogens either under State Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB (2012) reports that air pollution studies have shown an association that diesel exhaust and other cancer-causing TACs emitted from vehicles are responsible for much of the overall cancer risk from TACs in California. Particulate matter emitted from diesel-fueled engines, diesel particulate matter (DPM), was found to comprise much of that risk. In 1998, CARB formally identified DPM as a TAC (CARB 2012). DPM is of particular concern since it can be distributed over large regions, thus leading to widespread public exposure. The particles emitted by diesel

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engines are coated with chemicals, many of which have been identified by U.S. EPA as HAPs, and by CARB as TACs. The vast majority of diesel exhaust particles (over 90 percent) consist of $PM_{2.5}$ (CARB 2012). Like other particles of this size, a portion will eventually become trapped within the lung possibly leading to adverse health effects. While the gaseous portion of diesel exhaust also contains TACs, CARB's 1998 action was specific to DPM, which accounts for much of the cancer-causing potential from diesel exhaust. California has adopted a comprehensive diesel risk reduction program to reduce DPM emissions (CARB 2000). The EPA and CARB adopted low sulfur diesel fuel standards in 2006 that reduce DPM substantially.

Smoke from residential wood combustion can be a source of TACs. Wood smoke is typically emitted during winter when dispersion conditions are poor. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind the pollution can persist for many hours, especially in sheltered valleys during winter. Wood smoke also contains a significant amount of PM_{10} and $PM_{2.5}$. Wood smoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

Existing Air Quality

The San Joaquin Valley experiences poor air quality conditions, due primarily to elevated levels of ozone and particulate matter (SJVAPCD 2015). CARB, in cooperation with SJVAPCD, monitors air quality throughout the San Joaquin Valley Air Basin. Monitoring data presented in Table 2 was derived for each pollutant based upon the closest monitoring station to the project site.

<u>Ozone</u>

In California, ozone concentrations are generally lower near the coast regions than inland regions. The inland regions, such as the San Joaquin Valley, typically experience some of the higher ozone concentrations. This is because of the greater frequency of hot days (that is, higher temperatures) and stagnant air conditions (that is, very calm atmospheric conditions with very gentle winds) that are conducive to ozone formation. Many areas of the Valley lie downwind of urban areas that are sources of ozone precursor pollutants (2016a). While Fresno County is fairly rural, exceedances of the ozone standard occurred on 31 to 41 days per year, based on the last three years of available monitoring data (see Table 2).

<u>Carbon Monoxide</u>

State and federal standards for carbon monoxide are met throughout California as a result of cleaner vehicles and fuels that were reformulated in the 1990s. For CO, the 2012 monitored value of 2.2 ppm for an 8-hour average was used as the air basin maximum level (CARB 2016f). Because CO levels are so low in the air basin, monitoring was discontinued after 2012.

Table 2. Summary of Criteria Air Pollution Monitoring Data for Fresno County

Pollutant	Standard	Monitored Values[1] and Exceedance Days		
		2021	2022	2023
Ozone (ppm)	State 1-Hour	**0.125 / 12**	**0.112 / 4**	**0.117 / 4**
Ozone (ppm)	State 8-Hour	**0.100 / 41**	**0.089 / 31**	**0.088 / 35**
Ozone (ppm)	Federal 8-Hour	**0.100 / 39**	**0.089 / 30**	**0.088 / 30**
PM_{10} (ug/m^3)	State 24-Hour	**149.8 / 20**	**166.5 / 133**	**130.0 / 120**
PM_{10} (ug/m^3)	Federal 24-Hour	151.8 / 0	73.4 / 0	131.1 / 0
PM_{10} (ug/m^3)	State Annual	NR	NR	NR
$PM_{2.5}$ (ug/m^3)	Federal 24-Hour	**104.6 / 39.7[2]**	**55.8 / 21.5**	**51.3 / 11.0**
$PM_{2.5}$ (ug/m^3)	State Annual	**15.7**	14.8	12.6
$PM_{2.5}$ (ug/m^3)	Federal Annual	**17.2**	**14.8**	**12.6**
Carbon Monoxide (ppm)	State/Fed.8-Hour	NR / --[3]	NR / --[3]	NR / --[3]
Nitrogen Dioxide (ppm)	State 1-Hour	0.064 / 0	0.061 / 0	0.061 / 0
Nitrogen Dioxide (ppm)	Federal 1-Hour	0.065 / 0	0.062 / 0	0.062 / 0
Nitrogen Dioxide (ppm)	State Annual	0.018	0.019	0.010

Note: (1) Monitored values are the high values considering the form of the applicable standard,
(2) affected by wildfire smoke.
(3) NR = not reported in summaries, but last measured levels in 2012 were 2 ppm.

Source: CARB ADAM Data at http://www.arb.ca.gov/adam/index.html, Accessed 11/07/2024.

Particulate Matter ($PM_{2.5}$ and PM_{10})

Most areas of California have either 24-hour or annual PM_{10} concentrations that exceed the CAAQS. Most urban areas exceed the State annual standard and the 2006 24-hour federal standard. In the San Joaquin Valley, there is a strong seasonal variation in PM, with higher PM_{10} and $PM_{2.5}$ concentrations occurring in the fall and winter months. These higher concentrations are caused by increased activity for some emission sources and meteorological conditions that are conducive to the build-up of particulate matter. Industry and motor vehicles consistently emit particulate matter. Seasonal sources of particulate matter in San Joaquin Valley include wildfires, agricultural activities, windblown dust, and residential wood burning. In California, area sources, which primarily consist of fugitive dust, account for most directly emitted particulate matter. This includes dust from paved and unpaved roads. CARB estimates that 85 percent of directly emitted PM_{10} (and 66 percent of directly emitted $PM_{2.5}$) is from area sources (SJVAPCD 2016d). During the winter, the $PM_{2.5}$ size fraction makes up much of the total particulate matter concentrations. The major contributor to high levels of ambient $PM_{2.5}$ is the secondary formation of particulate matter caused by the reaction of NO_x and ammonium to form ammonium nitrate. CARB estimates that the secondary portion of $PM_{2.5}$ makes up about 50 percent of the annual concentrations in the Valley (SJVAPCD 2016b). A review of the San Joaquin Valley monitored data show the area records high PM_{10} and $PM_{2.5}$ levels during the fall. During this season, both the coarse fraction (from dust) and the $PM_{2.5}$ fraction result in elevated $PM_{2.5}$ and PM_{10} concentrations. Measured $PM_{2.5}$ levels exceeded the 2006 federal standards on an estimated 11 to 40 days per year. Measured

PM_{10} levels exceeded State standards on 20 to 133 days. Note wildfire smoke contributed to the highest measured levels and frequency that standards were exceeded.

Other Pollutants

Current and past air monitoring data indicate that the San Joaquin Valley meets ambient air quality standards for NO_2, SO_2, and lead. CARB does not routinely monitor lead, sulphates, hydrogen sulfide and vinyl chloride is not routinely conducted by CARB in the air basin (CARB 2018).

Air Quality Trends

Air quality in the San Joaquin Valley has improved significantly despite a natural low capacity for pollution, created by unique geography, topography, and meteorology. Emissions have been reduced at a rate similar or better than other areas in California. Since 1990, emissions of ozone precursors (i.e., NO_x and ROG) reduced by 80 percent (CARB 2016g), resulting in much fewer days where ozone standards have been exceeded. Direct emissions of PM_{10} and $PM_{2.5}$ have been reduced by 10 to 13 percent (CARB 2013). The San Joaquin Valley is the first Air Basin previously classified as "serious nonattainment" under the NAAQS to come into attainment of the PM_{10} standards.

Attainment Status

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The San Joaquin Valley does not meet State or federal ambient air quality standards for ground level O_3 and $PM_{2.5}$ and State standards for PM_{10}. The attainment status for the Valley with respect to various pollutants of concern is described in Table 3.

Under the CAA, the US EPA has classified the region as *extreme nonattainment* for the 8-hour O_3 standard. The air basin has attained the NAAQS for PM_{10}. The air basin is designated *nonattainment* for the $PM_{2.5}$ standard. CARB anticipates the San Joaquin Valley will also be designated nonattainment for the new 2024 $PM_{2.5}$ annual standard. The US EPA classifies the region as *attainment* or *unclassified* for all other air pollutants, which include CO and NO_2.

At the state level, the Air Basin is considered *severe non-attainment* for ground level O_3 and *nonattainment* for PM_{10} and $PM_{2.5}$. In general, the CAAQS are more stringent than the NAAQS. The Air Basin is required to adopt plans on a triennial basis that show progress toward meeting the State O_3 standard. The Air Basin is considered *attainment* or *unclassified* for all other pollutants.

Table 3. Plan Area Attainment Status

Pollutant	Federal Status	State Status
Ozone (O_3) – 1-Hour Standard	No Designation	Severe Nonattainment
Ozone (O_3) – 8-Hour Standard	Extreme Nonattainment	Nonattainment
Respirable Particulate Matter (PM_{10})	Attainment	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Sulfates and Lead	No Designation	Attainment
Hydrogen Sulfide	No Designation	Unclassified
Visibility Reducing Particles	No Designation	Unclassified

Regional Air Quality Plans

In response to not meeting the NAAQS, the region is required to submit attainment plans to US EPA through the State, which are referred to as the SIP. These plans are provided on SJVAPCD's website at http://valleyair.org/Air_Quality_Plans/PM_Plans.htm. As noted previously, the SIP is a compilation of regulations and plans used to implement and maintain the NAAQS for each nonattainment pollutants.

CARB submitted the 2004 Extreme Ozone Attainment Demonstration Plan to EPA in 2004, which addressed the old 1-hour NAAQS. The region's 2007 Ozone Plan, addressing the 1997 8-hour ozone NAAQS, was submitted to US EPA and approved in March 2012. A wide variety of control measures are included in these plans, such as reducing or offsetting emissions from construction and traffic associated with land use developments. The 2016 Plan for the 2008 8-Hour Ozone Standard was adopted by SJVAPCD on June 16, 2016. Addressing the 2008 8-hour ozone standard poses a tremendous challenge for the Valley, as NOx emissions require a 60 percent reduction to bring the San Joaquin Valley into attainment of EPA's 2008 8-hour ozone standard. SJVAPCD's 2016 Ozone Plan received EPA's final approval or conditional approval of all portions of the plan in 2019. EPA found that sufficient quantified emissions reductions are identified in the plan without including unquantified emissions reductions such as those related to the "further study" of Rule 4694 that controls emissions from winery activities (fermentation and storage of wines). The District adopted the 2020 Reasonably Available Control Technology (RACT) Demonstration for the 2015 8-Hour Ozone Standard on June 18, 2020, as required to the federal Clean Air Act. RACT requirements apply to sources that are subject to U.S. EPA Control Techniques Guidelines (CTGs) and for "major sources" of VOCs and NOx (i.e., ozone precursors). These RACT requirements ensure that significant sources of these emissions are controlled to a "reasonable" extent. The District adopted the 2022 Plan for the 2015 8-Hour Ozone Standard on December 15, 2022 (SJVAPCD 2022). This Plan satisfies requirements by the Clean Air Act in addition to ensuring expeditious attainment of the 0.70 ppm 8-hour ozone standard.

The SJVAPCD adopted the *2018 Plan for the 1997, 2006 and 2012 $PM_{2.5}$ Standards* on November 15, 2018. This plan was approved by CARB on January 24, 2019. This plan demonstrates attainment of the federal $PM_{2.5}$ standards as expeditiously as practicable. The plan uses control measures to reduce NO_x, which also leads to fine particulate formation in the atmosphere. The plan incorporates measures to reduce direct emissions of $PM_{2.5}$, including a strengthening of regulations for various industries and the general public through new rules and rule amendments. The plan increases controls on residential wood-burning activities.

The SJVAPCD adopted the *2024 Plan for the 2012 $PM_{2.5}$ Standards* on June 20, 2024. This plan was approved by CARB on July 25, 2024 and fulfills the remaining CAA requirements, including the final modeling analysis, attainment strategy and emission reduction commitments, reasonable further progress/quantitative milestones, and contingency measures. This Plan demonstrates expeditious attainment of the 2012 $PM_{2.5}$ standard by 2030.

Each of the ozone and $PM_{2.5}$ plans include measures (i.e., federal, state and local) that would be implemented through State and SJVAPCD or other regional rule making or program funding to reduce air pollutant emissions. Transportation Control Measures (TCMs) are part of the SIP. These are strategies that reduce transportation-related air pollution, GHG emissions, and fuel use by reducing vehicle miles traveled and improving roadway operations. The plans described above that address ozone NAAQS also meet the state planning requirements.

SJVAPCD Rules and Regulations

The SJVAPCD has adopted rules and regulations that apply to land use projects, such as the proposed project. These are described below.

<u>SJVAPCD Indirect Source Review Rule</u>

In 2005, the SJVAPCD adopted Rule 9510 Indirect Source Review (ISR or SJVAPCD Rule 9510) to reduce NO_x and PM_{10} emissions from new land use development projects. The rule resulted from adoption of SJVAPCD commitments contained in the 2004 Extreme Ozone Attainment Demonstration Plan and the 2006 PM_{10} Plan. These plans identified the need to reduce PM_{10} and NO_x substantially to attain and maintain the NAAQS on schedule.

New discretionary development projects that would generate substantial air pollutant emissions are subject to this rule. The rule requires projects to mitigate both construction and operational period emissions by applying the SJVAPCD-approved mitigation measures and paying fees to support programs that reduce emissions. The rule requires mitigated exhaust emissions during construction based on the following levels:

- 20 percent reduction from unmitigated baseline in total NO_x exhaust emissions
- 45 percent reduction from unmitigated baseline in total PM_{10} exhaust emissions

For operational emissions, Rule 9510 requires the following reductions:

- 33.3 percent of the total operational NO_x emissions from unmitigated baseline
- 50 percent of the total operational PM_{10} exhaust emissions from unmitigated baseline

Fees apply to the unmitigated portion of the emissions and are based on estimated costs to reduce the emissions from other sources plus estimated costs to cover administration of the program. It is expected that in accordance with the ISR, the project applicant will submit an application for approval of an Air Impact Assessment (AIA) to the SJVAPCD. The AIA would provide the calculation of project emissions to determine the amount of fees payable for unmitigated emissions.

Regulation VIII – Fugitive PM_{10}

SJVAPCD controls fugitive PM_{10} through Regulation VIII (Fugitive PM_{10} Prohibitions). The purpose of this regulation is to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce or mitigate anthropogenic (human caused) fugitive dust emissions. This applies to activities such as construction, bulk materials, open areas, paved and unpaved roads, material transport, and agricultural areas. Sources regulated are required to provide dust control plans that meet the regulation requirements. Fees are collected by SJVAPCD to cover costs for reviewing plans and conducting field inspections.

Other SJVAPCD Rules

Other SJVAPCD Rules and Regulations[7] that may be applicable to the project include, but are not limited to:

- Rule 4101 (Visible Emissions): The purpose of this rule is to prohibit the emissions of visible air contaminants to the atmosphere. The provisions of this rule apply to any operation that emits or may emit air contaminants.
- Rule 4102 (Nuisance): The purpose of this rule is to protect the health and safety of the public, and applies to any operation that emits or may emit air contaminants or other materials.
- Rule 4601 (Architectural Coatings): The purpose of this rule is to limit Volatile Organic Compounds (VOC) emissions from architectural coatings. Emissions are reduced by limits on VOC content and providing requirements on coatings storage, cleanup, and labeling.
- Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations): The purpose of this rule is to limit VOC emissions from asphalt paving and maintenance operations. Paving operations will be subject to Rule 4641.

The Air District is anticipated to provide a determination of applicable rules/regulations to the project when specific building, grading, etc. plans are provided to the Air District prior to initiation of construction- and operation-related activities that fall within the purview of the Air District's regulatory authority.

[7] See current SJVAPCD Rules and Regulations at https://ww2.valleyair.org/rules-and-planning/current-district-rules-and-regulations/ accessed March 31, 2025.

Sensitive Receptors

"Sensitive receptors" are defined as facilities where sensitive population groups, such as children, the elderly, the acutely ill, and the chronically ill, are likely to be located. Land uses that include sensitive receptors are residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals, and medical clinics. There are numerous rural dwellings and two elementary schools within the VCIP Plan Area. The community of Cantua Creek, near the center of the Plan Area, includes approximately 100 residences and the Cantua Elementary School, and represents the greatest concentration of sensitive receptors within the Plan Area.

IMPACT ANALYSIS

Standards of Significance

Appendix G, of the California Environmental Quality Act (CEQA) Guidelines (Environmental Checklist) contains a list of project effects that may be considered significant. The project would result in a significant impact if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations;
- Result in other emissions (such as those leading to odors) affecting a substantial number of people;
- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant effect on the environment; or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The SJVAPCD has developed the Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD 2015), also known as the GAMAQI. The following thresholds of significance, obtained from the SJVAPCD's GAMAQI, are used to determine whether a proposed project would result in a significant air quality impact under CEQA:

1) Construction Emissions of PM. Construction projects are required to comply with Regulation VIII as listed in the SJVAPCD. However, the size of the project and the proximity to sensitive receptors may warrant additional measures, such as additional watering, wind fences, reduced equipment usage, etc...

2) Criteria Air Pollutant Emissions. SJVAPCD's adopted CEQA thresholds of significance for criteria pollutant emissions and their application is presented in Table 4[8]. These

[8] SJVAPCD significance thresholds for criteria air pollutant emissions are published on their website at https://ww2.valleyair.org/media/m2ecyxiw/1-cms-format-ceqa-air-quality-thresholds-of-significance-criteria-pollutants.pdf, accessed March 31, 2025. These are equivalent to those published in the GAMAQI (SJVAPCD

thresholds address both construction and operational emissions. Note that the District treats permitted equipment and activities separately. The projects to be developed under the VCIP are not considered a source of SO_X emissions and would have relatively low CO emissions.

3) Ambient Air Quality. Emissions that are predicted to cause or contribute to a violation of an ambient air quality would be considered a significant impact. SJVAPCD recommends that dispersion modeling be conducted for construction or operation of projects when on-site emissions exceed 100 pounds per day after implementation of all mitigation measures.

4) Local CO Concentrations. CO is considered a localized air pollutant caused by large emissions in a localized area, such as busy roadway intersections. Construction equipment is not considered a substantial source of CO emissions; however, construction-related traffic would be considered a source of CO. Traffic emissions associated with the VCIP projects would be considered significant if the project contributes to CO concentrations at receptor locations in excess of an ambient air quality standard.

5) Toxic Air Contaminants or Hazardous Air Pollutants. Exposure to HAPs or TACs would be considered significant if the probability of contracting cancer for the Maximally Exposed Individual (MEI) would exceed 20 in 1 million or would result in a Hazard Index (HI) greater than 1 for non-cancer health effects[9]. The HI represents the ratio of the predicted exposure to a recommended exposure limit, where an HI of greater than 1.0 indicates an unhealthy exposure.

6) Odors. Odor impacts associated with the potential VICP projects would be considered significant if they have the potential to frequently expose members of the public to objectionable odors through development of a new odor source or placement of receptors near an existing odor source.

7) Greenhouse Gases (GHGs). In SJVAPCD's *Guidance for Valley Land-Use Agencies in Addressing GHG Emissions Impacts for New Projects Under CEQA*, the District establishes a requirement that land use development projects demonstrate a 29 percent reduction in GHG emissions from Business-As-Usual (BAU).

8) With respect to cumulative air quality impacts, the GAMAQI provides that any single project that would individually have a significant air quality impact (i.e., exceed significance thresholds for criteria pollutants ROG, NOx, or PM_{10}) would also be considered to have a significant cumulative impact. In cases where project emissions are all below the applicable significance thresholds, a project may still contribute to a significant cumulative impact if there are other projects nearby whose emissions would

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2015c).

[9] /SJVAPCD significance thresholds for toxic air contaminants are published on their website at https://ww2.valleyair.org/media/2lpbkso0/2-cms-format-air-quality-thresholds-of-significance-toxic-air-contaminants.pdf, accessed on March 31, 2025. Note that these have been updated since the last version of the GAMAQI was published in 2015.

combine with a given project's emissions to result in an exceedance of one or more significance thresholds for criteria pollutants.

Table 4. SJVAPCD CEQA Thresholds of Significance for Projects – Criteria Pollutant Emission Levels in Tons Per Year

Pollutant/Precursor	Construction Emissions	Operational Emissions	
		Permitted Equipment and Activities	Non-Permitted Equipment and Activities
Carbon Monoxide (CO)	100	100	100
Nitrogen Oxides (NOx)	10	10	10
ROG	10	10	10
Sulfur Dioxide (SOx)	27	27	27
Particulate Matter – PM_{10}	15	15	15
Particulate Matter – $PM_{2.5}$	15	15	15
Source: San Joaquin Valley Air Pollution Control District, GAMAQI, Page 80, Table 2 or website at http://www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf.			

