

Energy Impact Assessment

Vega SES 4 Solar Energy Storage Project

County of Imperial, California

Prepared For:

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ATTACHMENTS

Attachment A - Energy Consumption Modeling Output

LIST OF ACRONYMS AND ABBREVIATIONS

APNs	Assessor's Parcel Numbers
CalEEMod	California Emissions Estimator Model
CAISO	California Independent System Operator
CARB	California Air Resources Board
CEC	California Energy Commission
CPUC	California Public Utility Commission
EPS	Emissions Performance Standard
HSAT	Horizontal Single-Axis Tracker
IID	Imperial Irrigation District
kWh	Kilowatt-Hours
MW	Megawatt
mWh	Megawatt Hour
PV	Photovoltaic
Project	Vega SES 4 Solar Energy Storage Project
RPS	Renewables Portfolio Standard

1.0 INTRODUCTION

This report documents the results of an Energy Impact Assessment completed for the Vega SES 4 Solar Energy Storage Project (Project), which includes the construction of a nominal 100-megawatt (MW) alternating current solar photovoltaic (PV) energy generation system with an integrated 100 MW battery storage project on approximately 531.53 acres of land in Imperial County, California. This report was prepared to analyze the potential direct and indirect environmental impacts associated with Project energy consumption, including the depletion of nonrenewable resources (oil, natural gas, coal, etc.) during the construction and operational phases. The impact analysis focuses on the four sources of energy that are relevant to the proposed Project: electricity, natural gas, the equipment-fuel necessary for Project construction, and the automotive fuel necessary for Project operations.

1.1 Project Overview

The Project proposes to construct a nominal 100 MW alternative current PV energy generation system, accompanied by a 100 MW battery storage, utilizing either thin film or crystalline solar PV technology modules mounted either on fixed frames or horizontal single-axis tracker (HSAT) systems. The fixed frame PV module arrays would be mounted on racks that would be supported by driven piles. The individual PV systems would be arranged in large arrays by placing them in columns spaced approximately ten feet apart to maximize operational performance and to allow access for panel cleaning and maintenance.

1.2 Project Location

The Project site is an approximately 531.53-acre site located between the California/Mexico border and the All-American Canal (Aqueduct), on the California side in southcentral Imperial County (County) (see Figure 1). The Project site is located approximately 1.92 miles southeast of the Bonds Corner Road/East Cedar Street/California State Route 98 intersection near the unincorporated community of Bonds Corner. The Project would be located on Imperial County Assessor's Parcel Numbers (APNs) 059-300-015-000 (approximately 301.73 acres), 059-300-017-000 (approximately 148.88 acres) and 059-290-010-000 (approximately 80.92 acres). The irregular shaped site is bound by undeveloped agricultural land to the south, west and east, and the Aqueduct running southwest on the northern border of the proposed Project site. The Project site is currently characterized by flat and undeveloped agricultural land.

