Appendix D

Air Quality, Energy, and Greenhouse Gas Technical Report

HELIX Environmental Planning

Aramis Solar Energy Generation and Storage Project

Air Quality, Energy and Greenhouse Gas Technical Report

September 2020 | IPO-01.03

Prepared for:

Alameda County Planning Department
224 West Winton Avenue
Hayward, CA 94544

Prepared by:

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ACRONYMS AND ABBREVIATIONS

AAM	Annual Arithmetic Mean
AB	Assembly Bill
AC	alternating current
APN	Assessor's Parcel Number
BAAQMD	Bay Area Air Quality Management District
BCMM	basic construction mitigation measure
BTU	British thermal unit
C_2F_6	hexafluoroethane
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CF_4	tetrafluoromethane
CFC	chlorofluorocarbon
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
County	Alameda County
CPSF	Clean Power San Francisco
CPUC	California Public Utilities Commission
CUP	Conditional Use Permit
DC	direct current
DPM	diesel particulate matter
EBCE	East Bay Clean Energy
EO	Executive Order
GHG	greenhouse gas
GPA	General Plan Amendment
GWP	global warming potential

ACRONYMS AND ABBREVIATIONS (cont.)

HFC	hydrofluorocarbon
HR	House of Representatives
I-580	Interstate 580
IPCC	Intergovernmental Panel on Climate Change
kV	kilovolt
kW	kilowatt
kWhr	kilowatt hour
LCFS	Low Carbon Fuel Standard
LOS	Level of Service
LST	localized significance threshold
MBtu	million British thermal units
mg/m^3	milligrams per cubic meter
MMT	million metric tons
MT	metric tons
mpg	miles per gallon
mph	miles per hour
MPOs	Metropolitan Planning Organizations
MV	medium voltage
MW	megawatt
MWh	megawatt hour
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NHTSA	National Highway Traffic Safety Administration
NO	nitrogen oxide
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NO_X	nitrogen oxides
O_3	ozone
O&M	operations and maintenance
Pb	lead
PFC	perfluorocarbon
PG&E	Pacific Gas and Electric Company
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns

ACRONYMS AND ABBREVIATIONS (cont.)

ppm	parts per million
PV	photovoltaic
ROG	reactive organic gas
RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
SB	Senate Bill
SCS	Sustainable Communities Strategy
SF_6	hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_X	sulfur oxides
TAC	toxic air contaminant
TIS	Traffic Impact Study
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geologic Survey
VMT	vehicle miles traveled
VOC	volatile organic compound
WRCC	Western Regional Climate Center
WRI	World Resources Institute

EXECUTIVE SUMMARY

This report presents an assessment of potential air quality, energy and greenhouse gas (GHG) impacts associated with the proposed Aramis Solar Energy Generation and Storage Project (project). The report evaluates the potential for criteria air pollutant emissions, energy use, and GHG emission impacts during the construction, operation, and decommissioning of the project. All analyses comply with the Bay Area Air Quality Management District's (BAAQMD) *California Environmental Quality Act Air Quality Guidelines* (May 2017) to satisfy California Environmental Quality Act (CEQA) requirements.

The project would construct a photovoltaic (PV) solar energy generation and storage facility with a capacity of 100 megawatts (MW) on approximately 410 acres in unincorporated Alameda County. The project would result in emissions of criteria air pollutants and GHGs during construction, operation, and decommissioning. Construction emissions would include fugitive dust, heavy construction equipment exhaust, and vehicle exhaust associated with workers commuting to and from the site and trucks delivering materials. Construction activities are assumed to begin in January 2022 and would be completed in September 2022. Upon the end of its useful life in 50 or more years, the project would be reequipped with new PV equipment, or decommissioned and the land restored. Decommissioning emissions would include fugitive dust, heavy construction equipment exhaust, and vehicle exhaust associated with workers commuting to and from the site and trucks removing equipment from the site. In place of a quantitative threshold for fugitive dust, BAAQMD recommends implementation of Basic Construction Mitigation Measures (BCMMs) to control fugitive dust. Mitigation Measure AQ-1 requires implementation of the BCMMs for all on-site project construction activities. Project emissions of criteria pollutants during construction would remain below the BAAQMD emissions thresholds for all pollutants with the exception of nitrogen oxides (NO_X). Construction-period NO_X emissions would be reduced to a less than significant level with the incorporation of Mitigation Measures AQ-2, which requires all off-road diesel-powered construction equipment with 50 or more horsepower to be certified to meet U.S. Environmental Protection Agency Tier 4 Final emission standards. Project operational emissions would include pollutants generated by vehicular traffic associated with staff activities and hauling water to the project site, occasional use of off-road equipment for maintenance and panel washing, the disposal and decompositions of solid waste, and periodic maintenance painting. Project emissions of criteria pollutants during operations and decommissioning would be below the BAAQMD emissions thresholds for all pollutants. Project decommissioning activities would be similar or less intense in equipment use and duration compared to construction emissions, and on-road and off-road vehicle and equipment exhaust standards would be more stringent than current rules. Therefore, emissions of criteria pollutant during decommissioning activities emissions would be below the BAAQMD emissions thresholds.

The project's generation and storage of renewable energy would support State renewable energy programs and the mandate to procure 100 percent of California's electricity from renewable or zero carbon sources by 2045. The project's temporary energy use for construction and long-term operational and maintenance energy use would be an inconsequential fraction of the renewable energy generated over the anticipated 50-plus-year project lifespan. The project would not result in inefficient or wasteful use of energy and the project would not conflict with state and local renewable energy plans.

The project's direct and indirect GHG emissions from construction, operation and maintenance, and decommissioning activities would not exceed the BAAQMD project-level threshold, adjusted for the GHG reduction mandates of Senate Bill 32. The project would generate eligible renewable energy in accordance with California's Renewables Portfolio Standard. After accounting for the annual electricity generated by the project, there would be a net decrease of emissions of GHGs over the lifetime of the project because it would replace the use of fossil fuels that would have otherwise been used to generate similar amounts of energy. The project would be consistent with state and regional GHG reduction plans including the BAAQMD 2017 Clean Air Plan and the Alameda County Community Climate Action Plan.

1.0 INTRODUCTION

1.1 PURPOSE OF THE REPORT

This report analyzes potential air quality, greenhouse gas emissions and energy usage impacts associated with the proposed Aramis Solar Energy Generation and Storage Project (project), which includes an evaluation of existing conditions in the project vicinity and an assessment of potential impacts associated with project construction and project operation. As appropriate, the analysis identifies measures that can be taken to avoid adverse air quality, greenhouse gas emissions, and energy usage impacts.

1.2 PROJECT LOCATION

The approximately 410-acre project site is located in the northeast area of unincorporated Alameda County, approximately 2.5 miles north of the City of Livermore. The project site is bounded by Manning Road to the north, North Livermore Avenue to the east, and a private driveway to the south. The western project site boundary generally follows the natural topography of Cayetano Creek and the adjacent hills. The project site comprises portions of four privately-owned parcels – Assessor's Parcel Numbers (APNs) 903-0006-001-02, 903-0007-002-01, 903-0006-003-07, and 902-0001-005-00. The project site consists of four noncontiguous development areas that are split into the following sections: the northern section, measuring approximately 103 acres; the central section, measuring approximately 269 acres; the southeastern section, measuring approximately 23 acres; and the southwestern section, measuring approximately 15 acres. The project site is within Sections 16 and 17 of Township 02 South, Range 02 East and unsurveyed land of the Las Positas Land Grant, Mount Diablo Base and Meridian. The project site is located within the "Tassajara, CA" and "Livermore, CA" U.S. Geologic Survey (USGS) 7.5-minute quadrangles (see Figure 1, *Regional Location*, and Figure 2, *Aerial Map*).

1.3 PROJECT DESCRIPTION

The project is proposed by IP Aramis, LLC (a subsidiary of Intersect Power, LLC). The project applicant has applied to the Alameda County Community Development Agency for a Conditional Use Permit (CUP) from Alameda County to construct, operate, and maintain a solar photovoltaic (PV) and electric storage facility for at least 50 years and a Parcel Subdivision of APN 903-0006-001-02 to modify the eastern boundary of legal parcel of the proposed solar facility and create a distinct parcel. The solar facility would generate a 100 megawatts (MW) of PV power on approximately 410 acres. The project would provide solar power to utility customers by interconnecting to the nearby electricity grid at Pacific Gas and Electric Company's (PG&E) existing Cayetano 230 kilovolt (kV) substation located adjacent to the project site. The project would serve East Bay Community Energy (EBCE), Clean Power San Francisco (CPSF), and/or PG&E customers by providing local generation capacity under a long-term contract.

The project would include individual PV modules arranged in rows onto a single-axis tracker racking system, which would in turn be affixed to steel piles. Each row (or array) would track the sun during the day, from east to west, to optimize power generation of the facility. The arrays would be connected by low-voltage underground or above-ground electrical wiring to a central inverter station or to string inverters located throughout the facility, where the electricity would be converted from direct current (DC) to alternating current (AC). The system would then step up the voltage of the electricity to a medium voltage (MV) of 34.5 kV (or lower suitable voltage) to match the collection system voltage. The

power output from the inverter station would be conveyed to the on-site substation via collection cables. Medium-voltage lines would be buried for a majority of their length but would emerge above-ground and be mounted on up to two overhead wooden utility poles on either side of Manning Avenue and up to 10 additional wooden poles to cross Cayetano Creek and its tributaries, to cross an access driveway, and where a connection to the PG&E Cayetano substation must be overhead.

The project substation would provide the circuit breakers, switches, protection relays, and other necessary equipment to reliably and safely protect the electrical infrastructure. The substation would step up the MV collected energy to the interconnection voltage via one or more step up transformers. The project substation would occupy an approximately 5,000-square-foot area in a 0.9-acre dedicated area and would be located adjacent to the west of the PG&E Cayetano substation, allowing the gen-tie to be either overhead or underground. The project substation would be set back from North Livermore Avenue by at least 250 feet. Overhead lines would be constructed on either tubular steel poles or wood H-frames and may be constructed to be single-circuit or double-circuit.

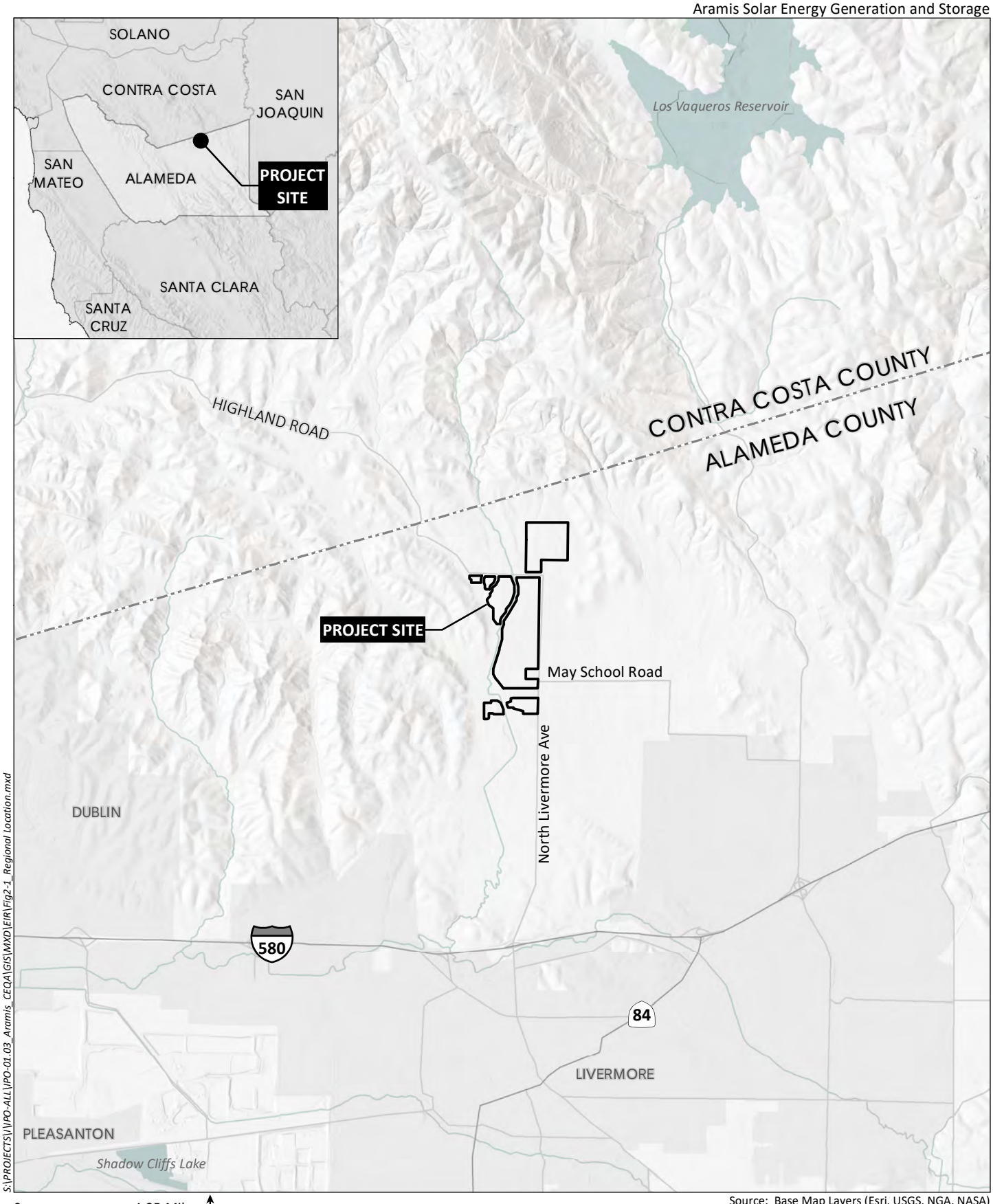
A battery storage system would be located on-site to the west of the PG&E Cayetano substation, which would be shared with the battery system. The battery storage system would be designed to accept between 75 and 100 MW of system charging, and subsequently dispatch stored electricity during times of peak demand. The system would either be housed in electrical containers or in up to four 100-foot by 180-foot buildings. Various sizes and numbers of electrical enclosures would be used depending on the final battery vendor selected. Up to 50 large electrical enclosures or up to 1,000 small electrical enclosures would be clustered together to make up the battery storage system. Battery buildings or containers would have foundations with a cumulative floor area of 3 acres or less. Low voltage wiring from battery enclosures would be underground and converted as a bi-directional inverter station and transformed at the shared transformer.

An approximately 400-square-foot operation and maintenance (O&M) building located near the project substation would be used to accommodate up to four permanent O&M staff. Water for the O&M building would be stored in a 5,000-gallon water tank and filled on a quarterly basis. Wastewater would be held in a septic tank system and removed routinely (see Figure 3, *Site Plan*).

Long-term operation of the project would involve monitoring of the site remotely and up to four permanent staff on the site at a time for ongoing facility maintenance and repairs. Up to 12 workers could be on site once annually for module washing. The project would promote continued agricultural use of the project site. The proposed program for concomitant agricultural land uses during operation of the solar facility would be outlined in an Agricultural Management Plan prepared for the project and could include livestock grazing and commercial beekeeping operations.

1.4 CONSTRUCTION ACTIVITIES AND PHASING

Project construction activities would consist of site preparation, installation of interconnection facilities and battery storage system, cable installation, pile and skid installation, tracker and module installation, and general construction operations, site clean-up and restoration. Construction of the solar facility would commence between October 2021 and February 2022, depending on final construction plans and building permit requirements. Construction would last for approximately nine months. Construction equipment would operate between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, for up to a maximum of eight hours per piece of equipment, daily. Weekend



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Source: Base Map Layers (Esri, USGS, NGA, NASA)

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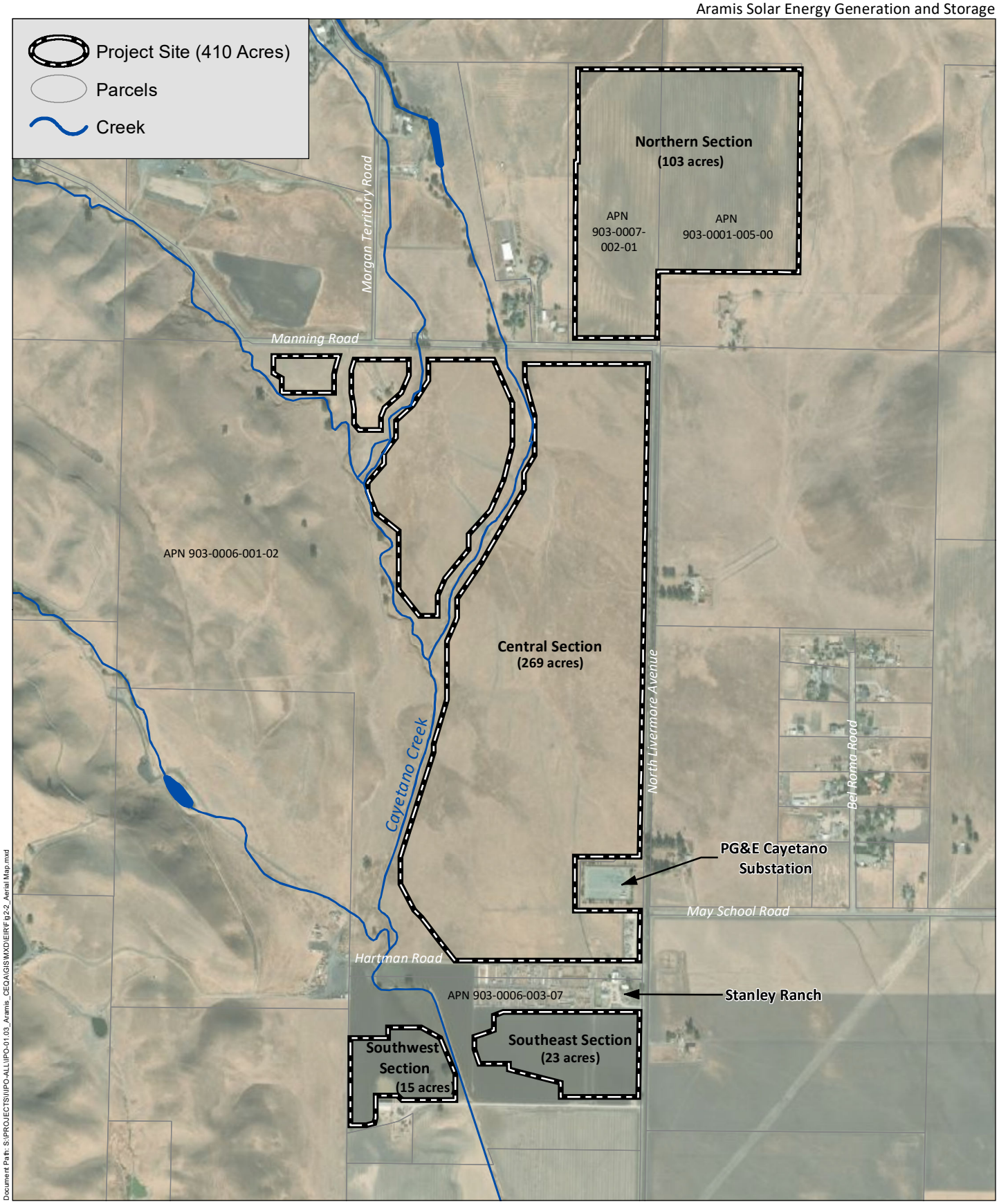
Regional Location

Figure 1



Source: Base Map Layers (DigitalGlobe 2018)

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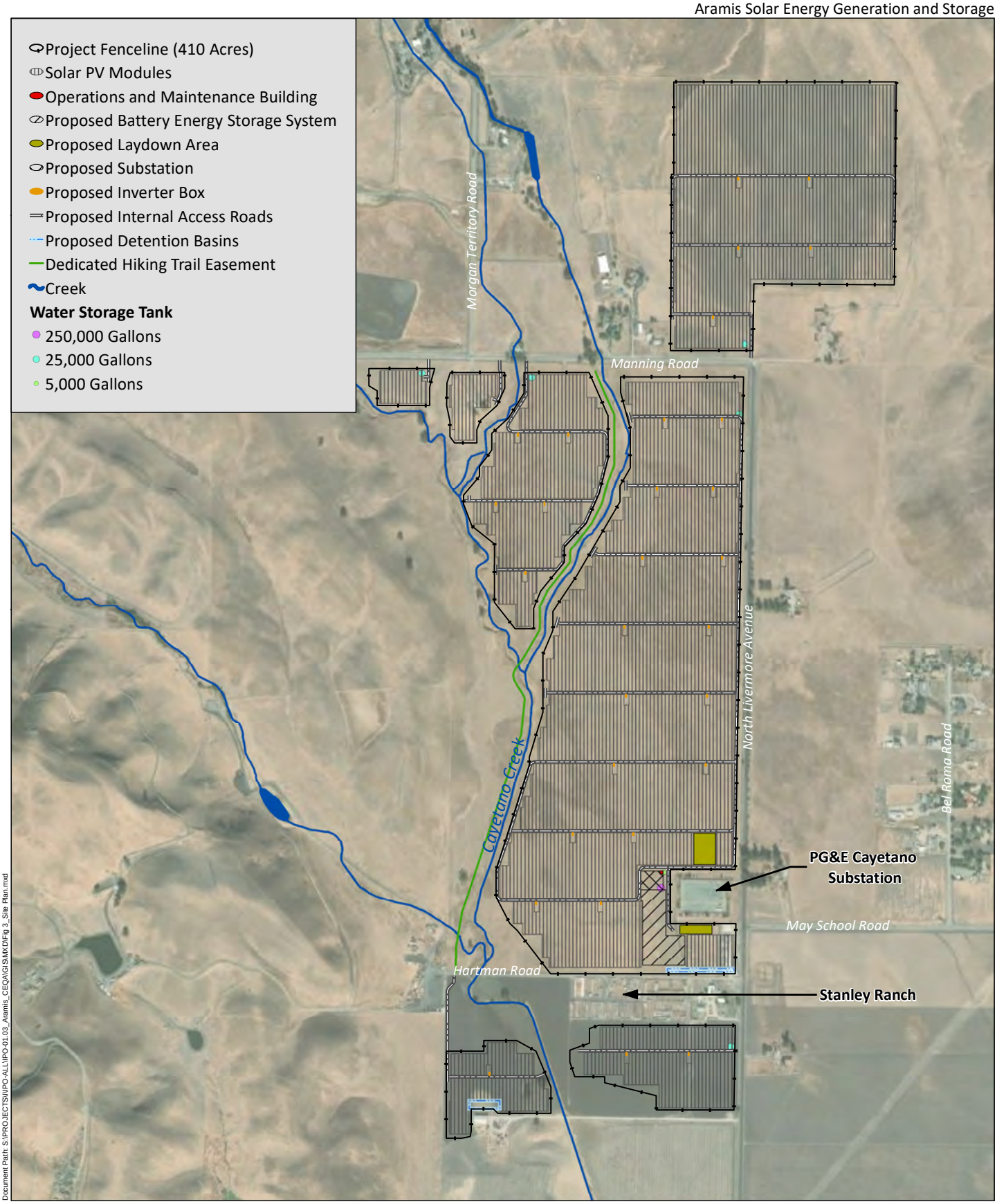
Aerial Map

Figure 2



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Source: Base Map Layers (DigitalGlobe 2018)

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Site Plan

Figure 3

construction work is not anticipated, but may occur on occasion, depending on schedule considerations.

2.0 AIR QUALITY

2.1 AIR QUALITY REGULATORY SETTING

The project site is located within the San Francisco Bay Area Air Basin (SFBAAB). Air quality in the SFBAAB is regulated by the U.S. Environmental Protection Agency (USEPA) at the federal level, by the California Air Resources Board (CARB) at the state level, and by the Bay Area Air Quality Management District (BAAQMD) at the regional level.

2.1.1 Air Pollutant Descriptors and Terminology

2.1.1.1 Criteria Air Pollutants

Criteria pollutants are defined by state and federal law as a risk to the health and welfare of the general public. In general, criteria air pollutants include the following compounds:

- Ozone (O_3)
- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Particulate matter (PM), which is further subdivided:
  - Coarse PM, 10 micrometers or less in diameter (PM_{10})
  - Fine PM, 2.5 micrometers or less in diameter ($PM_{2.5}$)
- Sulfur dioxide (SO_2)
- Lead (Pb)

Criteria pollutants can be emitted directly from sources (primary pollutants; e.g., CO, SO_2, PM_{10}, $PM_{2.5}$, and lead), or they may be formed through chemical and photochemical reactions of precursor pollutants in the atmosphere (secondary pollutants; e.g., ozone, NO_2, PM_{10}, and $PM_{2.5}$). PM_{10} and $PM_{2.5}$ can be both primary and secondary pollutants. The principal precursor pollutants of concern are reactive organic gases ([ROGs] also known as volatile organic compounds [VOCs])[1] and nitrogen oxides (NO_X).

The descriptions of sources and general health effects for each of the criteria air pollutants are shown in Table 1, *Summary of Common Sources and Human Health Effects of Criteria Air Pollutants*, based on information provided by the California Air Pollution Control Officers Association ([CAPCOA] 2018). Specific adverse health effects on individuals or population groups induced by criteria pollutant emissions are highly dependent on a multitude of interconnected variables such as cumulative concentrations, local meteorology and atmospheric conditions, and the number and characteristics of exposed individuals (e.g., age, gender). Criteria pollutant precursors (ROG and NO_X) affect air quality on

[1] CARB defines and uses the term ROGs while the USEPA defines and uses the term VOCs. The compounds included in the lists of ROGs and VOCs and the methods of calculation are slightly different. However, for the purposes of estimating criteria pollutant precursor emissions, the two terms are often used interchangeably.

a regional scale, typically after significant delay and distance from the pollutant source emissions. Health effects related to ozone and NO_2 are, therefore, the product of emissions generated by numerous sources throughout a region. Emissions of criteria pollutants from vehicles traveling to or from the project site (mobile emissions) are distributed nonuniformly in location and time throughout the region, wherever the vehicles may travel. As such, specific health effects from these criteria pollutant emissions cannot be meaningfully correlated to the incremental contribution from the project.