Air Quality Impacts

The VCIP is a comprehensive master plan of development for solar PV generation projects and battery storage facilities, along with their supporting infrastructure of gen-tie lines, collection substations, and connecting transmission lines. The VCIP provides a plan for overall development at a programmatic land use scale but does not identify individual projects or provide project-level details of development. SJVAPCD significance thresholds as identified in the GAMAQI would apply to each individual project constructed under the VCIP, and are not intended to be applied at the Plan-wide level. However, to determine the overall emissions from construction and operations resulting from the buildout of the VCIP, estimates of overall emissions were computed. The analysis also included a health risk assessment for VCIP development for the area with the highest concentration of sensitive receptors, which is the Cantua Creek community.

Air quality impacts fall into two categories: short-term impacts due to construction, and long-term impacts due to facilities operation. During construction, local particulate matter concentrations would increase primarily due to fugitive dust sources and would contribute to regional ozone and $PM_{10}/PM_{2.5}$ concentrations due to exhaust emissions. During operation, the solar and energy storage facilities would result in an increase in emissions of ozone precursors such as ROG and NO_x, primarily due to increased motor vehicle trips (employee trips, site deliveries, and onsite maintenance activities).

<u>CalEEMod Construction Modeling</u>

SJVAPCD requires criteria pollutant emissions from construction and operational sources be identified and quantified using the latest version of the California Emissions Estimator Model (CalEEMod). CalEEMod Version 2022.1.1.28 is the most recent version with relevant emission factors.

There are four different types of projects that would be constructed under VCIP, which include:

1. Solar photo voltaic panels plus battery energy storage system (PV+BESS) facilities. These are the solar arrays and battery storage facilities that are constructed at each site.

2. Solar generation tie-lines (Gen Tie). The gen-tie lines internally connect the PV+BESS sites to the nearest VCIP substation.

3. 230/500/ kV Utility Switchyard (Substations). The five VCIP substations collect the power transmitted by gen-tie lines from the PV+BESS.

4. VCIP Transmission lines (T-Lines 500-kV). The T-lines collect power from the VCIP substations for conveyance to the state power grid..

VCIP would consist of the types of projects, described above, constructed as discrete projects in various sizes. A CalEEMod model was developed to represent emissions from the VCIP projects planned to be developed in each year of VCIP buildout. Table 5 describes the VCIP projects that are planned to be constructed in each of the first four years of VCIP buildout, which represent the maximum development planned for any year. The annual development planned for subsequent years would be smaller in overall scale than the maximum development described in Table 5. It is important to note that while maximum annual PV+BESS development planned for VCIP is 2,300 MW, the typical PV+BESS project would likely be 250 MW, although projects could range from 100 MW to 1,150 MW. Thus, in any given year, there could be 9 or more separate solar projects under construction by different developers, each of which would be required to conduct their own project-level air quality assessments as part of their project-level approval and environmental review process. Inputs to the CalEEMod model runs are provided in Attachment 1 to this report.

Table 5. CalEEMod Unit-Sized Projects

VICP Project	Phases	Duration	Size Modeled
Solar + BESS	Site Preparation Construction of Solar Arrays Inverters, Transformers, Switching BESS	200 days	2,300MW 15,000 acres
Gen Ties	Gen-Tie Line construction (poles, lines)	100 days	20 miles
Substations	Site Preparation Construction	200 days	60 acres
T-Lines	T-Line construction (poles, lines)	200 days	30 miles

The inputs for the construction build-out scenarios, described in Table 5, were developed based on experience from other built solar projects. The emissions computed using CalEEMod for this assessment address use of construction equipment, worker vehicle travel, on-site vehicle and truck use, and off-site truck travel by vendors or equipment/material deliveries.

The types, quantity and duration of construction equipment anticipated for construction were based on projections used for similar projects with solar PV and BESS along with Gen-Tie, T-line, and substation construction. The total hours each piece of equipment would operate was divided by the number of workdays in the phase to compute the hours per day that were entered into CalEEMod along with the quantity of equipment. Default horsepower and load factors assigned by CalEEMod for each type of equipment were used.

For construction vehicle trips, the number of trips and average trip distance were provided for the various types of trips: workers, freight, gravel import, concrete, and water trucks. Some of the freight trips would originate outside of the air basin. When not traveling on site, trips were assumed to be made mostly on freeways or large arterial roadways (e.g., highways). It is noted that all commuting workers were assumed to be driving solo, whereas substantial reductions in commute traffic would occur due to traffic mitigations such as the fleet of shuttle buses which would be required to avoid congestion on area roadways. Construction emission computations do not take carpooling into account, which is typical for these types of projects in rural environments; on past solar projects, a carpooling rate of 25-30 percent was found to be typical.

A small fraction (i.e., one quarter mile) of each trip would occur where roads are not paved. On site travel routes would be gravel covered and dust would be controlled through frequent watering and/or use of dust suppressants. Water trucks and other on-site construction trucks were assumed to travel mostly on-site on unpaved roadways (i.e., 90 percent of the travel length on unpaved roadways). Water trucks and other vehicles operating on the site were assumed to be moving 50 percent of the construction day.

Annual construction emissions from buildout of the VCIP were based on the planned construction schedule. Construction is planned to begin in 2028/2029 and continue through 2038. The amount of construction assumed each year is shown in Table 6.

<u>Helicopter Construction Emissions</u>

Light helicopter operations are necessary during construction of the Gen Ties and T-lines to lift line leads over monopoles. For this assessment, a single engine Hughes MD500E was assumed. These emissions were computed separately from CalEEMod based on published emission factors for various helicopter models (Swiss Federation 2015). The emissions account for five landing take-off (LTO) cycles per day in addition to hourly flight emissions..

Table 6. Hypothetical Annual Construction Phasing Plan

Construction Year	Size in MW, acres, or miles			
	Solar + BESS	**Gen Ties**	**Utility Substations**	**Internal T-Lines**
2029	2,300 MW	26 miles	60 acres	30 miles
2030	2,300 MW	26 miles	60 acres	30 miles
2031	2,300 MW	26 miles	60 acres	30 miles
2032	2,300 MW	26 miles	60 acres	30 miles
2033	2,300 MW	26 miles	60 acres	20 miles
2034	2,100 MW	26 miles	--	--
2035	2,100 MW	26 miles	--	--
2036	2,100 MW	26 miles	--	--
2037	2,100 MW	26 miles	--	--
2038	1,100 MW	26 miles	--	--
Total	21,000 MW	260 miles	--	140 miles

CalEEMod Operational Modeling

As projects under VCIP are completed, operational emissions increase. There would be activity associated with maintaining each completed project. Activity would include some on-site equipment and vehicle usage, along with worker and small truck trips traveling off site. CalEEMod inputs for the operation of completed VCIP facilities were developed for each year.

Modeling Results

Annual emissions are reported in Table 7 based on the conceptual phasing plan . These emissions are from onsite construction activity, on- and off-site vehicle travel (i.e., workers and trucks), construction of Gen-Ties, construction of substations and construction of connecting transmission lines. The construction of Gen-Ties and transmission lines includes helicopter activity. The emissions of PM_{10} and $PM_{2.5}$ reported in Table 7 reflect the application of dust control measures that would be required by regulation. However, any additional application of required emissions controls would provide substantial reductions in emissions from on-site fugitive dust generation. Operational emissions are reported in Table 8, which include onsite maintenance activity and both on- and off-site worker and truck travel.

Attachment 1 includes the construction assumptions that were used to model emissions. The CalEEMod modeling outputs for construction and operational emissions are quite voluminous and available upon request. Attachment 1 includes summaries of the model results.

Table 7. Annual VCIP Construction Criteria Air Pollutant Emissions in Tons per Year

Construction Year	ROG	NO_x*	CO	Total PM_{10}*,**	Total $PM_{2.5}$**
2029	27.44	200.33	387.61	138.60	19.30
2030	24.39	193.71	374.71	137.93	18.60
2031	23.50	189.21	363.89	137.90	18.57
2032	22.55	181.98	353.09	137.89	18.32
2033	21.42	175.67	337.19	134.61	17.84
2034	18.47	153.72	296.53	117.13	15.66
2035	17.92	148.45	289.64	117.12	15.65
2036	17.54	145.11	283.13	116.90	15.65
2037	15.59	142.95	279.14	116.89	15.65
2038	8.24	75.73	147.48	62.46	8.33
Individual Project-Level Significance thresholds	**10**	**10**	**100**	**15**	**15**

* ISR requires reductions for NOx and PM_{10} that are not reflected in this assessment.
** Values reported for “PM_{10} and $PM_{2.5}$ include a combination of exhaust and fugitive dust, and reflect the effect of dust control measures implemented under Regulation VIII, but not reductions in exhaust emissions required under ISR..

Table 8. Annual VCIP Operational Emissions in Tons Per Year (Unmitigated)

Operation Year	ROG	NO_x	CO	PM_{10}^*	$PM_{2.5}^*$
2030	0.30	2.32	3.95	12.95	1.40
2031	0.59	4.56	7.79	25.90	2.80
2032	0.86	6.75	11.56	38.84	4.20
2033	1.14	8.88	15.27	51.77	5.59
2034	1.40	10.98	18.92	64.71	6.98
2035	1.64	12.87	22.21	76.51	8.24
2036	1.87	14.71	25.47	88.31	9.50
2037	2.10	16.54	28.71	100.10	10.76
2038	2.33	18.34	31.94	111.90	12.02
2039	2.43	19.21	33.56	118.08	12.68
Individual Project Significance Thresholds	***10***	***10***	***100[2]***	***15***	***15***

*Includes both exhaust and fugitive dust emissions.

Emissions from Existing Agricultural Activities

The VCIP would essentially utilize land that is currently active for agricultural purposes. Farming operations generate existing emissions of dust and air pollutants. Dust emissions are generated primarily by ground disturbances from tilling, harvesting, and vehicle travel over unpaved surfaces. ROG emissions are primarily from the application of fertilizers and pesticides. NOx emissions are primarily from the operation of farm equipment that include tractors and harvesters. There are emissions from truck traffic used to export farm products and service the farmlands, as well as the workforce traffic.

VCIP implementation would develop PV projects and infrastructure over about 136,000 acres in Fresno County. In 2024 approximately 53,044 acres of this total were actively farmed for row and field crops, tree crops, and vines, and approximately 81,357 acres were fallowed (the remaining 1,599 acres are mapped as natural or developed/roads). Agricultural activities such as discing and weed control occur on fallowed lands. Thus, there are agriculture-related emissions associated with both actively farmed and fallowed lands, although a wider range of activities that result in emissions occurs on actively farmed lands (e.g., harvesting, irrigation, pest control). Altogether, these agriculturally related activities result in emissions of particulate matter (PM10 and PM 2.5) from tilling, discing, and other soil preparation; pruning; harvesting; vehicle travel on unpaved farm roads; and wind erosion. They also result in NO_x and VOC emissions associated with the use of diesel fuel in tractors, sprayers, and irrigation pumps, as well as the use of pesticides and herbicides. Approximate agricultural emissions associated with these existing uses were calculated for informational purposes.

CARB Inventory Estimates

CARB reports annual emissions for Fresno County. The California Emissions Inventory Data Analysis and Reporting System (CEIDARS) is a database management system developed to track statewide criteria pollutant emissions[10]. The database is divided into reporting years and stores discrete information for stationary, areawide, mobile, and natural sources. Emissions can be reported by county for different years from 2017 to 2050, with 2017 being the base year. This inventory for Fresno County was used to compute emissions per acre per year and apply these rates to VCIP (see Table 9). The following emissions calculations used the 2025 emissions year.

Emissions were based on dust generation, fertilizer and pesticide applications, and farm equipment use. There would be on-road traffic associated with farming operations but these are reported for all of the county traffic and agricultural traffic cannot be separated. Therefore, these emissions do not include farming on-road traffic sources (i.e., truck and worker traffic).

Table 9. CARB Inventory of Fresno County Emissions

Source (CARB classification)	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**
	Daily	**Emissions**	**in tons**	**per day**	
614-TILLING DUST				6.25	0.94
615-HARVEST OPERATIONS - DUST				7.88	1.18
530-PESTICIDES/FERTILIZERS	4.08				
645-UNPAVED TRAFFIC AREA - AGRICULTURE				1.92	0.11
646-UNPAVED ROAD TRAVEL DUST- FARM ROADS					
870-FARM EQUIPMENT	1.14	10.89	5.51	0.33	0.3
Total Daily (tpd)	5.22	10.89	5.51	18.73	2.76
	Annual	**Emissions**	**in tons**	**per year**	
Total Annually (tpy)	1905.3	3974.85	2011.15	6836.45	1007.4
Ag Emission in tons/acre/year	**0.0018**	**0.0037**	**0.0019**	**0.0064**	**0.0009**

Note: Based on 1,073,350 farmed acres in Fresno County used by CARB[11]. Although this acreage figure is from 2012, it is within 5% of the California Department of Conservation acreage for cultivated lands in Fresno County for 2022 and is therefore suitable for this informational analysis.
Source: CARB's CEPAM2019v1.04 Emission Projection Data

Farming dust generating emissions (i.e., PM_{10} and $PM_{2.5}$) are uncontrolled and come from a variety of activities:

- Tilling dust includes mechanical operations used to prepare the soil, such as discing, shaping, chiseling, and leveling. Emissions vary seasonally and regionally according to

[10] CARB California Emissions Inventory Data Analysis and Reporting System. See https://ww2.arb.ca.gov/ceidars accessed June 13,2025.

[11] CARB's Miscellaneous Process Methodology Section (7.4 - Agricultural Land Preparation Operations, Revised and updated, most recent version is April 2016), provides 2012 harvested acreage from the U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS), compiled from County Agricultural Commissioner reports. Acreage not subject to land preparation operations was excluded (pasture lands, mushrooms, greenhouse, nursery and flower crops, forest firewood), as well as acreage aggregated statewide as "Sum of Others."

the crop mix and the associated land preparation activities. Since fallow lands are disked twice per year, emissions from this activity were computed for those lands in addition to farmed lands.

- Harvest operations include crop harvesting and the first post-harvest processing stage (packing houses, nut hullers and processors, cotton gins, dehydrators, feed and grain mills). Emissions vary seasonally and regionally according to the crop mix and the intensity of harvest activities taking place, with the highest emissions occurring during the peak harvest months of summer and fall.

- Traffic on unpaved roadway generates fugitive dust based on vehicle miles travelled estimates.

- Vehicle travel over other unpaved surfaces generates emissions that are computed based on vehicles miles travelled per acre per year and per crop.

The operation of farming equipment that combusts fuel, mainly diesel, generates emissions. CARB computed these emissions for Fresno County based on their OFFROAD2021 model.

The application of fertilizers and pesticides during farming operations primarily emit ROG.

On-road traffic associated with farming cannot be segregated from the overall county emissions since traffic emissions are based on vehicle registration data and cannot be tied to any type of individual activity. Therefore, traffic emissions associated with agriculture are not included.

<u>VICP Area Farming Emissions</u>

The CARB inventory was based on an estimate of 1,073,350 acres of farmland in Fresno County. Total emissions were divided by this acreage to generate a per acre per year emission rate that could be applied to VCIP. The total farming acreage without VCIP was estimated at 53,044 acres in any given year, assuming that 81,357 acres are left fallow. Build-out acreage of VCIP projects at the rate shown in Table 6 and based on 15,000 acres per 2,300 MW of PV power (see Table 5) were used to compute the annual farming emissions that would be eliminated. These are shown in Table 10.

As VCIP projects are constructed and brought online, farming-related emissions would decrease. The combination of modeled construction plus operational emissions associated with VCIP (shown in Tables 7 and 8) were combined with the removed estimates of farming emissions (see Table 10) to estimate the net change in emissions that are shown below in Table 11.

While farming operations may be less frequent and intensive as construction, they are not controlled, and therefore, have higher emissions rates than VCIP construction or operation. VCIP does not have any substantial sources of ROG, therefore, emissions would be lower than farming ROG emissions that come from application of fertilizers and pesticides. Construction emissions of NOx would generally be greater than farming operations, but VCIP operational activities would be less.

Table 10. Farming Emissions Displaced in Tons Per Year (Uncontrolled)

Operation Year	ROG	NO_x	CO	PM_{10}*	$PM_{2.5}$*
2029	10.99	11.60	22.93	59.62	8.85
2030	21.98	23.20	45.86	119.24	17.69
2031	32.97	34.80	68.79	178.86	26.54
2032	43.96	46.41	91.72	238.48	35.39
2033	54.95	58.01	114.65	298.10	44.23
2034	64.99	68.60	135.58	352.54	52.31
2035	74.15	78.27	154.70	402.24	59.69
2036	82.52	87.10	172.15	447.63	66.42
2037	90.16	95.17	188.09	489.06	72.57
2038	94.16	99.39	196.43	510.76	75.79
2039	94.16	99.39	196.43	510.76	75.79

*Includes both exhaust and fugitive dust emissions. Note that fugitive dust emissions are uncontrolled.

Table 11. Change in Annual Emissions with VCIP Implementation in Tons Per Year

Operation Year	ROG	NO_x	CO	PM_{10}*	$PM_{2.5}$*
2029	16.4	188.7	364.7	79.0	10.5
2030	2.7	172.8	332.8	31.6	2.3
2031	-8.9	159.0	302.9	-15.1	-5.2
2032	-20.6	142.3	272.9	-61.8	-12.9
2033	-32.4	126.5	237.8	-111.7	-20.8
2034	-45.1	96.1	179.9	-170.7	-29.7
2035	-54.6	83.0	157.2	-208.6	-35.8
2036	-63.1	72.7	136.4	-242.4	-41.3
2037	-72.5	64.3	119.8	-272.1	-46.2
2038	-83.6	-5.3	-17.0	-336.4	-55.4
2039	-91.7	-80.2	-162.9	-392.7	-63.1

*Includes both exhaust and fugitive dust emissions. Note that fugitive dust emissions from agricultural activities are uncontrolled, while VCIP emissions are controlled.

Attachment 2 includes the calculations of agricultural emissions in Fresno County and those displaced by the VCIP.

Impact 1: Construction Dust. Construction activity involves a high potential for the emission of fugitive particulate matter emissions that would affect local air quality.

PM_{10} and $PM_{2.5}$ emissions reported in Table 7 are associated with construction ground disturbance, windblown dust from disturbed areas, vehicle travel on unpaved and paved roadways, and additional dust generated on roadways from vehicle tracking material on to roadways. A small fraction is from equipment and vehicle exhaust. Most of these emissions are generated by vehicle travel, especially workers, trucks and equipment traveling on unpaved roadways. When considering yearly emissions from all VCIP construction of multiple projects in a given year, fugitive dust emissions, without dust controls, would appear to exceed the CEQA significance thresholds contained in the GAMAQI. However, the Air District's thresholds apply only to annual emissions from individual projects, not all VCIP projects planned for a given year. Past experience has shown that solar +BESS projects of up to 300 MW that are constructed in one year result in emissions that are below thresholds for all criteria pollutants with the implementation of dust controls required under Regulation VIII.

Site preparation and disturbance (e.g., vehicle travel on exposed areas) would likely result in the greatest emissions of dust that includes $PM_{10}/PM_{2.5}$. Windy conditions during construction could cause substantial emissions of $PM_{10}/PM_{2.5}$. The SJVAPCD's GAMAQI emphasizes implementation of effective and comprehensive control measures. SJVAPCD adopted a set of PM_{10} fugitive dust rules collectively called Regulation VIII. This regulation essentially prohibits the emissions of visible dust (limited to 20-percent opacity) and requires that disturbed areas or soils be stabilized. Prior to construction of each project phase, the applicant would be required to submit a dust control plan that meets the regulation requirements. These plans are reviewed by SJVAPCD and construction cannot begin until District approval of the dust control plan is obtained. The rules pertaining to construction activities generally require:

- Effective dust suppression (e.g., watering) for land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill and demolition activities.
- Effective stabilization of all disturbed areas of a construction site, including storage piles, not used for seven or more days.
- Control of fugitive dust from on-site unpaved roads and off-site unpaved access roads.
- Removal of accumulations of mud or dirt at the end of the workday or once every 24 hours from public paved roads, shoulders and access ways adjacent to the site.
- Cease outdoor construction activities that disturb soils during periods with high winds.
- Record keeping for each day dust control measures are implemented.
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Landscape or replant vegetation in disturbed areas as quickly as possible.
- Prevent the tracking of dirt on public roadways. Limit access to the construction sites, so tracking of mud or dirt on public roadways can be prevented. If necessary, use wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.

- Suspend grading activity when winds (instantaneous gusts) exceed 25 mph or dust clouds cannot be prevented from extending beyond the site.

Implementation of an approved dust control plan would reduce emissions by at least 80 percent with aggressive measures[12].