Table 1
SUMMARY OF COMMON SOURCES AND HUMAN HEALTH EFFECTS OF CRITERIA AIR POLLUTANTS

Pollutant	Major Man-Made Sources	Human Health Effects
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO_2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Sources include motor vehicles, electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Contributes to climate change and nutrient overloading, which deteriorates water quality. Causes brown discoloration of the atmosphere.
Ozone (O_3)	Formed by a chemical reaction between reactive organic gases (ROGs) and nitrogen oxides (NO_X) in the presence of sunlight. Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, gasoline storage and transport, solvents, paints, and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing, and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield. Damages rubber, some textiles and dyes.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Produced by power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles, and other sources.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).
Sulfur Dioxide (SO_2)	A colorless, nonflammable gas formed when fuel containing sulfur is burned, when gasoline is extracted from oil, or when metal is extracted from ore. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid, which can damage marble, iron and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain.
Lead	Metallic element emitted from metal refineries, smelters, battery manufacturers, iron and steel producers, use of leaded fuels by racing and aircraft industries.	Anemia, high blood pressure, brain and kidney damage, neurological disorders, cancer, lowered IQ. Affects animals, plants, and aquatic ecosystems.

Source: CAPCOA 2018

2.1.1.2 Toxic Air Contaminants

Toxic air contaminants (TACs) are a diverse group of air pollutants that may cause or contribute to an increase in deaths or in serious illness, or that may pose a present or potential hazard to human health. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage, or short-term acute effects such as eye watering, respiratory irritation (a cough), runny nose, throat pain, and headaches. TACs may be carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For carcinogenic TACs, there is no level of exposure that is considered safe, and impacts are evaluated in terms of overall relative risk expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

Diesel engines emit a complex mixture of air pollutants, including both gaseous and solid material. The solid material in diesel exhaust is referred to as diesel particulate matter (DPM). Almost all DPM is 10 microns or less in diameter, and 90 percent of DPM is less than 2.5 microns in diameter (CARB 2018a). Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung. In 1998, CARB identified DPM as a TAC based on published evidence of a relationship between diesel exhaust exposure and lung cancer and other adverse health effects. DPM has a notable effect on California's population—it is estimated that about 70 percent of total known cancer risk related to air toxics in California is attributable to DPM (CARB 2018a).

2.1.2 Federal Regulations

2.1.2.1 Clean Air Act

Air quality is defined by ambient air concentrations of specific pollutants identified by the USEPA to be of concern with respect to the health and welfare of the general public. The USEPA is responsible for enforcing the Federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 Amendments. The CAA required the USEPA to establish National Ambient Air Quality Standards (NAAQS), which identify concentrations of pollutants in the ambient air below which no adverse effects on the public health and welfare are anticipated. In response, the USEPA established both primary and secondary standards for several criteria pollutants, which are introduced above. Table 2, *Ambient Air Quality Standards*, shows the federal and state ambient air quality standards (AAQS) for these pollutants.

Table 2
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary[1]	Secondary[2]
O_3	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)	Same as Primary
PM_{10}	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary
	AAM	20 µg/m^3	–	Same as Primary
$PM_{2.5}$	24 Hour	–	35 µg/m^3	Same as Primary
	AAM	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
CO	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	–
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	–
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
NO_2	1 Hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	–
	AAM	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary
SO_2	1 Hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	–
	3 Hour	–	–	0.5 ppm (1,300 µg/m^3)
	24 Hour	0.04 ppm (105 µg/m^3)	–	–
Lead	30-day Avg.	1.5 µg/m^3	–	–
	Calendar Quarter	–	1.5 µg/m^3	Same as Primary
	Rolling 3-month Avg.	–	0.15 µg/m^3	
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per km – visibility ≥ 10 miles (0.07 per km – ≥30 miles for Lake Tahoe)	**No Federal Standards**	
Sulfates	24 Hour	25 µg/m^3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)		
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m^3)		

Source: CARB 2016

[1] National Primary Standards: The levels of air quality necessary, within an adequate margin of safety, to protect the public health.

[2] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

O_3: ozone; ppm: parts per million; µg/m^3: micrograms per cubic meter; PM_{10}: large particulate matter; AAM: Annual Arithmetic Mean; $PM_{2.5}$: fine particulate matter; CO: carbon monoxide; mg/m^3: milligrams per cubic meter; NO_2 nitrogen dioxide; SO_2: sulfur dioxide; km: kilometer; –: No Standard.

The CAA allows states to adopt ambient air quality standards and other regulations provided they are at least as stringent as federal standards. Areas that do not meet the NAAQS for a particular pollutant are considered to be "nonattainment areas" for that pollutant. The area air quality attainment status of the SFBAAB, including Alameda County, is shown in Table 3, *San Francisco Bay Area Air Basin Attainment Status*. The SFBAAB is currently in nonattainment for federal and state ozone and $PM_{2.5}$ standards. The SFBAAB is in state nonattainment for PM_{10} standards. Concentrations of all other pollutants meet state and federal standards.

Table 3
SAN FRANCISCO BAY AREA AIR BASIN ATTAINMENT STATUS

Pollutant	State of California Attainment Status	Federal Attainment Status
Ozone (1-hour)	Nonattainment	No Federal Standard
Ozone (8-hour)	Nonattainment	Nonattainment (marginal)
Suspended Particulate Matter (PM_{10})	Nonattainment	Attainment/Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment (moderate)
Carbon Monoxide (CO)	Attainment	Attainment/Unclassified
Nitrogen Dioxide ($N0_2$)	Attainment	Attainment/Unclassified
Lead	Attainment	Attainment/Unclassified
Sulfur Dioxide (SO_2)	Attainment	Attainment/Unclassified
Sulfates	Attainment	No Federal Standard
Hydrogen Sulfide	Unclassified	No Federal Standard
Visibility Reducing Particles	Unclassified	No Federal Standard

Sources: BAAQMD 2017a; CARB 2018b.

2.1.3 State Regulations

2.1.3.1 California Clean Air Act

CARB has established the more stringent California Ambient Air Quality Standards (CAAQS) for the seven criteria air pollutants listed above through the California Clean Air Act of 1988 (CCAA), and has also established CAAQS for additional pollutants, including sulfates, hydrogen sulfide (H_2S), vinyl chloride and visibility-reducing particles (see Table 2). Areas that do not meet the CAAQS for a particular pollutant are considered to be "nonattainment areas" for that pollutant. The SFBAAB is currently classified as a nonattainment area under the CAAQS for ozone (1-hour and 8-hour), PM_{10}, and $PM_{2.5}$ (BAAQMD 2017a). The current state attainment status for the SFBAAB is provided in Table 3.

CARB is the state regulatory agency with the authority to enforce regulations to both achieve and maintain the NAAQS and CAAQS. The BAAQMD is responsible for developing and implementing the rules and regulations designed to attain the NAAQS and CAAQS, as well as the permitting of new or modified sources, developing of air quality management plans, and adopting and enforcing air pollution regulations within the SFBAAB.

2.1.3.2 State Implementation Plan

The CAA requires areas with unhealthy levels of ozone, inhalable particulate matter, carbon monoxide, nitrogen dioxide, and sulfur dioxide to develop plans, known as State Implementation Plans (SIPs). SIPs

are comprehensive plans that describe how an area will attain the NAAQS. The 1990 amendments to the CAA set deadlines for attainment based on the severity of an area's air pollution problem.

SIPs are not single documents—they are a compilation of new and previously submitted plans, programs (e.g., monitoring, modeling, permitting), district rules, state regulations and federal controls. Many of California's SIPs rely on a core set of control strategies, including emission standards for cars and heavy trucks, fuel regulations and limits on emissions from consumer products. State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB forwards the SIP revisions to the USEPA for approval and publication in the Federal Register. The Code of Federal Regulations (CFR) Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items that are included in the California SIP (CARB 2009). At any one time, several California submittals are pending USEPA approval.

2.1.3.3 California Energy Code

The California Code of Regulations (CCR), Title 24, Part 6 is the California Energy Efficiency Standards for Residential and Nonresidential Buildings (also known as the California Energy Code). Future buildings associated with implementation of the project would be required to be designed to meet applicable the Title 24 energy efficiency standards in effect at the time of construction, including (but not limited to): insulation of conditioned spaced; lighting energy efficiency; appliance energy efficiency; and plumbing fixture water efficiency.

2.1.3.4 Toxic Air Contaminants

The Health and Safety Code (§39655, subd. (a)) defines a TAC as “an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health.” A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the CAA (42 United States Code Sec. 7412[b]) is a TAC. Under State law, the California Environmental Protection Agency (CalEPA), acting through CARB, is authorized to identify a substance as a TAC if it determines the substance is an air pollutant that may cause or contribute to an increase in mortality or an increase in serious illness, or that may pose a present or potential hazard to human health.

2.1.4 Local Regulations

2.1.4.1 Bay Area Air Quality Management District

2017 Clean Air Plan

The BAAQMD is responsible for preparing plans to attain ambient air quality standards in the SFBAAB. The BAAQMD prepares ozone attainment plans for the national ozone standard and clean air plans for the California standard, both in coordination with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG).

The BAAQMD adopted the 2017 Clean Air Plan, *Spare the Air Cool the Climate*, in April 2017. The plan addresses nonattainment of the federal 1-hour and state 1-hour and 8-hour ozone standards in the SFBAAB, as well as nonattainment of federal and state PM standards. The 2017 Clean Air Plan establishes a program of rules and regulations directed at reducing air pollutant emissions and achieving California and national air quality standards. The plan’s pollutant control strategies are based on the

latest scientific and technical information and planning assumptions, updated emission inventory methodologies for various source categories, and the latest population growth projections and vehicle miles traveled (VMT) projections for the region. The 2017 Clean Air Plan defines a control strategy that the BAAQMD and its partners will implement to: (1) reduce emissions and decrease ambient concentrations of harmful pollutants; (2) safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, with an emphasis on protecting the communities most heavily impacted by air pollution; and (3) reduce greenhouse gas emissions to protect the climate. In addition to updating the previously prepared ozone plan, the 2017 Clean Air Plan also serves as a multipollutant plan to protect public health and the climate. In its dual role as an update to the state ozone plan and a multipollutant plan, the 2017 Clean Air Plan addresses four categories of pollutants (BAAQMD 2017b):

- Ground-level ozone and its key precursors, ROG and NO_X
- Particulate matter: primary $PM_{2.5}$, as well as precursors to secondary $PM_{2.5}$
- Air toxics (e.g., TACs)
- Greenhouse Gasses (GHGs)

The 2017 Clean Air Plan includes local guidance for the State Implementation Plan, which includes the framework for air quality basins to achieve attainment of the state and federal ambient air quality standards.

Regulations and Rules

The following BAAQMD regulations and rules would be applicable to the project:

Regulation 6, Rule 6, Prohibition of Trackout: limits the quantity of fugitive dust in the atmosphere through control of trackout of solid materials onto paved public roads outside the boundaries of large construction sites (more than 1 acre).

Regulation 8, Rule 3, Architectural Coatings: limits the VOC content of architectural coatings (e.g., paint) manufactured, sold, supplied, or applied in the SFBAAB.

2.2 AIR QUALITY EXISTING CONDITIONS

The project site is located in a rural agricultural area of the County. The project site lies at an elevation of roughly 500 to 700 feet above mean sea level (amsl) and is undeveloped. The site is currently used for oat and hay cultivation and cattle grazing. Land uses surrounding the project site include row crop cultivation, cattle grazing, electric utilities, rural residential housing, agricultural outbuildings, small-scale ground-mounted solar systems, and open space associated with Cayetano Creek. The existing PG&E Cayetano substation is located west of the terminus of May School Road at North Livermore Avenue. The project site surrounds the existing PG&E Cayetano substation to the north, west, and south. An approximately 59-acre solar PV facility is proposed by SunWalker Energy, east of project site and northeast of the intersection of North Livermore Avenue and May School Road (see Figure 2).

2.2.1 Climate/Meteorology

The project site is located within the Livermore Valley climatological subregion of the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties, the southern portion of Sonoma, and the southwestern

portion of Solano County. During the summer, the large-scale meteorological condition that dominates the West Coast is a semi-permanent high-pressure cell centered over the northeastern Pacific Ocean, called the Pacific high, which keeps most storms from affecting the California coast. Hence, the SFBAAB experiences little precipitation in the summer months. Winds tend to blow on shore out of the north/northwest. The steady northwesterly flow induces upwelling of cold water from below. This upwelling produces a band of cold water off the California coast. When air approaches the California coast, already cool and moisture-laden from its long journey over the Pacific, it is further cooled as it crosses this bank of cold water. This cooling often produces condensation, resulting in a high incidence of fog and stratus clouds along the Northern California coast in the summer. During the winter, the Pacific high generally weakens and shifts southward, winds tend to flow offshore, upwelling ceases and storms occur.

Temperature inversion layers (inversions; layers of warmer air over colder air) affect air quality conditions significantly because they influence the mixing depth (i.e., the vertical depth in the atmosphere available for diluting air contaminants near the ground). The highest air pollutant concentrations in the SFBAAB generally occur during inversions. There are two types of inversions that occur regularly in the SFBAAB. The frequent occurrence of elevated inversions in summer and fall months acts to cap the mixing depth, limiting the depth of air available for dilution. Elevated inversions are caused by subsiding air from the subtropical high-pressure zone, and from the cool marine air layer that is drawn into the SFBAAB by the heated low-pressure region in the Central Valley. The inversions typical of winter, called radiation inversions, are formed as heat quickly radiates from the earth's surface after sunset, causing the air in contact with it to rapidly cool. Radiation inversions are strongest on clear, low-wind, cold winter nights, allowing the build-up of such pollutants as carbon monoxide and particulate matter. Mixing depths under these conditions can be as shallow as 50 to 100 meters, particularly in rural areas.

The Livermore Valley climatological subregion is a sheltered inland valley near the eastern border of SFBAAB. The western side of the valley is bordered by 1,000 to 1,500-foot-high hills with two gaps connecting the valley to the central SFBAAB, the Hayward Pass and Niles Canyon. The eastern side of the valley also is bordered by 1,000- to 1,500-foot-high hills with one major passage to the San Joaquin Valley called the Altamont Pass and several secondary passages. To the north lie the Black Hills and Mount Diablo. A northwest-to-southeast channel connects the Diablo Valley to the Livermore Valley. The south side of the Livermore Valley is bordered by mountains approximately 3,000 to 3,500 feet high. Air pollution potential is high in the Livermore Valley, especially for photochemical pollutants (e.g., ozone) in the summer and fall—high temperatures increase the potential for ozone to build up. The Livermore Valley not only traps locally generated pollutants but can be the receptor of ozone and ozone precursors from San Francisco, Alameda, Contra Costa and Santa Clara counties. On northeasterly wind flow days, most common in the early fall, ozone may be carried west from the San Joaquin Valley to the Livermore Valley (BAAQMD 2017c).

The predominant wind direction in the vicinity of the project site is from the west and the average wind speed is approximately 8 miles per hour (mph; Iowa Environmental Mesonet [IEM] 2019). The annual average maximum temperature at the project site is approximately 72 degrees Fahrenheit (°F), and the average annual minimum temperature is approximately 47°F. Total precipitation in the vicinity of the project site averages approximately 14 inches annually. Precipitation occurs mostly during the winter and is relatively infrequent during the summer (Western Regional Climate Center [WRCC] 2016).

2.2.2 Existing Air Quality

The BAAQMD operates a network of ambient air monitoring stations throughout the SFBAAB. The air quality monitoring station closest to the project site is the Livermore 793 Rincon Avenue Station, approximately 3.2 miles south of the project site. There are no monitoring stations in Alameda County with data for PM_{10}, SO_2 or Lead concentrations. The ambient pollutant concentrations collected at the stations during the last 3 available years (2016 through 2018) are shown in Table 4, *Air Quality Monitoring Data*. The data indicates: exceedance of the state 1-hour and state/federal 8-hour ozone standards on multiple days in 2016 through 2018; and exceedance of the federal $PM_{2.5}$ standard on multiple days in 2017 and 2018. Data for NO_2 showed no exceedances from 2016 through 2018.

Table 4
AIR QUALITY MONITORING DATA

Pollutant Standard	2016	2017	2018
Ozone (O_3) – Livermore 793 Rincon Avenue Station			
Maximum 1-hour concentration (ppm)	0.102	0.109	0.099
Days above 1-hour state standard (0.09 ppm)	2	5	2
Maximum 8-hour concentration (ppm)	0.085	0.086	0.078
Days above 8-hour state standard (0.070 ppm)	6	6	3
Days above 8-hour federal standard (0.070 ppm)	4	6	3
Fine Particulate Matter (PM2.5) – Livermore 793 Rincon Avenue Station			
Maximum 24-hour concentration (μg/m^3)	22.3	41.5	172.6
Estimated Days above federal standard (35 μg/m^3)	0.0	2.0	14.4
Nitrogen Dioxide (NO_2) – Livermore 793 Rincon Avenue Station			
Maximum 1-hour concentration (ppm)	41.3	45.4	56.4
Days above state 1-hour standard (180 ppb)	0	0	0

Source: CARB 2020a.
ppb = parts per billion; ppm = parts per million; μg/m3 = micrograms per cubic meter.

2.2.3 Sensitive Receptors

CARB and the Office of Environmental Health Hazard Assessment (OEHHA) have identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, infants (including in utero in the third trimester of pregnancy), and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis (CARB 2005; OEHHA 2015). Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved and are referred to as sensitive receptors. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers.

The closest existing sensitive receptors to the project site are rural single-family homes located:

- North of Manning Road, approximately 80 feet west of the project site;
- Northeast of Manning Road, approximately 600 feet south of the project site;
- East of North Livermore Avenue, approximately 300 feet east of the project site;
- West of North Livermore Avenue, approximately 180 feet south of the project site; and
- East of North Livermore Avenue, approximately 240 feet east of the project site;

There are no schools, hospitals, or daycare facilities within 1 mile of the project site.

2.3 AIR QUALITY METHODOLOGY

Air emissions from mobile, area, and energy sources were calculated using CalEEMod, version 2016.3.2. CalEEMod is a computer model used to estimate air emissions resulting from land development projects throughout the state of California. CalEEMod was developed by CAPCOA in collaboration with the California air quality management and pollution control districts, primarily the South Coast Air Quality Management District (SCAQMD). The calculation methodology, source of emission factors used, and default data is described in the CalEEMod User's Guide, and Appendices A, D, and E (CAPCOA 2017).

In brief, CalEEMod is a computer model that estimates criteria air pollutant and greenhouse gas emissions from mobile (i.e., vehicular) sources, area sources (fireplaces, woodstoves, and landscape maintenance equipment), energy use (electricity and natural gas used in space heating, ventilation, and cooling; lighting; and plug-in appliances), water use and wastewater generation, and solid waste disposal. Emissions are estimated based on land use information input to the model by the user.

In the first module, the user defines the specific land uses that will occur at the project site. The user also selects the appropriate land use setting (urban or rural), operational year, location, climate zone, and utility provider. The input land uses, size features, and population are used throughout CalEEMod in determining default parameters and calculations in each of the subsequent modules. The input land use information consists of land use subtypes (such as the residential subtypes of single-family residential and multi-family medium-rise residential) and their unit or square footage quantities.

Subsequent modules include construction (including off-road vehicle emissions), mobile (on-road vehicle emissions), area sources (architectural coatings [painting], consumer products [cleansers, aerosols, solvents]), water and wastewater, and solid waste. Each module comprises multiple components including an associated mitigation module to account for further reductions in the reported baseline calculations. Other inputs include trip generation rates, trip lengths, vehicle fleet mix (percentage autos, trucks, etc.), trip distribution (percent work to home, etc.), duration of construction phases, construction equipment usage, grading areas, season, and ambient temperature, as well as other parameters.

In various places the user can input additional information and/or override the default assumptions to account for project- or location-specific parameters. For this assessment, the default parameters were not changed unless otherwise noted. The CalEEMod output files are included in Appendix A to this report.

2.3.1 Construction Emissions

2.3.1.1 Construction Activities

Construction emissions were estimated based on the timeline provided by the project applicant, which assumes construction would begin in January 2022 and would be completed by September 2022, for a total construction period of approximately nine months. The quantity, duration, and intensity of construction activity influence the amount of construction emissions and related pollutant concentrations that occur at any one time. As such, the emission forecasts provided herein reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction activity is occurring in a relatively intensive manner. Because of

this conservative assumption, actual emissions could be less than those forecasted. If construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix than assumed in CalEEMod, and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval).

Project construction would be completed in four phases: Phase 1 site preparation (30 days), Phase 2 photovoltaic installation (150 days), Phase 3 electrical and gen-tie installation (75 days), and Phase 4 general construction operations, site clean-up and restoration (175 days). Phases 2 and 3 would occur concurrently and Phase 4 would span the entire construction duration (concurrent with Phases 1, 2 and 3). Phase 3 includes building construction and architectural coatings for the O&M and energy storage buildings. All earth-moving, cut and fill activities, and excavation of soil, were assumed to be balanced on site (i.e., no import or export of soil). The construction schedule assumed in the modeling is shown in Table 5, *Anticipated Construction Schedule.*

Table 5
ANTICIPATED CONSTRUCTION SCHEDULE

Construction Activity	Construction Period		
	Start	End	Number of Working Days
Phase 1 Site Preparation	1/1/2022	2/11/2022	30
Phase 2 Photovoltaic Installation	2/12/2022	9/9/2022	150
Phase 3 Electrical and Gen-Tie Installation	5/28/2022	9/9/2022	75
Phase 4 General Construction Operations, Site Clean-up and Restoration	1/8/2022	9/9/2022	175

Source: Intersect Power 2020.

2.3.1.2 Construction Off-Road Equipment

Construction would require the use of heavy off-road equipment. Construction equipment assumptions were based on equipment estimates from the project applicant (Intersect Power 2020). Table 6, *Construction Equipment Assumptions*, presents a summary of the assumed equipment that would be involved in each stage of construction. Because some of the off-road equipment is not included in the CalEEMod equipment selection lists, the pile drivers were modeled as bore/drill rigs. The horsepower (HP) and load factor for each equipment type was modeled using CalEEMod default values.

Table 6
CONSTRUCTION EQUIPMENT ASSUMPTIONS

Equipment	Horsepower	Number	Hours/Day
Bulldozer	212	20	7
Grader	187	15	7
Roller/Compactor	80	8	7
Portable Water Trailers with Pump	84	1	7
Trencher	78	1	7
Frontend Loader	203	2	7
Skid Steer Loader	65	4	7
Crane	231	2	2
Forklift	100	50	7
Backhoe	97	1	7
Pile Driver	221	4	7
Aerial Lift	63	2	4
Welder	46	10	4

Source: Intersect Power 2020; CalEEMod.

Although it was assumed that all of the BAAQMD Basic Construction Mitigation Measures (BCMMs) would be implemented to control fugitive dust, to model the most conservative fugitive dust estimates, only application of water twice per day and limiting vehicle speed to 15 mph during on unpaved surfaces were taken into consideration (BAAQMD 2017c) for off-road equipment modeling. The control efficiency for the application of water twice daily (55 percent) was based on the CalEEMod default (CAPCOA 2017).

2.3.1.3 Construction On-Road Trips

Worker commute trips and truck trips hauling material to and from the project site were modeled based on the analysis in the Transportation Impact Study (TIS) prepared for the project (CHS 2020). Workers were assumed to commute individually each day 28.8 miles each way. In addition, each worker was assumed to travel off-site once per day, 4.6 miles. Construction material would be hauled on trucks to the site assuming each truck trip would be 34.1 miles (from/to the Port of Oakland). Phase 4 was assumed to be completed by workers on-site from the other phases and would not generate new worker trips. Project construction would require approximately 50,000 gallons of water per day (Intersect Power 2020). Because the source of the water was not known at the time of this analysis, 30 one-way trips per day were assumed in the modeling to haul water for dust control from Livermore, (approximately 4.6 miles each way). The estimated project construction trips and miles are shown in Table 7, *Daily Construction Trips*.

Table 7
DAILY CONSTRUCTION TRIPS

Phase and Type	One-Way Trips	One-Way Distance
Phase 1		
Worker Commute Trips	200	28.8
Worker Midday Trips	200	4.6
Truck Haul Trips	46	34.1
Phase 2		
Worker Commute Trips	500	28.8
Worker Midday Trips	500	4.6
Truck Haul Trips	52	34.1
Phase 3		
Worker Commute Trips	250	28.8
Worker Midday Trips	250	4.6
Truck Haul Trips	10	34.1
Phase 4		
Truck Haul Trips	59	34.1
Water Truck Trips	30	4.6

Source: CHS 2020.

The material hauled to the project site would be delivered to the final use location on the project site or would be transferred from a staging area on the project site by a flatbed truck. To account for trucks traveling on unpaved roads while delivering material within the project site, 0.5 mile of each one-way trip was assumed to be on unpaved roads. Although it was assumed that all of the BAAQMD BCMMs would be implemented to control fugitive dust on unpaved roads, to model the most conservative fugitive dust estimates, only limiting vehicle speed to 15 mph and watering unpaved roads to maintain a minimum of 12 percent moisture content were taken into consideration (BAAQMD 2017c).

2.3.2 Operational Emissions

While daily monitoring of the site would occur remotely, up to four permanent staff could be on the site at a time for ongoing facility maintenance and repairs. Up to 12 workers could be on site once annually for module washing. To model the most conservative (highest) daily operational emissions, 12 workers were assumed be onsite each day with the same trip and distance assumptions as use for construction workers: Two commute trips per employee per day (approximately 28.8 miles per trip) and two off-site trips per employee per day (approximately 4.6 miles per trip). To account for the use of highway vehicles (e.g., pickups) to transport workers around the project site, 0.5 mile of unpaved road was assumed for each trip.

The project would require approximately 5 acre-feet (1,629,255 gallons) of water annually for provisioning the O&M building, panel washing, and livestock drinking water. Water would either be obtained via an on-site well or from an off-site water purveyor and trucked to the site. To be conservative, the modeling assumes two loads of water (3,000 to 4,000 gallons per load) would be trucked to the project site from Livermore (approximately 4.6 miles) each workday. To account for the water truck trips and the use of pickups for O&M activities, the modeled fleet mix for the project operational trips was set to 60 percent autos, 25 percent light duty trucks, and 15 percent heavy duty trucks.

The project O&M activities would require the use of off-road vehicles, as shown in Table 8, *Operational Off-Road Equipment*. The size and engine type of the anticipated off-road equipment was not known at the time of this analysis. Therefore, to be conservative (highest emissions), all off-road equipment was assumed to be diesel-powered. CalEEMod default horsepower and load factors were used in the modeling. The modeling assumes the CalEEMod default use of consumer products (cleansers, aerosols, solvents) and architectural coatings (painting for maintenance).

Table 8
OPERATIONAL OFF-ROAD EQUIPMENT

Equipment	Units	Horsepower	Estimated Usage	
			Hours per Day	Days per Year
All-Terrain Vehicles	2	88	4	20
Small Tractors	2	97	8	120
Portable Generators	1	84	2	12
Portable Water Trailers with Pump	2	84	10	20

2.4 AIR QUALITY SIGNIFICANCE CRITERIA

The following significance thresholds are based on Appendix G of the state CEQA Guidelines. A significant impact is identified if the project would result in any of the following:

(1) Conflict with or obstruct implementation of the applicable air quality plan;

(2) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard;

(3) Expose sensitive receptors to substantial pollutant concentrations; or

(4) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The final determination of whether or not a project has a significant effect is within the purview of the lead agency pursuant to CEQA Guidelines Section 15064(b). The BAAQMD has adopted thresholds that lead agencies can use to determine the significance of a development project's short-term construction and long-term operational pollutant emissions. The BAAQMD's 2017 thresholds of significance for criteria pollutant and precursors are shown in Table 9, *BAAQMD Significance Thresholds* (BAAQMD 2017c). Refer to Section 8.VII, *Greenhouse Gas Emissions* for a discussion of GHG emissions. For construction fugitive dust, rather than a numeric threshold BAAQMD recommends that lead agencies consider projects that implement the BCMMs to have a less than significant impact related to fugitive dust (BAAQMD 2017c).

Table 9
BAAQMD SIGNIFICANCE THRESHOLDS

Pollutant	Construction	Operation	
	Average Daily Emissions (pounds/day)	Average Daily Emissions (pounds/day)	Maximum Annual Emissions (tons/year)
Reactive Organic Gasses (ROG)	54	54	10
Nitrogen Oxides (NO_X)	54	54	10
Particulate Matter Exhaust (PM_{10})	82	82	15
Fine Particulate Matter Exhaust ($PM_{2.5}$)	54	54	10
PM_{10} and $PM_{2.5}$ Fugitive Dust	BCMMs[1]	none	none
Local Carbon Monoxide (CO)	none	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	
Sulfur Oxides (SO_X)	none	none	none

Source: BAAQMD 2017c.

[1] For construction fugitive dust, rather than a numeric threshold BAAQMD recommends that lead agencies consider projects that implement the Basic Construction Mitigation Measures to have a less than significant impact related to fugitive dust.

ppm = part per million; BCMMs = Basic Construction Mitigation Measures.

2.5 AIR QUALITY IMPACT ANALYSIS

2.5.1 Issue 1: Consistency with the Regional Air Quality Plan

Consistency with the air quality plan is determined by whether the project would hinder implementation of control measures identified in the air quality plan or would result in growth of population or employment that is not accounted for in local and regional planning. The BAAQMD's 2017 Clean Air Plan is the applicable air quality plan for the SFBAAB and the County, adopted on April 19, 2017 (BAAQMD 2017b).

The project would not result in population growth in the County, and the anticipated 4 to 12 O&M workers would represent an inconsequential growth in County employment and would not exceed the employment growth accounted for in the County General Plan and the East County Area Plan.

The Clean Air Plan contains control measures that identify actions to be taken by the air district, local government agencies, and private enterprises to reduce stationary and mobile sources of criteria pollutants and ozone precursors, TACs, and GHG emissions in the SFBAAB. As a PV electricity generation and energy storage facility, the project would be consistent with the Energy Control Measure EN1, *Decarbonize Electricity Production*, which strives to maximize the amount of renewable energy contributing to the production of electricity within the SFBAAB as well as electricity imported into the region (BAAQMD 2017b). None of the other control measures in the 2017 Clean Air Plan would be directly applicable to the project. Therefore, the project would not conflict with or obstruct implementation of the 2017 Clean Air Plan and the impact would be less than significant.

2.5.2 Issue 2: Cumulatively Considerable Net Increase of Nonattainment Criteria Pollutants

The project would generate criteria pollutants in the short-term during construction and the long-term during O&M. To determine whether a project would result in a cumulatively considerable net increase in criteria pollutant emissions that would violate an air quality standard or contribute substantially to an

existing or projected air quality violation, a project's emissions are evaluated based on the quantitative emission thresholds established by the BAAQMD (as shown in Table 9).

2.5.2.1 Construction Criteria Pollutant and Precursor Emissions

The project's temporary construction emissions were estimated using CalEEMod as described in Section 2.3. The results of the modeling of the project's construction emissions of criteria pollutants and ozone precursors are shown in Table 10, *Unmitigated Maximum Daily Construction Emissions*. The data are presented as the maximum anticipated daily emissions for comparison with the BAAQMD thresholds. The complete CalEEMod output is provided in Appendix A to this report.

Table 10
UNMITIGATED MAXIMUM DAILY CONSTRUCTION EMISSIONS

Construction Activity	Pollutant Emissions (pounds per day)							
	ROG	NO_X	CO[1]	SO_X	Fugitive PM_{10}	Exhaust PM_{10}	Fugitive $PM_{2.5}$	Exhaust $PM_{2.5}$
Phase 1 Site Preparation	11.4	119.0	77.5	0.2	15.1	4.3	2.4	4.0
Phase 2 Photovoltaic Installation	12.3	89.5	108.0	0.3	16.7	3.5	3.8	3.2
Phase 3 Electrical and Gen-Tie Installation	29.8	96.2	93.7	0.2	10.2	4.2	2.1	3.9
Phase 4 General Construction Operations, Site Clean-up and Restoration	1.2	13.3	16.6	<0.1	0.4	0.5	<0.1	0.5
Concurrent Phases 1 and 4	12.6	132.3	94.1	0.2	15.5	4.8	2.5	4.5
Concurrent Phases 2, 3 and 4	43.3	199.0	218.3	0.5	27.2	8.3	5.9	7.6
Maximum Daily Emissions	**43.3**	**199.0**	**218.3**	**0.5**	**27.2**	**8.3**	**5.9**	**7.6**
BAAQMD Thresholds	*54*	*54*	*none*	*none*	*BCMMs*	*84*	*BCMMs*	*54*
Exceed Thresholds?	***No***	***Yes***	***No***	***No***	***No***	***No***	***No***	***No***

Source: CalEEMod (output data is provided in Appendix A).

[1] The maximum daily emissions of CO would occur during summer. The maximum of all other pollutants would occur during winter.

For construction fugitive dust, rather than a numeric threshold BAAQMD recommends that lead agencies consider projects that implement the BCMMs to have a less than significant impact related to fugitive dust (BAAQMD 2017c). The County does not have a uniformly applied development policy or standard (e.g., ordinance or General Plan policy) that requires implementation of the BAAQMD's recommended BCMMs. Therefore, Mitigation Measure AQ-1 requires implementation of the BCMMs for control of fugitive dust during construction.

As shown in Table 10, the construction period maximum emissions of NO_X would be 199 pounds per day during concurrent phases 2, 3 and 4 construction activity. This would exceed the BAAQMD emissions threshold for NO_X of 54 pounds per day. Mitigation Measure AQ-2 requires all diesel-powered off-road equipment with 50 or more HP to be USEPA Tier-4 certified or be retrofitted with CARB-approved diesel emissions reduction devices meeting Tier 4 standards. The project's construction emissions of criteria pollutants and precursors, with implementation of Mitigation Measures AQ-1 and AQ-2, are shown in Table 11, *Mitigated Maximum Daily Construction Emissions*.

Table 11
MITIGATED MAXIMUM DAILY CONSTRUCTION EMISSIONS

Construction Activity	Pollutant Emissions (pounds per day)							
	ROG	NO_X	CO[1]	SO_X	Fugitive PM_{10}	Exhaust PM_{10}	Fugitive $PM_{2.5}$	Exhaust $PM_{2.5}$
Phase 1 Site Preparation	3.9	10.8	101.3	0.2	9.5	0.3	1.8	0.3
Phase 2 Photovoltaic Installation	7.2	15.8	123.2	0.3	14.5	0.5	3.6	0.5
Phase 3 Electrical and Gen-Tie Installation	23.6	14.7	109.3	0.2	8.1	0.4	1.9	0.4
Phase 4 General Construction Operations, Site Clean-up and Restoration	0.3	1.6	19.5	<0.0	0.1	<0.1	<0.1	<0.1
Concurrent Phases 1 and 4	4.3	12.4	120.8	0.2	9.6	0.4	1.8	0.4
Concurrent Phases 2, 3 and 4	31.2	32.1	252.1	0.5	22.7	1.0	5.4	0.9
Maximum Daily Emissions	**31.2**	**32.1**	**252.1**	**0.5**	**22.7**	**1.0**	**5.4**	**0.9**
BAAQMD Thresholds	*54*	*54*	*none*	*none*	*BCMMs*	*84*	*BCMMs*	*54*
Exceed Thresholds?	***No***	***No***	***No***	***No***	***No***	***No***	***No***	***No***

Source: CalEEMod (output data is provided in Appendix A).

[1] The maximum daily emissions of CO would occur during summer. The maximum of all other pollutants would occur during winter.

As shown in Table 11, with implementation of Mitigation Measures AQ-1 and AQ-2, all project construction emissions of criteria pollutants and precursors would be less than the BAAQMD thresholds. Therefore, the project's construction activities would not result in a cumulatively considerable net increase of criteria pollutants that would violate any air quality standard or contribute substantially to an existing or projected air quality violation, and the impact would be less than significant with mitigation incorporated.

2.5.2.2 Operation Criteria Pollutant and Precursor Emissions

The project's long-term average daily and maximum annual operational emissions were estimated using CalEEMod as described in Section 2.3. The results of the modeling of the project's operational emissions of criteria pollutants and precursors are shown in Table 12, *Operational Emissions*. The data are presented as the maximum anticipated daily emissions and maximum annual emissions for comparison with the BAAQMD thresholds. The complete CalEEMod output is provided in Appendix A to this report.

Table 12
OPERATIONAL EMISSIONS

Source Category	Pollutant Emissions							
	ROG	NO_X	CO	SO_X	Fugitive PM_{10}	Exhaust PM_{10}	Fugitive $PM_{2.5}$	Exhaust $PM_{2.5}$
Average Daily Emissions (pounds per day)								
Area	1.8	<0.1	<0.1	<0.1	-	<0.1	-	<0.1
Mobile	<0.1	1.1	1.1	<0.1	10.3	<0.1	1.1	<0.1
Off-Road	1.4	12.2	16.6	<0.1	-	0.6	-	0.6
Average Daily Total [1]	**3.2**	**13.3**	**17.9**	**<0.1**	**10.3**	**0.6**	**1.1**	**0.6**
BAAQMD Thresholds	*54*	*54*	*none*	*none*	*none*	*84*	*none*	*54*
Exceed Thresholds?	***No***	***No***	***No***	***No***	***No***	***No***	***No***	***No***
Maximum annual Emissions (tons per year)								
Area	0.3	<0.1	<0.1	<0.1	-	<0.1	-	<0.1
Mobile	<0.1	0.1	0.2	<0.1	1.3	<0.1	0.1	<0.1
Off-Road	<0.1	0.2	0.2	<0.1	-	<0.1	-	<0.1
Maximum Annual Total[1]	**0.3**	**0.3**	**0.4**	**<0.1**	**1.3**	**<0.1**	**0.1**	**<0.1**
BAAQMD Thresholds	*10*	*10*	*none*	*none*	*none*	*15*	*none*	*10*
Exceed Thresholds?	***No***	***No***	***No***	***No***	***No***	***No***	***No***	***No***

Source: CalEEMod (output data is provided in Appendix A)

[1] Total may not sum due to rounding.

As shown in Table 12, all project long-term operational emissions of criteria pollutants and precursors would be less than the BAAQMD thresholds. Therefore, the project's operational activities would not result in a cumulatively considerable net increase of criteria pollutants that would violate any air quality standard or contribute substantially to an existing or projected air quality violation and the impact would be less than significant.

2.5.2.3 Decommissioning and Site Reclamation Pollutant and Precursor Emissions

The solar facility is anticipated to have an operating life of at least 50 years. Once the operating life of the facility is over, it would be either repowered or decommissioned. If repowering were to be pursued, it would require the facility owner to obtain all required permit approvals. Project decommissioning would occur in accordance with the expiration of the CUP and would involve the removal of above-grade facilities, buried electrical conduit, and all concrete foundations in accordance with a Decommissioning Plan. Equipment would be repurposed off-site, recycled, or disposed of in a landfill as appropriate.

Decommissioning is anticipated to take approximately six months to complete and would occur in 2073 or later. Decommissioning would be completed in three phases: Phase 1 would involve shutting down the systems and removing hazardous materials and wiring; Phase 2 would include removing the PV modules, inverters, substation(s), switching station, and energy storage system; Phase 3 would include removing site fencing and driveways and the final soils reclamation process. Decommissioning and reclamation activities are anticipated to require approximately 200 workers, generating 800 maximum daily worker trips and 40 daily truck trips.

Current California emissions modeling programs and data (i.e., CalEEMod, EMFAC2017, OFFROAD2017) do not estimate emissions beyond the year 2050. However, because it is anticipated that the intensity of project decommissioning and reclamation activities would be similar to or less than construction

activities, the off-road equipment and water use for decommissioning are assumed to be similar or less than that required for project constructions. In addition, in accordance with current CARB regulations, in 50 plus years (2073 or later), all diesel-powered off-road equipment with 25 or more HP used in construction fleets would be required to meet USEPA Tier 4 standards or better (CARB 2020b). Therefore, due to the shorter duration and equal or lesser intensity of activity compared to project construction, emissions of criteria pollutant and precursors from decommissioning and reclamation activities would be less than the mitigated emissions calculated for project construction. As discussed above, the project's mitigated construction emissions would not exceed the BAAQMD thresholds. Therefore, Therefore, the project's decommissioning and reclamation activities would not result in a cumulatively considerable net increase of criteria pollutants that would violate any air quality standard or contribute substantially to an existing or projected air quality violation and the impact would be less than significant.

Mitigation Measures

AQ-1 Prior to issuance of any Grading Permit, the County shall confirm that the Grading Plan, Building Plans, and specifications stipulate that, in compliance with the BAAQMD CEQA Air Quality Guidelines, the following basic construction mitigation measures shall be implemented for all project construction activity:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- A publicly visible sign shall be posted with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

AQ-2 Prior to issuance of any Grading Permit, the County shall confirm that the Grading Plan, Building Plans, and specifications stipulate that, all diesel-powered off-road equipment with 50 or more horsepower be certified to meet the USEPA Tier 4 Final emissions standards, or be retrofitted with CARB verified diesel exhaust emissions reduction devices that reduce emissions of both NO_X and PM to USEPA Tier 4 Final emissions standards.

2.5.3 Issue 3: Impacts to Sensitive Receptors

Sensitive receptors are described as residences, schools, day-care centers, playgrounds, medical facilities, or other facilities that may house individuals with health conditions (medical patients or elderly persons/athletes/students/children) that may be adversely affected by changes in air quality. Impacts to sensitive receptors are typically analyzed for CO hot spots and exposure to TACs. An analysis of the project's potential to expose sensitive receptors to these pollutants is provided below.

2.5.3.1 Localized Carbon Monoxide Hotspots

Vehicle exhaust is the primary source of CO. In an urban setting, the highest CO concentrations are generally found in close proximity to congested intersections. Under typical meteorological conditions, CO concentrations tend to decrease as distance from the emissions source (e.g., congested intersection) increase. Project-generated traffic has the potential of contributing to localized "hotspots" of CO off-site. Because CO is a byproduct of incomplete combustion, exhaust emissions are worse when fossil-fueled vehicles are operated inefficiently, such as in stop-and-go traffic or through heavily congested intersections. Because CO disperses rapidly, hotpots are most likely to occur in areas with limited vertical mixing such as tunnels, long underpasses, or below-grade roadways. The BAAQMD CEQA guidelines provide that, if a project is consistent with the applicable congestion management plan and would not increase traffic volumes at intersections to more than 44,000 vehicles per hour for regular intersections, or would not increase traffic volumes at intersections to more than 24,000 vehicles per hour for intersections with limited vertical mixing zones, the impacts from CO hotpots would be less than significant (BAAQMD 2017c).

The project TIS concluded that the highest project construction traffic-affected intersection would be the intersection of North Livermore Avenue and Eastbound Interstate 580, which would carry approximately 2,742 vehicles during the PM peak hour under the existing plus project conditions. This intersection traffic volume would not exceed the BAAQMD guideline of hourly intersection traffic volumes with more than 44,000 vehicles per hour, or 24,000 vehicles per hour for intersections with limited mixing zones. Therefore, Impacts related to CO hotspots would be less than significant.

2.5.3.2 Construction Diesel Particulate Matter Emissions

Implementation of the project would result in the use of heavy-duty construction equipment, haul trucks, and construction worker vehicles. These vehicles and equipment could generate DPM, which is a TAC. Generation of DPM from construction projects typically occurs in a localized area (e.g., near locations with multiple pieces of heavy construction equipment working in close proximity) for a short period of time. Because construction activities and subsequent emissions vary depending on the phase of construction, the construction-related emissions to which nearby receptors are exposed to would also vary throughout the construction period. During some equipment-intensive activities such as grading and excavation, construction-related emissions would be higher than other less equipment-intensive phases such as PV panel installation. Concentrations of mobile-source DPM emissions are

typically reduced by 70 percent at approximately 500 feet (CARB 2005). It is not anticipated that the use of heavy diesel power equipment would be concentrated within 500 feet of any existing sensitive receptors (rural single-family residences) for more than a few days duration.

The dose (of TAC) to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance in the environment and the extent of exposure a person has with the substance; a longer exposure period to a fixed amount of emissions would result in higher health risks. Current models and methodologies for conducting cancer health risk assessments are associated with longer-term exposure periods (typically 30 years for individual residents based on guidance from OEHHA) and are best suited for evaluation of long duration TAC emissions with predictable schedules and locations. These assessment models and methodologies do not correlate well with the temporary and highly variable nature of construction activities. Cancer potency factors are based on animal lifetime studies or worker studies where there is long-term exposure to the carcinogenic agent. There is considerable uncertainty in trying to evaluate the cancer risk from projects that will only last a small fraction of a lifetime (Office of Environmental Health Hazard Assessment [OEHHA] 2015).

In addition, as shown in Tables 11 and 12, USEPA Tier 4 Final certified engines (required by Mitigation Measure AQ-2 for all project construction equipment with 50 or more HP) would reduce Exhaust PM_{10} emissions (approximately equivalent to DPM) by 85 percent. Considering this information, the highly dispersive nature of DPM, and the fact that any concentrated use of heavy construction equipment would occur at various locations throughout the project site only for short durations, construction of the project would not expose sensitive receptors to substantial DPM concentrations, and the impact would be less than significant.

2.5.3.3 Operation Diesel Particulate Matter Emissions

O&M activities could require the use of diesel-powered off-road equipment. As described in Section 2.3, above, up to seven pieces of off-road equipment could be used during maintenance and panel washing. However, only two small tractors are anticipated to be used on more than 20 days per year. Therefore, due to the limited use of diesel-powered off-road equipment and the fact that O&M activities would occur at various locations throughout the project site for short durations and would not be concentrated near sensitive receptors, operation of the project would not expose sensitive receptors to substantial DPM concentrations, and the impact would be less than significant.

2.5.4 Issue 4: Odors

Construction of the project would require the use of diesel-powered equipment. Diesel exhaust can be a temporary source of odors. Due to the temporary and intermittent nature of construction activities, and due to the dispersion of construction activities thorough the large project site (410 acres), construction of the project would not result in emissions leading to odors that would adversely affect substantial numbers of people.

The BAAQMD CEQA Guidelines contain a table of odor screening distances for siting new land uses/operations that are typical sources of odors. The project would be a PV electricity generation facility, which is not considered to be a typical significant source of objectionable odors. The proposed program for concomitant agricultural land uses during project operation could include seasonal livestock grazing. Seasonal livestock grazing is not considered a typical source of objectionable odors in the

BAAQMD CEQA guidelines. In additions, the majority of the project site is currently used for seasonal livestock grazing and future concomitant agricultural land uses on the project site would not result substantially different odors than those generate by the existing land use. Therefore, operation of the project would not result in emissions leading to odors that would adversely affect substantial numbers of people, and the impact would be less than significant.

3.0 ENERGY

This section provides an evaluation of existing energy production/consumption conditions and potential energy use and related impacts from the project. The units of energy used in this section are the British thermal units (BTU), megawatt hours (MWh)[2], therms, and gallons. A BTU is the quantity of heat required to raise the temperature of one pound of water one °F at sea level. Because the other units of energy can all be converted into equivalent BTU, the BTU is used as the basis for comparing energy consumption associated with different resources. A MWh is a unit of electrical energy, and one MWh is equivalent to approximately 3.413 million BTU (MBTU), taking into account initial conversion losses (i.e., from one type of energy, such as chemical, to another type of energy, such as mechanical) and transmission losses. Natural gas consumption is described typically in terms of cubic feet or therms; one cubic foot of natural gas is equivalent to approximately 1.05 MBTU, and one therm represents 0.1 MBTU. One gallon of gasoline/diesel is equivalent to approximately 0.125/0.139 MBTU, respectively, taking into account energy consumed in the refining process.

3.1 ENERGY REGULATORY FRAMEWORK

3.1.1 Federal Energy Regulations

3.1.1.1 Energy Independence and Security Act of 2007

House of Representatives Bill 6 (HR 6), the federal Energy Independence and Security Act of 2007, established new standards for a few energy-consuming equipment types not already subject to a standard, and updated some existing standards. The most substantial new standard that HR 6 established is for general service lighting that is being deployed in two phases. First, phased in between 2012 through 2014, common light bulbs were required to use about 20 to 30 percent less energy than previous incandescent bulbs. Second, by 2020, light bulbs were required to consume 60 percent less energy than previous incandescent bulbs; this requirement will effectively phase out the incandescent light bulb.

3.1.2 California Energy Regulations

3.1.2.1 Renewable Energy Programs and Mandates (SB 1078, SB 107, SB 2 X1, SB 350 and SB 100)

A series of substantive and far-reaching legislative initiatives have been advanced at the State level in the last two decades. These initiatives focused on increasing the generation of electricity via renewable energy sources and promoting a shift from fossil- or carbon-based fuels as a key strategy to reduce GHG emissions, air pollution, and water use associated with the energy sector.

[2] MWh is the most common measure or electrical energy when discussing utility-scale electrical generation. Kilowatt hours (kWh; 1,000 kWh = 1 MWh) and gigawatt hours (GWh; 1,000 MWh = 1 GWh).

In 2002, California established the Renewables Portfolio Standard (RPS) with SB 1078, requiring electric utilities in the State to increase procurement of eligible renewable energy resources to achieve a target of 20 percent of their annual retail sales by the year 2010. In 2011, Governor Jerry Brown approved the California Renewable Energy Resources Act, SB 2 X1. SB 2 X1 legislatively broadens the scope of the State RPS to include retail electricity sellers; investor- and publicly owned utilities; municipal utilities; and community choice aggregators under the mandate to obtain 33 percent of their retail electrical energy sales from renewable sources by 2020.

Approved by Governor Brown on October 7, 2015, SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. This will increase the use of Renewables Portfolio Standard eligible resources, including solar, wind, biomass, and geothermal. In addition, large utilities are required to develop and submit Integrated Resource Plans to detail how each entity will meet their customers resource needs, reduce GHG emissions, and increase the use of clean energy.

Approved by Governor Brown on September 10, 2018, SB 100 extends the renewable electricity procurement goals and requirements of SB 350. SB 100 requires that all retail sale of electricity to California end-use customers be procured from 100 percent eligible renewable energy resources and/or zero-carbon resources by the end of 2045.

3.1.2.2 California Energy Plan

The California Energy Commission (CEC) is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the fewest environmental and energy costs. To further this policy, the plan identifies a number of strategies, including providing assistance to public agencies and fleet operators.

3.2 ENERGY EXISTING CONDITIONS

3.2.1 State Energy Supply

3.2.1.1 Electricity

California's electricity needs are satisfied by a variety of entities, including investor-owned utilities, publicly owned utilities, electric service providers, and choice aggregators.[3] As of 2018, California electricity demand totaled 285,488 gigawatt hours (GWh).In-state generating facilities accounted for about 194,842 GWh, or 68 percent of the total electric power used in the state, with the remaining electricity coming from out-of-state imports (CEC 2019a).

[3] Community choice aggregation is authorized in California by AB 117 (Chapter 836, Statutes of 2002), which allows cities, counties, and groups of cities and counties to aggregate the electric load of the residents, businesses and institutions within their jurisdictions to provide them electricity.

Since deregulation in 1998, the CEC has licensed or given small power plant exemptions to 91 power plants, including:

- 66 projects representing 22,965 MW currently on-line;
- 4 projects totaling 2,635 MW currently under construction or pre-construction;
- 2 projects totaling 795 MW currently on hold or under suspension; and
- 15 projects totaling 5,844.5 MW approved but then cancelled by applicants, or license expired or terminated before construction.

In addition, as of February 2020, the CEC had five proposed projects under review, totaling approximately 453 MW (CEC 2020a). One additional geothermal steam turbine project, representing a total of 250 MW, has been announced but has not yet filed with the CEC.

On the demand side, Californians consumed 284,060 GWh of electricity in 2017; this is a decrease from the 285,434 GWh demanded in 2016 (CEC 2018). CEC staff forecasts of future electricity demand anticipate that consumption will grow by between 0.99 and 1.59 percent per year from 2017 to 2030, with peak demand forecasts growing by 0.30 to 1.52 percent annually from 2017 to 2030 (CEC 2018).

3.2.1.2 Natural Gas

Natural gas continues to play an important and varied role in California. In 2012, nearly 45 percent of the natural gas burned in California was used for electricity generation, and much of the remainder was consumed in the residential (21 percent), industrial (25 percent), and commercial (9 percent) sectors (CEC 2019b). Natural gas supplies are currently plentiful and relatively inexpensive as a result of technological advances that allow recovery of natural gas from formations such as shale reservoirs that were previously inaccessible. However, potential environmental concerns are causing decision makers to reexamine the development of shale resources and consider tighter regulations, which could affect future natural gas supplies and prices.