Impact 2: Construction Emissions. Equipment and vehicle trips associated with construction would emit ozone precursor and particulate matter air pollutants on a temporary basis. Construction emissions for individual VCIP projects could exceed the GAMAQI CEQA significance thresholds.

Construction equipment and traffic exhaust affects air quality both locally and regionally. Emissions of Diesel Particulate Matter (DPM), a Toxic Air Contaminant (TAC), can affect local air quality. The impact from local TAC emissions is addressed under *Impact 5*. Emissions of air pollutants that could affect regional air quality were estimated and included in Table 7. As shown, unmitigated construction emissions would exceed the applicable SJVAPCD CEQA thresholds, including PM_{10} (exhaust plus fugitive dust) for overall VCIP development in a given year, and could exceed the thresholds at the larger individual VCIP projects (e.g., solar PV + BESS projects over 300 MW constructed in one year).

The SJVAPCD Indirect Source Review Rule (Rule 9510) applies to construction of projects with mitigated emissions above 2.0 tons per year (tpy) of NOx or 2.0 tpy of PM_{10}. Regardless of whether a project's construction emissions of regional pollutants would exceed the Air District's CEQA significance thresholds for each pollutant, the project is still required to comply with Rule 9510 to ensure that the project contributes its fair share of emissions reductions in order to achieve the basin-wide reduction targets established in the Air District's Ozone and PM attainment plans. Rule 9510 requires that the project reduce uncontrolled construction exhaust emissions by 20 percent for NO_x and 45 percent for PM_{10} from calculated unmitigated levels. The basis for the reductions is an analysis using CalEEMod model. SJVAPCD encourages reductions through on-site mitigation measures. (Note: The use of the term "mitigation" under Rule 9510 does not refer to mitigation of impacts under CEQA; i.e., the ISR emission reduction percentages are required without regard to whether the CEQA emissions thresholds are exceeded or not.) Fees to purchase or sponsor off-site reductions through SJVAPCD apply when on-site mitigation measures do not achieve the required percentage of emissions reduction. Using less-polluting construction equipment, such as newer equipment or retrofitting older equipment reduces construction emissions on-site. A combination of on-site and off-site measures can be implemented to meet the overall emission reduction requirements. The uncontrolled emissions reported in Table 7 do not include the reductions required by Rule 9510.

Note that meeting the requirements of Rule 9510 does not necessarily mean that emissions will be reduced below the project significance thresholds. In such cases, the project proponent and SJVAPCD would enter into a contractual agreement (i.e., Voluntary Emissions Reduction Agreement - VERA), under which the project proponent agrees to mitigate project-specific

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[12] Based on modeling of dust control measures using CalEEMod for a combination of control measures that include aggressive site watering, reduced vehicle speed, and use of dust palliatives.

emissions (to below the Air District's thresholds) by providing funds to the SJVAPCD. The District's role is to administer the implementation of the VERA consisting of identifying emissions reductions projects, funding those projects and verifying that emissions reductions have been successfully achieved. Thus, project-related impacts on air quality can and would be mitigated to less-than-significant levels under CEQA. Although VERAs are nominally voluntary, in practice they must be executed and implemented in order to meet the CEQA requirement that impacts be mitigated to the extent feasible (CEQA Guidelines Section 15126.4(a)). Types of emission reduction projects that have been funded in the past include electrification of stationary internal combustion engines (such as agricultural irrigation pumps), replacing old heavy-duty trucks with new, cleaner, more efficient heavy-duty trucks, and replacement of agricultural equipment with the latest generation technologies.

Emissions reported in Table 7 reflect those associated with build-out of the entire VCIP, which would involve numerous construction projects over a period of 10 years. Thus, it would not be appropriate to apply the air district's project-level CEQA thresholds to the annual unmitigated emissions provided in Table 7. SJVAPCD thresholds apply to both particulate matter exhaust and fugitive dust. The application of dust emission controls, as required by SJVAPCD, would be expected to reduce fugitive PM_{10} emissions below the significance thresholds for all VCIP projects. Thus, while the residual construction-related exhaust emissions of ozone precursors and particulates (i.e., emissions from individual projects would be below the CEQA thresholds) and may result in a small decrease in overall air quality, and may therefore, have a small adverse health affect (as described earlier in this report under "Criteria Air Pollutants and Their Health Effects"), the overall impacts would not cause the health-based NAAQS or CAAQS to be violated.

The VCIP solar and BESS projects would be decommissioned at the end of their productive lives. The activities associated with deconstruction would be comparable to construction, but emissions are expected to be substantially lower given anticipated reductions in vehicle and equipment emissions to be phased-in per State and federal regulations, and also because of the generally lower intensity of equipment use associated with decommissioning. With the application of air district's dust control requirements, fugitive PM_{10} emissions are likewise expected to be below the CEQA significance thresholds during decommissioning of VCIP projects.

Mitigation Measure for Impact 2: Apply construction period emissions controls through on- and off-site reduction measures as required by the SJVAPCD for each individual VCIP project.

Individual projects are subject to ISR which requires reductions in emissions of NOx and PM10 for all projects regardless of whether a project results in an air quality impact. Note that reductions in PM10 would also reduce PM2.5 emissions. Measures to reduce on-site emissions may include the use of Tier 4 construction equipment that would reduce the on-site project emissions of NOx by 32 percent during the early VCIP construction years and by 26 percent in later years when NOx emissions are lower due to emission control improvements in the construction vehicle fleet which are mandated to be phased-in over time. Off-site vehicle travel also contributes to NOx and particulate matter emissions during construction. Approximately 25 percent of commuting construction workers are expected to carpool based on experience at previous solar projects. Also, VCIP implementation will require substantial traffic mitigation during construction, primarily in the form a fleet of shuttle buses which would substantially reduce emissions from worker travel.

The emission computations shown in Table 7 do not reflect the anticipated reductions in worker traffic.

For projects where it is not feasible to fully meet the required level of mitigation for project emissions through on-site measures developed under ISR (i.e., where ISR reductions would not reduce emissions to below Air District's thresholds), the project proponent and SJVAPCD would enter into a contractual agreement (i.e., Voluntary Emissions Reduction Agreement - VERA), under which the project proponent agrees to mitigate project-specific emissions by providing funds to the SJVAPCD. As mentioned above, the execution and implementation of VERAs can and would mitigate project-specific air quality impacts to less-than-significant levels under CEQA. Although VERAs are nominally voluntary, in practice they must be executed and implemented in order to meet the CEQA requirement that impacts be mitigated to the extent feasible (CEQA Guidelines Section 15126.4(a)).

Impact 3: Operational Emissions. Proposed Project operational emissions, generated primarily by traffic and maintenance equipment, would increase emissions of criteria air pollutants.

Table 8 provides annual emissions estimates from operation of from the incremental development of VCIP projects as they come online during the 10-year build-out period. The first full year that a VCIP project would become partially operational is 2030. As projects are constructed through 2038, overall VCIP operational emissions would increase. Operational emissions would consist of emissions from maintenance vehicles, off-road equipment usage, and worker and vendor vehicles.

All of the planned VCIP solar and battery storage facilities are scheduled to become fully operational in 2039. As shown in Table 8, the Air District's thresholds for NOx and PM10 would be exceeded if the entire VCIP were a single project. However, to determine the significance of air quality impacts, the Air District would not consider the emissions from the entire development planned under VCIP but would apply the thresholds to the emissions of individual projects on an annual basis. The largest potential solar project within VCIP would be quite small compared to the total VCIP, i.e., less than 5 percent of the total VCIP generation capacity, and would emit a proportional amount of criteria pollutants. Therefore, the annual operational emissions from an individual solar project in 2039 would be below the operational thresholds for each pollutant. Criteria pollutant emissions from individual VCIP projects would be below their applicable thresholds.

Note that on-site travel and activity were assumed to occur on unpaved roadways. It is important for solar projects to minimize generation of dust that could settle on PV equipment and adversely affect the overall performance of solar modules. The solar and energy storage projects would have internal gravel roadways and compacted earth roadways that would be compacted to 95 percent compaction and treated with dust palliatives to minimize dust generation. Reduced traffic speeds would further reduce dust emissions.

Stationary combustion equipment, like standby generators, that could emit air pollution during facility operation are not anticipated to be utilized for VCIP projects. Photovoltaic energy projects do not usually include these sources. If stationary sources are to be employed, they may require permits from SJVAPCD. Such sources could include combustion emissions from standby emergency generators (rated 50 horsepower or greater). These sources would normally result in minor emissions, compared to those from traffic generation and off-road maintenance equipment reported above. Sources of stationary air pollutant emissions that comply with all applicable SJVAPCD regulations generally are not considered to have a significant air quality impact for CEQA purposes.

As previously mentioned, all VCIP projects would be subject to SJVAPCD's ISR Rule 9510 to reduce NO_x and PM_{10} emissions. The emissions in Table 7 and 8 do not reflect any reductions that would be required under ISR. If operational emissions are below the Partial Exemption limits of ISR, the requirements of ISR to further reduce NOx emissions may not apply. In order to determine if the project would qualify for an exemption, the project proponent would be required to submit an AIA application to the SJVAPCD staff, who would determine if the exemption applies.

Mitigation Measure for Impact 3: None Required.

Impact 4: Carbon monoxide concentrations. Mobile emissions generated by VCIP project traffic would increase carbon monoxide concentrations at intersections in the project vicinity. However, resulting concentrations would be below ambient air quality standards and below CEQA thresholds.

Much of the emissions from construction and operation of VCIP projects would be generated off site by traffic traveling to or from the project sites. Construction would result in temporary traffic emissions at any one location. As shown in Table 8, the CO levels from overall VCIP operation would be well below the air district's threshold upon full operation of VCIP facilities. Thus, traffic from VCIP projects would have a negligible effect on concentrations of CO along roadways providing access to the projects. Carbon monoxide is a localized air pollutant, where highest concentrations are found very near sources. The major source of CO is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volume and congestion. During operation, the typical 250-MW VCIP solar + BESS project would increase traffic by approximately 20 vehicle trips per day, on average.

Emissions and ambient concentrations of CO have decreased greatly over the past 30 years. These improvements are due largely to the introduction of cleaner burning motor vehicles and reformulated motor vehicle fuels. No exceedances of the State or federal CO standards have been recorded at any of San Joaquin Valley's monitoring stations in the past 20 years. The San Joaquin Valley Air Basin has attained the State and National CO standards. This is demonstrated by monitoring data that includes monitoring stations in heavily urbanized areas with large traffic volumes.

Despite this progress, localized CO concentrations are addressed through SJVAPCD-recommended screening method that can be used to determine that the effect a project has on any given intersection would not cause a potential CO hotspot. A project can be said to have no potential to create a CO violation or create a localized hotspot if either of the following conditions are not met: level of service (LOS) on one or more streets or intersections would be reduced to LOS E or F; or the project would substantially worsen an already LOS F street or intersection within the project vicinity. The traffic study for the VCIP PEIR indicates that all intersections affected by VCIP traffic would operate at LOS C or better, and all affected roadways would operate at LOS D or better, during the construction period with the implementation of recommended traffic mitigations. The traffic study also indicates that LOS at intersections and roadways will not change from baseline conditions during full operation of VCIP facilities. Note that VCIP projects would be located in rural areas that do not have large volumes of traffic capable of causing violations of ambient air quality standards for CO. Therefore, the implementation of VCIP would not potentially result in a CO violation or create a localized CO hotspot.

Mitigation Measure for Impact 4: None Required.

Impact 5: Exposure of Sensitive Receptors to Toxic Air Contaminants. Construction activity, delivery trucks, employee traffic and emissions from onsite vehicles used in maintenance activities would expose nearby receptors to toxic air contaminants. Based on the proximity of sensitive receptors to the location of the highest predicted TAC emissions, a health risk assessment to assess the potential cancer risk was performed and the risks were below SJVAPCD CEQA thresholds.

The TAC of concern is DPM emitted from diesel-fueled vehicles and equipment during construction of VCIP solar and BESS projects. Operation of the projects would generate some traffic and on-site maintenance activity. Construction activities would be intensive for individual projects, resulting in much of the health risk impacts.

Projects within the VCIP would be built out over a large geographic area during a period of 10 years or longer. The plan area is sparsely populated. The Cantua Creek community includes the greatest concentration of sensitive receptors in the Plan Area with residences and a school. . A health risk assessment was conducted that predicted increased cancer risk and non-cancer health hazards associated with construction activity within approximately one mile of the community. The health risk assessment was based on emissions from nearby construction equipment and traffic. The construction areas and roadway segments modeled are shown in Figure 2.

The highest daily levels of DPM would be emitted during construction activities from use of heavy-duty diesel equipment such as loaders, graders and diesel-fueled haul trucks. However, these emissions would be intermittent, vary throughout the area, and be of a temporary duration (approximately 12 months of total construction activity in the vicinity). During project operations, low-level DPM emissions would result from infrequent worker vehicles and maintenance activities, but they would be constant over the lifetime of the project. Operational DPM emissions would mainly result from the use of pickup trucks with a portable water trailer (and pump), which would be used for panel cleaning.

Construction Emissions

Construction period air pollutant emissions were modeled using CalEEMod Version 2022.1.1.28, with project construction information (see Impact 2) and the CT-EMFAC2021 model. CalEEMod was used to develop emissions of DPM for offroad construction equipment while CT-EMFAC2021 was used to develop off-site emissions for construction traffic. Inputs to CalEEMod for offroad equipment are described for Impact 2.

A construction scenario developed for construction of solar arrays and BESS within approximately 3 to 4 miles from the center of Cantua Creek was modeled using CalEEMod. The area subject to VCIP development within this area was estimated to be approximately 1,700 acres. A gram per second per square meter emissions rate was estimated from the annual emissions reported by CalEEMod. The same type of modeling technique was used to estimate emission for the 2.7-mile gen-tie line that would be constructed in the area. There are no VCIP collection substations planned in the area.

Figure 2. Cantua Creek Community, Construction Areas Modeled and Sensitive Receptor Locations

Construction Traffic

On-site construction traffic emissions were accounted for in CalEEMod by assuming the worker, vendor, hauling, and on-site vehicle activity described under Impact 2. Since this assessment only uses CalEEMod emissions on-site, a trip length of one mile was used as input to the model to account for travel and idling. Construction traffic emissions for vehicles traveling to and from the construction sites on public roadways were modeled separately using CT-EMFAC2021.

Roadway traffic inputs to CT-EMFAC2021 include the county (Fresno), anticipated year of construction (2031), and fleet mix (i.e., percent trucks). Emissions factors from CT-EMAFC2021 were then applied to the average daily traffic volume for workers and haul trucks accessing the site. This includes 1,800 worker trips and 88 truck trips on S. San Mateo Ave., 800 daily worker trips on W. Clarkson Ave. to the west, and 1,000 worker and 88 trucks on the same roadway to the east. Emissions from each source category are reported in Table 9.

Operational Traffic

Operational emissions were modeled in CalEEMod, similar to the method described under Impact 2. It was assumed that 18 trips would occur daily during operation of the affected surrounding projects with 10 of those trips from light duty vehicles and 8 trips from light-heavy-duty vehicles.

Decommissioning

After a 35-year operational period, this analysis assumed the project could end its useful operational period and be decommissioned. This would involve deconstruction activities that are assumed to be equivalent to the construction activities.

Table 12. Construction and Operational Period Emissions

Year	CalEEMod On-Site Emissions	CT-EMFAC2021 Off-Site Emissions	Total Emissions
2031 Construction DPM Emissions	0.503 tons	0.001 tons	0.504 tons
2031 Construction Non-diesel TOG Emissions	NA	0.200 tons	0.200 tons
Annual Operational DPM Emissions	0.007 tons	0.0001 tons	0.007 tons
Annual Operational Non-diesel TOG Emissions	NA	0.005 tons	0.005 tons

NA = not applicable, TOG = total organic gases, both exhaust and evaporative.

The emissions rates developed for the project were used in dispersion modeling to estimate TAC concentrations and health risks associated with construction of the VCIP projects in this area

Dispersion Modeling

The US EPA AERMOD dispersion model was used to calculate DPM and other TAC concentrations at existing sensitive receptors (residences) in the vicinity of the project site. The AERMOD dispersion model is a SJVAPCD-recommended model for use in modeling analysis of these types of emission activities for CEQA projects.

For modeling construction impacts the AERMOD modeling utilized an area source to represent the location of on-site construction activities and on-site traffic. Emissions were distributed evenly across the area source. To represent the construction equipment exhaust emissions, an emission release height of 6 meters (20 feet) was used for construction equipment and trucks. The elevated source height reflects the height of the vehicle's exhaust pipes plus an additional distance for the height of the exhaust plume above the exhaust pipes to account for plume rise of the exhaust gases. Emissions from on-road truck travel at and near the project site were included in the area source. Emissions from truck travel were modeled as occurring daily between 7 am - 7 pm, when the majority of construction activity would occur.

Vehicle emissions on S. San Mateo and W. Clarkson Avenues were modeled as line-area source (a series of area sources along a line) representing off-site haul traffic near sensitive receptor locations shown in Figure 2. Source modeling parameters were based on EPA (US EPA 2021) and SJVAPCD (SJVAPCD 2022) guidance. DPM and TOG from vehicle exhaust were modeled using a release height of 3.4 m (11 feet). The elevated source height reflects the height of the vehicle's exhaust pipes plus an additional distance for the height of the exhaust plume above the exhaust pipes to account for plume rise of the exhaust gases. Evaporative TOG was modeled with a source height of 1.3 m (4.3 feet) representing the height of the engine and fuel system components where evaporative TOG emissions occur.

The model used a 5-year data set (2018-2022) of hourly meteorological data from the Lemoore Naval Air Station prepared for use with the AERMOD model by the SJVAPCD. DPM concentrations were calculated at nearby sensitive receptors using a receptor height of 0 meters. Flat terrain was used for the modeling since there is negligible elevation difference between the source and receptors and the receptors with the highest modeled concentrations are close to the affected project sites. Rural dispersion conditions were used in the modeling given the area surrounding the project site is predominantly rural.

Details on the emission calculations and dispersion modeling information for the construction sources are provided in *Attachment 3*.

Cancer Risk and Hazards

Based on the over 100 receptors modeled, the maximum-modeled unmitigated (uncontrolled) annual DPM concentration at a residential receptor was used to describe health risk impacts. The location, referred to as the maximally exposed individual or MEI, is where health risk impacts were highest (see MEI identified in Figure 2). Increased cancer risks were calculated using the modeled annual concentrations and SJVAPCD recommended risk assessment methods for infant, child, and adult exposures for residential receptors. Results of this assessment with uncontrolled project construction emissions are shown in Table 10.

The maximum cancer risk and non-cancer hazard index (or HI) were computed using the maximum modeled TAC concentrations and the calculation methods recommended by SJVAPCD and OEHHA that include nearly continuous exposures with adjustments for infants and children. Based on modeled TAC concentrations, construction and operational cancer risks were calculated for a 70-year residential exposure as 2.26 in one million[13]. This is below the SJVAPCD's CEQA

[13] Note that solar and BESS projects are anticipated to operate for less than 70 years, so the cancer risk predictions are slightly overestimated.

significance threshold of 20 in one million. The chronic HI from DPM would be less than 0.1 at all receptor locations, below the CEQA significance threshold of 1.0. Both construction and operational health risks are shown in Table 10. Details on the health risk calculations sources are provided in *Attachment 3*. Since predicted health risk impacts from the built out VCIP are estimated to be below the SJVAPCD's CEQA significance thresholds, the health risks from individual projects would also be below the CEQA significance thresholds. Since the Cantua Creek area has the highest concentration of population in proximity to planned energy and infrastructure projects in the VCIP Plan Area, the results of this health risk assessment represent the worst-case scenario for VCIP development. As such, it is concluded that the health risk associated with VCIP development overall, and the health risk associated with individual projects under VCIP, would represent a less-than-significant impact.

Table 13. Construction and Operational Period Health Risk Impacts (Uncontrolled)

Activity	Maximum (assuming residential exposure)	
	Cancer Risk (per million)	**Non-Cancer Hazard Index**
Construction (1 year)	2.03 (infant)	<0.1
Operation (35 years)	0.20 (infant/child/adult)	0.0
Decommission (1 year)	2.03 (infant) or 0.03 (adult)	<0.1
Lifetime = Construction (1 year) & Operation (35 years) & Decommission (1 year)	2.26 (infant/child/adult)*	<0.1
SJVAPCD CEQA Significance Threshold	20.0	1.0
Above Threshold?	No	No

*Lifetime cancer risk is based on infant exposure to all construction, infant/child/adult to operation and adult exposure to decommissioning.

Mitigation Measure for Impact 5: None required.

Impact 6: Odors. The project would result in temporary odors during construction.

During construction, the various diesel-powered vehicles and equipment in use on-site would create localized odors. These odors would be temporary and not likely to be noticeable for extended periods of time much beyond the project's site boundaries.