3.2.1.3 Transportation Fuels

Automobiles and trucks consume gasoline and diesel fuel, which are nonrenewable energy products derived from crude oil, which in turn is derived from petroleum. In addition to energy consumption associated with on-road vehicle use, energy is consumed in connection with construction and maintenance of transportation infrastructure. Passenger cars and light-duty trucks are by far the largest consumers of transportation fuel. Retail sales of transportation fuel in California totaled 15.6 billion gallons of gasoline and 1.9 billion gallons of diesel in 2017 (CEC 2018).

3.2.2 Local Energy Supply

3.2.2.1 Electricity

The primary provider of electricity in Alameda County is PG&E. PG&E provides electric service to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California. The electrical grid (a network of transmissions lines that links powerplants, other utility providers, and end-use customers) operated by PG&E includes 106,681 circuit miles of electric

distribution lines and 18,466 circuit miles of interconnected transmission lines (PG&E 2020a). PG&E generates or procures energy from a variety of sources that may include fossil fuel powerplants (e.g., natural gas, coal), nuclear power plants, large hydroelectric facilities, and renewable sources (e.g., solar, wind, geothermal, biomass, small hydroelectric). In 2018, PG&E's electrical power mix comprised 39 percent renewable sources, 34 percent nuclear power plants, 15 percent natural gas power plants, and 13 percent large hydroelectric facilities (PG&E 2020b). PG&E customers consumed 52.5 GWh of electricity in 2018 (CEC 2019b).

3.3 ENERGY METHODOLOGY

Construction and operational energy used were calculated based on the off-road equipment use and on-road vehicle trips and distances described in Section 2.3. Fuel consumption factors in terms of gallons per hour of diesel for off-road equipment were calculated using data from the CARB Mobile Source Emissions Inventory online database –OFFROAD2017 version 1.0.1 (CARB 2020c). Fuel consumption factors in terms of gallon of diesel and gasoline per mile travel were calculated from the CARB Mobile Source Emissions Inventory online database – EMFAC2017 version 1.0.2 (CARB 2020d). The energy calculation sheets are included as Appendix B to this report.

3.4 ENERGY SIGNIFICANCE CRITERIA

According to Appendix G of the CEQA Guidelines, a project would have a significant environmental impact if it would:

(1) Result in the wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

(2) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

The CEQA Guidelines Appendix F, *Energy Conservation*, provides guidance for environmental impact reports (EIRs) regarding potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing the inefficient, wasteful and unnecessary consumption of energy. In addition, though not described as thresholds for determining the significance of impacts, Appendix F seeks inclusion of information in an EIR addressing the following topics:

- The project's energy requirements and its energy-use efficiencies by amount and fuel type for each stage of the project, including construction, operation, maintenance, and/or removal. If appropriate, the energy intensiveness of materials may be discussed.
- The effects of the project on local and regional energy supplies and on requirements for additional capacity.
- The effects of the project on peak and base period demands for electricity and other forms of energy.
- The degree to which the project complies with existing energy standards.

- The effects of the project on energy resources.
- The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

3.5 ENERGY IMPACT ANALYSIS

3.5.1 Issue 1: Result in the wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation

3.5.1.1 Construction Energy

Energy consumed for project construction would primarily consist of fuels in the form of diesel and gasoline. Fuel consumption would result from: the use of on-road trucks for the transportation of construction materials and water; construction worker vehicles traveling to and from the project site; and from the use of off-road construction equipment. The estimated fuel and total energy consumed during project construction is shown in Table 13, *Construction Energy Use*. The full construction energy consumption calculation sheets are included as Appendix B to this report.

Table 13
CONSTRUCTION ENERGY USE

Phase	Gallons Diesel	Gallons Gasoline	MBtu
Site Preparation	7,336	6,671	1,847
General Construction Operations	58,320	12,519	9,659
Photovoltaic Installation	41,759	83,387	16,144
Electrical and Gen-Tie Installation	4,098	20,847	3,155
TOTAL	**111,513**	**123,423**	**30,805**

Source: CalEEMod; OFFROAD2017; EMFAC2017
MBtu = million British thermal units

While construction activities would consume petroleum-based fuels, consumption of such resources would be temporary and would cease upon the completion of construction. The BCMMs, required to be implemented by Mitigation Measure AQ-1, would reduce the inefficient use of fuels by requiring proper maintenance and tuning of off-road vehicles and limiting idling time. The petroleum consumed during project construction would be typical of similar solar PV generation projects and would not require the use of new petroleum resources beyond those typically consumed in California annually for construction activities. Based on these considerations, construction of the project would not result in wasteful, inefficient, or unnecessary consumption of energy resources and the impact would be less than significant.

3.5.1.2 Operational Energy

During long-term operation of the project, energy would be consumed in the form of: diesel and gasoline used by worker/company vehicles and water trucks traveling to and from the project site for O&M; diesel and gasoline used in the operation of off-road equipment for facility maintenance; natural gas for heating and hot water in the O&M building; and electricity required to source and treat water used by the project.

The project would be capable of generating up to 100 MW of AC electricity under peak solar conditions. The energy generated by the project is estimated by multiplying the electrical power capacity by the number of hours in a year and by a capacity factor. The capacity factor accounts for: the available hours of sunlight in a year (daylight hours); climate (the amount of cloud cover); the efficiency of the PV panel tracking system; the efficiency of the inverters, transformers, transmission lines, and energy storage system; and the electricity consumed in operation of the project (e.g., building electricity, PV panel tracking motors, equipment cooling fans, security lighting). Data from the CEC for existing solar PV facilities with one or more MW capacity was used to estimate the capacity factor for the project. Using data collected from the eastern and southern Bay Area counties with similar climates to the project site (the counties of Alameda, Contra Costa, Santa Clara, and Solano), the average capacity factor for solar generation facilities in 2019 was 20.2 percent (CEC 2020b). The project's estimated annual energy generated would be 177,207 MWh (100 MW times 8,766 hours per year times 20.2 percent). Because the project would utilize a battery storage system, some of the electricity generated during off-peak hours could be stored and released during hours of peak demand.

The project's net operational energy use in gallons of fuel, electricity, and equivalent MBtu is shown in Table 14, *Operational Net Energy Use*. The energy calculation sheets are included in Appendix B to this report.

Table 14
OPERATIONAL NET ENERGY USE

Source	Diesel (gallons)	Gasoline (gallons)	Electricity (MWh)	Energy (MBtu)
Mobile	5,504	5,950	-	1,503
Off-Road	1,568	-	-	278
Natural Gas	-	-	-	7
Water/Wastewater	-	-	9	30
Electricity Generation	-	-	(-177,207)	(-604,657)
TOTAL[1]	**10,620**	**5,970**	**(-177,198)**	**(-602,839)**

Source: CalEEMod; OFFROAD2017; EMFAC2017

[1] Totals may not sum due to rounding.

MWh = megawatt hours; MBtu = million British thermal units

As shown in Table 14, the project would generate a net of approximately 177,198 MWh (602,839 MBtu of energy) of renewable electricity delivered to the state and regional electrical distribution system. Operation of the project would consume approximately 2,314 MBtu of energy, or approximately 0.4 percent of the energy generated by the project. Because the amount of energy consumed by project operation would be inconsequential compared to the amount of energy generated by the project, the operation of the project would not result in the wasteful, inefficient, or unnecessary consumption of energy resources, and the impact would be less than significant.

3.5.2 Issue 2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency

As a solar PV energy generation facility, the project would directly support the State's Renewable Energy Programs and the renewable source electricity procurement mandates of 50 percent by 2030 from SB 350 and 100 percent by 2045 from SB 100 (described in Section 3.1). The project would also support the BAAQMD 2017 Clean Air Plan Energy Control Measure EN1, *Decarbonize Electricity Production*, which strives to maximize the amount of renewable energy contributing to the production of electricity

within the SFBAAB as well as electricity imported into the region (BAAQMD 2017b). Therefore, the project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency and there would be no impact.

4.0 GREENHOUSE GAS EMISSIONS

4.1 GHG SETTING

4.1.1 Climate Change Overview

Global climate change refers to changes in average climatic conditions on Earth including temperature, wind patterns, precipitation, and storms. Global temperatures are moderated by atmospheric gases. These gases are commonly referred to as GHGs because they function like a greenhouse by letting sunlight in but preventing heat from escaping, thus warming the Earth's atmosphere.

GHGs are emitted by natural processes and human (anthropogenic) activities. Anthropogenic GHG emissions are primarily associated with: (1) the burning of fossil fuels during motorized transport, electricity generation, natural gas consumption, industrial activity, manufacturing, and other activities; (2) deforestation; (3) agricultural activity; and (4) solid waste decomposition.

The temperature record shows a decades-long trend of warming, with 2018 ranked as the fourth warmest year on record with an increase of 1.5 degrees Fahrenheit compared to the 1951-1980 average. Globally, 2018's temperatures rank behind the three warmest years on record—2016, 2017 and 2015 (National Aeronautics and Space Administration [NASA] 2019). GHG emissions from human activities are the most significant driver of observed climate change since the mid-20th century (United Nations Intergovernmental Panel on Climate Change [IPCC] 2013). The IPCC constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. The statistical models show a "high confidence" that temperature increase caused by anthropogenic GHG emissions could be kept to less than two degrees Celsius relative to pre-industrial levels if atmospheric concentrations are stabilized at about 450 parts per million (ppm) carbon dioxide equivalent (CO_2e) by the year 2100 (IPCC 2014).

4.1.2 Greenhouse Gases

The GHGs defined under California's Assembly Bill (AB) 32 include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Carbon Dioxide. CO_2 is the most important and common anthropogenic GHG. CO_2 is an odorless, colorless GHG. Natural sources include the decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungi; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of CO_2 include burning fuels, such as coal, oil, natural gas, and wood. Data from ice cores indicate that CO_2 concentrations remained steady prior to the current period for approximately 10,000 years. The atmospheric CO_2 concentration in 2010 was 390 ppm, 39 percent above the concentration at the start of the Industrial Revolution (about 280 ppm in 1750). As of April 2020, the CO_2 concentration exceeded 413 ppm (National Oceanic and Atmospheric Administration [NOAA] 2020).

Methane. CH_4 is the main component of natural gas used in homes. A natural source of methane is from the decay of organic matter. Geological deposits known as natural gas fields contain methane, which is

extracted for fuel. Other sources are from decay of organic material in landfills, fermentation of manure, and cattle digestion.

Nitrous Oxide. N_2O is produced by both natural and human-related sources. N_2O is emitted during agricultural and industrial activities, as well as during the combustion of fossil fuels and solid waste. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic (fatty) acid production, and nitric acid production.

Hydrofluorocarbons. Fluorocarbons are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. Chlorofluorocarbons are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at Earth's surface). Chlorofluorocarbons were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. Because hydrofluorocarbons destroy stratospheric ozone, their production was stopped as required by the 1989 Montreal Protocol.

Sulfur Hexafluoride. SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semi-conductor manufacturing, and as a tracer gas for leak detection.

GHGs have long atmospheric lifetimes that range from one year to several thousand years. Long atmospheric lifetimes allow for GHG emissions to disperse around the globe. Because GHG emissions vary widely in the power of their climatic effects, climate scientists have established a unit called global warming potential (GWP). The GWP of a gas is a measure of both potency and lifespan in the atmosphere as compared to CO_2. For example, because methane and N_2O are approximately 25 and 298 times more powerful than CO_2, respectively, in their ability to trap heat in the atmosphere, they have GWPs of 25 and 298, respectively (CO_2 has a GWP of 1). CO_2e is a quantity that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the prevalence of that gas to produce CO_2e.

Historically, GHG emission inventories have been calculated using the GWPs from the IPCC's Second Assessment Report (SAR). In 2007, IPCC updated the GWP values based on the latest science at the time in its Fourth Assessment Report (AR4). The updated GWPs in the IPCC AR4 have begun to be used in recent GHG emissions inventories. In 2013, IPCC again updated the GWP values based on the latest science in its Fifth Assessment Report (AR5) (IPCC 2013). However, United Nations Framework Convention on Climate Change (UNFCCC) reporting guidelines for national inventories require the use of GWP values from the AR4. To comply with international reporting standards under the UNFCCC, official emission estimates for California and the U.S. are reported using AR4 GWP values, and statewide and national GHG inventories have not yet updated their GWP values to the AR5 values.

By applying the GWP ratios, project related CO_2e emissions can be tabulated in metric tons per year. Typically, the GWP ratio corresponding to the warming potential of CO_2 over a 100-year period is used as a baseline. The atmospheric lifetime and GWP of selected GHGs are summarized in Table 15, *Global Warming Potentials and Atmospheric Lifetimes*.

Table 15
GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES

Greenhouse Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide (CO_2)	50-200	1
Methane (CH_4)	12	25
Nitrous Oxide (N_2O)	114	298
HFC-324a	14	1,430
PFC: Tetrafluoromethane (CF_4)	50,000	7,390
PFC: Hexafluoroethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Source: IPCC 2007
HFC: hydrofluorocarbon; PFC: perfluorocarbon

4.2 GHG REGULATORY FRAMEWORK

All levels of government have some responsibility for the protection of air quality, and each level (federal, State, and regional/local) has specific responsibilities relating to air quality regulation. GHG emissions and the regulation of GHGs is a relatively new component of air quality management.

4.2.1 Federal GHG Regulations

4.2.1.1 Federal Clean Air Act

The U.S. Supreme Court ruled on April 2, 2007, in *Massachusetts v. U.S. Environmental Protection Agency* (USEPA*)* that CO_2 is an air pollutant, as defined under the CAA, and that the USEPA has the authority to regulate emissions of GHGs. The USEPA announced that GHGs (including CO_2, CH_4, N_2O, HFC, PFC, and SF_6) threaten the public health and welfare of the American people. This action was a prerequisite to finalizing the USEPA's GHG emissions standards for light-duty vehicles, which were jointly proposed by the USEPA and the United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA). The standards were established on April 1, 2010 for 2012 through 2016 model year vehicles and on October 15, 2012 for 2017 through 2025 model year vehicles (USEPA 2017; USEPA and NHTSA 2012).

4.2.1.2 Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards

The USEPA and the NHTSA worked together on developing a national program of regulations to reduce GHG emissions and to improve fuel economy of light-duty vehicles. The USEPA established the first-ever national GHG emissions standards under the CAA, and the NHTSA established Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. On April 1, 2010, the USEPA and NHTSA announced a joint Final Rulemaking that established standards for 2012 through 2016 model year vehicles. This was followed up on October 15, 2012, when the agencies issued a Final Rulemaking with standards for model years 2017 through 2025. On August 2, 2018, the agencies released a notice of proposed rulemaking—the Safer Affordable Fuel-Efficient Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks (SAFE Vehicles Rule). The purpose of the SAFE Vehicles Rule is "to correct the national automobile fuel economy and greenhouse gas emissions standards to give the American people greater access to safer, more affordable vehicles that are cleaner for the

environment." The direct effect of the rule is to eliminate the standards that were put in place to gradually raise average fuel economy for passenger cars and light trucks under test conditions from 37 miles per gallon (mpg) in 2020 to 50 mpg in 2025. The new SAFE Vehicles Rule freezes the average fuel economy level standards indefinitely at the 2020 levels. The new SAFE Vehicles Rule also results in the withdraw of the waiver previously provided to California for that State's GHG and zero emissions vehicle (ZEV) programs under Section 209 of the CAA. The combined USEPA GHG standards and NHTSA CAFE standards resolve previously conflicting requirements under both federal programs and the standards of the State of California and other states that have adopted the California standards.

4.2.2 California GHG Regulations

There are numerous State plans, policies, regulations, and laws related to GHG emissions and global climate change. Following is a discussion of some of these plans, policies, and regulations that (1) establish overall State policies and GHG emission reduction targets; (2) require State or local actions that result in direct or indirect GHG emission reductions for the proposed project; and (3) require CEQA analysis of GHG emissions.

4.2.2.1 California Energy Code

CCR Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. Energy-efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for water heating) results in GHG emissions.

The Title 24 standards are updated approximately every three years to allow consideration and possible incorporation of new energy efficiency technologies and methods. The 2019 Title 24 standards went into effect on January 1, 2020. The 2019 update to the Building Energy Efficiency Standards focuses on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings.

The standards are divided into three basic sets. First, there is a basic set of mandatory requirements that apply to all buildings. Second, there is a set of performance standards – the energy budgets – that vary by climate zone (of which there are 16 in California) and building type; thus, the standards are tailored to local conditions. Finally, the third set constitutes an alternative to the performance standards, which is a set of prescriptive packages that are basically a recipe or a checklist compliance approach.

4.2.2.2 California Green Building Standards Code

The California Green Building Standards Code (CALGreen; CCR Title 24, Part 11) is a code with mandatory requirements for new residential and nonresidential buildings (including industrial buildings) throughout California. The code is Part 11 of the California Building Standards Code in Title 24 of the CCR (CBSC 2019). The current 2019 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings went into effect on January 1, 2020.

The development of CALGreen is intended to (1) cause a reduction in GHG emissions from buildings; (2) promote environmentally responsible, cost-effective, healthier places to live and work; (3) reduce energy and water consumption; and (4) respond to the directives by the Governor. In short, the code is

established to reduce construction waste; make buildings more efficient in the use of materials and energy; and reduce environmental impact during and after construction.

CALGreen contains requirements for storm water control during construction; construction waste reduction; indoor water use reduction; material selection; natural resource conservation; site irrigation conservation; and more. The code provides for design options allowing the designer to determine how best to achieve compliance for a given site or building condition. The code also requires building commissioning, which is a process for the verification that all building systems, like heating and cooling equipment and lighting systems, are functioning at their maximum efficiency.

4.2.2.3 Executive Order S-3-05

On June 1, 2005, Executive Order (EO) S-3-05 proclaimed that California is vulnerable to climate change impacts. It declared that increased temperatures could reduce snowpack in the Sierra Nevada, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To avoid or reduce climate change impacts, EO S-3-05 calls for a reduction in GHG emissions to the year 2000 level by 2010, to year 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

4.2.2.4 Assembly Bill 32 – Global Warming Solution Act of 2006

The California Global Warming Solutions Act of 2006, widely known as AB 32, requires that the CARB develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is directed to set a GHG emission limit, based on 1990 levels, to be achieved by 2020. The bill requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG emission reductions.

4.2.2.5 Senate Bill 375

Senate Bill (SB) 375, the Sustainable Communities and Climate Protection Act of 2008, supports the State's climate action goals to reduce GHG emissions through coordinated transportation and land use planning with the goal of more sustainable communities.

Under the Sustainable Communities Act, CARB sets regional targets for GHG emissions reductions from passenger vehicle use. In 2010, CARB established these targets for 2020 and 2035 for each region covered by one of the State's metropolitan planning organizations (MPOs). CARB periodically reviews and updates the targets, as needed.

Each of California's MPOs must prepare a Sustainable Communities Strategy (SCS) as an integral part of its regional transportation plan (RTP). The SCS contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet its GHG emission reduction targets. Once adopted by the MPO, the RTP/SCS guides the transportation policies and investments for the region. CARB must review the adopted SCS to confirm and accept the MPO's determination that the SCS, if implemented, would meet the regional GHG targets. If the combination of measures in the SCS would not meet the regional targets, the MPO must prepare a separate alternative planning strategy (APS) to meet the targets. The APS is not a part of the RTP. Qualified projects consistent with an approved SCS or Alternative Planning Strategy categorized as "transit priority projects" would receive incentives to streamline CEQA processing.

4.2.2.6 Senate Bill 743

On September 27, 2013, California Governor Jerry Brown signed SB 743 into law and started a process that changes transportation impact analysis as part of CEQA compliance. These changes include the elimination of auto delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts for land use projects and plans in California. Further, parking impacts will not be considered significant impacts on the environment for select development projects within infill areas with nearby frequent transit service. According to the legislative intent contained in SB 743, these changes to current practice were necessary to more appropriately balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of GHG emissions.

4.2.2.7 Senate Bill 97

SB 97 required the Governor's Office of Planning and Research to develop recommended amendments to the State CEQA Guidelines for addressing GHG emissions, including the effects associated with transportation and energy consumption. The amendments became effective on March 18, 2010.

4.2.2.8 Executive Order B-30-15

On April 29, 2015, EO B-30-15 established a California GHG emission reduction target of 40 percent below 1990 levels by 2030. The EO aligns California's GHG emission reduction targets with those of leading international governments, including the 28 nation European Union. California is on track to meet or exceed the target of reducing GHG emissions to 1990 levels by 2020, as established in AB 32. California's new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the goal established by EO S-3-05 of reducing emissions 80 percent under 1990 levels by 2050.

4.2.2.9 Senate Bill 32 and Assembly Bill 197

As a follow-up to AB 32 and in response to EO-B-30-15, SB 32 was passed by the California legislature in August 2016 to codify the EO's California GHG emission reduction target of 40 percent below 1990 levels by 2030 and requires the State to invest in the communities most affected by climate change. AB 197 establishes a legislative committee on climate change policies to help continue the State's activities to reduce GHG emissions.

4.2.2.10 Assembly Bill 1493 – Vehicular Emissions of Greenhouse Gases

AB 1493 (Pavley) requires that CARB develop and adopt regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State." On September 24, 2009, CARB adopted amendments to the Pavley regulations that intend to reduce GHG emissions in new passenger vehicles from 2009 through 2016. The amendments bind California's enforcement of AB 1493 (starting in 2009), while providing vehicle manufacturers with new compliance flexibility. The amendments also prepare California to merge its rules with the federal CAFE rules for passenger vehicles (CARB 2017a). In January 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single packet of standards called Advanced Clean Cars (CARB 2017a).

4.2.2.11 Assembly Bill 341

The State legislature enacted AB 341 (California Public Resource Code Section 42649.2), increasing the solid waste diversion target to 75 percent statewide. AB 341 requires all businesses and public entities that generate 4 cubic yards or more of waste per week to have a recycling program in place. The final regulation was approved by the Office of Administrative Law on May 7, 2012 and went into effect on July 1, 2012.

4.2.2.12 Executive Order S-01-07 – Low Carbon Fuel Standard

This EO, signed by Governor Schwarzenegger on January 18, 2007, directs that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by the year 2020. It orders that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California and directs CARB to determine whether a LCFS can be adopted as a discrete early action measure pursuant to AB 32. CARB approved the LCFS as a discrete early action item with a regulation adopted and implemented in April 2010. Although challenged in 2011, the Ninth Circuit reversed the District Court's opinion and rejected arguments that implementing LCFS violates the interstate commerce clause in September 2013. As a result, CARB continues to implement the LCFS statewide.

4.2.2.13 California Air Resources Board: Climate Change Scoping Plan

On December 11, 2008, CARB adopted the Scoping Plan (CARB 2008) as directed by AB 32. The Scoping Plan proposes a set of actions designed to reduce overall GHG emissions in California to the levels required by AB 32. Measures applicable to development projects include those related to energy-efficiency building and appliance standards, the use of renewable sources for electricity generation, regional transportation targets, and green building strategy. Relative to transportation, the 2008 Scoping Plan includes nine measures or recommended actions related to reducing VMT and vehicle GHG emissions through fuel and efficiency measures. These measures would be implemented statewide rather than on a project by project basis.

In response to EO B-30-15 and SB 32, all state agencies with jurisdiction over sources of GHG emissions were directed to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 targets. CARB was directed to update the Scoping Plan to reflect the 2030 target (CARB 2014). The mid-term target is critical to help frame the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure needed to continue driving down emissions. In December 2017, CARB adopted the *2017 Climate Change Scoping Plan Update, the Strategy for Achieving California's 2030 Greenhouse Gas Target,* to reflect the 2030 target set by EO B-30-15 and codified by SB 32 (CARB 2017b).

4.2.3 Regional GHG Policies and Plans

4.2.3.1 Bay Area Air Quality Management District

The BAAQMD provides direction and recommendations for the analysis of GHG impacts of a project and approach to mitigation measures in its CEQA Guidelines (BAAQMD 2017b). The guidance provided in the handbook was used to prepare this analysis. In addition, the 2017 Clean Air Plan, *Spare the Air Cool the Climate* defines a control strategy that the BAAQMD and its partners will implement to reduce greenhouse gas emissions to protect the climate (BAAQMD 2017b).

4.2.3.2 Association of Bay Area Governments and Metropolitan Transportation Commission

As required by the Sustainable Communities and Climate Protection Act of 2008 (SB 375), ABAG and the MTC have developed a RTP/SCS as a component of Plan Bay Area 2040 (MTC and ABAG 2017). This plan seeks to reduce GHG and other mobile source emissions through coordinated transportation and land use planning to reduce VMT.

4.2.4 Local Greenhouse Gas Plans

4.2.4.1 Alameda County

The County adopted the *Unincorporated Areas Community Climate Action Plan* (CAP) in 2014. The CAP addresses reduction of greenhouse gas emissions through a series of local programs and policy measures related to transportation, land use, building energy, water, waste, and green infrastructure. Implementation of the plan would reduce GHG emissions in the unincorporated County area to 15 percent below 2005 levels by 2020 and set the County on a path towards reducing emissions to 80 percent below 1990 levels by 2050 (County 2014).

4.3 GHG EXISTING CONDITIONS

4.3.1 Worldwide and National GHG Inventory

In 2014, total GHG emissions worldwide were estimated at 48,892 million metric tons (MMT) of CO_2e emissions (World Resource Institute [WRI] 2020). The U.S. contributed the second largest portion (13 percent) of global GHG emissions in 2014. The total U.S. GHG emissions was 6,319 MMT CO_2e in 2019, of which 82 percent was CO_2 emission (WRI 2020). On a national level, approximately 27 percent of GHG emissions were associated with transportation and about 38 percent were associated with electricity generation (WRI 2020).

4.3.2 State GHG Inventories

The CARB performed statewide inventories for the years 1990 to 2017, as shown in Table 16, *California State Greenhouse Gas Emissions by Sector*. The inventory is divided into six broad sectors of economic activity: agriculture, commercial, electricity generation, industrial, residential, and transportation. Emissions are quantified in MMT CO_2e.

As shown in Table 16, statewide GHG source emissions totaled 431 MMT CO_2e in 1990, 471 MMT CO_2e in 2000, 449 MMT CO_2e in 2010, and 424 MMT CO_2e in 2017. Transportation-related emissions consistently contribute the most GHG emissions, followed by electricity generation and industrial emissions.

Table 16
CALIFORNIA GREENHOUSE GAS EMISSIONS BY SECTOR

Sector	Emissions (MMT CO_2e)			
	1990	2000	2010	2017
Agriculture and Forestry	18.9 (4%)	31.0 (7%)	33.7 (8%)	32.4 (8%)
Commercial	14.4 (3%)	14.1 (3%)	20.1 (4%)	23.3 (5%)
Electricity Generation	110.5 (26%)	105.4 (22%)	90.6 (20%)	62.6 (15%)
Industrial	105.3 (24%)	105.8 (22%)	101.8 (23%)	101.1 (24%)
Residential	29.7 (7%)	31.7 (7%)	32.1 (7%)	30.4 (7%)
Transportation	150.6 (35%)	183.2 (39%)	170.2 (38%)	174.3 (41%)
Unspecified Remaining	1.3 (<1%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
TOTAL	**430.7**	**471.1**	**448.5**	**424.1**

Source: CARB 2007 and CARB 2019
MMT = million metric tons; CO_2e = carbon dioxide equivalent

4.3.3 Regional GHG Inventory

A San Francisco Bay Area regional emissions inventory for the year 2015 prepared by BAAQMD for the 2017 Clean Air Plan is presented in Table 17, *San Francisco Bay Area GHG Emissions by Sector* (BAAQMD 2017b). The sectors included in this inventory are somewhat different from those in the statewide inventory. Similar to the statewide emissions, transportation related GHG emissions contributed the most regionally.

Table 17
SAN FRANCISCO BAY AREA GHG EMISSIONS BY SECTOR

Sector	2015 Emissions MMT CO_2e (% total)[1]
Transportation	34.6 (41%)
Electricity	12.1 (14%)
Buildings	8.9 (11%)
Stationary Sources	22.0 (26%)
Waste Management	2.3 (3%)
Fluorinated Gases	3.6 (4%)
Agriculture	1.2 (1%)
TOTAL	**84.7**

Source: BAAQMD 2017b.
[1] Percentages may not total 100 due to rounding.
MMT = million metric tons; CO_2e = carbon dioxide equivalent

4.4 GHG METHODOLOGY

The project's GHG emissions were calculated using CalEEMod, as described in Section 2.3, above.

4.4.1 Construction GHG Emissions

Construction of the project would result in emissions of GHGs from the use of diesel-powered equipment, from worker vehicles traveling to and from the project site, and from trucks hauling material

and water to the project site. The anticipated construction equipment and vehicle trips required for project construction are described in Section 2.3, above.

4.4.2 Operational GHG Emissions

4.4.2.1 Area GHG Sources

The project O&M activities would result in area GHG emissions from the use of gasoline-powered landscape equipment for vegetation management.

4.4.2.2 Energy Sources

The project would generate electrical energy from PV panels and supply that energy to the electrical grid through a series of inverters and transformers and an energy storage system. Long-term operation of the project would use electrical energy for PV panel tracking motors, inverter and transformer cooling fans, security lighting, and use of the O&M building (e.g., lighting, appliances, and heating ventilation, and air conditioning [HVAC] systems). All electricity used for operation of the project was assumed to be generated on-site and would not result in direct or indirect emissions of GHGs. Natural gas or propane may be used for the O&M building heating system and/or hot water heater. The CalEEMod default natural gas consumption for the O&M building was used in the emissions modeling.

4.4.2.3 Vehicular (Mobile) GHG Sources

Operational GHG emissions from mobile source emissions are associated with vehicle trip generation and trip length. The anticipated vehicle trips associated with O&M activities are described in Section 2.3, above.

4.4.2.4 Off-Road GHG Sources

The project O&M activities would require the use of off-road vehicles for ongoing maintenance, repairs, panel washing, and vegetation management. The anticipated off-road equipment required for O&M activities is described in Section 2.3, above.

4.4.2.5 Solid Waste Sources

The disposal of solid waste produces GHG emissions from anaerobic decomposition in landfills, incineration, and transportation of waste. CalEEMod determines the GHG emissions associated with disposal of solid waste into landfills. Portions of these emissions are biogenic. CalEEMod methods for quantifying GHG emissions from solid waste are based on the IPCC method using the degradable organic content of waste. The CalEEMod default levels of solid waste generation for long-term operation of the O&M building were used in the emissions modeling.

4.4.2.6 Water Sources

The project would require approximately 5 acre-feet (1,629,255 gallons) of water annually for provisioning the O&M building, panel washing, and livestock drinking water. Water would either be obtained via an on-site well or from an off-site water purveyor and trucked to the site. GHG emissions associated with trucking water to the project site are included in the vehicular sources trip generation.

Indirect GHG emissions associated with the sourcing and treatment of water are included in the modeling.

4.5 GHG SIGNIFICANCE CRITERIA

Given the relatively small levels of emissions generated by a typical project in relationship to the total amount of GHG emissions generated on a national or global basis, individual development projects are not expected to result in significant, direct impacts with respect to climate change. However, considering the magnitude of the impact of GHG emissions on the global climate, GHG emissions from new development could result in significant, cumulative impacts with respect to climate change. Thus, the potential for a significant GHG impact is limited to cumulative impacts.

According to Appendix G of the CEQA Guidelines, a project would have a significant environmental impact if it would:

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

(2) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

The BAAQMD has adopted GHG thresholds of significance that a lead agency may use for determining the significance of a land use development project's GHG impacts. For development projects, the BAAQMD recommends a bright-line screening threshold of 1,100 metric tons (MT) of CO_2e per year for a project's long-term operational GHG emissions (BAAQMD 2017c). The BAAQMD's GHG thresholds were developed to meet the year 2020 statewide GHG emissions targets as mandated by AB 32 and implemented by the CARB Scoping Plan. The BAAQMD has not adopted guidance or revised thresholds to account for GHG reduction target beyond 2020. Therefore, this analysis compares the project's emissions to a reduced threshold corresponding to the SB 32 reduction target of emissions 40 percent below 1990 levels by 2030. Accordingly, a threshold reduced by 4.98 percent for each year between 2020 and 2030 would meet the mandates of SB 32. The first full year of operation for the project is anticipated to be 2023. Therefore, an adjusted threshold of 968 MT of CO_2e per year is used in this analysis.

The BAAQMD has not adopted a threshold for determining the significance of a project's construction GHG emissions. However, the BAAQMD recommends quantification and disclosure of GHG emissions that would occur during construction.

4.6 GHG IMPACT ANALYSIS

4.6.1 Issue 1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

4.6.1.1 Construction GHG Emissions

The project's temporary construction emissions were estimated using CalEEMod as described in Section 2.3. The results of the modeling of the project's construction GHG emissions shows that construction of the project would generate a total of 2,941 MT of CO_2e, or 58.8 MT of CO_2e per year

amortized (averaged) over the anticipated 50-year lifespan of the project. Because the neither the County nor the BAAQMD has adopted thresholds to determine the significance of a project's construction-period GHG emissions, the data are presented for informational purposes. The complete CalEEMod output is provided in Appendix A to this report.

4.6.1.2 Operational GHG Emissions

The GHG emissions associated with long-term operation of the project were estimated using CalEEMod as described in Section 2.3 and Section 4.4. The results of the modeling of the project's operational GHG emissions are shown in Table 18, *Operational GHG Emissions*. The data are presented as the maximum anticipated operational GHG emissions for the first full year of operation (2023) and compared to the BAAQMD thresholds (adjusted for the year 2023). As shown in Table 18, the estimated GHG emissions associated with long-term operation of the project would not exceed the 2023 adjusted threshold.

Table 18
OPERATIONAL GHG EMISSIONS

Source	Emissions (MT CO_2e/year)
Area	<0.1
Energy	0.4
Vehicular (Mobile)	95.4
Off-Road	29.0
Solid Waste	0.2
Water and Wastewater	1.8
Total Annual Emissions[1]	**128.8**
2023 Adjusted Threshold	*968*
Exceed Threshold?	***No***

Source: CalEEMod, output data is provided in Appendix A.
[1] Totals may not sum due to rounding.
MT = metric ton; CO_2e = carbon dioxide equivalent

As described in Section 3.5, above, the installation and operation of solar facilities, such as the project, would result in a net reduction of fossil-based electricity generation and, therefore, a net reduction in CO_2e emissions relative to overall CO_2e emissions that would occur without the project. Using PG&E's electricity generation GHG intensity factors, the project's estimated generation of 177,207 MWh of electrical power would result in the offset of up to 51,730 MT CO_2e per year (CAPCOA 2017). The energy and GHG offset calculations are included in Appendix B to this report.

The project's net annual GHG emissions, accounting for project construction and operational GHG emissions and offset GHG emissions, are presented in Table 19, *Net GHG Emissions*. As shown in Table 19, the project would result in a reduction in GHG emissions of 51,542 MT CO_2e per year. Therefore, the project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment and the impact would be less than significant.

Table 19
NET GHG EMISSIONS

Source	Emissions (MT CO_2e/year)
Amortized Construction Emissions	58.8
Operation Emissions	128.8
Offset GHG Emissions (reduced fossil fuel use in state electricity procurement)	(-51,729.6)
Net Annual Emissions	**(-51,542.0)**

Source: CalEEMod; CEC 2020b; calculations and output data is provided in Appendices A and B.
MT = metric ton; CO_2e = carbon dioxide equivalent

4.6.2 Issue 2: Conflict with an applicable GHG reduction plan, policy, or regulation

As a solar PV generation project, the project would fulfill a portion of the RPS that is mandated for California and reflected in the CARB AB 32 Scoping Plan, partially satisfying the goals of the California Renewable Energy Programs (as described above under Section 3.2). Additionally, the project would help reach the AB 32 and SB 32 statewide GHG emission reduction goals for the electricity generation sector. The project would directly support the BAAQMD 2017 Clean Air Plan Energy Control Measure EN1, *Decarbonize Electricity Production*, which strives to maximize the amount of renewable energy contributing to the production of electricity within the SFBAAB as well as electricity imported into the region (BAQMD 2017b). The project would also support achievement of the County's GHG reduction goals in the CAP through expanding renewable energy generation within the unincorporated county and supporting the CAP Renewable energy Strategy E-13. Therefore, the project would not conflict with applicable plans, policies, and regulations related to GHG emission reductions, and the impact would be less than significant.

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Appendix A

CalEEMod Output

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IPO-01.03 Aramis Solar Project

Alameda County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	0.40	1000sqft	0.01	400.00	0
Unrefrigerated Warehouse-No Rail	72.00	1000sqft	1.65	72,000.00	0
Other Non-Asphalt Surfaces	537.34	Acre	537.34	23,406,530.40	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

IPO-01.03 Aramis Solar Project - Alameda County, Winter

Project Characteristics -

Land Use - Office building = O&M building
Warehouse = energy storage buildings
Other non-asphalt = photovoltaic eletrcity generation, energy storage, and substation

Construction Phase - Construction phasing, schedule, and duration per project description

Off-road Equipment -

Off-road Equipment - Construction equipment per project description

Off-road Equipment - Construction equipment per project description

Off-road Equipment - Construction equipment per project description

Off-road Equipment - Construction equipment per project description

Trips and VMT - Trips and VMT - Project trips and trip distances per Aramis Transportation Impact Study (CHS April2020).
Haul trips for General Construction Operations includes 30 water truck trips per day (4.6 miles/trip)

On-road Fugitive Dust - On-road Fugitive Dust - % Paved reduced to account on-site unpaved roads and use of highway vehicles on-site

Grading -

Architectural Coating - No painting parking areas

Vehicle Trips - Operational trips based on 12 workers per day, 2 commute trips and 2 midday trips per worker

Road Dust - % Pave adjusted to account for highway vehicles used on-site on unpaved roads.
15 mph speed limit on on-site unpaved roads

Consumer Products - No consumer products parking area

Area Coating - No painting parking area

Energy Use - All electrical energy generated on-site
Natural gas O&M building only

Water And Wastewater - 5 acre-feet of water per year for operation and maintenance.

Solid Waste - Only O&M building generates solid waste

Construction Off-road Equipment Mitigation - MM AQ-1: Dust mitigation per BAAQMD recommended BCMMs.
MM AQ-2: Tier 4 engine mitigation for all off-road diesel equipment with 50 or more HP

Operational Off-Road Equipment - Operation and maintenance equipment per project description.
Other general industrial equipment = all terrain vehicle used for maintenance

Fleet Mix - Fleet mix = 85% autos/pickups and 15% water trucks

IPO-01.03 Aramis Solar Project - Alameda County, Winter

Table Name	Column Name	Default Value	New Value
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tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	20.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	15.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	8.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	50.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

IPO-01.03 Aramis Solar Project - Alameda County, Winter

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	360.00	30.00
tblConstructionPhase	NumDays	930.00	175.00
tblConstructionPhase	NumDays	930.00	150.00
tblConstructionPhase	NumDays	930.00	75.00
tblConstructionPhase	NumDays	660.00	40.00
tblConsumerProducts	ROG_EF_Degreaser	3.542E-07	0
tblEnergyUse	LightingElect	3.88	0.00
tblEnergyUse	LightingElect	2.14	0.00
tblEnergyUse	NT24E	7.84	0.00
tblEnergyUse	NT24E	1.07	0.00
tblEnergyUse	NT24NG	0.07	0.00
tblEnergyUse	T24E	6.11	0.00
tblEnergyUse	T24E	0.32	0.00
tblEnergyUse	T24NG	3.40	0.00
tblFleetMix	HHD	0.05	0.15
tblFleetMix	LDA	0.56	0.60
tblFleetMix	LDT1	0.04	0.05
tblFleetMix	LDT2	0.19	0.20
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.1800e-003	0.00
tblFleetMix	MCY	5.4910e-003	0.00
tblFleetMix	MDV	0.11	0.00
tblFleetMix	MH	7.0400e-004	0.00

tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	2.2090e-003	0.00
tblFleetMix	SBUS	3.3400e-004	0.00
tblFleetMix	UBUS	2.4560e-003	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
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tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOnRoadDust	HaulingPercentPave	100.00	98.50
tblOnRoadDust	HaulingPercentPave	100.00	98.00
tblOnRoadDust	HaulingPercentPave	100.00	98.50

tblOnRoadDust	HaulingPercentPave	100.00	98.50
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	20.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	120.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	12.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	20.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	2.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	10.00
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tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblRoadDust	MeanVehicleSpeed	40	15
tblRoadDust	RoadPercentPave	100	97
tblSolidWaste	SolidWasteGenerationRate	67.68	0.00
tblTripsAndVMT	HaulingTripLength	20.00	34.10
tblTripsAndVMT	HaulingTripLength	20.00	24.16
tblTripsAndVMT	HaulingTripLength	20.00	34.10
tblTripsAndVMT	HaulingTripLength	20.00	34.10
tblTripsAndVMT	HaulingTripNumber	0.00	46.00
tblTripsAndVMT	HaulingTripNumber	0.00	89.00
tblTripsAndVMT	HaulingTripNumber	0.00	52.00
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	WorkerTripLength	10.80	16.71
tblTripsAndVMT	WorkerTripLength	10.80	16.71
tblTripsAndVMT	WorkerTripLength	10.80	16.71

tblTripsAndVMT	WorkerTripNumber	88.00	400.00
tblTripsAndVMT	WorkerTripNumber	20.00	0.00
tblTripsAndVMT	WorkerTripNumber	105.00	1,000.00
tblTripsAndVMT	WorkerTripNumber	105.00	500.00
tblTripsAndVMT	WorkerTripNumber	1,972.00	0.00
tblVehicleTrips	CC_TTP	48.00	0.00
tblVehicleTrips	CNW_TL	6.60	4.60
tblVehicleTrips	CNW_TTP	19.00	15.00
tblVehicleTrips	CW_TL	14.70	16.71
tblVehicleTrips	CW_TTP	33.00	85.00
tblVehicleTrips	DV_TP	19.00	0.00
tblVehicleTrips	PB_TP	4.00	0.00
tblVehicleTrips	PR_TP	77.00	100.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	11.03	120.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	16,650,000.00	0.00
tblWater	OutdoorWaterUseRate	43,573.43	1,558,156.50

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	43.3004	198.9876	213.4698	0.4971	27.2282	8.2584	35.4867	5.9343	7.6409	13.5752	0.0000	48,397.0398	48,397.0398	10.2303	0.0000	48,652.7969
Maximum	**43.3004**	**198.9876**	**213.4698**	**0.4971**	**27.2282**	**8.2584**	**35.4867**	**5.9343**	**7.6409**	**13.5752**	**0.0000**	**48,397.0398**	**48,397.0398**	**10.2303**	**0.0000**	**48,652.7969**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	31.2020	32.1483	252.1127	0.4971	22.6566	0.9551	23.6117	5.4445	0.9459	6.3905	0.0000	48,397.0398	48,397.0398	10.2303	0.0000	48,652.7969
Maximum	**31.2020**	**32.1483**	**252.1127**	**0.4971**	**22.6566**	**0.9551**	**23.6117**	**5.4445**	**0.9459**	**6.3905**	**0.0000**	**48,397.0398**	**48,397.0398**	**10.2303**	**0.0000**	**48,652.7969**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**27.94**	**83.84**	**-18.10**	**0.00**	**16.79**	**88.44**	**33.46**	**8.25**	**87.62**	**52.93**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.7620	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422
Energy	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231
Mobile	0.0718	1.1196	1.1833	7.7400e-003	10.3120	4.1600e-003	10.3162	1.1150	3.8900e-003	1.1189		800.2370	800.2370	0.0281		800.9405
Offroad	1.3610	12.1753	16.6177	0.0269		0.6097	0.6097		0.5905	0.5905		2,564.5162	2,564.5162	0.3534		2,573.3512
Total	**3.1950**	**13.2972**	**17.8647**	**0.0346**	**10.3120**	**0.6142**	**10.9262**	**1.1150**	**0.5947**	**1.7097**		**3,366.9973**	**3,366.9973**	**0.3819**	**4.0000e-005**	**3,376.5569**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.7620	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422
Energy	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231
Mobile	0.0718	1.1196	1.1833	7.7400e-003	10.3120	4.1600e-003	10.3162	1.1150	3.8900e-003	1.1189		800.2370	800.2370	0.0281		800.9405
Offroad	1.3610	12.1753	16.6177	0.0269		0.6097	0.6097		0.5905	0.5905		2,564.5162	2,564.5162	0.3534		2,573.3512
Total	**3.1950**	**13.2972**	**17.8647**	**0.0346**	**10.3120**	**0.6142**	**10.9262**	**1.1150**	**0.5947**	**1.7097**		**3,366.9973**	**3,366.9973**	**0.3819**	**4.0000e-005**	**3,376.5569**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2022	2/11/2022	5	30	
2	General Construction Operations	Grading	1/8/2022	9/9/2022	5	175	
3	Photovoltaic Installation	Grading	2/12/2022	9/9/2022	5	150	
4	Electrical and Gen-Tie Installation	Grading	5/28/2022	9/9/2022	5	75	
5	Architectural Coating	Architectural Coating	7/17/2022	9/9/2022	5	40	

Acres of Grading (Site Preparation Phase): 249.38

Acres of Grading (Grading Phase): 0

Acres of Paving: 537.34

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 108,600; Non-Residential Outdoor: 36,200; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Crawler Tractors	10	7.00	212	0.43
Site Preparation	Graders	9	7.00	187	0.41
Site Preparation	Rollers	5	7.00	80	0.38
Site Preparation	Rough Terrain Forklifts	10	7.00	100	0.40
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Rubber Tired Loaders	1	7.00	203	0.36
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
General Construction Operations	Excavators	0	8.00	158	0.38
General Construction Operations	Graders	0	8.00	187	0.41
General Construction Operations	Pumps	1	7.00	84	0.74
General Construction Operations	Rough Terrain Forklifts	5	7.00	100	0.40

General Construction Operations	Rubber Tired Dozers	0	8.00	247	0.40
General Construction Operations	Rubber Tired Loaders	1	7.00	203	0.36
General Construction Operations	Scrapers	0	8.00	367	0.48
General Construction Operations	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Photovoltaic Installation	Aerial Lifts	1	4.00	63	0.31
Photovoltaic Installation	Bore/Drill Rigs	2	7.00	221	0.50
Photovoltaic Installation	Cranes	1	2.00	231	0.29
Photovoltaic Installation	Crawler Tractors	5	7.00	212	0.43
Photovoltaic Installation	Excavators	0	8.00	158	0.38
Photovoltaic Installation	Graders	3	7.00	187	0.41
Photovoltaic Installation	Rollers	1	7.00	80	0.38
Photovoltaic Installation	Rough Terrain Forklifts	20	7.00	100	0.40
Photovoltaic Installation	Rubber Tired Dozers	0	8.00	247	0.40
Photovoltaic Installation	Scrapers	0	8.00	367	0.48
Photovoltaic Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Photovoltaic Installation	Trenchers	3	7.00	78	0.50
Photovoltaic Installation	Welders	6	4.00	46	0.45
Electrical and Gen-Tie Installation	Aerial Lifts	1	4.00	63	0.31
Electrical and Gen-Tie Installation	Bore/Drill Rigs	2	7.00	221	0.50
Electrical and Gen-Tie Installation	Cranes	1	2.00	231	0.29
Electrical and Gen-Tie Installation	Crawler Tractors	5	7.00	212	0.43
Electrical and Gen-Tie Installation	Excavators	0	8.00	158	0.38
Electrical and Gen-Tie Installation	Graders	3	7.00	187	0.41
Electrical and Gen-Tie Installation	Rollers	2	7.00	80	0.38
Electrical and Gen-Tie Installation	Rough Terrain Forklifts	15	7.00	100	0.40
Electrical and Gen-Tie Installation	Rubber Tired Dozers	0	8.00	247	0.40
Electrical and Gen-Tie Installation	Scrapers	0	8.00	367	0.48

Electrical and Gen-Tie Installation	Skid Steer Loaders	2	7.00	65	0.37
Electrical and Gen-Tie Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Electrical and Gen-Tie Installation	Trenchers	7	7.00	78	0.50
Electrical and Gen-Tie Installation	Welders	4	4.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	35	400.00	0.00	46.00	16.71	6.60	34.10	LD_Mix	HDT_Mix	HHDT
General Construction Operations	8	0.00	0.00	89.00	10.80	6.60	24.16	LD_Mix	HDT_Mix	HHDT
Photovoltaic Installation	42	1,000.00	0.00	52.00	16.71	6.60	34.10	LD_Mix	HDT_Mix	HHDT
Electrical and Gen-Tie Installation	42	500.00	0.00	10.00	16.71	6.60	34.10	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.8156	0.0000	8.8156	0.9519	0.0000	0.9519			0.0000			0.0000
Off-Road	9.5336	117.1225	63.3156	0.1679		4.2761	4.2761		3.9341	3.9341		16,253.6169	16,253.6169	5.2568		16,385.0356
Total	**9.5336**	**117.1225**	**63.3156**	**0.1679**	**8.8156**	**4.2761**	**13.0917**	**0.9519**	**3.9341**	**4.8859**		**16,253.6169**	**16,253.6169**	**5.2568**		**16,385.0356**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0182	0.5548	0.1197	1.8900e-003	1.1995	1.8100e-003	1.2013	0.1276	1.7300e-003	0.1293		201.3873	201.3873	8.4500e-003		201.5987
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	1.8591	1.3179	12.7794	0.0439	5.0819	0.0307	5.1126	1.3477	0.0283	1.3760		4,378.6474	4,378.6474	0.0939		4,380.9944
Total	**1.8773**	**1.8728**	**12.8991**	**0.0458**	**6.2813**	**0.0325**	**6.3139**	**1.4753**	**0.0300**	**1.5053**		**4,580.0347**	**4,580.0347**	**0.1023**		**4,582.5931**

3.2 Site Preparation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9670	0.0000	3.9670	0.4283	0.0000	0.4283			0.0000			0.0000
Off-Road	2.0618	8.9345	88.3774	0.1679		0.2749	0.2749		0.2749	0.2749	0.0000	16,253.6168	16,253.6168	5.2568		16,385.0356
Total	**2.0618**	**8.9345**	**88.3774**	**0.1679**	**3.9670**	**0.2749**	**4.2419**	**0.4283**	**0.2749**	**0.7033**	**0.0000**	**16,253.6168**	**16,253.6168**	**5.2568**		**16,385.0356**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0182	0.5548	0.1197	1.8900e-003	0.4193	1.8100e-003	0.4211	0.0496	1.7300e-003	0.0513		201.3873	201.3873	8.4500e-003		201.5987
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	1.8591	1.3179	12.7794	0.0439	5.0819	0.0307	5.1126	1.3477	0.0283	1.3760		4,378.6474	4,378.6474	0.0939		4,380.9944
Total	**1.8773**	**1.8728**	**12.8991**	**0.0458**	**5.5012**	**0.0325**	**5.5337**	**1.3972**	**0.0300**	**1.4273**		**4,580.0347**	**4,580.0347**	**0.1023**		**4,582.5931**

3.3 General Construction Operations - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	1.1964	13.1871	16.5751	0.0290		0.5297	0.5297		0.4982	0.4982		2,798.8714	2,798.8714	0.7567		2,817.7893
Total	**1.1964**	**13.1871**	**16.5751**	**0.0290**	**0.0000**	**0.5297**	**0.5297**	**0.0000**	**0.4982**	**0.4982**		**2,798.8714**	**2,798.8714**	**0.7567**		**2,817.7893**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.5300e-003	0.1436	0.0300	4.6000e-004	0.3722	4.3000e-004	0.3727	0.0390	4.1000e-004	0.0394		48.8700	48.8700	2.3200e-003		48.9280
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**4.5300e-003**	**0.1436**	**0.0300**	**4.6000e-004**	**0.3722**	**4.3000e-004**	**0.3727**	**0.0390**	**4.1000e-004**	**0.0394**		**48.8700**	**48.8700**	**2.3200e-003**		**48.9280**

3.3 General Construction Operations - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.3436	1.4891	19.4997	0.0290		0.0458	0.0458		0.0458	0.0458	0.0000	2,798.8714	2,798.8714	0.7567		2,817.7893
Total	**0.3436**	**1.4891**	**19.4997**	**0.0290**	**0.0000**	**0.0458**	**0.0458**	**0.0000**	**0.0458**	**0.0458**	**0.0000**	**2,798.8714**	**2,798.8714**	**0.7567**		**2,817.7893**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.5300e-003	0.1436	0.0300	4.6000e-004	0.1278	4.3000e-004	0.1282	0.0146	4.1000e-004	0.0150		48.8700	48.8700	2.3200e-003		48.9280
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**4.5300e-003**	**0.1436**	**0.0300**	**4.6000e-004**	**0.1278**	**4.3000e-004**	**0.1282**	**0.0146**	**4.1000e-004**	**0.0150**		**48.8700**	**48.8700**	**2.3200e-003**		**48.9280**