During project operations, the project is not expected to generate any objectionable odors.

Mitigation Measure for Impact 6: None proposed.

Impact 7: Consistency with Clean Air Planning Efforts. The project would not conflict with the current clean air plan or obstruct its implementation.

The GAMAQI does not include methodologies for assessing the effect of a project on consistency with clean air plans developed by the SJVAPCD. Regional clean air plans developed by SJVAPCD rely on local land use designations to develop population and travel projections that are the basis of future emissions inventories. Air pollution control plans are aimed at reducing these projected future emissions. The VCIP proposes land uses that would not alter population and vehicle related emissions projections contained in regional clean air planning efforts in any measurable way, and would not conflict with achievement of the control plans aimed at reducing these projected emissions. Therefore, the VCIP projects would not conflict with or obstruct implementation of efforts outlined in the region's air pollution control plans to attain or maintain ambient air quality standards.

Also, as discussed above, in 2005 the SJVAPCD adopted the ISR Rule in order to fulfill the SJVAPCD's emission reduction commitments in its PM_{10} and ozone attainment plans. The District has determined that implementation and compliance with the ISR would reduce the cumulative PM_{10} and NO_X impacts of growth anticipated in the air quality plans. Since the VCIP projects would be required to comply with emissions reductions under ISR, they would fulfill their share of achieving the SJVAPCD's emission reduction commitments in the PM_{10} and ozone attainment plans.

Mitigation Measure for Impact 7: None required.

Cumulative Air Quality Impacts

The SJVAPCD has developed criteria to determine if a development project could result in potentially significant regional emissions. According to the GAMAQI, any proposed project that would individually have a significant air quality impact (i.e., exceed significance thresholds for ROG or NO_x) would also be considered to have a significant cumulative air quality impact. Impacts of local pollutants (CO and TACs) are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects will exceed CEQA significance thresholds. The GAMAQI further states that "a Lead Agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program, including, but not limited to an air quality attainment or maintenance plan that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located" (SJVAPCD 2015, p. 66). For local impacts of PM_{10} from unrelated construction projects, the GAMAQI recommends a qualitative approach where construction activities from unrelated projects in the area should be examined to determine if enhanced dust suppression measures are necessary.

<u>Regional Air Pollutants</u>

As discussed under 'Significance Criteria" above, cumulative ozone impacts would be considered significant - if project-specific emissions exceed the SJVAPCD CEQA significance thresholds for ozone precursors ROG or NO_x, or the project is not consistent with the regional clean air plan. As discussed in Impacts 1, 2, and 3 above, project-specific construction emissions of ozone precursor pollutants (ROG and NO_x) and PM from dust were found to exceed the CEQA significance thresholds for annual VCIP development, and would also likely do so for individual projects. However, control measures to reduce emissions from individual projects would reduce these impacts to less-than-significant levels. As discussed under Impact 7, the project would be consistent with clean air planning efforts and would not conflict with or obstruct their implementation.

Local Air Pollutant Emissions

Construction period PM_{10} emissions would be localized. With implementation of dust control plan required by the SJVAPCD, and if necessary, additional emission reduction achieved through the District's ISR Rule 9510, and potentially through VERAs, construction period impacts would be below CEQA significance thresholds. Additional construction that may occur in the area concurrently with the project would be subject to SJVAPCD Regulation VIII, as well as the District's ISR Rule 9510, and potentially also VERAs, which would reduce cumulative construction emissions. Operational emissions would also be below CEQA significance thresholds in compliance with local requirements to control fugitive dust emissions.

Cumulative Toxic Air Pollutant Impacts

The overall implementation of the VCIP, and individual projects developed under VCIP, would not have a significant impact related to community health risk from project construction or operation and, therefore, would also not contribute to a cumulatively considerable community risk impact in the Plan Area and vicinity.

Summary of Cumulative Contribution to Air Quality Impacts

The implementation of the VCIP Energy Resource and Infrastructure Plans would not contribute to local cumulative air quality impacts with respect to any standard or significance criteria. In addition, the contribution of VCIP projects to cumulative regional air quality impacts would not be considerable. In conclusion, VCIP implementation would not have a cumulatively significant impact on air quality.

Greenhouse Gas Emissions

GHG emissions in terms of CO_2e are low for both the construction and operational phases of individual VCIP projects. A photovoltaic power production facility inherently represents "best performance standards" as compared to other typical forms of electrical power production, i.e., such as fossil-fueled power plants. The operation of the project would provide electric power with negligible GHG emissions over the life of the project compared with traditional fossil-fueled power plants. Therefore, the project is consistent with state GHG policy to encourage solar power development as a means to reduce fossil fuels and GHG emissions and improve air quality. GHG Emissions are reported in Table 11 for both construction and operation of the project.

Note that operational emissions in Table 11 do not include emissions associated with sulfur hexafluoride (SF6), a commonly used insulator in electricity transmission and distribution equipment. SF6 is approximately 23,900 times as potent as carbon dioxide in trapping heat in the atmosphere. Minor emissions of this potent GHG are emitted from insulating switches for high-voltage current applications, typically found in the transmission grids of electrical utilities. These emissions are expected to be minor as newer technologies come on line during construction and equipment with SF6 will be phased out by 2028 for up to 230-kV switchgear or gas-insulated equipment (GIE), and for all GIE by 2033. This type of equipment is included in substations and transmissions line components of VCIP. Plans for transmission lines and substations that would are not developed with enough detail to provide any meaningful emission calculations. However, any emissions of SF6 are anticipated to be minor due to the phase out of SF6 as an insulating gas.

Table 14. Total VCIP Annual GHG Emissions

Year	**Megawatts Generated**	**Annual GHG Emissions in Metric Tons per Year**			
		Construction	Operation	**VCIP Total**	**Solar Emission Offset**[1]
2029		114,009		114,009	-
2030	2,300	112,240	445	112,686	1,473,870
2031	4,600	110,030	886	110,916	2,947,740
2032	6,900	108,386	1,323	109,709	4,421,609
2033	9,200	105,221	1,755	106,975	5,895,479
2034	11,500	93,120	2,183	95,302	7,369,349
2035	13,600	92,073	2,607	94,679	8,715,056
2036	15,700	91,193	3,027	94,219	10,060,764
2037	17,800	90,431	3,444	93,875	11,406,471
2038	19,900	47,726	3,858	51,583	12,752,178
2039	21,000		4,269	4,269	13,457,072

[1]Based on a CO2 Intensity rate of 886 lbs. per MWh contained in the PG&E Corporate Sustainability Report 2022. See https://sustainabilityreports.com/reports/pg-e-corp-2022-corporate-sustainability-report-pdf/ page 88, accessed Dec. 19, 2024.

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Attachment 1: Activity Assumptions used for CalEEMod Modeling

Note there are numerous CalEEMod modeling output files that can be provided to lead agency separately upon request**.**

Helicopter Emissions

Helicopter type: **Hughes MD500E**

Emissions Source: **Guidance on the Determination of Helicopter Emissions**
Swiss Federation, Volume 2, December 2015

	Quantity	Units	Fuel (kg)	NOx (g)	HC (g)	CO (g)	PM (g)	CO2			
LTO Emissions	5	LTO per day	16.40	59.50	438.20	571.20	2.30				
Hourly	4	hrs/day	98.80	480.00	960.00	1200.00	16.00				
	Daily	kg or g/day	477.20	2217.50	6031.00	7656.00	75.50				
			Daily Emissions								
		gallons or lbs/day	149.50	4.88	13.28	16.86	0.17	3154			
Aviation Fuel:	6.8	lbs/gallon									
	0.0038	m**3/gallon									
	840	kg/m**3									
	21.1	lbsCO2/gallon		lbs. per period							
	100	days		488.44	1328.41	1686.34	16.63	315442			
		Total		**tons and metric tons CO2**							
				ROG	**NOx**	**CO**	PM10	PM2.5	PM10	PM2.5	**GHG**
				0.66	**0.24**	**0.84**	**0.01**	0.01	0	0	**143.10**

https://www.eia.gov/environment/emissions/co2_vol_mass.php

Code	Aircraft_ICAO	Aircraft_Name	Engine_Name	Max SHP per engine	Number_of_Engines	LTO Emissions: LTO fuel (kg)	LTO NOx (g)	LTO HC (g)	LTO CO (g)	LTO PM non volatile (g)	LTO PM number	One hour emissions: One hour fuel (kg)	One hour NOx (kg)	One hour HC (kg)	One hour CO (kg)	One hour PM non vol. (g)	One hour PM number
H124	A109	AGUSTA A109 Power	ARRIUS 2K	670	2	42.4	220.7	741.8	961.1	7.3	3.1181E+16	240.7	1.61	1.3	1.61	48	1.58E+18
H131	ALO2	ALOUETTE II	ARTOUSTE IIC5	402	1	18.1	75.4	378	489.2	2.7	2.718E+16	109.7	0.61	0.82	1.02	19.4	6.39E+17
H131	ALO2	ALOUETTE II	ARTOUSTE IIC6	402	1	18.1	75.4	378	489.2	2.7	2.718E+16	109.7	0.61	0.82	1.02	19.4	6.39E+17
H132	EC20	EC-120 COLIBRI	ARTOUSTE III B	563	1	21.4	108.9	308.9	395.9	3.6	2.9258E+16	134.9	0.92	0.7	0.86	27	8.04E+17
H132	LAMA	SA315B LAMA	ARTOUSTE IIIB	563	1	21.4	108.9	308.9	395.9	3.6	2.9258E+16	159.2	1.08	0.83	1.02	32.2	5.89E+17
H132	ALO3	SA316B ALOUETTE III	ARTOUSTE IIIB	563	1	21.4	108.9	308.9	395.9	3.6	2.9258E+16	134.9	0.92	0.7	0.86	27.2	8.96E+17
H133	AS55	AS 355 ECUREUIL 21	ARTOUSTE III B	563	2	37.6	175.8	802.1	1046.7	6.1	2.9876E+16	235.7	1.41	1.53	1.91	44	1.29E+18
H141	GAZL	SA341 GAZELLE	ASTAZOU IIIA	644	1	23.5	128.9	288.6	367.6	4.2	3.0155E+16	148.5	1.08	0.67	0.82	32	5.83E+17
H141	GAZL	SA341 GAZELLE	ASTAZOU IIIN2	644	1	23.5	128.9	288.6	367.6	4.2	3.0155E+16	148.5	1.08	0.67	0.82	32	5.83E+17
H142	ALO3	SA316B ALOUETTE III	ASTAZOU XIVB	590	1	21.9	114.5	299.8	384.7	3.8	2.9446E+16	139.4	0.98	0.69	0.85	29	9.52E+17
H142	GAZL	SA342 GAZELLE	ASTAZOU XIVG	590	1	21.9	114.5	299.8	384.7	3.8	2.9446E+16	139.4	0.98	0.69	0.85	28.9	5.28E+17
H142	GAZL	SA342 GAZELLE	ASTAZOU XIVH	590	1	21.9	114.5	299.8	384.7	3.8	2.9446E+16	139.4	0.98	0.69	0.85	28.9	5.28E+17
H151	TIGR	EUROCOPTER 665 TIGER	MTR 390	1450	2	69	507.6	613.6	781	15.2	4.3258E+16	476	4.76	1.17	1.43	133	1.95E+18
H161	2HAC	HAL DHRUV MK II	TM333-2B2	1219	2	63.4	421.3	688.7	881.4	12.9	4.0814E+16	434.1	3.95	1.29	1.56	112	3.68E+18
H201	H500	HUGHES 500	DDA250-C18	317	1	16.4	59.5	438.2	571.2	2.3	2.5999E+16	98.8	0.48	0.96	1.2	16	2.94E+17
		AGUSTA	DDA250-														

VCIP - Construction Equipment and Vehicle Use

CalEEMod Runs

Model Solar PV & BESS Built Per 1,150 mW Size

Phase Work Days	Equipment	Qty	Avg Hrs/day	Mobile Class	Trips/day	Miles/trip
	7500 acres					
	Stage 1 – Site Preparation					
90	Water Trucks (5,000 gal)			LDA/LDT	520.00	47.50
	Graders	22	9	MHDT	6.13	34.06
	Skid Loaders	41	9	HHDT	63.56	32.52
	Roller/Compactors	122	9			
	Fork Lifts	11	8			
	Pickup Trucks	20	9	LHDT1 at 15mph at 50%		135 mi/day
	ATVs	20	9	LDA at 15mph at 50%		135 mi/day
200	**Stage 2 – Installation of Solar Arrays**					
	Water Trucks (5,000 gal)	56	25	LDA/LDT	7040.00	47.50
	Roller compactors	4	9	MHDT	0.00	0.00
	Skid Loaders (skip loaders (	27	9	HHDT	406.67	111.58
	Dozer	12	9			
	Loaders	38	9.9			
	Welders	12	9.9			
	Trenchers	4	8.1			
	Forklifts	68	9.9			
	Bore/Drill Rig	8	3.6			
	Grader	19	8.1			
	Backhoe/mini Excavators	27	9.9			
	Pile Drivers	136	9.9	MHDT at 15 mph at 50%		375mi/day
	Pickup Trucks	80	9.9	LHDT1 at 15mph at 50%		149 mi/day
	ATVs	160	9.9			
200	**Stage 3 – Installation of Inverters, Transformers, Substation**					
	Water Trucks (5,000 gal)			LDA/LDT	340.00	47.50
	Skid steers	16	5.4	MHDT	4.00	30.00
	Pile Drivers	16	7.2	HHDT	64.00	63.75
	Trenchers	4	5.4			
	Backhoes	8	9			
	Aerial Lifts	24	6.75			
	Cranes	12	4.5			
	Forklifts	27	9			
	Welders	20	9			
	Pickup Trucks	100	9	LHDT1 at 15mph at 50%		135 mi/day
	ATVs	120	9			
	Helicopter	2	1			
200	**Stage 4 – Installation of Battery Energy Storage Systems (BESS)**					
	Water Trucks (5,000 gal)			LDA/LDT	340.00	47.50
	Skip loaders/skid steers	20	3.6	MHDT	4.00	30.00
	Forklifts	16	2	HHDT	64.00	63.75
	Roller/Compactors	4	2			
	Pile Drivers	16	1.25			
	Trenchers	4	2			
	Backhoes/ mini excavators	16	1.25			
	Aerial Lifts	12	1.2			
	Cranes	10	1.25			
	Pickup Trucks	20	2.5	LHDT1 at 15mph at 50%		38 mi/day
	ATVs	20	4.5			

Model Gen Ties

Phase Work Days	Equipment	Qty	Avg Hrs/day	Mobile Class	Trips/day	
	116 acres					
100 working	Gen-Tie Line - Construction - Off-Site Vehicle Usa			LDA/LDT	54.40	
	Water Trucks	4	8	MHDT	4.40	
	Graders	1	4	HHDT	6.48	
	Skip Loaders	5	8			
	Aerial Lifts	20	8			
	Cranes	6	8			
	Pullers	4	4			
	Tensioners	4	4	MHDT at 15 mph at 50%		120mi/day
	Pickup/Utilit	40	8	LHDT1 at 15mph at 50%		120mi/day
	Helicopter	1	4			

VCIP - Construction Equipment and Vehicle Use

CalEEMod Runs

Model 500/230 KV Utility Switchyard

Phase Work Days	Equipment	Qty	Avg Hrs/day	Mobile Class	Trips/day	Miles/trip
200	40 acres					
	Phase 1 – Site Preparation					
	Water Trucks (5,000 gal)	2	8	LDA/LDT	400.00	47.50
	Graders	3	0.8	MHDT	6.02	10.13
	Skip Loaders	15	2	HHDT	11.83	38.88
	Backhoes	6	2			
	Dozer	6	1			
	Loaders	6	2			
	Roller/Compactors	3	0.8			
	Trenchers	3	2			
	Welders	10	2			
	Drill Truck/Rig	2	2			
	Cranes	10	0.8			
	Aerial Lifts	20	1.6	MHDT at 15 mph at 50%		120mi/day
	Pickup Trucks	20	8	LHDT1 at 15mph at 50%		120mi/day

Model Connector 500 kV-T Lines

Phase Work Days	Equipment	Qty	Avg Hrs/day	Mobile Class	Trips/day	Miles/trip
	1,076 acres					
200	Water Trucks (5,000 gal)	4	10	LDA/LDT	125.00	47.50
	Graders	1	2	MHDT	25.00	30.00
	Skip Loaders	5	8	HHDT	12.44	116.72
	Aerial Lifts	20	8			
	Cranes	6	8			
	Pullers	4	4			
	Tensioners	4	4	MHDT at 15 mph at 50%		150mi/day
	Pickup/Utility Trucks	40	10	LHDT1 at 15mph at 50%		150mi/day
	Helicopter	1	4			

VCIP - Construction Annual Emissions from Equipment and Vehicle Use

Based on annual size

			Uncontrolled				Controlled	Uncontrolled
			Off site travel					
Construction Year	**Size**	**Units**	**ROG**	**NOx**	**CO**	**PM10**	**PM2.5**	**GHG**
2029 Total			**27.44**	**200.33**	**387.61**	**138.60**	**19.30**	**114,009**
Solar PV + BESS	2300	mW	24.39	189.70	370.49	125.50	17.15	109,143
Gen Ties	26	miles	0.87	2.94	3.54	3.25	0.94	800
Utility Substation	1	stations	0.41	2.74	7.13	3.28	0.48	1,869
Internal T-Lines	30	miles	1.77	4.94	6.45	6.58	0.73	2,196
2030 Total			**24.39**	**193.71**	**374.71**	**137.93**	**18.60**	**112,240**
Solar PV + BESS	2300	mW	23.37	184.03	358.65	125.49	17.12	107,439
Gen Ties	26	miles	0.20	2.23	2.85	2.58	0.28	793
Utility Substation	1	stations	0.39	2.64	6.85	3.28	0.48	1,843
Internal T-Lines	30	miles	0.43	4.81	6.35	6.58	0.72	2,166
2031 Total			**23.50**	**189.21**	**363.89**	**137.90**	**18.57**	**110,030**
Solar PV + BESS	2300	mW	22.51	179.86	348.21	125.46	17.10	105,307
Gen Ties	26	miles	0.19	2.14	2.83	2.58	0.28	785
Utility Substation	1	stations	0.38	2.58	6.60	3.28	0.48	1,806
Internal T-Lines	30	miles	0.42	4.63	6.25	6.58	0.72	2,132
2032 Total			**22.55**	**181.98**	**353.09**	**137.89**	**18.32**	**108,386**
Solar PV + BESS	2300	mW	21.59	173.02	337.82	125.46	16.85	103,725
Gen Ties	26	miles	0.19	2.07	2.79	2.58	0.28	777
Utility Substation	1	stations	0.37	2.44	6.34	3.28	0.48	1,782
Internal T-Lines	30	miles	0.40	4.46	6.14	6.58	0.72	2,102
2033 Total			**21.42**	**175.67**	**337.19**	**134.61**	**17.84**	**105,221**
Solar PV + BESS	2300	mW	20.85	169.35	328.34	125.46	16.85	102,374
Gen Ties	26	miles	0.18	2.00	2.77	2.58	0.28	771
Internal T-Lines	1	stations	0.39	4.32	6.07	6.58	0.72	2,075
2034 Total			**18.47**	**153.72**	**296.53**	**117.13**	**15.66**	**93,120**
Solar PV + BESS	2100	mW	18.29	151.76	293.77	114.54	15.38	92,355
Gen Ties	26	miles	0.18	1.96	2.76	2.58	0.28	765
2035 Total			**17.92**	**148.45**	**289.64**	**117.12**	**15.65**	**92,073**
Solar PV + BESS	2100	mW	17.75	146.55	286.91	114.54	15.38	91,314
Gen Ties	26	miles	0.17	1.90	2.72	2.58	0.28	759
2036 Total			**17.54**	**145.11**	**283.13**	**116.90**	**15.65**	**91,193**
Solar PV + BESS	2100	mW	17.38	143.28	280.45	114.32	15.37	90,439
Gen Ties	26	miles	0.17	1.82	2.68	2.58	0.28	754
2037 Total			**15.59**	**142.95**	**279.14**	**116.89**	**15.65**	**90,431**
Solar PV + BESS	2100	mW	15.43	141.18	276.50	114.31	15.37	89,682
Gen Ties	26	miles	0.16	1.78	2.64	2.58	0.28	749
2038 Total			**8.24**	**75.73**	**147.48**	**62.46**	**8.33**	**47,726**
Solar PV + BESS	1100	mW	8.08	73.95	144.83	59.88	8.05	46,976
Gen Ties	26	miles	0.16	1.78	2.64	2.58	0.28	749