3.4 Photovoltaic Installation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.7118	0.0000	3.7118	0.4008	0.0000	0.4008			0.0000			0.0000
Off-Road	7.6335	86.0538	72.8233	0.1497		3.4175	3.4175		3.1594	3.1594		14,367.5923	14,367.5923	4.5199		14,480.5908
Total	**7.6335**	**86.0538**	**72.8233**	**0.1497**	**3.7118**	**3.4175**	**7.1292**	**0.4008**	**3.1594**	**3.5602**		**14,367.5923**	**14,367.5923**	**4.5199**		**14,480.5908**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.1100e-003	0.1254	0.0271	4.3000e-004	0.2712	4.1000e-004	0.2716	0.0289	3.9000e-004	0.0292		45.5311	45.5311	1.9100e-003		45.5788
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.6478	3.2948	31.9485	0.1098	12.7047	0.0768	12.7815	3.3692	0.0708	3.4399		10,946.6185	10,946.6185	0.2347		10,952.4859
Total	**4.6519**	**3.4203**	**31.9756**	**0.1102**	**12.9759**	**0.0772**	**13.0531**	**3.3980**	**0.0712**	**3.4692**		**10,992.1495**	**10,992.1495**	**0.2366**		**10,998.0647**

3.4 Photovoltaic Installation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6703	0.0000	1.6703	0.1804	0.0000	0.1804			0.0000			0.0000
Off-Road	2.5855	12.3772	91.2581	0.1497		0.4243	0.4243		0.4243	0.4243	0.0000	14,367.5923	14,367.5923	4.5199		14,480.5908
Total	**2.5855**	**12.3772**	**91.2581**	**0.1497**	**1.6703**	**0.4243**	**2.0946**	**0.1804**	**0.4243**	**0.6047**	**0.0000**	**14,367.5923**	**14,367.5923**	**4.5199**		**14,480.5908**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.1100e-003	0.1254	0.0271	4.3000e-004	0.0948	4.1000e-004	0.0952	0.0112	3.9000e-004	0.0116		45.5311	45.5311	1.9100e-003		45.5788
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.6478	3.2948	31.9485	0.1098	12.7047	0.0768	12.7815	3.3692	0.0708	3.4399		10,946.6185	10,946.6185	0.2347		10,952.4859
Total	**4.6519**	**3.4203**	**31.9756**	**0.1102**	**12.7995**	**0.0772**	**12.8767**	**3.3804**	**0.0712**	**3.4515**		**10,992.1495**	**10,992.1495**	**0.2366**		**10,998.0647**

3.5 Electrical and Gen-Tie Installation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.7118	0.0000	3.7118	0.4008	0.0000	0.4008			0.0000			0.0000
Off-Road	8.4081	93.0787	74.2676	0.1497		4.1133	4.1133		3.7944	3.7944		14,417.2873	14,417.2873	4.5783		14,531.7446
Total	**8.4081**	**93.0787**	**74.2676**	**0.1497**	**3.7118**	**4.1133**	**7.8250**	**0.4008**	**3.7944**	**4.1952**		**14,417.2873**	**14,417.2873**	**4.5783**		**14,531.7446**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.5800e-003	0.0483	0.0104	1.6000e-004	0.1043	1.6000e-004	0.1045	0.0111	1.5000e-004	0.0113		17.5119	17.5119	7.4000e-004		17.5303
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	2.3239	1.6474	15.9743	0.0549	6.3523	0.0384	6.3908	1.6846	0.0354	1.7200		5,473.3092	5,473.3092	0.1174		5,476.2430
Total	**2.3255**	**1.6957**	**15.9847**	**0.0551**	**6.4566**	**0.0386**	**6.4952**	**1.6957**	**0.0355**	**1.7312**		**5,490.8212**	**5,490.8212**	**0.1181**		**5,493.7733**

3.5 Electrical and Gen-Tie Installation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6703	0.0000	1.6703	0.1804	0.0000	0.1804			0.0000			0.0000
Off-Road	2.3852	12.8937	91.5322	0.1497		0.3647	0.3647		0.3647	0.3647	0.0000	14,417.2873	14,417.2873	4.5783		14,531.7445
Total	**2.3852**	**12.8937**	**91.5322**	**0.1497**	**1.6703**	**0.3647**	**2.0350**	**0.1804**	**0.3647**	**0.5451**	**0.0000**	**14,417.2873**	**14,417.2873**	**4.5783**		**14,531.7445**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.5800e-003	0.0483	0.0104	1.6000e-004	0.0365	1.6000e-004	0.0366	4.3100e-003	1.5000e-004	4.4600e-003		17.5119	17.5119	7.4000e-004		17.5303
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	2.3239	1.6474	15.9743	0.0549	6.3523	0.0384	6.3908	1.6846	0.0354	1.7200		5,473.3092	5,473.3092	0.1174		5,476.2430
Total	**2.3255**	**1.6957**	**15.9847**	**0.0551**	**6.3888**	**0.0386**	**6.4274**	**1.6889**	**0.0355**	**1.7244**		**5,490.8212**	**5,490.8212**	**0.1181**		**5,493.7733**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	18.8760					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**19.0806**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

Unmitigated Construction Off-Site

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

3.6 Architectural Coating - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	18.8760					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**18.9058**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

Mitigated Construction Off-Site

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

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0718	1.1196	1.1833	7.7400e-003	10.3120	4.1600e-003	10.3162	1.1150	3.8900e-003	1.1189		800.2370	800.2370	0.0281		800.9405
Unmitigated	0.0718	1.1196	1.1833	7.7400e-003	10.3120	4.1600e-003	10.3162	1.1150	3.8900e-003	1.1189		800.2370	800.2370	0.0281		800.9405

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	48.00	0.00	0.00	185,871	185,871
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	48.00	0.00	0.00	185,871	185,871

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.71	6.60	4.60	85.00	0.00	15.00	100	0	0
Other Non-Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	14.70	6.60	6.60	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.600000	0.050000	0.200000	0.000000	0.000000	0.000000	0.000000	0.150000	0.000000	0.000000	0.000000	0.000000	0.000000
Other Non-Asphalt Surfaces	0.561348	0.038614	0.190285	0.107199	0.015389	0.005180	0.024554	0.046236	0.002209	0.002456	0.005491	0.000334	0.000704
Unrefrigerated Warehouse-No Rail	0.561348	0.038614	0.190285	0.107199	0.015389	0.005180	0.024554	0.046236	0.002209	0.002456	0.005491	0.000334	0.000704

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231
NaturalGas Unmitigated	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	17.9397	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9000e-004**	**1.7600e-003**	**1.4800e-003**	**1.0000e-005**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**		**2.1106**	**2.1106**	**4.0000e-005**	**4.0000e-005**	**2.1231**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	0.0179397	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9000e-004**	**1.7600e-003**	**1.4800e-003**	**1.0000e-005**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**		**2.1106**	**2.1106**	**4.0000e-005**	**4.0000e-005**	**2.1231**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.7620	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422
Unmitigated	1.7620	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.2069					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.5494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.7700e-003	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422
Total	**1.7620**	**5.7000e-004**	**0.0622**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1334**	**0.1334**	**3.5000e-004**		**0.1422**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.2069					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.5494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.7700e-003	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422
Total	**1.7620**	**5.7000e-004**	**0.0622**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1334**	**0.1334**	**3.5000e-004**		**0.1422**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Generator Sets	1	2.00	20	84	0.74	Diesel
Other General Industrial Equipment	2	4.00	120	88	0.34	Diesel
Pumps	2	10.00	12	84	0.74	Diesel
Tractors/Loaders/Backhoes	2	8.00	20	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Generator Sets	0.0765	0.6789	0.9173	1.6400e-003		0.0321	0.0321		0.0321	0.0321		155.7586	155.7586	6.8500e-003		155.9299
Other General Industrial Equipment	0.1623	1.5430	1.9245	2.5600e-003		0.0889	0.0889		0.0818	0.0818		248.0182	248.0182	0.0802		250.0235
Pumps	0.8195	6.8821	9.3132	0.0164		0.3371	0.3371		0.3371	0.3371		1,557.5864	1,557.5864	0.0713		1,559.3679
Tractors/Loaders/Backhoes	0.3027	3.0714	4.4626	6.2300e-003		0.1516	0.1516		0.1395	0.1395		603.1530	603.1530	0.1951		608.0298
Total	**1.3610**	**12.1753**	**16.6177**	**0.0269**		**0.6097**	**0.6097**		**0.5905**	**0.5905**		**2,564.5162**	**2,564.5162**	**0.3534**		**2,573.3512**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

IPO-01.03 Aramis Solar Project

Alameda County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	0.40	1000sqft	0.01	400.00	0
Unrefrigerated Warehouse-No Rail	72.00	1000sqft	1.65	72,000.00	0
Other Non-Asphalt Surfaces	537.34	Acre	537.34	23,406,530.40	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Office building = O&M building
Warehouse = energy storage buildings
Other non-asphalt = photovoltaic eletrcity generation, energy storage, and substation

Construction Phase - Construction phasing, schedule, and duration per project description

Off-road Equipment -

Off-road Equipment - Construction equipment per project description

Off-road Equipment - Construction equipment per project description

Off-road Equipment - Construction equipment per project description

Off-road Equipment - Construction equipment per project description

Trips and VMT - Trips and VMT - Project trips and trip distances per Aramis Transportation Impact Study (CHS April2020).
Haul trips for General Construction Operations includes 30 water truck trips per day (4.6 miles/trip)

On-road Fugitive Dust - On-road Fugitive Dust - % Paved reduced to account on-site unpaved roads and use of highway vehicles on-site

Grading -

Architectural Coating - No painting parking areas

Vehicle Trips - Operational trips based on 12 workers per day, 2 commute trips and 2 midday trips per worker

Road Dust - % Pave adjusted to account for highway vehicles used on-site on unpaved roads.
15 mph speed limit on on-site unpaved roads

Consumer Products - No consumer products parking area

Area Coating - No painting parking area

Energy Use - All electrical energy generated on-site
Natural gas O&M building only

Water And Wastewater - 5 acre-feet of water per year for operation and maintenance.

Solid Waste - Only O&M building generates solid waste

Construction Off-road Equipment Mitigation - MM AQ-1: Dust mitigation per BAAQMD recommended BCMMs.
MM AQ-2: Tier 4 engine mitigation for all off-road diesel equipment with 50 or more HP

Operational Off-Road Equipment - Operation and maintenance equipment per project description.
Other general industrial equipment = all terrain vehicle used for maintenance

Fleet Mix - Fleet mix = 85% autos/pickups and 15% water trucks

IPO-01.03 Aramis Solar Project - Alameda County, Summer

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Parking	1,404,392.00	0.00
tblAreaCoating	Area_Parking	1404390	0
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	20.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	15.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	8.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	50.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

IPO-01.03 Aramis Solar Project - Alameda County, Summer

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	360.00	30.00
tblConstructionPhase	NumDays	930.00	175.00
tblConstructionPhase	NumDays	930.00	150.00
tblConstructionPhase	NumDays	930.00	75.00
tblConstructionPhase	NumDays	660.00	40.00
tblConsumerProducts	ROG_EF_Degreaser	3.542E-07	0
tblEnergyUse	LightingElect	3.88	0.00
tblEnergyUse	LightingElect	2.14	0.00
tblEnergyUse	NT24E	7.84	0.00
tblEnergyUse	NT24E	1.07	0.00
tblEnergyUse	NT24NG	0.07	0.00
tblEnergyUse	T24E	6.11	0.00
tblEnergyUse	T24E	0.32	0.00
tblEnergyUse	T24NG	3.40	0.00
tblFleetMix	HHD	0.05	0.15
tblFleetMix	LDA	0.56	0.60
tblFleetMix	LDT1	0.04	0.05
tblFleetMix	LDT2	0.19	0.20
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.1800e-003	0.00
tblFleetMix	MCY	5.4910e-003	0.00
tblFleetMix	MDV	0.11	0.00
tblFleetMix	MH	7.0400e-004	0.00

tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	2.2090e-003	0.00
tblFleetMix	SBUS	3.3400e-004	0.00
tblFleetMix	UBUS	2.4560e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOnRoadDust	HaulingPercentPave	100.00	98.50
tblOnRoadDust	HaulingPercentPave	100.00	98.00
tblOnRoadDust	HaulingPercentPave	100.00	98.50

tblOnRoadDust	HaulingPercentPave	100.00	98.50
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	20.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	120.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	12.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	20.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	2.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	10.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblRoadDust	MeanVehicleSpeed	40	15
tblRoadDust	RoadPercentPave	100	97
tblSolidWaste	SolidWasteGenerationRate	67.68	0.00
tblTripsAndVMT	HaulingTripLength	20.00	34.10
tblTripsAndVMT	HaulingTripLength	20.00	24.16
tblTripsAndVMT	HaulingTripLength	20.00	34.10
tblTripsAndVMT	HaulingTripLength	20.00	34.10
tblTripsAndVMT	HaulingTripNumber	0.00	46.00
tblTripsAndVMT	HaulingTripNumber	0.00	89.00
tblTripsAndVMT	HaulingTripNumber	0.00	52.00
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	WorkerTripLength	10.80	16.71
tblTripsAndVMT	WorkerTripLength	10.80	16.71
tblTripsAndVMT	WorkerTripLength	10.80	16.71

tblTripsAndVMT	WorkerTripNumber	88.00	400.00
tblTripsAndVMT	WorkerTripNumber	20.00	0.00
tblTripsAndVMT	WorkerTripNumber	105.00	1,000.00
tblTripsAndVMT	WorkerTripNumber	105.00	500.00
tblTripsAndVMT	WorkerTripNumber	1,972.00	0.00
tblVehicleTrips	CC_TTP	48.00	0.00
tblVehicleTrips	CNW_TL	6.60	4.60
tblVehicleTrips	CNW_TTP	19.00	15.00
tblVehicleTrips	CW_TL	14.70	16.71
tblVehicleTrips	CW_TTP	33.00	85.00
tblVehicleTrips	DV_TP	19.00	0.00
tblVehicleTrips	PB_TP	4.00	0.00
tblVehicleTrips	PR_TP	77.00	100.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	11.03	120.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	16,650,000.00	0.00
tblWater	OutdoorWaterUseRate	43,573.43	1,558,156.50

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	42.7088	198.0128	218.3022	0.5115	27.2282	8.2584	35.4867	5.9343	7.6409	13.5752	0.0000	49,832.1175	49,832.1175	10.2622	0.0000	50,088.6732
Maximum	**42.7088**	**198.0128**	**218.3022**	**0.5115**	**27.2282**	**8.2584**	**35.4867**	**5.9343**	**7.6409**	**13.5752**	**0.0000**	**49,832.1175**	**49,832.1175**	**10.2622**	**0.0000**	**50,088.6732**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	30.6104	31.1735	256.9450	0.5115	22.6566	0.9550	23.6117	5.4445	0.9459	6.3904	0.0000	49,832.1175	49,832.1175	10.2622	0.0000	50,088.6731
Maximum	**30.6104**	**31.1735**	**256.9450**	**0.5115**	**22.6566**	**0.9550**	**23.6117**	**5.4445**	**0.9459**	**6.3904**	**0.0000**	**49,832.1175**	**49,832.1175**	**10.2622**	**0.0000**	**50,088.6731**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**28.33**	**84.26**	**-17.70**	**0.00**	**16.79**	**88.44**	**33.46**	**8.25**	**87.62**	**52.93**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.7620	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422
Energy	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231
Mobile	0.0813	1.0928	1.2611	8.1700e-003	10.3120	4.1200e-003	10.3161	1.1150	3.8500e-003	1.1188		842.9643	842.9643	0.0273		843.6461
Offroad	1.3610	12.1753	16.6177	0.0269		0.6097	0.6097		0.5905	0.5905		2,564.5162	2,564.5162	0.3534		2,573.3512
Total	**3.2045**	**13.2705**	**17.9425**	**0.0351**	**10.3120**	**0.6142**	**10.9262**	**1.1150**	**0.5947**	**1.7096**		**3,409.7245**	**3,409.7245**	**0.3811**	**4.0000e-005**	**3,419.2625**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.7620	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422
Energy	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231
Mobile	0.0813	1.0928	1.2611	8.1700e-003	10.3120	4.1200e-003	10.3161	1.1150	3.8500e-003	1.1188		842.9643	842.9643	0.0273		843.6461
Offroad	1.3610	12.1753	16.6177	0.0269		0.6097	0.6097		0.5905	0.5905		2,564.5162	2,564.5162	0.3534		2,573.3512
Total	**3.2045**	**13.2705**	**17.9425**	**0.0351**	**10.3120**	**0.6142**	**10.9262**	**1.1150**	**0.5947**	**1.7096**		**3,409.7245**	**3,409.7245**	**0.3811**	**4.0000e-005**	**3,419.2625**

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

3.0 Construction Detail

Construction Phase

IPO-01.03 Aramis Solar Project - Alameda County, Summer

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2022	2/11/2022	5	30	
2	General Construction Operations	Grading	1/8/2022	9/9/2022	5	175	
3	Photovoltaic Installation	Grading	2/12/2022	9/9/2022	5	150	
4	Electrical and Gen-Tie Installation	Grading	5/28/2022	9/9/2022	5	75	
5	Architectural Coating	Architectural Coating	7/17/2022	9/9/2022	5	40	

Acres of Grading (Site Preparation Phase): 249.38

Acres of Grading (Grading Phase): 0

Acres of Paving: 537.34

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 108,600; Non-Residential Outdoor: 36,200; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Crawler Tractors	10	7.00	212	0.43
Site Preparation	Graders	9	7.00	187	0.41
Site Preparation	Rollers	5	7.00	80	0.38
Site Preparation	Rough Terrain Forklifts	10	7.00	100	0.40
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Rubber Tired Loaders	1	7.00	203	0.36
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
General Construction Operations	Excavators	0	8.00	158	0.38
General Construction Operations	Graders	0	8.00	187	0.41
General Construction Operations	Pumps	1	7.00	84	0.74
General Construction Operations	Rough Terrain Forklifts	5	7.00	100	0.40

General Construction Operations	Rubber Tired Dozers	0	8.00	247	0.40
General Construction Operations	Rubber Tired Loaders	1	7.00	203	0.36
General Construction Operations	Scrapers	0	8.00	367	0.48
General Construction Operations	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Photovoltaic Installation	Aerial Lifts	1	4.00	63	0.31
Photovoltaic Installation	Bore/Drill Rigs	2	7.00	221	0.50
Photovoltaic Installation	Cranes	1	2.00	231	0.29
Photovoltaic Installation	Crawler Tractors	5	7.00	212	0.43
Photovoltaic Installation	Excavators	0	8.00	158	0.38
Photovoltaic Installation	Graders	3	7.00	187	0.41
Photovoltaic Installation	Rollers	1	7.00	80	0.38
Photovoltaic Installation	Rough Terrain Forklifts	20	7.00	100	0.40
Photovoltaic Installation	Rubber Tired Dozers	0	8.00	247	0.40
Photovoltaic Installation	Scrapers	0	8.00	367	0.48
Photovoltaic Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Photovoltaic Installation	Trenchers	3	7.00	78	0.50
Photovoltaic Installation	Welders	6	4.00	46	0.45
Electrical and Gen-Tie Installation	Aerial Lifts	1	4.00	63	0.31
Electrical and Gen-Tie Installation	Bore/Drill Rigs	2	7.00	221	0.50
Electrical and Gen-Tie Installation	Cranes	1	2.00	231	0.29
Electrical and Gen-Tie Installation	Crawler Tractors	5	7.00	212	0.43
Electrical and Gen-Tie Installation	Excavators	0	8.00	158	0.38
Electrical and Gen-Tie Installation	Graders	3	7.00	187	0.41
Electrical and Gen-Tie Installation	Rollers	2	7.00	80	0.38
Electrical and Gen-Tie Installation	Rough Terrain Forklifts	15	7.00	100	0.40
Electrical and Gen-Tie Installation	Rubber Tired Dozers	0	8.00	247	0.40
Electrical and Gen-Tie Installation	Scrapers	0	8.00	367	0.48

Electrical and Gen-Tie Installation	Skid Steer Loaders	2	7.00	65	0.37
Electrical and Gen-Tie Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Electrical and Gen-Tie Installation	Trenchers	7	7.00	78	0.50
Electrical and Gen-Tie Installation	Welders	4	4.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	35	400.00	0.00	46.00	16.71	6.60	34.10	LD_Mix	HDT_Mix	HHDT
General Construction Operations	8	0.00	0.00	89.00	10.80	6.60	24.16	LD_Mix	HDT_Mix	HHDT
Photovoltaic Installation	42	1,000.00	0.00	52.00	16.71	6.60	34.10	LD_Mix	HDT_Mix	HHDT
Electrical and Gen-Tie Installation	42	500.00	0.00	10.00	16.71	6.60	34.10	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.8156	0.0000	8.8156	0.9519	0.0000	0.9519			0.0000			0.0000
Off-Road	9.5336	117.1225	63.3156	0.1679		4.2761	4.2761		3.9341	3.9341		16,253.6169	16,253.6169	5.2568		16,385.0356
Total	**9.5336**	**117.1225**	**63.3156**	**0.1679**	**8.8156**	**4.2761**	**13.0917**	**0.9519**	**3.9341**	**4.8859**		**16,253.6169**	**16,253.6169**	**5.2568**		**16,385.0356**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0179	0.5377	0.1141	1.9200e-003	1.1995	1.7900e-003	1.2013	0.1276	1.7200e-003	0.1293		203.7608	203.7608	8.0300e-003		203.9615
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	1.7014	1.0604	14.0690	0.0477	5.0819	0.0307	5.1126	1.3477	0.0283	1.3760		4,760.9267	4,760.9267	0.1025		4,763.4885
Total	**1.7193**	**1.5981**	**14.1831**	**0.0497**	**6.2813**	**0.0325**	**6.3139**	**1.4753**	**0.0300**	**1.5053**		**4,964.6876**	**4,964.6876**	**0.1105**		**4,967.4500**

3.2 Site Preparation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.9670	0.0000	3.9670	0.4283	0.0000	0.4283			0.0000			0.0000
Off-Road	2.0618	8.9345	88.3774	0.1679		0.2749	0.2749		0.2749	0.2749	0.0000	16,253.6168	16,253.6168	5.2568		16,385.0356
Total	**2.0618**	**8.9345**	**88.3774**	**0.1679**	**3.9670**	**0.2749**	**4.2419**	**0.4283**	**0.2749**	**0.7033**	**0.0000**	**16,253.6168**	**16,253.6168**	**5.2568**		**16,385.0356**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0179	0.5377	0.1141	1.9200e-003	0.4193	1.7900e-003	0.4211	0.0496	1.7200e-003	0.0513		203.7608	203.7608	8.0300e-003		203.9615
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	1.7014	1.0604	14.0690	0.0477	5.0819	0.0307	5.1126	1.3477	0.0283	1.3760		4,760.9267	4,760.9267	0.1025		4,763.4885
Total	**1.7193**	**1.5981**	**14.1831**	**0.0497**	**5.5012**	**0.0325**	**5.5337**	**1.3972**	**0.0300**	**1.4273**		**4,964.6876**	**4,964.6876**	**0.1105**		**4,967.4500**

3.3 General Construction Operations - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	1.1964	13.1871	16.5751	0.0290		0.5297	0.5297		0.4982	0.4982		2,798.8714	2,798.8714	0.7567		2,817.7893
Total	**1.1964**	**13.1871**	**16.5751**	**0.0290**	**0.0000**	**0.5297**	**0.5297**	**0.0000**	**0.4982**	**0.4982**		**2,798.8714**	**2,798.8714**	**0.7567**		**2,817.7893**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.4300e-003	0.1401	0.0281	4.7000e-004	0.3722	4.3000e-004	0.3727	0.0390	4.1000e-004	0.0394		49.6572	49.6572	2.1800e-003		49.7117
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**4.4300e-003**	**0.1401**	**0.0281**	**4.7000e-004**	**0.3722**	**4.3000e-004**	**0.3727**	**0.0390**	**4.1000e-004**	**0.0394**		**49.6572**	**49.6572**	**2.1800e-003**		**49.7117**

3.3 General Construction Operations - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.3436	1.4891	19.4997	0.0290		0.0458	0.0458		0.0458	0.0458	0.0000	2,798.8714	2,798.8714	0.7567		2,817.7893
Total	**0.3436**	**1.4891**	**19.4997**	**0.0290**	**0.0000**	**0.0458**	**0.0458**	**0.0000**	**0.0458**	**0.0458**	**0.0000**	**2,798.8714**	**2,798.8714**	**0.7567**		**2,817.7893**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.4300e-003	0.1401	0.0281	4.7000e-004	0.1278	4.3000e-004	0.1282	0.0146	4.1000e-004	0.0150		49.6572	49.6572	2.1800e-003		49.7117
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**4.4300e-003**	**0.1401**	**0.0281**	**4.7000e-004**	**0.1278**	**4.3000e-004**	**0.1282**	**0.0146**	**4.1000e-004**	**0.0150**		**49.6572**	**49.6572**	**2.1800e-003**		**49.7117**

3.4 Photovoltaic Installation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.7118	0.0000	3.7118	0.4008	0.0000	0.4008			0.0000			0.0000
Off-Road	7.6335	86.0538	72.8233	0.1497		3.4175	3.4175		3.1594	3.1594		14,367.5923	14,367.5923	4.5199		14,480.5908
Total	**7.6335**	**86.0538**	**72.8233**	**0.1497**	**3.7118**	**3.4175**	**7.1292**	**0.4008**	**3.1594**	**3.5602**		**14,367.5923**	**14,367.5923**	**4.5199**		**14,480.5908**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.0400e-003	0.1216	0.0258	4.3000e-004	0.2712	4.1000e-004	0.2716	0.0289	3.9000e-004	0.0292		46.0677	46.0677	1.8100e-003		46.1130
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.2535	2.6509	35.1726	0.1194	12.7047	0.0768	12.7815	3.3692	0.0708	3.4399		11,902.3168	11,902.3168	0.2562		11,908.7212
Total	**4.2575**	**2.7725**	**35.1984**	**0.1198**	**12.9759**	**0.0772**	**13.0531**	**3.3980**	**0.0712**	**3.4692**		**11,948.3845**	**11,948.3845**	**0.2580**		**11,954.8342**

3.4 Photovoltaic Installation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6703	0.0000	1.6703	0.1804	0.0000	0.1804			0.0000			0.0000
Off-Road	2.5855	12.3772	91.2581	0.1497		0.4243	0.4243		0.4243	0.4243	0.0000	14,367.5923	14,367.5923	4.5199		14,480.5908
Total	**2.5855**	**12.3772**	**91.2581**	**0.1497**	**1.6703**	**0.4243**	**2.0946**	**0.1804**	**0.4243**	**0.6047**	**0.0000**	**14,367.5923**	**14,367.5923**	**4.5199**		**14,480.5908**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.0400e-003	0.1216	0.0258	4.3000e-004	0.0948	4.1000e-004	0.0952	0.0112	3.9000e-004	0.0116		46.0677	46.0677	1.8100e-003		46.1130
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.2535	2.6509	35.1726	0.1194	12.7047	0.0768	12.7815	3.3692	0.0708	3.4399		11,902.3168	11,902.3168	0.2562		11,908.7212
Total	**4.2575**	**2.7725**	**35.1984**	**0.1198**	**12.7995**	**0.0772**	**12.8767**	**3.3804**	**0.0712**	**3.4515**		**11,948.3845**	**11,948.3845**	**0.2580**		**11,954.8342**

3.5 Electrical and Gen-Tie Installation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.7118	0.0000	3.7118	0.4008	0.0000	0.4008			0.0000			0.0000
Off-Road	8.4081	93.0787	74.2676	0.1497		4.1133	4.1133		3.7944	3.7944		14,417.2873	14,417.2873	4.5783		14,531.7446
Total	**8.4081**	**93.0787**	**74.2676**	**0.1497**	**3.7118**	**4.1133**	**7.8250**	**0.4008**	**3.7944**	**4.1952**		**14,417.2873**	**14,417.2873**	**4.5783**		**14,531.7446**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.5500e-003	0.0468	9.9200e-003	1.7000e-004	0.1043	1.6000e-004	0.1045	0.0111	1.5000e-004	0.0112		17.7183	17.7183	7.0000e-004		17.7358
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	2.1268	1.3255	17.5863	0.0597	6.3523	0.0384	6.3908	1.6846	0.0354	1.7200		5,951.1584	5,951.1584	0.1281		5,954.3606
Total	**2.1283**	**1.3722**	**17.5962**	**0.0599**	**6.4566**	**0.0386**	**6.4952**	**1.6957**	**0.0355**	**1.7312**		**5,968.8767**	**5,968.8767**	**0.1288**		**5,972.0964**

3.5 Electrical and Gen-Tie Installation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6703	0.0000	1.6703	0.1804	0.0000	0.1804			0.0000			0.0000
Off-Road	2.3852	12.8937	91.5322	0.1497		0.3647	0.3647		0.3647	0.3647	0.0000	14,417.2873	14,417.2873	4.5783		14,531.7445
Total	**2.3852**	**12.8937**	**91.5322**	**0.1497**	**1.6703**	**0.3647**	**2.0350**	**0.1804**	**0.3647**	**0.5451**	**0.0000**	**14,417.2873**	**14,417.2873**	**4.5783**		**14,531.7445**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.5500e-003	0.0468	9.9200e-003	1.7000e-004	0.0365	1.6000e-004	0.0366	4.3100e-003	1.5000e-004	4.4600e-003		17.7183	17.7183	7.0000e-004		17.7358
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	2.1268	1.3255	17.5863	0.0597	6.3523	0.0384	6.3908	1.6846	0.0354	1.7200		5,951.1584	5,951.1584	0.1281		5,954.3606
Total	**2.1283**	**1.3722**	**17.5962**	**0.0599**	**6.3888**	**0.0386**	**6.4274**	**1.6889**	**0.0355**	**1.7244**		**5,968.8767**	**5,968.8767**	**0.1288**		**5,972.0964**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	18.8760					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**19.0806**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

Unmitigated Construction Off-Site

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

3.6 Architectural Coating - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	18.8760					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**18.9058**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

Mitigated Construction Off-Site

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

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0813	1.0928	1.2611	8.1700e-003	10.3120	4.1200e-003	10.3161	1.1150	3.8500e-003	1.1188		842.9643	842.9643	0.0273		843.6461
Unmitigated	0.0813	1.0928	1.2611	8.1700e-003	10.3120	4.1200e-003	10.3161	1.1150	3.8500e-003	1.1188		842.9643	842.9643	0.0273		843.6461

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	48.00	0.00	0.00	185,871	185,871
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	48.00	0.00	0.00	185,871	185,871

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.71	6.60	4.60	85.00	0.00	15.00	100	0	0
Other Non-Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	14.70	6.60	6.60	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.600000	0.050000	0.200000	0.000000	0.000000	0.000000	0.000000	0.150000	0.000000	0.000000	0.000000	0.000000	0.000000
Other Non-Asphalt Surfaces	0.561348	0.038614	0.190285	0.107199	0.015389	0.005180	0.024554	0.046236	0.002209	0.002456	0.005491	0.000334	0.000704
Unrefrigerated Warehouse-No Rail	0.561348	0.038614	0.190285	0.107199	0.015389	0.005180	0.024554	0.046236	0.002209	0.002456	0.005491	0.000334	0.000704

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231
NaturalGas Unmitigated	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	17.9397	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9000e-004**	**1.7600e-003**	**1.4800e-003**	**1.0000e-005**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**		**2.1106**	**2.1106**	**4.0000e-005**	**4.0000e-005**	**2.1231**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	0.0179397	1.9000e-004	1.7600e-003	1.4800e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004		2.1106	2.1106	4.0000e-005	4.0000e-005	2.1231
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9000e-004**	**1.7600e-003**	**1.4800e-003**	**1.0000e-005**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**		**2.1106**	**2.1106**	**4.0000e-005**	**4.0000e-005**	**2.1231**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.7620	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422
Unmitigated	1.7620	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.2069					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.5494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.7700e-003	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422
Total	**1.7620**	**5.7000e-004**	**0.0622**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1334**	**0.1334**	**3.5000e-004**		**0.1422**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.2069					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.5494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.7700e-003	5.7000e-004	0.0622	0.0000		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		0.1334	0.1334	3.5000e-004		0.1422
Total	**1.7620**	**5.7000e-004**	**0.0622**	**0.0000**		**2.2000e-004**	**2.2000e-004**		**2.2000e-004**	**2.2000e-004**		**0.1334**	**0.1334**	**3.5000e-004**		**0.1422**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Generator Sets	1	2.00	20	84	0.74	Diesel
Other General Industrial Equipment	2	4.00	120	88	0.34	Diesel
Pumps	2	10.00	12	84	0.74	Diesel
Tractors/Loaders/Backhoes	2	8.00	20	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Generator Sets	0.0765	0.6789	0.9173	1.6400e-003		0.0321	0.0321		0.0321	0.0321		155.7586	155.7586	6.8500e-003		155.9299
Other General Industrial Equipment	0.1623	1.5430	1.9245	2.5600e-003		0.0889	0.0889		0.0818	0.0818		248.0182	248.0182	0.0802		250.0235
Pumps	0.8195	6.8821	9.3132	0.0164		0.3371	0.3371		0.3371	0.3371		1,557.5864	1,557.5864	0.0713		1,559.3679
Tractors/Loaders/Backhoes	0.3027	3.0714	4.4626	6.2300e-003		0.1516	0.1516		0.1395	0.1395		603.1530	603.1530	0.1951		608.0298
Total	**1.3610**	**12.1753**	**16.6177**	**0.0269**		**0.6097**	**0.6097**		**0.5905**	**0.5905**		**2,564.5162**	**2,564.5162**	**0.3534**		**2,573.3512**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

IPO-01.03 Aramis Solar Project

Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	0.40	1000sqft	0.01	400.00	0
Unrefrigerated Warehouse-No Rail	72.00	1000sqft	1.65	72,000.00	0
Other Non-Asphalt Surfaces	537.34	Acre	537.34	23,406,530.40	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Office building = O&M building
Warehouse = energy storage buildings
Other non-asphalt = photovoltaic eletrcity generation, energy storage, and substation

Construction Phase - Construction phasing, schedule, and duration per project description

Off-road Equipment -

Off-road Equipment - Construction equipment per project description

Off-road Equipment - Construction equipment per project description

Off-road Equipment - Construction equipment per project description

Off-road Equipment - Construction equipment per project description

Trips and VMT - Trips and VMT - Project trips and trip distances per Aramis Transportation Impact Study (CHS April2020).
Haul trips for General Construction Operations includes 30 water truck trips per day (4.6 miles/trip)

On-road Fugitive Dust - On-road Fugitive Dust - % Paved reduced to account on-site unpaved roads and use of highway vehicles on-site

Grading -

Architectural Coating - No painting parking areas

Vehicle Trips - Operational trips based on 12 workers per day, 2 commute trips and 2 midday trips per worker

Road Dust - % Pave adjusted to account for highway vehicles used on-site on unpaved roads.
15 mph speed limit on on-site unpaved roads

Consumer Products - No consumer products parking area

Area Coating - No painting parking area

Energy Use - All electrical energy generated on-site
Natural gas O&M building only

Water And Wastewater - 5 acre-feet of water per year for operation and maintenance.

Solid Waste - Only O&M building generates solid waste

Construction Off-road Equipment Mitigation - MM AQ-1: Dust mitigation per BAAQMD recommended BCMMs.
MM AQ-2: Tier 4 engine mitigation for all off-road diesel equipment with 50 or more HP

Operational Off-Road Equipment - Operation and maintenance equipment per project description.
Other general industrial equipment = all terrain vehicle used for maintenance

Fleet Mix - Fleet mix = 85% autos/pickups and 15% water trucks

IPO-01.03 Aramis Solar Project - Alameda County, Annual

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Parking	1,404,392.00	0.00
tblAreaCoating	Area_Parking	1404390	0
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	20.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	15.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	8.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	50.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	360.00	30.00
tblConstructionPhase	NumDays	930.00	175.00
tblConstructionPhase	NumDays	930.00	150.00
tblConstructionPhase	NumDays	930.00	75.00
tblConstructionPhase	NumDays	660.00	40.00
tblConsumerProducts	ROG_EF_Degreaser	3.542E-07	0
tblEnergyUse	LightingElect	3.88	0.00
tblEnergyUse	LightingElect	2.14	0.00
tblEnergyUse	NT24E	7.84	0.00
tblEnergyUse	NT24E	1.07	0.00
tblEnergyUse	NT24NG	0.07	0.00
tblEnergyUse	T24E	6.11	0.00
tblEnergyUse	T24E	0.32	0.00
tblEnergyUse	T24NG	3.40	0.00
tblFleetMix	HHD	0.05	0.15
tblFleetMix	LDA	0.56	0.60
tblFleetMix	LDT1	0.04	0.05
tblFleetMix	LDT2	0.19	0.20
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	5.1800e-003	0.00
tblFleetMix	MCY	5.4910e-003	0.00
tblFleetMix	MDV	0.11	0.00
tblFleetMix	MH	7.0400e-004	0.00

tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	2.2090e-003	0.00
tblFleetMix	SBUS	3.3400e-004	0.00
tblFleetMix	UBUS	2.4560e-003	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOnRoadDust	HaulingPercentPave	100.00	98.50
tblOnRoadDust	HaulingPercentPave	100.00	98.00
tblOnRoadDust	HaulingPercentPave	100.00	98.50

tblOnRoadDust	HaulingPercentPave	100.00	98.50
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	20.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	120.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	12.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	20.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	2.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	4.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	10.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblRoadDust	MeanVehicleSpeed	40	15
tblRoadDust	RoadPercentPave	100	97
tblSolidWaste	SolidWasteGenerationRate	67.68	0.00
tblTripsAndVMT	HaulingTripLength	20.00	34.10
tblTripsAndVMT	HaulingTripLength	20.00	24.16
tblTripsAndVMT	HaulingTripLength	20.00	34.10
tblTripsAndVMT	HaulingTripLength	20.00	34.10
tblTripsAndVMT	HaulingTripNumber	0.00	46.00
tblTripsAndVMT	HaulingTripNumber	0.00	89.00
tblTripsAndVMT	HaulingTripNumber	0.00	52.00
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	WorkerTripLength	10.80	16.71
tblTripsAndVMT	WorkerTripLength	10.80	16.71
tblTripsAndVMT	WorkerTripLength	10.80	16.71

tblTripsAndVMT	WorkerTripNumber	88.00	400.00
tblTripsAndVMT	WorkerTripNumber	20.00	0.00
tblTripsAndVMT	WorkerTripNumber	105.00	1,000.00
tblTripsAndVMT	WorkerTripNumber	105.00	500.00
tblTripsAndVMT	WorkerTripNumber	1,972.00	0.00
tblVehicleTrips	CC_TTP	48.00	0.00
tblVehicleTrips	CNW_TL	6.60	4.60
tblVehicleTrips	CNW_TTP	19.00	15.00
tblVehicleTrips	CW_TL	14.70	16.71
tblVehicleTrips	CW_TTP	33.00	85.00
tblVehicleTrips	DV_TP	19.00	0.00
tblVehicleTrips	PB_TP	4.00	0.00
tblVehicleTrips	PR_TP	77.00	100.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	11.03	120.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	16,650,000.00	0.00
tblWater	OutdoorWaterUseRate	43,573.43	1,558,156.50

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	1.9308	13.2147	13.8242	0.0331	1.8318	0.5305	2.3623	0.3904	0.4906	0.8811	0.0000	2,925.3054	2,925.3054	0.6170	0.0000	2,940.7307
Maximum	**1.9308**	**13.2147**	**13.8242**	**0.0331**	**1.8318**	**0.5305**	**2.3623**	**0.3904**	**0.4906**	**0.8811**	**0.0000**	**2,925.3054**	**2,925.3054**	**0.6170**	**0.0000**	**2,940.7307**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	1.1361	2.0100	16.4864	0.0331	1.4890	0.0615	1.5505	0.3537	0.0609	0.4146	0.0000	2,925.3031	2,925.3031	0.6170	0.0000	2,940.7284
Maximum	**1.1361**	**2.0100**	**16.4864**	**0.0331**	**1.4890**	**0.0615**	**1.5505**	**0.3537**	**0.0609**	**0.4146**	**0.0000**	**2,925.3031**	**2,925.3031**	**0.6170**	**0.0000**	**2,940.7284**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**41.16**	**84.79**	**-19.26**	**0.00**	**18.71**	**88.41**	**34.37**	**9.40**	**87.59**	**52.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-1-2022	3-31-2022	4.1313	0.6748
2	4-1-2022	6-30-2022	5.0203	1.0071
3	7-1-2022	9-30-2022	5.9869	1.4579
		Highest	5.9869	1.4579

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.3210	5.0000e-005	5.6000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0109	0.0109	3.0000e-005	0.0000	0.0116
Energy	4.0000e-005	3.2000e-004	2.7000e-004	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.3494	0.3494	1.0000e-005	1.0000e-005	0.3515
Mobile	9.4400e-003	0.1446	0.1503	1.0200e-003	1.3380	5.4000e-004	1.3385	0.1443	5.0000e-004	0.1448	0.0000	95.3370	95.3370	3.2200e-003	0.0000	95.4175
Offroad	0.0185	0.1714	0.2252	3.3000e-004		9.1900e-003	9.1900e-003		8.6500e-003	8.6500e-003	0.0000	28.8627	28.8627	6.5900e-003	0.0000	29.0274
Waste						0.0000	0.0000		0.0000	0.0000	0.0751	0.0000	0.0751	4.4400e-003	0.0000	0.1861
Water						0.0000	0.0000		0.0000	0.0000	0.0226	1.6984	1.7210	2.3900e-003	7.0000e-005	1.8018
Total	**0.3490**	**0.3163**	**0.3813**	**1.3500e-003**	**1.3380**	**9.7700e-003**	**1.3478**	**0.1443**	**9.1900e-003**	**0.1535**	**0.0977**	**126.2585**	**126.3561**	**0.0167**	**8.0000e-005**	**126.7959**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.3210	5.0000e-005	5.6000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0109	0.0109	3.0000e-005	0.0000	0.0116
Energy	4.0000e-005	3.2000e-004	2.7000e-004	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.3494	0.3494	1.0000e-005	1.0000e-005	0.3515
Mobile	9.4400e-003	0.1446	0.1503	1.0200e-003	1.3380	5.4000e-004	1.3385	0.1443	5.0000e-004	0.1448	0.0000	95.3370	95.3370	3.2200e-003	0.0000	95.4175
Offroad	0.0185	0.1714	0.2252	3.3000e-004		9.1900e-003	9.1900e-003		8.6500e-003	8.6500e-003	0.0000	28.8627	28.8627	6.5900e-003	0.0000	29.0274
Waste						0.0000	0.0000		0.0000	0.0000	0.0751	0.0000	0.0751	4.4400e-003	0.0000	0.1861
Water						0.0000	0.0000		0.0000	0.0000	0.0226	1.6984	1.7210	2.3900e-003	7.0000e-005	1.8018
Total	**0.3490**	**0.3163**	**0.3813**	**1.3500e-003**	**1.3380**	**9.7700e-003**	**1.3478**	**0.1443**	**9.1900e-003**	**0.1535**	**0.0977**	**126.2585**	**126.3561**	**0.0167**	**8.0000e-005**	**126.7959**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2022	2/11/2022	5	30	
2	General Construction Operations	Grading	1/8/2022	9/9/2022	5	175	
3	Photovoltaic Installation	Grading	2/12/2022	9/9/2022	5	150	
4	Electrical and Gen-Tie Installation	Grading	5/28/2022	9/9/2022	5	75	
5	Architectural Coating	Architectural Coating	7/17/2022	9/9/2022	5	40	

Acres of Grading (Site Preparation Phase): 249.38

Acres of Grading (Grading Phase): 0

Acres of Paving: 537.34

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 108,600; Non-Residential Outdoor: 36,200; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Crawler Tractors	10	7.00	212	0.43
Site Preparation	Graders	9	7.00	187	0.41
Site Preparation	Rollers	5	7.00	80	0.38
Site Preparation	Rough Terrain Forklifts	10	7.00	100	0.40
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Rubber Tired Loaders	1	7.00	203	0.36
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
General Construction Operations	Excavators	0	8.00	158	0.38
General Construction Operations	Graders	0	8.00	187	0.41
General Construction Operations	Pumps	1	7.00	84	0.74
General Construction Operations	Rough Terrain Forklifts	5	7.00	100	0.40

General Construction Operations	Rubber Tired Dozers	0	8.00	247	0.40
General Construction Operations	Rubber Tired Loaders	1	7.00	203	0.36
General Construction Operations	Scrapers	0	8.00	367	0.48
General Construction Operations	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Photovoltaic Installation	Aerial Lifts	1	4.00	63	0.31
Photovoltaic Installation	Bore/Drill Rigs	2	7.00	221	0.50
Photovoltaic Installation	Cranes	1	2.00	231	0.29
Photovoltaic Installation	Crawler Tractors	5	7.00	212	0.43
Photovoltaic Installation	Excavators	0	8.00	158	0.38
Photovoltaic Installation	Graders	3	7.00	187	0.41
Photovoltaic Installation	Rollers	1	7.00	80	0.38
Photovoltaic Installation	Rough Terrain Forklifts	20	7.00	100	0.40
Photovoltaic Installation	Rubber Tired Dozers	0	8.00	247	0.40
Photovoltaic Installation	Scrapers	0	8.00	367	0.48
Photovoltaic Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Photovoltaic Installation	Trenchers	3	7.00	78	0.50
Photovoltaic Installation	Welders	6	4.00	46	0.45
Electrical and Gen-Tie Installation	Aerial Lifts	1	4.00	63	0.31
Electrical and Gen-Tie Installation	Bore/Drill Rigs	2	7.00	221	0.50
Electrical and Gen-Tie Installation	Cranes	1	2.00	231	0.29
Electrical and Gen-Tie Installation	Crawler Tractors	5	7.00	212	0.43
Electrical and Gen-Tie Installation	Excavators	0	8.00	158	0.38
Electrical and Gen-Tie Installation	Graders	3	7.00	187	0.41
Electrical and Gen-Tie Installation	Rollers	2	7.00	80	0.38
Electrical and Gen-Tie Installation	Rough Terrain Forklifts	15	7.00	100	0.40
Electrical and Gen-Tie Installation	Rubber Tired Dozers	0	8.00	247	0.40
Electrical and Gen-Tie Installation	Scrapers	0	8.00	367	0.48

Electrical and Gen-Tie Installation	Skid Steer Loaders	2	7.00	65	0.37
Electrical and Gen-Tie Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Electrical and Gen-Tie Installation	Trenchers	7	7.00	78	0.50
Electrical and Gen-Tie Installation	Welders	4	4.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	35	400.00	0.00	46.00	16.71	6.60	34.10	LD_Mix	HDT_Mix	HHDT
General Construction Operations	8	0.00	0.00	89.00	10.80	6.60	24.16	LD_Mix	HDT_Mix	HHDT
Photovoltaic Installation	42	1,000.00	0.00	52.00	16.71	6.60	34.10	LD_Mix	HDT_Mix	HHDT
Electrical and Gen-Tie Installation	42	500.00	0.00	10.00	16.71	6.60	34.10	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1322	0.0000	0.1322	0.0143	0.0000	0.0143	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1430	1.7568	0.9497	2.5200e-003		0.0641	0.0641		0.0590	0.0590	0.0000	221.1755	221.1755	0.0715	0.0000	222.9638
Total	**0.1430**	**1.7568**	**0.9497**	**2.5200e-003**	**0.1322**	**0.0641**	**0.1964**	**0.0143**	**0.0590**	**0.0733**	**0.0000**	**221.1755**	**221.1755**	**0.0715**	**0.0000**	**222.9638**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7000e-004	8.2600e-003	1.7500e-003	3.0000e-005	0.0150	3.0000e-005	0.0150	1.6100e-003	3.0000e-005	1.6400e-003	0.0000	2.7592	2.7592	1.1000e-004	0.0000	2.7620
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0248	0.0180	0.1885	6.6000e-004	0.0734	4.6000e-004	0.0738	0.0195	4.2000e-004	0.0199	0.0000	60.0564	60.0564	1.2800e-003	0.0000	60.0885
Total	**0.0251**	**0.0263**	**0.1903**	**6.9000e-004**	**0.0884**	**4.9000e-004**	**0.0888**	**0.0211**	**4.5000e-004**	**0.0216**	**0.0000**	**62.8155**	**62.8155**	**1.3900e-003**	**0.0000**	**62.8504**

3.2 Site Preparation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0595	0.0000	0.0595	6.4300e-003	0.0000	6.4300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0309	0.1340	1.3257	2.5200e-003		4.1200e-003	4.1200e-003		4.1200e-003	4.1200e-003	0.0000	221.1752	221.1752	0.0715	0.0000	222.9636
Total	**0.0309**	**0.1340**	**1.3257**	**2.5200e-003**	**0.0595**	**4.1200e-003**	**0.0636**	**6.4300e-003**	**4.1200e-003**	**0.0106**	**0.0000**	**221.1752**	**221.1752**	**0.0715**	**0.0000**	**222.9636**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7000e-004	8.2600e-003	1.7500e-003	3.0000e-005	5.3000e-003	3.0000e-005	5.3300e-003	6.4000e-004	3.0000e-005	6.7000e-004	0.0000	2.7592	2.7592	1.1000e-004	0.0000	2.7620
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0248	0.0180	0.1885	6.6000e-004	0.0734	4.6000e-004	0.0738	0.0195	4.2000e-004	0.0199	0.0000	60.0564	60.0564	1.2800e-003	0.0000	60.0885
Total	**0.0251**	**0.0263**	**0.1903**	**6.9000e-004**	**0.0787**	**4.9000e-004**	**0.0792**	**0.0202**	**4.5000e-004**	**0.0206**	**0.0000**	**62.8155**	**62.8155**	**1.3900e-003**	**0.0000**	**62.8504**

3.3 General Construction Operations - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1047	1.1539	1.4503	2.5400e-003		0.0464	0.0464		0.0436	0.0436	0.0000	222.1707	222.1707	0.0601	0.0000	223.6724
Total	**0.1047**	**1.1539**	**1.4503**	**2.5400e-003**	**0.0000**	**0.0464**	**0.0464**	**0.0000**	**0.0436**	**0.0436**	**0.0000**	**222.1707**	**222.1707**	**0.0601**	**0.0000**	**223.6724**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.9000e-004	0.0125	2.5300e-003	4.0000e-005	0.0271	4.0000e-005	0.0271	2.8600e-003	4.0000e-005	2.9000e-003	0.0000	3.9155	3.9155	1.8000e-004	0.0000	3.9199
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.9000e-004**	**0.0125**	**2.5300e-003**	**4.0000e-005**	**0.0271**	**4.0000e-005**	**0.0271**	**2.8600e-003**	**4.0000e-005**	**2.9000e-003**	**0.0000**	**3.9155**	**3.9155**	**1.8000e-004**	**0.0000**	**3.9199**

3.3 General Construction Operations - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0301	0.1303	1.7062	2.5400e-003		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003	0.0000	222.1704	222.1704	0.0601	0.0000	223.6721
Total	**0.0301**	**0.1303**	**1.7062**	**2.5400e-003**	**0.0000**	**4.0100e-003**	**4.0100e-003**	**0.0000**	**4.0100e-003**	**4.0100e-003**	**0.0000**	**222.1704**	**222.1704**	**0.0601**	**0.0000**	**223.6721**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.9000e-004	0.0125	2.5300e-003	4.0000e-005	9.3800e-003	4.0000e-005	9.4200e-003	1.0900e-003	4.0000e-005	1.1300e-003	0.0000	3.9155	3.9155	1.8000e-004	0.0000	3.9199
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.9000e-004**	**0.0125**	**2.5300e-003**	**4.0000e-005**	**9.3800e-003**	**4.0000e-005**	**9.4200e-003**	**1.0900e-003**	**4.0000e-005**	**1.1300e-003**	**0.0000**	**3.9155**	**3.9155**	**1.8000e-004**	**0.0000**	**3.9199**