	Uncontrolled							
	Emissions per Year (tons)						On-site travel	
Construction Year	ROG	NOx	CO	PM10	PM2.5	GHG	ROG	NOx
2029 Total	**26.2**	**197.8**	**382.3**	**35.5**	**12.8**	**110,890**	**1.2**	**2.5**
Solar PV + BESS	23.2	187.4	365.4	33.2	11.5	106,376	1.2	2.3
Gen Ties	0.9	2.9	3.5	0.8	0.7	725	0.0	0.1
Utility Substation	0.4	2.7	7.0	1.1	0.4	1785	0.0	0.1
Internal T-Lines	1.8	4.8	6.4	0.4	0.2	2004	0.0	0.1
2030 Total	**23.3**	**191.3**	**369.7**	**34.5**	**11.8**	**109,222**	**1.1**	**2.4**
Solar PV + BESS	22.3	181.9	353.9	32.9	11.1	104,760	1.1	2.1
Gen Ties	0.2	2.2	2.8	0.1	0.1	720	0.0	0.0
Utility Substation	0.4	2.6	6.7	1.1	0.4	1761	0.0	0.1
Internal T-Lines	0.4	4.7	6.3	0.4	0.2	1981	0.0	0.1
2031 Total	**22.4**	**187.0**	**359.2**	**34.2**	**11.6**	**107,114**	**1.1**	**2.2**
Solar PV + BESS	21.5	177.8	343.7	32.6	10.9	102,718	1.0	2.0
Gen Ties	0.2	2.1	2.8	0.1	0.1	714	0.0	0.0
Utility Substation	0.4	2.5	6.5	1.1	0.4	1728	0.0	0.1
Internal T-Lines	0.4	4.5	6.2	0.4	0.2	1954	0.0	0.1
2032 Total	**21.5**	**179.9**	**348.7**	**33.8**	**11.0**	**105,575**	**1.0**	**2.1**
Solar PV + BESS	20.6	171.1	333.6	32.2	10.3	101,227	1.0	1.9
Gen Ties	0.2	2.0	2.8	0.1	0.1	710	0.0	0.0
Utility Substation	0.3	2.4	6.2	1.1	0.4	1707	0.0	0.0
Internal T-Lines	0.4	4.4	6.1	0.4	0.2	1931	0.0	0.1
2033 Total	**20.5**	**173.7**	**333.1**	**32.3**	**10.2**	**102,579**	**0.9**	**1.9**
Solar PV + BESS	19.9	167.6	324.3	31.9	10.0	99,961	0.9	1.8
Gen Ties	0.2	2.0	2.8	0.1	0.1	706	0.0	0.0
Internal T-Lines	0.4	4.2	6.0	0.4	0.2	1912	0.0	0.1
	-	-	-	-	-	0	-	-
2034 Total	**17.7**	**152.1**	**293.0**	**28.9**	**9.0**	**90,935**	**0.8**	**1.6**
Solar PV + BESS	17.5	150.2	290.3	28.8	8.9	90,232	0.8	1.5
Gen Ties	0.2	1.9	2.7	0.1	0.1	703	0.0	0.0
2035 Total	**17.1**	**146.9**	**286.3**	**28.6**	**8.7**	**89,965**	**0.8**	**1.5**
Solar PV + BESS	17.0	145.1	283.6	28.5	8.6	89,265	0.8	1.5
Gen Ties	0.2	1.9	2.7	0.1	0.1	700	0.0	0.0
2036 Total	**16.8**	**143.7**	**280.0**	**28.2**	**8.5**	**89,159**	**0.8**	**1.4**
Solar PV + BESS	16.6	141.9	277.3	28.1	8.4	88,462	0.8	1.4
Gen Ties	0.2	1.8	2.7	0.1	0.0	697	0.0	0.0
2037 Total	**14.9**	**141.6**	**276.1**	**28.0**	**8.3**	**88,461**	**0.7**	**1.4**
Solar PV + BESS	14.7	139.8	273.4	27.9	8.2	87,766	0.7	1.3
Gen Ties	0.2	1.8	2.6	0.1	0.0	695	0.0	0.0
2038 Total	**7.9**	**75.0**	**145.9**	**14.7**	**4.4**	**46,668**	**0.4**	**0.7**
Solar PV + BESS	7.7	73.2	143.2	14.6	4.3	45,973	0.4	0.7
Gen Ties	0.2	1.8	2.6	0.1	0.0	695	0.0	0.0

	Controlled											
	Off site travel						On-site travel					
Construction Year	ROG	NOx	CO	PM10	PM2.5	GHG	ROG	NOx	CO	PM10	PM2.5	GHG
2029 Total	**12.8**	**130.4**	**393.6**	**29.8**	**8.4**	**110,890**	**1.2**	**2.5**	**5.3**	**108.8**	**10.9**	**3,119**
Solar PV + BESS	10.3	123.7	373.6	28.1	7.4	106,376	1.2	2.3	5.1	97.4	9.8	2,767
Gen Ties	0.7	2.0	4.4	0.7	0.7	725	0.0	0.1	0.0	2.5	0.3	76
Utility Substation	0.2	1.7	7.4	0.8	0.2	1,785	0.0	0.1	0.1	2.5	0.3	84
Internal T-Lines	1.5	3.1	8.2	0.3	0.1	2,004	0.0	0.1	0.1	6.3	0.6	192
2030 Total	**10.6**	**126.9**	**381.5**	**29.2**	**7.7**	**109,222**	**1.1**	**2.4**	**5.0**	**108.8**	**10.9**	**3,018**
Solar PV + BESS	10.1	120.9	362.5	28.1	7.4	104,760	1.1	2.1	4.8	97.4	9.8	2,679
Gen Ties	0.1	1.3	3.7	0.1	0.0	720	0.0	0.0	0.0	2.5	0.3	73
Utility Substation	0.2	1.7	7.1	0.8	0.2	1,761	0.0	0.1	0.1	2.5	0.3	81
Internal T-Lines	0.2	3.0	8.1	0.3	0.1	1,981	0.0	0.1	0.1	6.3	0.6	185
2031 Total	**10.3**	**125.8**	**372.0**	**29.2**	**7.7**	**107,114**	**1.1**	**2.2**	**4.7**	**108.7**	**10.9**	**2,916**
Solar PV + BESS	9.8	119.8	353.4	28.1	7.4	102,718	1.0	2.0	4.5	97.4	9.7	2,589
Gen Ties	0.1	1.3	3.7	0.1	0.0	714	0.0	0.0	0.0	2.5	0.3	70
Utility Substation	0.2	1.7	6.9	0.8	0.2	1,728	0.0	0.1	0.1	2.5	0.3	78
Internal T-Lines	0.2	3.0	8.0	0.3	0.1	1,954	0.0	0.1	0.1	6.3	0.6	178
2032 Total	**10.1**	**122.9**	**364.2**	**29.2**	**7.5**	**105,575**	**1.0**	**2.1**	**4.4**	**108.7**	**10.9**	**2,811**
Solar PV + BESS	9.6	117.0	345.8	28.0	7.1	101,227	1.0	1.9	4.2	97.4	9.7	2,498
Gen Ties	0.1	1.3	3.7	0.1	0.0	710	0.0	0.0	0.0	2.5	0.3	67
Utility Substation	0.2	1.6	6.7	0.8	0.2	1,707	0.0	0.0	0.1	2.5	0.3	75
Internal T-Lines	0.2	3.0	8.0	0.3	0.1	1,931	0.0	0.1	0.1	6.3	0.6	171
2033 Total	**9.7**	**120.5**	**349.9**	**28.4**	**7.2**	**102,579**	**0.9**	**1.9**	**4.1**	**106.2**	**10.6**	**2,642**
Solar PV + BESS	9.4	116.2	338.3	28.0	7.1	99,961	0.9	1.8	4.0	97.4	9.7	2,413
Gen Ties	0.1	1.3	3.7	0.1	0.0	706	0.0	0.0	0.0	2.5	0.3	65
Internal T-Lines	0.2	3.0	7.9	0.3	0.1	1,912	0.0	0.1	0.0	6.3	0.6	164
	-	-	-	-	-	-	-	-	-	-	-	-
2034 Total	**8.5**	**106.9**	**307.4**	**25.7**	**6.5**	**90,935**	**0.8**	**1.6**	**3.5**	**91.5**	**9.1**	**2,184**
Solar PV + BESS	8.4	105.6	303.7	25.6	6.5	90,232	0.8	1.5	3.5	88.9	8.9	2,123
Gen Ties	0.1	1.3	3.7	0.1	0.0	703	0.0	0.0	0.0	2.5	0.3	62
2035 Total	**8.4**	**104.7**	**302.2**	**25.7**	**6.5**	**89,965**	**0.8**	**1.5**	**3.3**	**91.5**	**9.1**	**2,108**
Solar PV + BESS	8.3	103.4	298.5	25.6	6.5	89,265	0.8	1.5	3.3	88.9	8.9	2,049
Gen Ties	0.1	1.3	3.7	0.1	0.0	700	0.0	0.0	0.0	2.5	0.3	59
2036 Total	**8.4**	**104.2**	**297.2**	**25.4**	**6.5**	**89,159**	**0.8**	**1.4**	**3.2**	**91.5**	**9.1**	**2,033**
Solar PV + BESS	8.3	102.9	293.5	25.4	6.5	88,462	0.8	1.4	3.2	88.9	8.9	1,977
Gen Ties	0.1	1.3	3.7	0.1	0.0	697	0.0	0.0	0.0	2.5	0.3	56
2037 Total	**6.7**	**103.7**	**293.6**	**25.4**	**6.5**	**88,461**	**0.7**	**1.4**	**3.1**	**91.5**	**9.1**	**1,970**
Solar PV + BESS	6.6	102.4	289.9	25.4	6.5	87,766	0.7	1.3	3.1	88.9	8.9	1,916
Gen Ties	0.1	1.3	3.7	0.1	0.0	695	0.0	0.0	0.0	2.5	0.3	54
2038 Total	**3.5**	**54.9**	**155.5**	**13.4**	**3.4**	**46,668**	**0.4**	**0.7**	**1.6**	**49.1**	**4.9**	**1,058**
Solar PV + BESS	3.5	53.6	151.9	13.3	3.4	45,973	0.4	0.7	1.6	46.6	4.7	1,004
Gen Ties	0.1	1.3	3.7	0.1	0.0	695	0.0	0.0	0.0	2.5	0.3	54

VCIP - Construction Emissions from Equipment and Vehicle Use

HRA Inputs

Emissions in tons

Includes 1mi trips (worker, vendor, hauling)

				Unmitigated					**Mitigated**			
Construction Year	Modeled **mW**	**Acres**	**Miles**	**PM10ex**	**PM2.5ex**	**PM10dust**	**PM2.5dust**		**PM10ex**	**PM2.5ex**	**PM10dust**	**PM2.5dust**
2031 Total												
Solar PV + BESS	**1150**	7500		2.22	2.04	1207.42	120.49		0.31	0.31	1191.06	118.86
Gen Ties		0	**20**	0.06	0.05	7.50	0.75		0.01	0.01	6.17	0.62
Utility Substation		**40**		0.06	0.05	60.88	6.28		0.01	0.01	59.24	5.99
Internal T-Lines		0	**30**	0.11	0.10	28.33	2.83		0.02	0.02	25.68	2.56
2031 Per acre/mi emissions												
Solar PV + BESS				0.0002963	per acre		0.503		1697.54			
Internal T-Lines				0.003645	per mile		0.0098					

VCIP Phase 1a - Operational Equipment and Vehicle Use - Sheet 2 of 5

VCIP Phase 1a - 1,150 MW - Operations (~7,500 acres)

[Double these numbers for 2300 MW of PV + BESS.]

Operations - On-Site Vehicle and Equipment Usage

	Estimated Usage (Annual)						
Equipment	**Units**	**Hours/Day/Unit**	**Total Days/Unit/Year**	**Qty**	**Hrs/day**		
All-Terrain Vehicle (ATV)	4	5	220	4	3.0		
Tractor	4	10	220	4	6.0		
Portable Generator	4	10	60	4	1.6		
Portable Water Trailer w/Pump	10	10	120	10	3.3		
Vehicles	**Units**	**Daily Miles/ Unit**	**Total Days/ Unit/Year**	**Trips/day**	**Mi/trip**	**Type**	**% Paved**
Pickup Truck (Routine O&M)	8	20	340	7.45	20	LHDT1	10%
Pickup Truck (Panel Washing)	10	40	120	3.29	40	LHDT2	10%
					280.5479452		

Operations - Off-Site Vehicle Usage

	Estimated Annual			Miles/Round Trip					
Personnel	**Workers**	**Days**	**Round Trips**		**Trips/day**	**Mi/trip**	**Type**	**% Paved**	
Operations - PV	4	365	1,460	95	8	47.5	LDA,LDT,MDV,LHDT1	98%	
Maintenance/Repair	4	180	1,000	95	5	47.5	LHDT1, LHDT2,MHDT	98%	
Veg Management	12	252	3,024	95	17	47.5	LHDT1, LHDT2	98%	
Panel Washing Crew	30	40	800	95	4	47.5	LHDT1, LHDT2	98%	
Operations - BESS	4	365	1,460	95	8	47.5	LHDT1, LHDT2	98%	
Total Annual Round Trips			**7,744**		**42**	**47.5**	**worker**	98%	2,015.56
					34	**47.5**	**vendor (LHDT2)**	98%	1,635.56
					10.74	**26.1**	**onsite vendor (LHDT2)**	10%	280.55
				HRA segme	9.62	worker			
					7.80	vendor (LHDT2)			

VCIP - Operational Emissions from Equipment and Vehicle Use

			Model Results						Built		Cumulative Operation					
	Modeled									Cumulative						
Construction Year	**mW**	**Acres**	**ROG**	**NOx**	**CO**	PM10	PM2.5	GHG	**mW**	**mW**	**ROG**	**NOx**	**CO**	PM10	PM2.5	**GHG**
2030 Solar + BESS	**1150**	7500	0.15	1.16	1.98	6.48	0.70	445.37	2300	2300	0.30	2.32	3.95	12.95	1.40	890.74
2031 Solar + BESS	**1150**		0.15	1.14	1.95	6.47	0.70	440.81	2300	4600	0.59	4.56	7.79	25.90	2.80	1,763.23
2032 Solar + BESS	**1150**		0.14	1.12	1.93	6.47	0.70	436.35	2300	6900	0.86	6.75	11.56	38.84	4.20	2,618.11
2033 Solar + BESS	**1150**		0.14	1.11	1.91	6.47	0.70	432.10	2300	9200	1.14	8.88	15.27	51.77	5.59	3,456.81
2034 Solar + BESS	**1150**		0.14	1.10	1.89	6.47	0.70	427.98	2300	11500	1.40	10.98	18.92	64.71	6.98	4,279.83
2035 Solar + BESS	**1150**		0.14	1.09	1.88	6.47	0.70	423.98	2100	13600	1.64	12.87	22.21	76.51	8.24	5,014.06
2036 Solar + BESS	**1150**		0.14	1.08	1.87	6.47	0.70	420.29	2100	15700	1.87	14.71	25.47	88.31	9.50	5,737.90
2037 Solar + BESS	**1150**		0.14	1.07	1.86	6.47	0.70	416.95	2100	17800	2.10	16.54	28.71	100.10	10.76	6,453.64
2038 Solar + BESS	**1150**		0.13	1.06	1.85	6.47	0.69	413.83	2100	19900	2.33	18.34	31.94	111.90	12.02	7,161.11
2039 Solar + BESS	**1150**		0.13	1.05	1.84	6.47	0.69	411.09	1100	21000	2.43	19.21	33.56	118.08	12.68	7,506.79
									21000							
2032 HRA (1-mi trips)			0.12	1.06	1.47	**0.03**	0.03							0.0000043		

Ratioed out % paved. 15 mph vehicle speed. 8% material moisture content to simulate dust suppressants.

Year	Megawatts Generated	Annual GHG Emissions in Metric Tons per Year				
		Construction	Operation	VCIP Total	Solar Offset[1]	Emission Offset
2029		**114,009**		114,009	-	
2030	2,300	112,240	445	112,686	1,473,870	1,361,184
2031	4,600	110,030	886	110,916	2,947,740	2,836,824
2032	6,900	108,386	1,323	109,709	4,421,609	4,311,901
2033	9,200	105,221	1,755	106,975	5,895,479	5,788,504
2034	11,500	93,120	2,183	95,302	7,369,349	7,274,047
2035	13,600	92,073	2,607	94,679	8,715,056	8,620,377
2036	15,700	91,193	3,027	94,219	10,060,764	9,966,544
2037	17,800	90,431	3,444	93,875	11,406,471	11,312,596
2038	19,900	47,726	3,858	51,583	12,752,178	12,700,595
2039	21,000		4,269	4,269	13,457,072	13,452,804

Attachment 2: Agricultural Emissions Calculations

FRESNO COUNTY AGRICULTURAL EMISSIONS

Development of per acre emission factors

	2025 Annual Average Emissions (Tons/Day)						
Source (CARB classification)	**TOG**	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**Description**
614-TILLING DUST					6.25	0.94	Tilling includes mechanical operations used to prepare the soil, such as discing, shaping, chiseling, and leveling. Emissions vary seasonally and regionally according to the crop mix and the associated land preparation activities
615-HARVEST OPERATIONS - DUST					7.88	1.18	Harvesting operations include crop harvesting and the first post-harvest processing stage (packing houses, nut hullers and processors, cotton gins, dehydrators, feed and grain mills). Emissions vary seasonally and regionally according to the crop mix and the intensity of harvest activities taking place, with the highest emissions occurring during the peak harvest months of summer and fall.
530-PESTICIDES/FERTILIZERS	4.08	4.08					CA DPR database
645-UNPAVED TRAFFIC AREA - AGRICULTURE					1.92	0.11	PM10 emissions from unpaved traffic areas, excluding roads are 2.27 lb PM10/VMT.
646-UNPAVED ROAD TRAVEL DUST- FARM ROADS					2.35	0.23	Vehicular travel over unpaved roads on agricultural lands causing mechanical disturbance of the roadway and vehicle generated air turbulence effects. Emissions based on VMT/acre/year by crop. Fresno Cty = 900,335 mi PM10=
870-FARM EQUIPMENT	1.33	1.14	10.89	5.51	0.33	0.3	OFFROAD2021 Database
Fresno County Havested Acres =	1,073,350	acres					
Total (tpd)	5.41	5.22	10.89	5.51	18.73	2.76	
Annually (tpy)	1974.65	1905.3	3974.85	2011.15	6836.45	1007.4	
Ag Emission in tons per Acre	**0.0018**	**0.0018**	**0.0037**	**0.0019**	**0.0064**	**0.0009**	
VCIP Estimate (54,400 acres) - tpy	100.08	96.57	201.46	101.93	346.49	51.06	

Source: CARB's CEPAM2019v1.04 Emission Projection Data

	2025 Annual Average Emissions (Tons/Day)					
Source (CARB classification)	**TOG**	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**
614-TILLING DUST					6.25	0.94
Fresno County Havested Acres =	1,073,350	acres			2281.25	
Rate (tpy/acre)					**0.0021**	**0.0003**

Fresno County acreage (1,073,350 acres) does not include pasture lands, mushrooms, greenhouse, nursery and flower crops, forest firewood, as well as acreage aggregated statewide as “Sum of Others”.