3.4 Photovoltaic Installation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2784	0.0000	0.2784	0.0301	0.0000	0.0301	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.5725	6.4540	5.4618	0.0112		0.2563	0.2563		0.2370	0.2370	0.0000	977.5545	977.5545	0.3075	0.0000	985.2428
Total	**0.5725**	**6.4540**	**5.4618**	**0.0112**	**0.2784**	**0.2563**	**0.5347**	**0.0301**	**0.2370**	**0.2670**	**0.0000**	**977.5545**	**977.5545**	**0.3075**	**0.0000**	**985.2428**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.1000e-004	9.3400e-003	1.9700e-003	3.0000e-005	0.0169	3.0000e-005	0.0170	1.8200e-003	3.0000e-005	1.8500e-003	0.0000	3.1191	3.1191	1.3000e-004	0.0000	3.1222
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3103	0.2251	2.3567	8.3000e-003	0.9171	5.7600e-003	0.9229	0.2439	5.3100e-003	0.2492	0.0000	750.7043	750.7043	0.0161	0.0000	751.1058
Total	**0.3106**	**0.2345**	**2.3587**	**8.3300e-003**	**0.9340**	**5.7900e-003**	**0.9398**	**0.2457**	**5.3400e-003**	**0.2511**	**0.0000**	**753.8234**	**753.8234**	**0.0162**	**0.0000**	**754.2280**

3.4 Photovoltaic Installation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1253	0.0000	0.1253	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1939	0.9283	6.8444	0.0112		0.0318	0.0318		0.0318	0.0318	0.0000	977.5534	977.5534	0.3075	0.0000	985.2417
Total	**0.1939**	**0.9283**	**6.8444**	**0.0112**	**0.1253**	**0.0318**	**0.1571**	**0.0135**	**0.0318**	**0.0454**	**0.0000**	**977.5534**	**977.5534**	**0.3075**	**0.0000**	**985.2417**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.1000e-004	9.3400e-003	1.9700e-003	3.0000e-005	5.9900e-003	3.0000e-005	6.0200e-003	7.3000e-004	3.0000e-005	7.6000e-004	0.0000	3.1191	3.1191	1.3000e-004	0.0000	3.1222
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3103	0.2251	2.3567	8.3000e-003	0.9171	5.7600e-003	0.9229	0.2439	5.3100e-003	0.2492	0.0000	750.7043	750.7043	0.0161	0.0000	751.1058
Total	**0.3106**	**0.2345**	**2.3587**	**8.3300e-003**	**0.9231**	**5.7900e-003**	**0.9289**	**0.2446**	**5.3400e-003**	**0.2500**	**0.0000**	**753.8234**	**753.8234**	**0.0162**	**0.0000**	**754.2280**

3.5 Electrical and Gen-Tie Installation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1392	0.0000	0.1392	0.0150	0.0000	0.0150	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3153	3.4905	2.7850	5.6100e-003		0.1543	0.1543		0.1423	0.1423	0.0000	490.4679	490.4679	0.1558	0.0000	494.3616
Total	**0.3153**	**3.4905**	**2.7850**	**5.6100e-003**	**0.1392**	**0.1543**	**0.2934**	**0.0150**	**0.1423**	**0.1573**	**0.0000**	**490.4679**	**490.4679**	**0.1558**	**0.0000**	**494.3616**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	1.8000e-003	3.8000e-004	1.0000e-005	3.2600e-003	1.0000e-005	3.2600e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	0.5998	0.5998	2.0000e-005	0.0000	0.6004
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0776	0.0563	0.5892	2.0700e-003	0.2293	1.4400e-003	0.2307	0.0610	1.3300e-003	0.0623	0.0000	187.6761	187.6761	4.0100e-003	0.0000	187.7765
Total	**0.0776**	**0.0581**	**0.5896**	**2.0800e-003**	**0.2325**	**1.4500e-003**	**0.2340**	**0.0613**	**1.3400e-003**	**0.0627**	**0.0000**	**188.2759**	**188.2759**	**4.0300e-003**	**0.0000**	**188.3769**

3.5 Electrical and Gen-Tie Installation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0626	0.0000	0.0626	6.7600e-003	0.0000	6.7600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0895	0.4835	3.4325	5.6100e-003		0.0137	0.0137		0.0137	0.0137	0.0000	490.4673	490.4673	0.1558	0.0000	494.3611
Total	**0.0895**	**0.4835**	**3.4325**	**5.6100e-003**	**0.0626**	**0.0137**	**0.0763**	**6.7600e-003**	**0.0137**	**0.0204**	**0.0000**	**490.4673**	**490.4673**	**0.1558**	**0.0000**	**494.3611**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	1.8000e-003	3.8000e-004	1.0000e-005	1.1500e-003	1.0000e-005	1.1600e-003	1.4000e-004	1.0000e-005	1.5000e-004	0.0000	0.5998	0.5998	2.0000e-005	0.0000	0.6004
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0776	0.0563	0.5892	2.0700e-003	0.2293	1.4400e-003	0.2307	0.0610	1.3300e-003	0.0623	0.0000	187.6761	187.6761	4.0100e-003	0.0000	187.7765
Total	**0.0776**	**0.0581**	**0.5896**	**2.0800e-003**	**0.2304**	**1.4500e-003**	**0.2319**	**0.0611**	**1.3400e-003**	**0.0625**	**0.0000**	**188.2759**	**188.2759**	**4.0300e-003**	**0.0000**	**188.3769**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3775					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.0900e-003	0.0282	0.0363	6.0000e-005		1.6300e-003	1.6300e-003		1.6300e-003	1.6300e-003	0.0000	5.1065	5.1065	3.3000e-004	0.0000	5.1148
Total	**0.3816**	**0.0282**	**0.0363**	**6.0000e-005**		**1.6300e-003**	**1.6300e-003**		**1.6300e-003**	**1.6300e-003**	**0.0000**	**5.1065**	**5.1065**	**3.3000e-004**	**0.0000**	**5.1148**

Unmitigated Construction Off-Site

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

3.6 Architectural Coating - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3775					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.9000e-004	2.5800e-003	0.0367	6.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	5.1065	5.1065	3.3000e-004	0.0000	5.1148
Total	**0.3781**	**2.5800e-003**	**0.0367**	**6.0000e-005**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**	**0.0000**	**5.1065**	**5.1065**	**3.3000e-004**	**0.0000**	**5.1148**

Mitigated Construction Off-Site

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

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	9.4400e-003	0.1446	0.1503	1.0200e-003	1.3380	5.4000e-004	1.3385	0.1443	5.0000e-004	0.1448	0.0000	95.3370	95.3370	3.2200e-003	0.0000	95.4175
Unmitigated	9.4400e-003	0.1446	0.1503	1.0200e-003	1.3380	5.4000e-004	1.3385	0.1443	5.0000e-004	0.1448	0.0000	95.3370	95.3370	3.2200e-003	0.0000	95.4175

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	48.00	0.00	0.00	185,871	185,871
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	48.00	0.00	0.00	185,871	185,871

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	16.71	6.60	4.60	85.00	0.00	15.00	100	0	0
Other Non-Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	14.70	6.60	6.60	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.600000	0.050000	0.200000	0.000000	0.000000	0.000000	0.000000	0.150000	0.000000	0.000000	0.000000	0.000000	0.000000
Other Non-Asphalt Surfaces	0.561348	0.038614	0.190285	0.107199	0.015389	0.005180	0.024554	0.046236	0.002209	0.002456	0.005491	0.000334	0.000704
Unrefrigerated Warehouse-No Rail	0.561348	0.038614	0.190285	0.107199	0.015389	0.005180	0.024554	0.046236	0.002209	0.002456	0.005491	0.000334	0.000704

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	4.0000e-005	3.2000e-004	2.7000e-004	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.3494	0.3494	1.0000e-005	1.0000e-005	0.3515
NaturalGas Unmitigated	4.0000e-005	3.2000e-004	2.7000e-004	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.3494	0.3494	1.0000e-005	1.0000e-005	0.3515

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	6548	4.0000e-005	3.2000e-004	2.7000e-004	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.3494	0.3494	1.0000e-005	1.0000e-005	0.3515
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**4.0000e-005**	**3.2000e-004**	**2.7000e-004**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.3494**	**0.3494**	**1.0000e-005**	**1.0000e-005**	**0.3515**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	6548	4.0000e-005	3.2000e-004	2.7000e-004	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.3494	0.3494	1.0000e-005	1.0000e-005	0.3515
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**4.0000e-005**	**3.2000e-004**	**2.7000e-004**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.3494**	**0.3494**	**1.0000e-005**	**1.0000e-005**	**0.3515**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.3210	5.0000e-005	5.6000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0109	0.0109	3.0000e-005	0.0000	0.0116
Unmitigated	0.3210	5.0000e-005	5.6000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0109	0.0109	3.0000e-005	0.0000	0.0116

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0378					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2828					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.2000e-004	5.0000e-005	5.6000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0109	0.0109	3.0000e-005	0.0000	0.0116
Total	**0.3210**	**5.0000e-005**	**5.6000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0109**	**0.0109**	**3.0000e-005**	**0.0000**	**0.0116**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0378					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2828					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.2000e-004	5.0000e-005	5.6000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0109	0.0109	3.0000e-005	0.0000	0.0116
Total	**0.3210**	**5.0000e-005**	**5.6000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0109**	**0.0109**	**3.0000e-005**	**0.0000**	**0.0116**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	1.7210	2.3900e-003	7.0000e-005	1.8018
Unmitigated	1.7210	2.3900e-003	7.0000e-005	1.8018

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	0.0710935 / 1.55816	1.7210	2.3900e-003	7.0000e-005	1.8018
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**1.7210**	**2.3900e-003**	**7.0000e-005**	**1.8018**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	0.0710935 / 1.55816	1.7210	2.3900e-003	7.0000e-005	1.8018
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**1.7210**	**2.3900e-003**	**7.0000e-005**	**1.8018**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0751	4.4400e-003	0.0000	0.1861
Unmitigated	0.0751	4.4400e-003	0.0000	0.1861

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	0.37	0.0751	4.4400e-003	0.0000	0.1861
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0751**	**4.4400e-003**	**0.0000**	**0.1861**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	0.37	0.0751	4.4400e-003	0.0000	0.1861
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0751**	**4.4400e-003**	**0.0000**	**0.1861**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Generator Sets	1	2.00	20	84	0.74	Diesel
Other General Industrial Equipment	2	4.00	120	88	0.34	Diesel
Pumps	2	10.00	12	84	0.74	Diesel
Tractors/Loaders/Backhoes	2	8.00	20	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Generator Sets	7.6000e-004	6.7900e-003	9.1700e-003	2.0000e-005		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	1.4130	1.4130	6.0000e-005	0.0000	1.4146
Other General Industrial Equipment	9.7400e-003	0.0926	0.1155	1.5000e-004		5.3300e-003	5.3300e-003		4.9100e-003	4.9100e-003	0.0000	13.4999	13.4999	4.3700e-003	0.0000	13.6091
Pumps	4.9200e-003	0.0413	0.0559	1.0000e-004		2.0200e-003	2.0200e-003		2.0200e-003	2.0200e-003	0.0000	8.4781	8.4781	3.9000e-004	0.0000	8.4878
Tractors/Loaders/Backhoes	3.0300e-003	0.0307	0.0446	6.0000e-005		1.5200e-003	1.5200e-003		1.3900e-003	1.3900e-003	0.0000	5.4717	5.4717	1.7700e-003	0.0000	5.5160
Total	**0.0185**	**0.1714**	**0.2252**	**3.3000e-004**		**9.1900e-003**	**9.1900e-003**		**8.6400e-003**	**8.6400e-003**	**0.0000**	**28.8627**	**28.8627**	**6.5900e-003**	**0.0000**	**29.0274**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B

Energy Calculation Sheets

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Construction Energy Use

Off-Road Construction Equipment Energy Use												
Phase	Equipment	Fuel	HP	Load Factor	Equipment Count	Hours/Day	Work Days	Gallons /HP-Hr	Gallons /Hour	Gallons /Day	Total Gallons	Total MBtu
Site Preparation	Crawler Tractors	Diesel	212	0.43	10	7.0	30	0.0221600	2.02011	141.408	4,242.2	590
	Graders	Diesel	187	0.41	9	7.0	30	0.0211437	1.62109	102.129	3,063.9	426
	Rollers	Diesel	80	0.38	5	7.0	30	0.0194042	0.58989	20.646	619.4	86
	Rough Terrain Forklifts	Diesel	100	0.4	10	7.0	30	0.0208047	0.83219	58.253	1,747.6	243
	Rubber Tired Loaders	Diesel	203	0.38	1	7.0	30	0.0186583	1.43930	10.075	302.3	42
										Site Preparation Subtotal	**9,975.3**	**1,387**
General Construction Operations	Pumps	Diesel	84	0.74	1	7.0	175	0.0154785	0.96214	6.735	1,178.6	164
	Rough Terrain Forklifts	Diesel	100	0.4	5	7.0	175	0.0208047	0.83219	29.127	5,097.2	709
	Rubber Tired Loaders	Diesel	203	0.38	1	7.0	175	0.0186583	1.43930	10.075	1,763.1	245
	Tractors/Loaders/Backhoes	Diesel	97	0.37	1	7.0	175	0.0191274	0.68648	4.805	840.9	117
										General Construction Operations Subtotal	**8,879.9**	**1,234**
Photovoltaic Installation	Aerial Lifts	Diesel	63	0.31	1	4.0	150	0.0159418	0.31134	1.245	186.8	26
	Bore/Drill Rigs	Diesel	221	0.5	2	7.0	150	0.0255415	2.82233	39.513	5,926.9	824
	Cranes	Diesel	231	0.29	1	2.0	150	0.0148849	0.99714	1.994	299.1	42
	Crawler Tractors	Diesel	212	0.43	5	7.0	150	0.0221600	2.02011	70.704	10,605.6	1,474
	Graders	Diesel	187	0.41	3	7.0	150	0.0211437	1.62109	34.043	5,106.4	710
	Rollers	Diesel	80	0.38	1	7.0	150	0.0194042	0.58989	4.129	619.4	86
	Rough Terrain Forklifts	Diesel	100	0.4	20	7.0	150	0.0208047	0.83219	116.506	17,476.0	2,429
	Trenchers	Diesel	78	0.5	3	7.0	150	0.0260228	1.01489	21.313	3,196.9	444
	Welders	Diesel	46	0.45	6	4.0	150	0.0258384	0.53485	12.836	1,925.5	268
										Photovoltaic Installation Subtotal	**45,342.6**	**6,303**
Electrical and Gen-Tie Installation	Air Compressors	Diesel	78	0.48	1	6.0	30	0.0154785	0.57951	3.477	104.3	14
	Aerial Lifts	Diesel	63	0.31	1	4.0	75	0.0159418	0.31134	1.245	93.4	13
	Bore/Drill Rigs	Diesel	221	0.5	2	7.0	75	0.0255415	2.82233	39.513	2,963.5	412
	Cranes	Diesel	231	0.29	1	2.0	75	0.0148849	0.99714	1.994	149.6	21
	Graders	Diesel	187	0.41	3	7.0	75	0.0211437	1.62109	34.043	2,553.2	355
	Rollers	Diesel	80	0.38	2	7.0	75	0.0194042	0.58989	8.258	619.4	86
	Rough Terrain Forklifts	Diesel	100	0.4	15	7.0	75	0.0208047	0.83219	87.380	6,553.5	911
	Skid Steer Loaders	Diesel	65	0.37	2	7.0	75	0.0190609	0.45841	6.418	481.3	67
	Trenchers	Diesel	78	0.5	7	7.0	75	0.0260228	1.01489	49.729	3,729.7	518
	Welders	Diesel	46	0.45	4	4.0	75	0.0258384	0.53485	8.558	641.8	89
										Electrical and Gen-Tie Installation Subtotal	**5,864.0**	**815**
										Project Construction Off-Road Total	**70,061.7**	**9,739**

On-Road Construction Energy Use											
Phase	Trip Type (Fleet Mix)	Trips (1-way)	Distance (miles)		Work Days	Total VMT	gallons diesel/VMT		Total diesel gallons	gallons gas/VMT	Total gasoline gallons	Total MBtu
Site Preparation	Worker (LDA, LDT1, LDT2)	400	16.71		30	200,520	0.0002138		42.87	0.033268172	6,670.9	833
	Hauling (HHDT)	46	34.1		30	47,058	0.1549861		7,293.3	-	-	1,014
General Construction Operations	Hauling (HHDT)	89	24.16		175	376,292	0.1549861		58,320.0	0.033268172	12,518.5	9,659
Photovoltaic Installation	Worker (LDA, LDT1, LDT2)	1000	16.71		150	2,506,500	0.0002138		535.9	0.033268172	83,386.7	10,414
	Hauling (HHDT)	52	34.1		150	265,980	0.1549861		41,223.2	-	-	5,730
Electrical and Gen-Tie Installation	Worker (LDA, LDT1, LDT2)	500	16.71		75	626,625	0.0002138		134.0	0.033268172	20,846.7	2,604
	Hauling (HHDT)	10	34.1		75	25,575	0.1549861		3,963.8	-	-	551
				Project Construction On-Road Total		**4,048,550**			**111,513.1**		**123,422.8**	**30,805**

Project Construction Energy By Phase				
Phase	Days	Gallons Diesel	Gallons Gas	MBtu
Site Preparation	30	7,336	6,671	1,847
General Construction Operations	175	58,320	12,519	9,659
Photovoltaic Installation	150	41,759	83,387	16,144
Electrical and Gen-Tie Installation	75	4,098	20,847	3,155
Project Construction Total		**111,513**	**123,423**	**30,805**

Project Construction Energy By Source			
Source	Gallons Diesel	Gallons Gas	MBtu
Off-Road Construction Equipment	70,062	-	9,739
On-Road Construction Traffic	111,513	123,423	30,805
Project Construction Total	**181,575**	**123,423**	**40,543**

Notes:
1. Off-road equipment types, horsepower, count and hours from CalEEMod Version 2016.3.2. http://www.caleemod.com/.
2. Off-road fuel consumption factors from CARB OFFROAD2017- ORION Web Database. https://www.arb.ca.gov/orion/.
3. On-road fuel consumption factors from CARB EMFAC2107 Web Database. https://www.arb.ca.gov/emfac/2017/.
4. 1 Gallon of diesel = 0.139 MBtu; 1 gallon of gasoline = 0.124 MBtu.

Operational Energy Use and Generation

On-Road Operation (Mobile) Energy Use										
Category	%	Trips (1-way)	Distance (miles)	Work Days	Total VMT	gallons diesel/VMT	Total diesel gallons	gallons gas/VMT	gasoline gallons	Total MBtu
LDA	60%	48	16.71	260	125,124	0.0205372	2,569.70	0.03133254	3,920.5	843.3
LDT1	5%	48	16.71	260	10,427	0.0416293	434.1	0.03648388	380.4	107.5
LDT2	20%	48	16.71	260	41,708	0.0279412	1,165.4	0.03948049	1,646.7	366.2
HDT	15%	48	4.6	260	8,611	0.1549861	1,334.6		-	185.5
Project Construction On-Road Total					**185,871**		**5,503.8**		**5,947.5**	**1,502.5**

Off-Road Equipment Energy Use											
Equipment	Fuel	HP	Load Factor	Equipment Count	Hours/Day	Work Days	Gallons Diesel /HP-Hr	Gallons Diesel /Hour	Gallons Diesel /Day	Total Gallons Diesel	Total MBtu
All-Terrain Vehicles	Diesel	88	0.34	2	7.0	120	0.0214653	0.64224	8.991	1,079.0	150.0
Small Tractors	Diesel	97	0.37	2	7.0	20	0.0191274	0.68648	9.611	192.2	26.7
Portable Generators	Diesel	84	0.74	1	7.0	20	0.0154785	0.96214	6.735	134.7	18.7
Portable Water Trailers with Pump	Diesel	84	0.74	2	7.0	12	0.0154785	0.96214	13.470	161.6	22.5
									Total	**1,567.5**	**217.9**

Natural Gas Use	
Source	Total MBtu
O&M Building	**6.5**

Water Use Energy								
Water Use (Mgal)			Electricity Intensity Factors (kWh/Mgal)					
Total	Indoor	Outdoor	Source Water	Treat Water	Distribute Water	Wastewater Treatment	kWh Total	Total MBtu
1.629	0.071	1.558	2117	111	1272	1911	8678.8	**29.6**

Project Electricity Generation				
Capacity Factor Calculations				
County	Capacity (MW AC)	Net Production (MW AC)	Capacity Factor	
Alameda	18	29,133	**18.7%**	
Contra Costa	45	83,057	**21.3%**	
Santa Clara	26	47,934	**21.1%**	
Solano	26	41,577	**18.5%**	
Total	**114**	**201,701**	**20.2%**	
Energy Generation				
Capacity (MW AC)	hours/year	Capacity Factor	Energy Generated (MWhr/year)	Total MBtu
100	8,766	20.2%	**177,207**	**604,656.6**

Project Net Operatiopnal Energy Use	
Source	Total MBtu
Mobile	1,502.5
Off-Road	217.9
Natural Gas	6.5
Water/Wastewater	29.6
Electricity Generation	(604,656.6)
Net Energy Use	**(602,900.0)**

Offset GHG Calculation			
Gas	Intensity Factor (lb/MWhr)	GWP	CO2e (MT/year)
CO2	6.41E+02	1	51,523.5
CH4	2.90E-02	25	58.3
N2O	6.17E-03	298	147.8
		Total	**51,729.6**

Notes:
1. Off-road equipment types, horsepower, count and hours from CalEEMod Version 2016.3.2. http://www.caleemod.com/.
2. Off-road fuel consumption factors from CARB OFFROAD2017- ORION Web Database. https://www.arb.ca.gov/orion/.
3. On-road fuel consumption factors from CARB EMFAC2107 Web Database. https://www.arb.ca.gov/emfac/2017/.
4. 1 Gallon of diesel = 0.139 MBtu; 1 gallon of gasoline = 0.124 M Btu.
5. Solar electricity generation capacity factor calculated from CEC data for Solar generation facilities in the eastern and southern San Francisco Bay Area.
6. GHG intensity factors from CalEEMod Version 2106.3.2

OFFROAD2017 (v1.0.1) Emissions Inventory
Region Type: Air Basin
Region: San Francisco Bay Area
Calendar Year: 2022
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2017 Equipment Types
Units: Emissions: tons/day, Fuel Consumption: gallons/year, Activity: hours/year, HP-Hours: HP-hours/year

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	Fuel_gpy	Total_Activity_hpy	Total_Population	Horsepower_Hours_hhpy	Gallons/hp-hour
San Francisc	2022	ConstMin - Bore/Drill Rigs	Aggregated	75	Diesel	8740.9033	4793.915797	10.5842572	342223.7168	0.02554149
San Francisc	2022	ConstMin - Cranes	Aggregated	300	Diesel	209417.64	63777.76967	135.2967655	14069174.34	0.01488486
San Francisc	2022	ConstMin - Crawler Tractors	Aggregated	300	Diesel	287351.18	63106.56853	141.4126564	12967089.72	0.02216004
San Francisc	2022	ConstMin - Graders	Aggregated	300	Diesel	802029.11	175216.3924	230.7533916	37932274.9	0.02114371
San Francisc	2022	ConstMin - Other Construction Equipment	Aggregated	100	Diesel	152976.83	86788.69257	192.2176828	7126688.203	0.02146535
San Francisc	2022	ConstMin - Rollers	Aggregated	100	Diesel	198634.77	117266.662	353.3959813	10236683.15	0.01940421
San Francisc	2022	ConstMin - Rough Terrain Forklifts	Aggregated	100	Diesel	509197.02	254184.8535	899.695678	24475070.54	0.02080472
San Francisc	2022	ConstMin - Rubber Tired Loaders	Aggregated	300	Diesel	1488248.8	382202.4152	358.5060573	79763414	0.01865829
San Francisc	2022	ConstMin - Skid Steer Loaders	Aggregated	75	Diesel	506829.28	376834.5261	1055.152456	26590054.59	0.01906086
San Francisc	2022	ConstMin - Tractors/Loaders/Backhoes	Aggregated	100	Diesel	3052088.4	1918653.407	3064.253302	159566319.8	0.01912740
San Francisc	2022	ConstMin - Trenchers	Aggregated	100	Diesel	44665.825	20508.70128	62.14064724	1716414.159	0.02602275
San Francisc	2022	Industrial - Aerial Lifts	Aggregated	75	Diesel	287697.89	249567.5957	826.7917243	18046711.9	0.01594185
San Francisc	2022	OFF - Light Commercial - Welders	Aggregated	50	Diesel	1053503.2	886366	1380.12	40772836	0.02583836
San Francisc	2022	Portable Equipment - Non-Rental Compressor	Aggregated	100	Diesel	121056.32	92008.17176	228.6682714	7820937.676	0.01547849
San Francisc	2022	Portable Equipment - Non-Rental Generator	Aggregated	100	Diesel	279996.17	191657.1516	142.7725755	18089369.84	0.01547849
San Francisc	2022	Portable Equipment - Non-Rental Pump	Aggregated	100	Diesel	56497.606	40834.00385	130.0042964	3650071.7	0.01547849

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: Air Basin
Region: SAN FRANCISCO BAY AREA
Calendar Year: 2022
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption. Note 'day' in the unit is operation d

2020 Construction Fleet Fuel Consumption								
Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	VMT	Fuel Consumption (1000 Gal.)	Gallons/VMT
Worker (LDA, LDT1, LDT2)								
SAN FRANCISCO BAY AREA	2022	LDA	Aggregated	Aggregated	DSL	1098265.5	22.55524516	0.020537151
SAN FRANCISCO BAY AREA	2022	LDT1	Aggregated	Aggregated	DSL	2983.8991	0.124217665	0.041629312
SAN FRANCISCO BAY AREA	2022	LDT2	Aggregated	Aggregated	DSL	256077.98	7.155116736	0.027941163
					Diesel Total	**1357327.4**	**29.83457956**	**0.000213798**
SAN FRANCISCO BAY AREA	2022	LDA	Aggregated	Aggregated	GAS	96209643	3014.492163	0.031332537
SAN FRANCISCO BAY AREA	2022	LDT1	Aggregated	Aggregated	GAS	9811542.1	357.9631207	0.03648388
SAN FRANCISCO BAY AREA	2022	LDT2	Aggregated	Aggregated	GAS	32166990	1269.96855	0.03948049
					Gas Total	**138188176**	**4642.423834**	**0.033268172**
					Total VMT	**139545503**		
Hauling (HHDT)								
SAN FRANCISCO BAY AREA	2022	HHDT	Aggregated	Aggregated	DSL	4387800.8	680.0482745	**0.154986131**