VCIP	Tons/year				
Construction	ROG	NOx*	CO	Total PM10	Total PM2.5**
Year					
2029	27.44	200.33	387.61	138.60	19.30
2030	24.39	193.71	374.71	137.93	18.60
2031	23.50	189.21	363.89	137.90	18.57
2032	22.55	181.98	353.09	137.89	18.32
2033	21.42	175.67	337.19	134.61	17.84
2034	18.47	153.72	296.53	117.13	15.66
2035	17.92	148.45	289.64	117.12	15.65
2036	17.54	145.11	283.13	116.90	15.65
2037	15.59	142.95	279.14	116.89	15.65
2038	8.24	75.73	147.48	62.46	8.33
2039					

VCIP	Tons/year				
Operation	ROG	NOx	CO	PM10*	PM2.5*
Year					
2030	0.30	2.32	3.95	12.95	1.40
2031	0.59	4.56	7.79	25.90	2.80
2032	0.86	6.75	11.56	38.84	4.20
2033	1.14	8.88	15.27	51.77	5.59
2034	1.40	10.98	18.92	64.71	6.98
2035	1.64	12.87	22.21	76.51	8.24
2036	1.87	14.71	25.47	88.31	9.50
2037	2.10	16.54	28.71	100.10	10.76
2038	2.33	18.34	31.94	111.90	12.02
2039	2.43	19.21	33.56	118.08	12.68

% built out	Acres	Farmed	Disked
0	15000	6192	9497
12%	15000	12384	18993
23%	15000	18575	28490
35%	15000	24767	37987
47%	15000	30959	47484
58%	13696	36612	56155
69%	12505	41774	64071
79%	11417	46487	71300
88%	10425	50790	77900
96%	5460	53044	81357
100%		53,044	81,357
	128,503		

Displaced Agricultural Activities

2029	10.99	11.60	22.93	59.62	8.85
2030	21.98	23.20	45.86	119.24	17.69
2031	32.97	34.80	68.79	178.86	26.54
2032	43.96	46.41	91.72	238.48	35.39
2033	54.95	58.01	114.65	298.10	44.23
2034	64.99	68.60	135.58	352.54	52.31
2035	74.15	78.27	154.70	402.24	59.69
2036	82.52	87.10	172.15	447.63	66.42
2037	90.16	95.17	188.09	489.06	72.57
2038	94.16	99.39	196.43	510.76	75.79
2039	94.16	99.39	196.43	510.76	75.79

Project - Agricultural, Emissions in Tons/year

Year	**ROG**	**NOx***	**CO**	**Total PM10*,****	**Total PM2.5****
2029	16.4	188.7	364.7	79.0	10.5
2030	2.7	172.8	332.8	31.6	2.3
2031	-8.9	159.0	302.9	-15.1	-5.2
2032	-20.6	142.3	272.9	-61.8	-12.9
2033	-32.4	126.5	237.8	-111.7	-20.8
2034	-45.1	96.1	179.9	-170.7	-29.7
2035	-54.6	83.0	157.2	-208.6	-35.8
2036	-63.1	72.7	136.4	-242.4	-41.3
2037	-72.5	64.3	119.8	-272.1	-46.2
2038	-83.6	-5.3	-17.0	-336.4	-55.4
2039	-91.7	-80.2	-162.9	-392.7	-63.1

CALIFORNIA AIR RESOURCES BOARD

ABOUT OUR WORK RESOURCES SERVICES RULEMAKING NEWS EQUIT

Emissions for User Defined Query

CEPAM2019v1.04 Emission Projection Data by EIC

2025 Annual Average Emissions (Tons/Day)

FRESNO COUNTY
MISCELLANEOUS PROCESSES
620-FARMING OPERATIONS

Download these results (as a comma delimited file).
Start a new query.

EMISSIONS INVENTORY CATEGORY	TOG	ROG	CO	NOX	SOX	PM	PM10	PM2.5	NH3
620-614-5400-0000 Methodology 614-TILLING DUST 5400-DUST 0000-SUB-CATEGORY UNSPECIFIED	-	-	-	-	-	13.76	6.25	0.94	-
620-615-5400-0000 Methodology 615-HARVEST OPERATIONS - DUST 5400-DUST 0000-SUB-CATEGORY UNSPECIFIED	-	-	-	-	-	17.35	7.88	1.18	-

Emissions for User Defined Query

CEPAM2019v1.04 Emission Projection Data by EIC

2025 Annual Average Emissions (Tons/Day)

FRESNO COUNTY
SOLVENT EVAPORATION
530-PESTICIDES/FERTILIZERS

Download these results (as a comma delimited file).
Start a new query.

EMISSIONS INVENTORY CATEGORY	TOG	ROG	CO	NOX	SOX	PM	PM10	PM2.5	NH3
530-530-3225-0000 Methodology 530-AGRICULTURAL PESTICIDES 3225-METHYL BROMIDE 0000-SUB-CATEGORY UNSPECIFIED	0.02	0.02	-	-	-	-	-	-	-
530-530-5702-0000 Methodology 530-AGRICULTURAL PESTICIDES 5702-NON - METHYL BROMIDE PESTICIDES 0000-SUB-CATEGORY UNSPECIFIED	4.02	4.02	-	-	-	-	-	-	-
530-540-5702-0000 Methodology 540-STRUCTURAL PESTICIDES 5702-NON - METHYL BROMIDE PESTICIDES 0000-SUB-CATEGORY UNSPECIFIED	0.04	0.04	-	-	-	-	-	-	-
530-918-5800-0000 918-AGRICULTURAL FERTILIZER 5800-FERTILIZERS (UNSPECIFIED) 0000-SUB-CATEGORY UNSPECIFIED	-	-	-	-	-	-	-	-	10.37

Emissions for User Defined Query

645-UNPAVED ROAD DUST

Download these results (as a comma delimited file).
Start a new query.

EMISSIONS INVENTORY CATEGORY	TOG	ROG	CO	NOX	SOX	PM	PM10	PM2.5	NH3
645-638-5400-0000 Methodology 638-UNPAVED ROAD TRAVEL DUST- CITY AND COUNTY ROADS 5400-DUST 0000-SUB-CATEGORY UNSPECIFIED	-	-	-	-	-	1.19	0.71	0.07	-
645-640-5400-0000 Methodology 640-UNPAVED ROAD TRAVEL DUST- U.S. FOREST AND PARK ROADS 5400-DUST 0000-SUB-CATEGORY UNSPECIFIED	-	-	-	-	-	5.70	3.39	0.34	-
645-644-5400-0000 Methodology 644-UNPAVED ROAD TRAVEL DUST- B.L.M. ROADS 5400-DUST 0000-SUB-CATEGORY UNSPECIFIED	-	-	-	-	-	0.11	0.07	0.01	-
645-645-5400-0000 Methodology 645-UNPAVED TRAFFIC AREA - AGRICULTURE 5400-DUST 0000-SUB-CATEGORY UNSPECIFIED	-	-	-	-	-	1.92	1.92	0.11	-
645-646-5400-0000 Methodology 646-UNPAVED ROAD TRAVEL DUST- FARM ROADS 5400-DUST 0000-SUB-CATEGORY UNSPECIFIED	-	-	-	-	-	3.95	2.35	0.23	-

Emissions for User Defined Query

CEPAM2019v1.04 Emission Projection Data by EIC

2025 Annual Average Emissions (Tons/Day)

FRESNO COUNTY
OTHER MOBILE SOURCES
870-FARM EQUIPMENT

Download these results (as a comma delimited file).
Start a new query.

EMISSIONS INVENTORY CATEGORY	TOG	ROG	CO	NOX	SOX	PM	PM10	PM2.5	NH3
870-893-1100-0014 Methodology 893-AGRICULTURAL EQUIPMENT 1100-GASOLINE (UNSPECIFIED) 0014-2-Wheel Tractors-G4-5-Exhaust	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
870-893-1100-0015 Methodology 893-AGRICULTURAL EQUIPMENT 1100-GASOLINE (UNSPECIFIED) 0015-2-Wheel Tractors-G4-5-Evap	0.00	0.00	-	-	-	-	-	-	-
870-893-1100-0024 Methodology 893-AGRICULTURAL EQUIPMENT 1100-GASOLINE (UNSPECIFIED) 0024-2-Wheel Tractors-G4-15-Exhaust	0.01	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00
870-893-1100-0025 Methodology 893-AGRICULTURAL EQUIPMENT 1100-GASOLINE (UNSPECIFIED) 0025-2-Wheel Tractors-G4-15-Evap	0.00	0.00	-	-	-	-	-	-	-

ARB MISCELLANEOUS PROCESS METHODOLOGY SECTION 7.4
Agricultural Land Preparation Operations

(Revised and updated, April 2016)

EMISSION INVENTORY SOURCE CATEGORY
Miscellaneous Processes / Farming Operations

EMISSION INVENTORY CODES (CES CODES) AND DESCRIPTION
620-614-5400-0000 (47332) Agricultural Land Preparation

Method Summary. This category estimates emissions of the airborne soil particulate emissions produced during the preparation of agricultural lands for planting and post-harvest activities. Included in this methodology are mechanical operations used to prepare the soil, such as discing, shaping, chiseling, and leveling. Emissions vary seasonally and regionally according to the crop mix and the associated land preparation activities.

ARB estimates land preparation emissions for each crop by summing the products of associated operation specific emission factors, corresponding acre-passes, and harvested crop acreage. County emissions are estimated by summing the emissions from all associated crops. Emission estimates in this update were developed for the 2016 ozone SIP inventory, Version 1.04. More information on method development is provided at the embedded links below, in the references, and in the Supporting Documentation section of the methodology's webpage at http://www.arb.ca.gov/ei/areasrc/arbmiscprocfarmops.htm.

Activity Data Source. For this update, 2012 harvested acreage from the U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS), compiled from County Agricultural Commissioner reports, was used for all regions (https://www.arb.ca.gov/ei/areasrc/fullpdf/2012acreage.pdf) Acreage not subject to land preparation operations was excluded (pasture lands, mushrooms, greenhouse, nursery and flower crops, forest firewood), as well as acreage aggregated statewide as "Sum of Others". Harvested acreage for counties split among two or more air basins was apportioned based on land surface areas compiled by ARB (ARB, 2009), except for Kern County, which was assigned 98% to the San Joaquin Valley Air Basin (SJV AB) and 2% to the Mojave Desert Air Basin. Information about the operation type, number of operations, and time of year that land preparation operations occur is provided by 20 crop profiles (Crop Calendars), developed in consultation with growers and other agricultural experts to accurately reflect current California growing practices (CARB, April 2003).

Table 1
2012 Agricultural Land Preparation Emissions

Air Basin	County	Air District	2012 Harvested Acres	Annual Acre-Passes	Emissions, tons/year PM10	PM2.5	Total PM
SF	Alameda	BA	10,035.00	7,335.96	12.32	1.85	27.11
SF	Contra Costa	BA	30,709.00	96,166.08	85.68	12.84	188.59
SF	Marin	BA	4,096.00	4,191.16	6.96	1.04	15.32
SF	Napa	BA	44,036.00	44,179.86	33.33	5.00	73.37
SF	San Francisco	BA	0	0	0	0	0
SF	San Mateo	BA	3,141.00	9,412.93	8.48	1.27	18.66
SF	Santa Clara	BA	19,407.00	63,068.73	65.19	9.77	143.50
SF	Solano	BA	50,426.00	83,684.52	103.93	15.58	228.76
SF	Sonoma	BA	23,967.68	22,697.25	21.19	3.18	46.64
SJV	Fresno	SJU	1,073,350.00	2,489,549.20	2,335.78	350.14	5,141.49
SJV	Kern	SJU	772,239.04	916,372.80	1,401.89	210.14	3,085.83
SJV	Kings	SJU	557,583.00	1,723,154.00	1,579.27	236.73	3,476.27
SJV	Madera	SJU	310,420.00	338,231.50	477.18	71.53	1,050.36
SJV	Merced	SJU	562,198.00	1,210,342.54	1,428.21	214.09	3,143.77
SJV	San Joaquin	SJU	690,367.00	1,320,858.52	1,436.03	215.26	3,160.98
SJV	Stanislaus	SJU	538,956.00	898,489.94	1,141.76	171.15	2,513.23
SJV	Tulare	SJU	893,908.00	1,434,574.38	1,590.55	238.42	3,501.10
SS	Imperial	IMP	565,617.00	981,288.60	1,628.80	244.16	3,585.29
SS	Riverside	SC	55,673.10	103,133.12	135.33	20.29	297.89
SV	Butte	BUT	213,910.00	637,396.51	488.00	73.15	1,074.18
SV	Colusa	COL	294,470.00	1,168,394.43	815.63	122.26	1,795.36
SV	Glenn	GLE	242,036.00	753,782.20	591.87	88.72	1,302.81
SV	Placer	PLA	6,168.30	29,332.41	17.75	2.66	39.07
SV	Sacramento	SAC	127,756.00	282,002.12	257.06	38.53	565.84
SV	Shasta	SHA	30,060.00	39,137.47	50.50	7.57	111.15
SV	Solano	YS	82,274.00	136,537.90	169.56	25.42	373.24
SV	Sutter	FR	230,115.00	858,143.44	584.66	87.64	1,286.95
SV	Tehama	TEH	63,510.00	24,759.88	74.96	11.24	165.00
SV	Yolo	YS	412,022.00	1,291,619.40	1,138.15	170.61	2,505.28
SV	Yuba	FR	63,866.00	218,611.54	141.80	21.26	312.13
Statewide Totals			9,389,416	20,576,647	21,828	3,272	48,049

YEAR	AREA	EIC	EICSUM	EICSOU	EICMAT	EICSUB	TOG	ROG	COT	NOX	SOX	PM	PM10	PM2.5
2025	FRESNO COUNTY	870-893-1100-0014	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0014-2-Wh	0	0	0.03	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0015	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0015-2-Wh	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0024	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0024-2-Wh	0.01	0.01	0.16	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0025	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0025-2-Wh	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0034	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0034-2-Wh	0	0	0.01	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0035	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0035-2-Wh	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0264	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0264-Agric	0	0	0.06	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0265	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0265-Agric	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0274	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0274-Agric	0	0	0.11	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0275	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0275-Agric	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0324	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0324-Agric	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-0344	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0344-Agric	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-3904	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	3904-Hydr	0	0	0.01	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-3905	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	3905-Hydr	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-3914	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	3914-Hydr	0	0	0.07	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-3915	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	3915-Hydr	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-3934	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	3934-Hydr	0	0	0.06	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-3935	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	3935-Hydr	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-3964	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	3964-Hydr	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-3965	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	3965-Hydr	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-3984	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	3984-Hydr	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-3985	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	3985-Hydr	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-5004	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	5004-Othe	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-5005	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	5005-Othe	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-5014	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	5014-Othe	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-5015	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	5015-Othe	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-5034	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	5034-Othe	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-5035	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	5035-Othe	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-5054	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	5054-Othe	0.16	0.13	1.44	0.06	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-5074	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	5074-Othe	0	0	0.09	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-5094	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	5094-Othe	0	0	0.02	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-8434	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	8434-Spra	0	0	0.07	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-8435	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	8435-Spra	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-8444	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	8444-Spra	0	0	0.03	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-8445	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	8445-Spra	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-8454	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	8454-Spra	0.01	0.01	0.23	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-8455	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	8455-Spra	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-9084	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	9084-Tiller	0.08	0.07	3.44	0.04	0	0	0	0
2025	FRESNO COUNTY	870-893-1100-9085	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	9085-Tiller	0.05	0.05	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-0300	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	0300-Agric	0.01	0.01	0.03	0.02	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-0320	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	0320-Agric	0.2	0.17	0.59	0.45	0	0.04	0.04	0.03
2025	FRESNO COUNTY	870-893-1210-0322	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	0322-Agric	0.11	0.09	0.42	0.63	0	0.04	0.04	0.04
2025	FRESNO COUNTY	870-893-1210-0335	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	0335-Agric	0.17	0.14	1.05	1.05	0	0.08	0.08	0.07
2025	FRESNO COUNTY	870-893-1210-0350	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	0350-Agric	0.12	0.1	0.9	0.78	0	0.04	0.04	0.03
2025	FRESNO COUNTY	870-893-1210-0365	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	0365-Agric	0.06	0.05	0.28	0.39	0	0.02	0.02	0.02
2025	FRESNO COUNTY	870-893-1210-0375	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	0375-AGRI	0.11	0.09	0.64	0.69	0	0.03	0.03	0.03
2025	FRESNO COUNTY	870-893-1210-0750	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	0750-Bale	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-1290	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	1290-Com	0	0	0.01	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-1315	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	1315-Com	0.01	0.01	0.03	0.05	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-1325	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	1325-COM	0.02	0.02	0.1	0.13	0	0.01	0.01	0.01
2025	FRESNO COUNTY	870-893-1210-3920	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	3920-Hydr	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-3950	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	3950-Hydr	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4560	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4560-Cons	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4561	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4561-Cons	0	0	0	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4562	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4562-Cons	0	0	0.02	0.02	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4563	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4563-Cons	0.01	0.01	0.07	0.07	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4564	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4564-Cons	0	0	0.01	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4565	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4565-CON	0	0	0.01	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4569	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4569-COT	0	0	0	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4572	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4572-Fora	0	0	0.01	0.02	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4573	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4573-Fora	0	0	0.02	0.03	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4574	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4574-FOR	0	0	0.01	0.02	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4575	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4575-Fork	0	0	0.01	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4576	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4576-Fork	0.01	0.01	0.06	0.08	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4577	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4577-FOR	0.01	0	0.03	0.03	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4578	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4578-Nut H	0.01	0.01	0.02	0.02	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4579	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4579-Nut H	0	0	0.01	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4580	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4580-Nut H	0.02	0.01	0.09	0.09	0	0.01	0.01	0.01
2025	FRESNO COUNTY	870-893-1210-4581	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4581-Nut H	0.01	0.01	0.05	0.06	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4582	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4582-Nut H	0	0	0.02	0.03	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4585	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4585-Othe	0	0	0.01	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4586	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4586-Othe	0.01	0.01	0.04	0.05	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4587	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4587-Othe	0.01	0.01	0.05	0.05	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4588	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4588-Othe	0.01	0.01	0.02	0.04	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4589	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4589-OTH	0	0	0.02	0.03	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4590	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4590-Hay S	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4592	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4592-Hay S	0	0	0.01	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4593	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4593-Hay S	0	0	0	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4594	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4594-HAY	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4597	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4597-Bale	0	0	0.02	0.02	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-4598	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	4598-BALE	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-5020	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	5020-Othe	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-5040	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	5040-Othe	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-5060	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	5060-Othe	0.01	0.01	0.04	0.03	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-5100	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	5100-Othe	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8460	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8460-Spra	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8480	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8480-Spra	0	0	0.01	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8482	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8482-Spra	0.03	0.03	0.15	0.19	0	0.01	0.01	0.01
2025	FRESNO COUNTY	870-893-1210-8484	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8484-Spra	0	0	0.01	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8520	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8520-Spra	0.01	0	0.04	0.04	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8535	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8535-Spra	0	0	0.02	0.03	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8545	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8545-SPRA	0.01	0.01	0.05	0.06	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8666	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8666-Swat	0	0	0	0	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8667	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8667-Swat	0	0	0	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8668	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8668-Swat	0.01	0	0.03	0.03	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8690	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8690-Swat	0	0	0.01	0.01	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-8695	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	8695-SWA	0	0	0.01	0.02	0	0	0	0
2025	FRESNO COUNTY	870-893-1210-9100	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	9100-Tiller	0	0	0	0	0	0	0	0

Attachment 3: CT-EMFAC2021 Modeling, Traffic Emissions, AERMOD Modeling Summaries, and Health Risk Calculations

Note: Do to the size, AERMOD output files can be provided to lead agency separately upon request**.**

VCIP Solar, Cantua Creek, CA - Impacts from Construction
AERMOD Risk Modeling Parameters
MEI Receptor

Emissions Years	2031
Receptor Information	
Number of Receptors	578
Receptor Height (in m) =	0 m
Receptor Distances =	Residential Locations

Meteorological Conditions

SJVAPCD Lemoore Met Data	2018 - 2022
Land Use Classification	rural
Wind Speed =	variable
Wind Direction =	variable

Construction

Analysis Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2031	0.0114	0.00065	0.00019

Operation

Analysis Years	TAC Concentrations (µg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2032 - 2100	0.00034	0.00031	0.00006

VCIP Solar, Cantua Creek, CA - Impacts from Construction
AERMOD Risk Modeling Parameters
MEI Receptor

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - MEI Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			TOTAL
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	
0	0.25	-0.25 - 0*	2031	10	0.0114	0.0007	0.0002	0.155	0.000	0.0000	0.16
1	1	0 - 1	2031	10	0.0114	0.0007	0.0002	1.872	0.001	0.0000	1.87
2	1	1 - 2	2032	10	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
3	1	2 - 3	2033	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
4	1	3 - 4	2034	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
5	1	4 - 5	2035	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
6	1	5 - 6	2036	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
7	1	6 - 7	2037	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
8	1	7 - 8	2038	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
9	1	8 - 9	2039	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
10	1	9 - 10	2040	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
20	1	19-20	2050	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
30	1	29-30	2060	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
40	1	39-40	2070	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
50	1	49-50	2080	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
60	1	59-60	2090	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
70	1	69-70	2100	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
Total Increased Cancer Risk								2.03	0.001	0.000	**2.03**

* Third trimester of pregnancy

VCIP Solar, Cantua Creek, CA - Impacts from Operation
AERMOD Risk Modeling Parameters
MEI Receptor

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Cancer Risk by Year -MEI Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			TOTAL
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	
0	0.25	-0.25 - 0*	2031	10							
1	1	0 - 1	2031	10							
2	1	1 - 2	2032	10	0.0003	0.0003	0.0001	0.056	0.000	0.0000	0.06
3	1	2 - 3	2033	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
4	1	3 - 4	2034	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
5	1	4 - 5	2035	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
6	1	5 - 6	2036	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
7	1	6 - 7	2037	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
8	1	7 - 8	2038	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
9	1	8 - 9	2039	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
10	1	9 - 10	2040	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
11	1	10 - 11	2041	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
12	1	11 - 12	2042	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
13	1	12 - 13	2043	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
14	1	13 - 14	2044	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
15	1	14 - 15	2045	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
16	1	15 - 16	2046	3	0.0003	0.0003	0.0001	0.009	0.000	0.0000	0.01
17	1	16-17	2047	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
18	1	17-18	2048	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
19	1	18-19	2049	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
20	1	19-20	2050	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
21	1	20-21	2051	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
22	1	21-22	2052	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
23	1	22-23	2053	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
24	1	23-24	2054	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
25	1	24-25	2055	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
26	1	25-26	2056	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
27	1	26-27	2057	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
28	1	27-28	2058	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
29	1	28-29	2059	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
30	1	29-30	2060	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
31	1	30-31	2061	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
32	1	31-32	2062	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
33	1	32-33	2063	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
34	1	33-34	2064	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
35	1	34-35	2065	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
36	1	35-36	2066	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
37	1	36-37	2067	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
38	1	37-38	2068	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
39	1	38-39	2069	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
40	1	39-40	2070	1	0.0003	0.0003	0.0001	0.0010	0.0000	0.00000	0.001
41	1	40-41	2071	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
42	1	41-42	2072	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
43	1	42-43	2073	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
44	1	43-44	2074	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
45	1	44-45	2075	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
46	1	45-46	2076	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
47	1	46-47	2077	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
48	1	47-48	2078	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
49	1	48-49	2079	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
50	1	49-50	2080	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
51	1	50-51	2081	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
52	1	51-52	2082	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
53	1	52-53	2083	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
54	1	53-54	2084	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
55	1	54-55	2085	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
56	1	55-56	2086	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
57	1	56-57	2087	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
58	1	57-58	2088	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
59	1	58-59	2089	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
60	1	59-60	2090	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
61	1	60-61	2091	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
62	1	61-62	2092	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
63	1	62-63	2093	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
64	1	63-64	2094	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
65	1	64-65	2095	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
66	1	65-66	2096	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
67	1	66-67	2097	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
68	1	67-68	2098	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
69	1	68-69	2099	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
70	1	69-70	2100	1	0.000	0.000	0.000	0.000	0.0000	0.00000	0.000
Total Increased Cancer Risk								0.20	0.001	0.000	**0.20**

* Third trimester of pregnancy

Maximum Chronic Hazard Index
0.00000

VCIP Solar, Cantua Creek, CA - Impacts from Construction
AERMOD Risk Modeling Parameters
MEI Receptor

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	**3rd Trimester**	**0 - 2**	**2 - 16**	**16 - 30**
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Decommission Cancer Risk by Year - MEI Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	TOTAL
0	0.25	-0.25 - 0*	2031	10	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
1	1	0 - 1	2031	10	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
2	1	1 - 2	2032	10	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
3	1	2 - 3	2033	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
4	1	3 - 4	2034	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
5	1	4 - 5	2035	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
6	1	5 - 6	2036	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
7	1	6 - 7	2037	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
8	1	7 - 8	2038	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
9	1	8 - 9	2039	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
10	1	9 - 10	2040	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
11	1	10 - 11	2041	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
12	1	11 - 12	2042	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
13	1	12 - 13	2043	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
14	1	13 - 14	2044	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
15	1	14 - 15	2045	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
16	1	15 - 16	2046	3	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
17	1	16-17	2047	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
18	1	17-18	2048	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
19	1	18-19	2049	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
20	1	19-20	2050	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
21	1	20-21	2051	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
22	1	21-22	2052	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
23	1	22-23	2053	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
24	1	23-24	2054	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
25	1	24-25	2055	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
26	1	25-26	2056	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
27	1	26-27	2057	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
28	1	27-28	2058	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
29	1	28-29	2059	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
30	1	29-30	2060	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
31	1	30-31	2061	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
32	1	31-32	2062	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
33	1	32-33	2063	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
34	1	33-34	2064	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
35	1	34-35	2065	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
36	1	35-36	2066	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
37	1	36-37	2067	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
38	1	37-38	2068	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
39	1	38-39	2069	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
40	1	39-40	2070	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
41	1	40-41	2071	1	0.0114	0.0007	0.0002	0.033	0.000	0.0000	0.03
42	1	41-42	2072	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
43	1	42-43	2073	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
44	1	43-44	2074	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
45	1	44-45	2075	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
46	1	45-46	2076	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
47	1	46-47	2077	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
48	1	47-48	2078	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
49	1	48-49	2079	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
50	1	49-50	2080	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
51	1	50-51	2081	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
52	1	51-52	2082	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
53	1	52-53	2083	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
54	1	53-54	2084	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
55	1	54-55	2085	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
56	1	55-56	2086	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
57	1	56-57	2087	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
58	1	57-58	2088	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
59	1	58-59	2089	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
60	1	59-60	2090	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
61	1	60-61	2091	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
62	1	61-62	2092	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
63	1	62-63	2093	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
64	1	63-64	2094	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
65	1	64-65	2095	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
66	1	65-66	2096	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
67	1	66-67	2097	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
68	1	67-68	2098	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
69	1	68-69	2099	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
70	1	69-70	2100	1	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.00
Total Increased Cancer Risk								0.00	0.000	0.000	**0.03**

* Third trimester of pregnancy

VCIP Solar, Cantua Creek, CA - Impacts from Construction & Operation
AERMOD Risk Modeling Parameters
MEI Receptor

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

Values

	Infant/Child			Adult
Age -->	3rd Trimester	0 - 2	2 - 16	16 - 30
Parameter				
ASF =	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Total Project Cancer Risk by Year - MEI Impact Receptor Location

Maximum - Exposure Information					Concentration (ug/m3)			Cancer Risk (per million)			TOTAL
Exposure Year	Exposure Duration (years)	Age	Year	Age Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	
0	0.25	-0.25 - 0*	2031	10	0.0114	0.0007	0.0002	0.155	0.000050	0.000001	0.16
1	1	0 - 1	2031	10	0.0114	0.0007	0.0002	1.872	0.000202	0.000003	1.87
2	1	1 - 2	2032	10	0.0003	0.0003	0.0001	0.056	0.00029	0.00000	0.06
3	1	2 - 3	2033	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
4	1	3 - 4	2034	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
5	1	4 - 5	2035	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
6	1	5 - 6	2036	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
7	1	6 - 7	2037	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
8	1	7 - 8	2038	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
9	1	8 - 9	2039	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
10	1	9 - 10	2040	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
11	1	10 - 11	2041	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
12	1	11 - 12	2042	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
13	1	12 - 13	2043	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
14	1	13 - 14	2044	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
15	1	14 - 15	2045	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
16	1	15 - 16	2046	3	0.0003	0.0003	0.0001	0.009	0.00000	0.00000	0.01
17	1	16-17	2047	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
18	1	17-18	2048	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
19	1	18-19	2049	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
20	1	19-20	2050	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
21	1	20-21	2051	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
22	1	21-22	2052	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
23	1	22-23	2053	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
24	1	23-24	2054	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
25	1	24-25	2055	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
26	1	25-26	2056	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
27	1	26-27	2057	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
28	1	27-28	2058	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
29	1	28-29	2059	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
30	1	29-30	2060	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
31	1	30-31	2061	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
32	1	31-32	2062	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
33	1	32-33	2063	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
34	1	33-34	2064	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
35	1	34-35	2065	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
36	1	35-36	2066	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
37	1	36-37	2067	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
38	1	37-38	2068	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
39	1	38-39	2069	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
40	1	39-40	2070	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
41	1	40-41	2071	1	0.0003	0.0003	0.0001	0.001	0.00001	0.00000	0.001
42	1	41-42	2072	1	0.0114	0.0007	0.0002	0.033	0.00001	0.00000	0.033
43	1	42-43	2073	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
44	1	43-44	2074	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
45	1	44-45	2075	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
46	1	45-46	2076	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
47	1	46-47	2077	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
48	1	47-48	2078	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
49	1	48-49	2079	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
50	1	49-50	2080	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
51	1	50-51	2081	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
52	1	51-52	2082	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
53	1	52-53	2083	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
54	1	53-54	2084	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
55	1	54-55	2085	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
56	1	55-56	2086	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
57	1	56-57	2087	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
58	1	57-58	2088	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
59	1	58-59	2089	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
60	1	59-60	2090	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
61	1	60-61	2091	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
62	1	61-62	2092	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
63	1	62-63	2093	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
64	1	63-64	2094	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
65	1	64-65	2095	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
66	1	65-66	2096	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
67	1	66-67	2097	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
68	1	67-68	2098	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
69	1	68-69	2099	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
70	1	69-70	2100	1	0.0000	0.0000	0.0000	0.000	0.00000	0.00000	0.000
Total Increased Cancer Risk								2.26	0.0007	0.00002	**2.26**

* Third trimester of pregnancy

VCIP Solar, Cantua Creek, CA - Project Impacts - Without Mitigation
Maximum DPM Cancer Risk Calculations From Construction and Operation
Impacts at Cantua Elementary School - 1 meter - Child Exposure

Student Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)

Inhalation Dose = C_{air} x SCAF x 8-Hr BR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
SCAF = School Child Adjustment Factor (unitless) for source operation and exposures different than 8 hours/day
= (24/SHR) x (7days/SDay) x (SCHR/8 hrs)
SHR = Hours/day of emission source operation
SDay = Number of days per week of source operation
SCHR = School operation hours while emission source in operation
8-Hr BR = Eight-hour breathing rate (L/kg body weight-per 8 hrs)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant	**Child**
Age -->	**0 - <2**	**2 - <16**
Parameter		
ASF =	10	3
DPM CPF =	1.10E+00	1.10E+00
TOG Exhaust CPF	6.28E-03	6.28E-03
TOG Evaporative CPF	3.70E-04	3.70E-04
8-Hr BR* =	1200	520
SCHR =	9	9
SHR =	9	9
SDay =	5	5
A =	1	1
EF =	250	250
AT =	70	70
SCAF =	4.20	4.20

* 95th percentile 8-hr breathing rates for moderate intensity activities

Construction Cancer Risk by Year - Maximum Preschool Impact Receptor Location

Exposure Year	**Exposure Duration (years)**	**Age**	**Child - Exposure Information: DPM Conc (ug/m3) Year**	**DPM Conc (ug/m3) Annual**	**Age* Sensitivity Factor**	**Child Cancer Risk (per million)**	**Hazard Index**
1	1	5 - 6	2031	0.0064	3	0.45	0.0013
2	1	6 - 7	2032	0.0003	3	0.02	0.0001
3	1	7 - 8	2033	0.0003	3	0.02	0.0001
4	1	8 - 9	2034	0.0003	3	0.02	0.0001
5	1	9 - 10	2035	0.0003	3	0.02	0.0001
Total Increased Cancer Risk						**0.52**	

* Children assumed to be 5 years of age with 5 years of exposure to project emissions

VCIP Solar, Cantua Creek, CA - Impacts from Construction & Operation
AERMOD Risk Modeling Parameters
Cantua Creek Elementary School MEI Receptor

Student Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)

Inhalation Dose = C_{air} x SCAF x 8-Hr BR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
SCAF = School Child Adjustment Factor (unitless) for source operation and exposures different than 8 hours/day
= (24/SHR) x (7days/SDay) x (SCHR/8 hrs)
SHR = Hours/day of emission source operation
SDay = Number of days per week of source operation
SCHR = School operation hours while emission source in operation
8-Hr BR = Eight-hour breathing rate (L/kg body weight-per 8 hrs)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant	**Child**
Age -->	**0 - <2**	**2 - <16**
Parameter		
ASF =	10	3
DPM CPF =	1.10E+00	1.10E+00
TOG Exhaust CPF	6.28E-03	6.28E-03
TOG Evaporative CPF	3.70E-04	3.70E-04
8-Hr BR* =	1200	520
SCHR =	9	9
SHR =	9	9
SDay =	5	5
A =	1	1
EF =	250	250
AT =	70	70
SCAF =	4.20	4.20

* 95th percentile 8-hr breathing rates for moderate intensity activities

Total Project Cancer Risk by Year - MEI Impact Receptor Location

Maximum - Exposure Information					**Concentration (ug/m3)**			**Cancer Risk (per million)**				
Exposure Year	**Exposure Duration (years)**	**Age**	**Year**	**Age Sensitivity Factor**	**DPM**	**Exhaust TOG**	**Evaporative TOG**	**DPM**	**Exhaust TOG**	**Evaporative TOG**	**TOTAL**	**Maximum Hazard Index**
1	1	5 - 6	2031	3	0.0064	0.0014	0.0004	0.45	0.00	0.00	0.45	0.0013
2	1	6 - 7	2032	3	0.0003	0.0005	0.0001	0.02	0.00	0.00	0.02	0.00005
3	1	7 - 8	2033	3	0.0003	0.0005	0.0001	0.02	0.00	0.00	0.02	
4	1	8 - 9	2034	3	0.0003	0.0005	0.0001	0.02	0.00	0.00	0.02	
5	1	9 - 10	2035	3	0.0003	0.0005	0.0001	0.02	0.00	0.00	0.02	
Total Increased Cancer Risk								0.52	0.0014	0.00002	**0.53**	

* Third trimester of pregnancy

VCIP - Construction Emissions from Equipment and Vehicle Use
HRA Inputs

Emissions in tons
Includes 1mi trips (worker, vendor, hauling)

Construction Year	Modeled mW	Acres	Miles	Unmitigated PM10ex	PM2.5ex	PM10dust	PM2.5dust	Mitigated PM10ex	PM2.5ex	PM10dust	PM2.5dust
2031 Total											
Solar PV + BESS	**1150**	7500		2.22	2.04	1207.42	120.49	0.31	0.31	1191.06	118.86
Gen Ties		0	**20**	0.06	0.05	7.50	0.75	0.01	0.01	6.17	0.62
Utility Substation		**40**		0.06	0.05	60.88	6.28	0.01	0.01	59.24	5.99
Internal T-Lines		0	**30**	0.11	0.10	28.33	2.83	0.02	0.02	25.68	2.56

2031 Per acre/mi emissions		
Solar PV + BESS	0.000296311	per acre
Internal T-Lines	0.003644973	per mile
Operational	0.00000433	per acre

VCIP Solar, Cantua Creek, CA

DPM Emissions and Modeling Emission Rates - Per Area Unmitigated

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	(lb/hr)	(g/s)	DPM Emission Rate (g/s/m²)
2031	Construction	0.0682	CON_DPM	136.3	0.05825	7.34E-03	7.89E-09
Total		***0.0682***		***136.3***	***0.0582***	***0.0073***	

Construction Hours

hr/day =	9	(8am - 5pm)
days/yr =	260	
hours/year =	2340	

VCIP Solar, Cantua Creek, CA

DPM Emissions and Modeling Emission Rates - Internal Line Unmitigated

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	DPM Emission Rate ($g/s/m^2$)
2031	Construction	0.0098	CON_DPM	19.7	0.00841	1.06E-03	8.00E-08
Total		***0.0098***		***19.7***	***0.0084***	***0.0011***	

Construction Hours

hr/day =	9	(8am - 5pm)
days/yr =	260	
hours/year =	2340	

VCIP Solar, Cantua Creek, CA

DPM Emissions and Modeling Emission Rates - Per Area Operational

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	(lb/hr)	(g/s)	DPM Emission Rate (g/s/m^2)
2031	Construction	0.0010	CON_DPM	2.0	0.00023	2.86E-05	3.08E-11
Total		***0.0010***		***2.0***	***0.0002***	***0.0000***	

Operational Hours

hr/day =	24
days/yr =	365
hours/year =	8760

VCIP Solar, Cantua Creek, CA
Worker Trips - Western Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Line Area Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Initial Vertical height (m)	(Sigma z) Vertical Dimension (m)
DPM_WE_WOR	Western portion of West Clark Ave	Both	2	3228.5	2.01	13.3	43.7	3.4	35	18	42,988	462,720	5.453E-11	4.021E-11	6.8	3.16
									Total	800						

Emission Factors

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.00005			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and DPM Emissions - DPM_WE_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	2	5.13E-08	17	11.11%	2	5.13E-08
2	0.00%	0	0.00E+00	10	11.11%	2	5.13E-08	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	2	5.13E-08	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	2	5.13E-08	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	2	5.13E-08	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	2	5.13E-08	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	2	5.13E-08	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	2	5.13E-08	24	0.00%	0	0.00E+00
								Total		18	

VCIP Solar, Cantua Creek, CA
Worker Trips - Western Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEXH_WE_WOR	Western portion of West Clark Ave	Both	2	3228.5	2.0	13.3	43.7	1.3	35	18	42,988	462,720	1.55E-09	1.14E-09	2.6	1.21
									Total	18						

Emission Factors - TOG Exhaust

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.01385			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Exhaust Emissions - TEXH_WE_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	2	1.54E-05	17	11.11%	2	1.54E-05
2	0.00%	0	0.00E+00	10	11.11%	2	1.54E-05	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	2	1.54E-05	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	2	1.54E-05	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	2	1.54E-05	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	2	1.54E-05	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	2	1.54E-05	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	2	1.54E-05	24	0.00%	0	0.00E+00
								Total		18	

VCIP Solar, Cantua Creek, CA
Worker Trips - Western Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEVAP_WE_WOR	Western portion of West Clark Ave	Both	2	3228.5	2.0	13.3	43.7	1.3	35	800	42,988	462,720	3.25E-10	2.39E-10	2.6	1.21
									Total	800						

Emission Factors - PM2.5 - Evaporative TOG

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle per Hour (g/hour)	0.98888			
Emissions per Vehicle per Mile (g/VMT)	0.02825			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Evaporative Emissions - TEVAP_WE_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	89	1.40E-03	17	11.11%	89	1.40E-03
2	0.00%	0	0.00E+00	10	11.11%	89	1.40E-03	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	89	1.40E-03	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	89	1.40E-03	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	89	1.40E-03	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	89	1.40E-03	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	89	1.40E-03	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	89	1.40E-03	24	0.00%	0	0.00E+00
								Total		800	

VCIP Solar, Cantua Creek, CA
Worker Trips - Eastern Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Initial Vertical height (m)	(Sigma z) Vertical Dimension (m)
											Line Area					
DPM_EA_WOR	Eastern portion of West Clark Ave	Both	2	1606.8	1.00	13.3	43.7	3.4	35	18	21,395	230,292	6.301E-11	4.646E-11	6.8	3.16
									Total	1,088						

Emission Factors

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.00050			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and DPM Emissions - DPM_EA_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	2	2.75E-07	17	11.11%	2	2.75E-07
2	0.00%	0	0.00E+00	10	11.11%	2	2.75E-07	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	2	2.75E-07	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	2	2.75E-07	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	2	2.75E-07	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	2	2.75E-07	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	2	2.75E-07	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	2	2.75E-07	24	0.00%	0	0.00E+00
								Total		18	

VCIP Solar, Cantua Creek, CA
Worker Trips - Eastern Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEXH_EA_WOR	Eastern portion of West Clark Ave	Both	2	1606.8	1.0	13.3	43.7	1.3	35	18	21,395	230,292	2.78E-09	2.05E-09	2.6	1.21
									Total	18						

Emission Factors - TOG Exhaust

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.01473			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Exhaust Emissions - TEXH_EA_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	2	8.17E-06	17	11.11%	2	8.17E-06
2	0.00%	0	0.00E+00	10	11.11%	2	8.17E-06	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	2	8.17E-06	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	2	8.17E-06	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	2	8.17E-06	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	2	8.17E-06	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	2	8.17E-06	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	2	8.17E-06	24	0.00%	0	0.00E+00
								Total		18	

VCIP Solar, Cantua Creek, CA
Worker Trips - Eastern Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEVAP_EA_WOR	Eastern portion of West Clark Ave	Both	2	1606.8	1.0	13.3	43.7	1.3	35	18	21,395	230,292	4.89E-10	3.61E-10	2.6	1.21
									Total	18						

Emission Factors - PM2.5 - Evaporative TOG

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle per Hour (g/hour)	0.91114			
Emissions per Vehicle per Mile (g/VMT)	0.02603			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Evaporative Emissions - TEVAP_EA_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	2	1.44E-05	17	11.11%	2	1.44E-05
2	0.00%	0	0.00E+00	10	11.11%	2	1.44E-05	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	2	1.44E-05	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	2	1.44E-05	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	2	1.44E-05	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	2	1.44E-05	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	2	1.44E-05	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	2	1.44E-05	24	0.00%	0	0.00E+00
								Total		18	

VCIP Solar, Cantua Creek, CA
Worker Trips - S San Mateo Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Line Area Initial Vertical height (m)	(Sigma z) Vertical Dimension (m)
DPM_SMA	South San Mateo Avenue	Both	2	2414.5	1.50	13.3	43.7	3.4	35	36	32,150	346,055	1.148E-10	8.468E-11	6.8	3.16
									Total	1,888						

Emission Factors

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.00031			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and DPM Emissions - DPM_SMA

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	4	5.12E-07	17	11.11%	4	5.12E-07
2	0.00%	0	0.00E+00	10	11.11%	4	5.12E-07	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	4	5.12E-07	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	4	5.12E-07	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	4	5.12E-07	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	4	5.12E-07	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	4	5.12E-07	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	4	5.12E-07	24	0.00%	0	0.00E+00
								Total		36	

VCIP Solar, Cantua Creek, CA
Worker Trips - S San Mateo Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEXH_EA_WOR	South San Mateo Avenue	Both	2	2414.5	1.5	13.3	43.7	1.3	35	36	32,150	346,055	3.92E-09	2.89E-09	2.6	1.21
									Total	36						

Emission Factors - TOG Exhaust

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.01436			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Exhaust Emissions - TEXH_EA_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	4	2.39E-05	17	11.11%	4	2.39E-05
2	0.00%	0	0.00E+00	10	11.11%	4	2.39E-05	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	4	2.39E-05	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	4	2.39E-05	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	4	2.39E-05	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	4	2.39E-05	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	4	2.39E-05	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	4	2.39E-05	24	0.00%	0	0.00E+00
								Total		36	

VCIP Solar, Cantua Creek, CA
Worker Trips - S San Mateo Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEVAP_EA_WOR	South San Mateo Avenue	Both	2	2414.5	1.5	13.3	43.7	1.3	35	36	32,150	346,055	7.60E-10	5.60E-10	2.6	1.21
									Total	36						

Emission Factors - PM2.5 - Evaporative TOG

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle per Hour (g/hour)	0.94377			
Emissions per Vehicle per Mile (g/VMT)	0.02696			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Evaporative Emissions - TEVAP_EA_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	4	4.50E-05	17	11.11%	4	4.50E-05
2	0.00%	0	0.00E+00	10	11.11%	4	4.50E-05	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	4	4.50E-05	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	4	4.50E-05	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	4	4.50E-05	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	4	4.50E-05	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	4	4.50E-05	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	4	4.50E-05	24	0.00%	0	0.00E+00
								Total		36	

VCIP Solar, Cantua Creek, CA
Worker Trips - Western Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Line Area Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Initial Vertical height (m)	(Sigma z) Vertical Dimension (m)
DPM_WE_WOR	Western portion of West Clark Ave	Both	2	3228.5	2.01	13.3	43.7	3.4	35	800	42,988	462,720	8.013E-11	5.908E-11	6.8	3.16
									Total	800						

Emission Factors

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.00005			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and DPM Emissions - DPM_WE_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	89	2.28E-06	17	11.11%	89	2.28E-06
2	0.00%	0	0.00E+00	10	11.11%	89	2.28E-06	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	89	2.28E-06	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	89	2.28E-06	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	89	2.28E-06	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	89	2.28E-06	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	89	2.28E-06	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	89	2.28E-06	24	0.00%	0	0.00E+00
								Total		800	

VCIP Solar, Cantua Creek, CA
Worker Trips - Western Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEXH_WE_WOR	Western portion of West Clark Ave	Both	2	3228.5	2.0	13.3	43.7	1.3	35	800	42,988	462,720	4.47E-08	3.29E-08	2.6	1.21
									Total	800						

Emission Factors - TOG Exhaust

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.01385			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Exhaust Emissions - TEXH_WE_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	89	6.86E-04	17	11.11%	89	6.86E-04
2	0.00%	0	0.00E+00	10	11.11%	89	6.86E-04	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	89	6.86E-04	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	89	6.86E-04	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	89	6.86E-04	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	89	6.86E-04	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	89	6.86E-04	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	89	6.86E-04	24	0.00%	0	0.00E+00
								Total		800	

VCIP Solar, Cantua Creek, CA
Worker Trips - Western Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEVAP_WE_WOR	Western portion of West Clark Ave	Both	2	3228.5	2.0	13.3	43.7	1.3	35	800	42,988	462,720	1.42E-08	1.05E-08	2.6	1.21
									Total	800						

Emission Factors - PM2.5 - Evaporative TOG

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle per Hour (g/hour)	0.98888			
Emissions per Vehicle per Mile (g/VMT)	0.02825			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Evaporative Emissions - TEVAP_WE_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	89	1.40E-03	17	11.11%	89	1.40E-03
2	0.00%	0	0.00E+00	10	11.11%	89	1.40E-03	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	89	1.40E-03	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	89	1.40E-03	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	89	1.40E-03	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	89	1.40E-03	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	89	1.40E-03	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	89	1.40E-03	24	0.00%	0	0.00E+00
								Total		800	

VCIP Solar, Cantua Creek, CA
Worker Trips - Eastern Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Line Area: Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Initial Vertical height (m)	(Sigma z) Vertical Dimension (m)
DPM_EA_WOR	Eastern portion of West Clark Ave	Both	2	1606.8	1.00	13.3	43.7	3.4	35	1,088	21,395	230,292	1.287E-09	9.487E-10	6.8	3.16
									Total	1,088						

Emission Factors

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.00050			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and DPM Emissions - DPM_EA_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	121	1.66E-05	17	11.11%	121	1.66E-05
2	0.00%	0	0.00E+00	10	11.11%	121	1.66E-05	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	121	1.66E-05	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	121	1.66E-05	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	121	1.66E-05	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	121	1.66E-05	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	121	1.66E-05	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	121	1.66E-05	24	0.00%	0	0.00E+00
								Total		1,088	

VCIP Solar, Cantua Creek, CA
Worker Trips - Eastern Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEXH_EA_WOR	Eastern portion of West Clark Ave	Both	2	1606.8	1.0	13.3	43.7	1.3	35	1,088	21,395	230,292	1.27E-07	9.33E-08	2.6	1.21
									Total	1,088						

Emission Factors - TOG Exhaust

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.01473			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Exhaust Emissions - TEXH_EA_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	121	4.94E-04	17	11.11%	121	4.94E-04
2	0.00%	0	0.00E+00	10	11.11%	121	4.94E-04	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	121	4.94E-04	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	121	4.94E-04	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	121	4.94E-04	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	121	4.94E-04	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	121	4.94E-04	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	121	4.94E-04	24	0.00%	0	0.00E+00
								Total		1,088	

VCIP Solar, Cantua Creek, CA
Worker Trips - Eastern Portion of West Clark Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEVAP_EA_WOR	Eastern portion of West Clark Ave	Both	2	1606.8	1.0	13.3	43.7	1.3	35	1,088	21,395	230,292	2.68E-08	1.98E-08	2.6	1.21
									Total	1,088						

Emission Factors - PM2.5 - Evaporative TOG

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle per Hour (g/hour)	0.91114			
Emissions per Vehicle per Mile (g/VMT)	0.02603			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Evaporative Emissions - TEVAP_EA_WOR

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	121	8.73E-04	17	11.11%	121	8.73E-04
2	0.00%	0	0.00E+00	10	11.11%	121	8.73E-04	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	121	8.73E-04	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	121	8.73E-04	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	121	8.73E-04	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	121	8.73E-04	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	121	8.73E-04	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	121	8.73E-04	24	0.00%	0	0.00E+00
								Total		1,088	

VCIP Solar, Cantua Creek, CA
Worker Trips - S San Mateo Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Initial Vertical height (m)	(Sigma z) Vertical Dimension (m)
											Line Area					
DPM_SMA	South San Mateo Avenue	Both	2	2414.5	1.50	13.3	43.7	3.4	35	1,888	32,150	346,055	1.059E-09	7.811E-10	6.8	3.16
									Total	1,888						

Emission Factors

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.00031			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and DPM Emissions - DPM_SMA

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	210	2.68E-05	17	11.11%	210	2.68E-05
2	0.00%	0	0.00E+00	10	11.11%	210	2.68E-05	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	210	2.68E-05	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	210	2.68E-05	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	210	2.68E-05	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	210	2.68E-05	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	210	2.68E-05	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	210	2.68E-05	24	0.00%	0	0.00E+00
								Total		1,888	

VCIP Solar, Cantua Creek, CA
Worker Trips - S San Mateo Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEXH_SMA	South San Mateo Avenue	Both	2	2414.5	1.5	13.3	43.7	1.3	35	1,888	32,150	346,055	1.45E-07	1.07E-07	2.6	1.21
									Total	1,888						

Emission Factors - TOG Exhaust

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle (g/VMT)	0.01436			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Exhaust Emissions - TEXH_SMA

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	210	1.26E-03	17	11.11%	210	1.26E-03
2	0.00%	0	0.00E+00	10	11.11%	210	1.26E-03	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	210	1.26E-03	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	210	1.26E-03	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	210	1.26E-03	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	210	1.26E-03	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	210	1.26E-03	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	210	1.26E-03	24	0.00%	0	0.00E+00
								Total		1,888	

VCIP Solar, Cantua Creek, CA
Worker Trips - S San Mateo Ave
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2031

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Length (mi)	Link Width (m)	Link Width (ft)	Release Height (m)	Average Speed (mph)	Average Vehicles per Day	Area (sq m)	Area (sq ft)	Emission (g/s/m2)	Emission (lb/hr/ft2)	Vertical height (m)	(Sigma z) Vertical Dimension (m)
TEVAP_SMA	South San Mateo Avenue	Both	2	2414.5	1.5	13.3	43.7	1.3	35	1,888	32,150	346,055	3.74E-08	2.76E-08	2.6	1.21
									Total	1,888						

Emission Factors - PM2.5 - Evaporative TOG

Speed Category	1	2	3	4
Travel Speed (mph)	35			
Emissions per Vehicle per Hour (g/hour)	0.94377			
Emissions per Vehicle per Mile (g/VMT)	0.02696			

Emisson Factors from CT-EMFAC2021

2031 Hourly Traffic Volumes and TOG Evaporative Emissions - TEVAP_SMA

Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s	Hour	% Per Hour	VPH	g/s
1	0.00%	0	0.00E+00	9	11.11%	210	2.36E-03	17	11.11%	210	2.36E-03
2	0.00%	0	0.00E+00	10	11.11%	210	2.36E-03	18	0.00%	0	0.00E+00
3	0.00%	0	0.00E+00	11	11.11%	210	2.36E-03	19	0.00%	0	0.00E+00
4	0.00%	0	0.00E+00	12	11.11%	210	2.36E-03	20	0.00%	0	0.00E+00
5	0.00%	0	0.00E+00	13	11.11%	210	2.36E-03	21	0.00%	0	0.00E+00
6	0.00%	0	0.00E+00	14	11.11%	210	2.36E-03	22	0.00%	0	0.00E+00
7	0.00%	0	0.00E+00	15	11.11%	210	2.36E-03	23	0.00%	0	0.00E+00
8	0.00%	0	0.00E+00	16	11.11%	210	2.36E-03	24	0.00%	0	0.00E+00
								Total		1,888	

Construction Trips

Description	Travel Distance (miles)	Idle Time (min)	Release Height (ft)	Release Height (m)	Initial Vertical Dimention (m)	Initial Vertical Dispersion (m)	Average Speed (mph)	Trips per Day	Emissions (g/day)	Emissions (grams/hr)	Emissions (grams/sec)	Emissions (ton/yr)
DPM from W Clark Ave, West Segment	2.00	2	11.15	3.4	6.80	3.16			0.30	0.01	3.44444E-06	0.00006
TOG Ex from W Clark Ave, West Segment	2.00	2	11.15	3.4	6.80	3.16	35	800	165.98	6.92	0.001921056	0.03293
TOG Evap from W Clark Ave, West Segment	2.00	2	4.27	1.3	2.60	1.21			52.74	2.20	0.000610419	0.01046
DPM from W Clark Ave, East Segment	1.00	2	11.15	3.4	6.80	3.16			2.38	0.10	2.75274E-05	0.000472
TOG Ex from W Clark Ave, East Segment	1.00	2	11.15	3.4	6.80	3.16	35	1,088	233.84	9.74	0.002706513	0.05
TOG Evap from W Clark Ave, West Segment	1.00	2	11.15	1.3	2.60	1.21			49.57	2.07	0.000573679	0.01
DPM from S San Mateo Ave	1.50	2	11.15	3.4	6.80	3.16			2.94	0.12	3.40561E-05	0.000584
TOG Ex from S San Mateo Ave	1.50	2	11.15	3.4	6.80	3.16	35	1,888	402.46	16.77	0.004658148	0.079855
TOG Evap from S San Mateo Ave	1.50	2	11.15	1.3	2.60	1.21			103.94	4.33	0.001203014	0.020623

Speed Category	Idle	Travel
Travel Speed (mph)	(g/veh - min)	35
DPM - W Clark Ave West	0.000140	0.000046
DPM - W Clark Ave East	0.000845	0.000496
DPM - S San Mateo Ave	0.000549	0.000307
TOG Exhaust - W Clark Ave West	0.089891	0.013846
TOG Exhaust - W Clark Ave East	0.100098	0.014733
TOG Exhaust - S San Mateo Ave	0.095814	0.014361
TOG Evap - W Clark Ave West	0.016481	0.016481
TOG Evap - W Clark Ave East	0.015186	0.015186
TOG Evap - S San Mateo Ave	0.015729	0.015729

File Name:	W Clark Ave - West.EF
CT-EMFAC2021 Version:	1.0.2.0
Run Date:	########
Area:	Fresno (SJV)
Analysis Year:	2031
Season:	Annual

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Vehicle Category	VMT Fract Across Cat	Diesel VM Within Cat	Gas VMT Fraction Within Category
Truck 1	0	0.448	0.461
Truck 2	0	0.913	0.015
Non-Truck	1	0.005	0.92

==

Road Type:	NA
Silt Loading Factor:	NA
Precipitation Correction:	NA

==

Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	<= 5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
TOG	0.089891	0.057664	0.038572	0.027423	0.020714	0.016513	0.013846	0.012185	0.011238	0.010878	0.01102	0.011705	0.013027	0.013991	0.013991
Diesel PM	0.00014	0.000121	0.00009	0.000067	0.000056	0.00005	0.000046	0.000045	0.000046	0.00005	0.000055	0.000062	0.00007	0.000074	0.000074

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Fleet Average Running Loss Emission Factors (grams/veh-hour)

Pollutant Name	Emission Factor
TOG	0.988878

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Fleet Average Tire Wear Factors (grams/veh-mile)

Pollutant Name	Emission Factor

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Fleet Average Brake Wear Factors (grams/veh-mile)

Pollutant Name	<= 5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph

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Fleet Average Road Dust Factors (grams/veh-mile)

Pollutant Name	Emission Factor

============================END=======================================

File Name:	W Clark Ave - East.EF
CT-EMFAC2021 Version:	1.0.2.0
Run Date:	########
Area:	Fresno (SJV)
Analysis Year:	2031
Season:	Annual

===

Vehicle Category	VMT Fract Across Cat	Diesel VM Within Cat	Gas VMT Fraction Within Category
Truck 1	0	0.448	0.461
Truck 2	0.081	0.913	0.015
Non-Truck	0.919	0.005	0.92

===

Road Type:	NA
Silt Loading Factor:	NA
Precipitation Correction:	NA

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Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	<= 5 mpl	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
TOG	0.100098	0.063756	0.041214	0.028956	0.021938	0.017557	0.014733	0.012946	0.011908	0.011494	0.011616	0.012367	0.013757	0.014646	0.014647
Diesel PM	0.000845	0.000818	0.000617	0.000499	0.00043	0.000428	0.000496	0.000633	0.000839	0.001114	0.001458	0.001869	0.002344	0.002348	0.002348

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Fleet Average Running Loss Emission Factors (grams/veh-hour)

Pollutant Name	Emission Factor
TOG	0.911137

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Fleet Average Tire Wear Factors (grams/veh-mile)

Pollutant Name	Emission Factor

===

Fleet Average Brake Wear Factors (grams/veh-mile)

Pollutant Name	<= 5 mpl	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph

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Fleet Average Road Dust Factors (grams/veh-mile)

Pollutant Name	Emission Factor

===========================END======================================

File Name:	S San Mateo Ave.EF
CT-EMFAC2021 Version:	1.0.2.0
Run Date:	########
Area:	Fresno (SJV)
Analysis Year:	2031
Season:	Annual

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Vehicle Category	VMT Fract Across Cat	Diesel VM' Within Cat	Gas VMT Fraction Within Category
Truck 1	0	0.448	0.461
Truck 2	0.047	0.913	0.015
Non-Truck	0.953	0.005	0.92

==

Road Type:	NA
Silt Loading Factor:	NA
Precipitation Correction:	NA

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Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	<= 5 mpl	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
TOG	0.095814	0.061199	0.040105	0.028313	0.021424	0.017119	0.014361	0.012627	0.011627	0.011236	0.011366	0.012089	0.01345	0.014371	0.014372
Diesel PM	0.000549	0.000525	0.000396	0.000318	0.000273	0.000269	0.000307	0.000386	0.000506	0.000667	0.000869	0.00111	0.001389	0.001393	0.001393

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Fleet Average Running Loss Emission Factors (grams/veh-hour)

Pollutant Name	Emission Factor
TOG	0.943769

==

Fleet Average Tire Wear Factors (grams/veh-mile)

Pollutant Name	Emission Factor

==

Fleet Average Brake Wear Factors (grams/veh-mile)

Pollutant Name	<= 5 mpl	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph

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Fleet Average Road Dust Factors (grams/veh-mile)

Pollutant Name	Emission Factor

============================END======================================

Operational Trips

Description	Travel Distance (miles)	Idle Time (min)	Release Height (ft)	Release Height (m)	Initial Vertical Dimention (m)	Initial Vertical Dispersion (m)	Average Speed (mph)	Trips per Day	Emissions (g/day)	Emissions (grams/hr)	Emissions (grams/sec)	Emissions (ton/yr)
DPM from W Clark Ave, West Segment	2.00	2	11.15	3.4	6.80	3.16			0.20	0.01	2.34417E-06	0.00004
TOG Ex from W Clark Ave, West Segment	2.00	2	11.15	3.4	6.80	3.16	35	18	5.75	0.24	6.65742E-05	0.00114
TOG Evap from W Clark Ave, West Segment	2.00	2	4.27	1.3	2.60	1.21			1.21	0.05	1.39598E-05	0.00024
DPM from W Clark Ave, East Segment	1.00	2	11.15	3.4	6.80	3.16			0.12	0.00	1.34813E-06	2.31E-05
TOG Ex from W Clark Ave, East Segment	1.00	2	11.15	3.4	6.80	3.16	35	18	5.13	0.21	5.93956E-05	0.00
TOG Evap from W Clark Ave, West Segment	1.00	2	11.15	1.3	2.60	1.21			0.90	0.04	1.04699E-05	0.00
DPM from S San Mateo Ave	1.50	2	11.15	3.4	6.80	3.16			0.32	0.01	3.69229E-06	6.33E-05
TOG Ex from S San Mateo Ave	1.50	2	11.15	3.4	6.80	3.16	35	36	10.88	0.45	0.00012597	0.00216
TOG Evap from S San Mateo Ave	1.50	2	11.15	1.3	2.60	1.21			2.11	0.09	2.44297E-05	0.000419

Speed Category	Idle	Travel
Travel Speed (mph)	(g/veh - min)	35
DPM - W Clark Ave West	0.000845	0.004781
DPM - W Clark Ave East	0.000845	0.004781
DPM - S San Mateo Ave	0.000845	0.004781
TOG Exhaust - W Clark Ave West	0.125321	0.034457
TOG Exhaust - W Clark Ave East	0.125321	0.034457
TOG Exhaust - S San Mateo Ave	0.125321	0.034457
TOG Evap - W Clark Ave West	0.016752	0.016752
TOG Evap - W Clark Ave East	0.016752	0.016752
TOG Evap - S San Mateo Ave	0.016752	0.016752

File Name:	Operational Trips.EF
CT-EMFAC2021 Version:	1.0.2.0
Run Date:	########
Area:	Fresno (SJV)
Analysis Year:	2032
Season:	Annual

==

Vehicle Category	VMT Fract Across Cat	Diesel VM Within Cat	Gas VMT Fraction Within Category
Truck 1	0.448	0.433	0.452
Truck 2	0	0.901	0.014
Non-Truck	0.552	0.005	0.916

==

Road Type:	NA
Silt Loading Factor:	NA
Precipitation Correction:	NA

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Fleet Average Running Exhaust Emission Factors (grams/veh-mile)

Pollutant Name	<= 5 mpl	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph
TOG	0.125321	0.094119	0.073395	0.059059	0.048608	0.04065	0.034457	0.029626	0.025936	0.02328	0.021615	0.020986	0.02149	0.022191	0.022191
Diesel PM	0.013758	0.011489	0.009615	0.008051	0.006744	0.005661	0.004781	0.004095	0.003595	0.003281	0.003151	0.003154	0.003158	0.00316	0.00316

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Fleet Average Running Loss Emission Factors (grams/veh-hour)

Pollutant Name	Emission Factor
TOG	1.005109

==

Fleet Average Tire Wear Factors (grams/veh-mile)

Pollutant Name	Emission Factor

==

Fleet Average Brake Wear Factors (grams/veh-mile)

Pollutant Name	<= 5 mpl	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph

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Fleet Average Road Dust Factors (grams/veh-mile)

Pollutant Name	Emission Factor

============================END======================================