1.3 Applicable Land Use Regulations

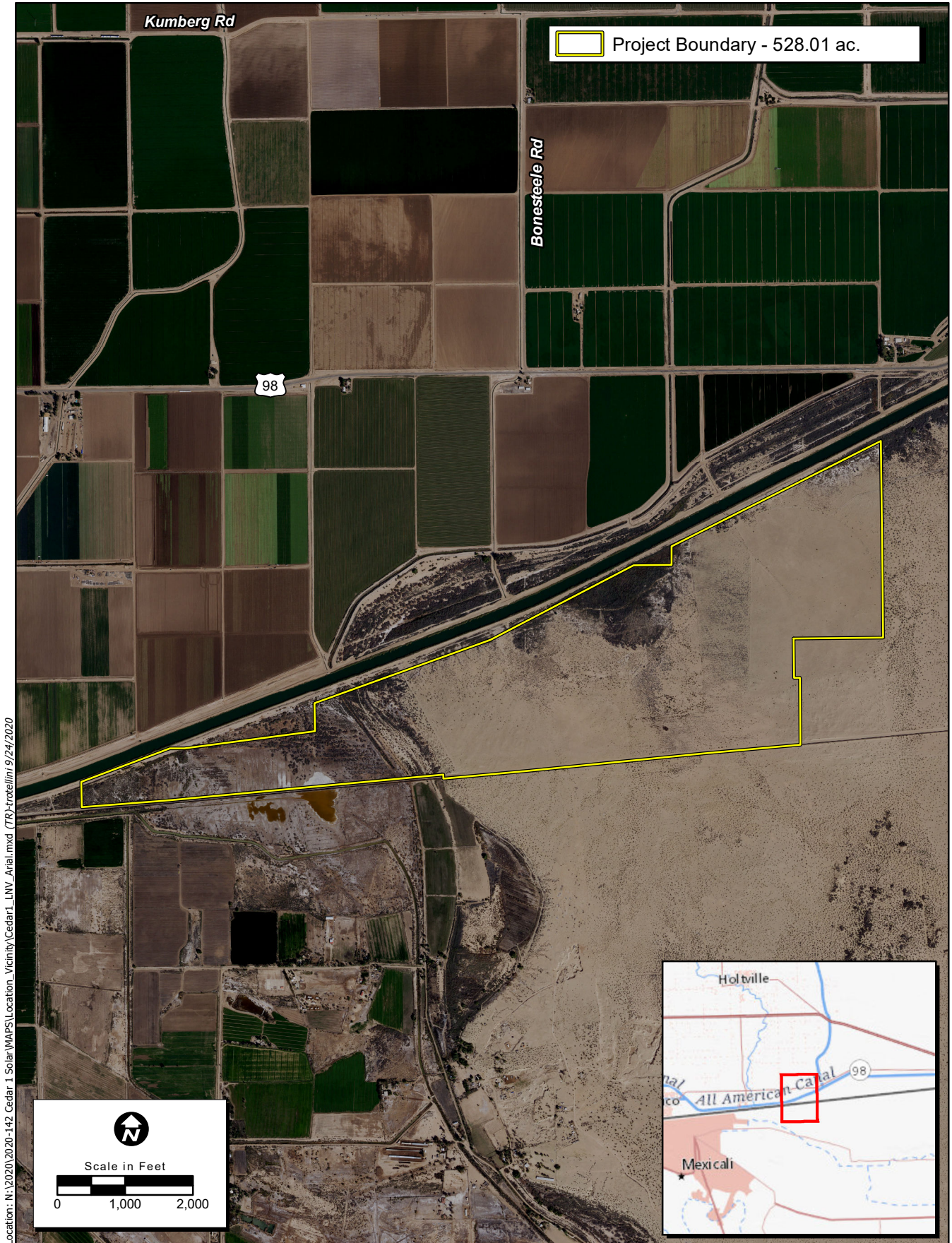
All three of the Project area parcels are designated as "Agriculture" in the Imperial County General Plan and are zoned A-3-RE (Heavy Agriculture with a Renewable Energy Overlay-areas that are suitable for agricultural land uses; to prevent the encroachment of incompatible uses onto and within agricultural lands; and to prohibit the premature conversion of such lands to non-agricultural uses). Pursuant to Section 91703.02 (*Conditional Use Permits*), Renewable Energy Projects must be located within the Renewable Energy Overlay Zone and may be permitted only through the issuance of a Conditional Use Permit (CUP) as approved by the Approving Authority unless otherwise allowed by applicable law. At present, the Project is located within the Renewable Energy Zone.

1.4 Project Site Access

The Project site would include one primary access driveway, currently contemplated across the East Highline Check of the Aqueduct, in the far northeastern corner of the Project area and a secondary access driveway (if required) with a to-be-determined location. This driveway would be provided with a minimum of 30-foot double swing gates with "Knox Box" for keyed entry. Internal to the Project site up to 30-foot wide roads would be provided between the PV arrays, as well as around the perimeter of each Project site inside the perimeter security fence to provide access to all areas of each site for maintenance and emergency vehicles.

1.5 Project Construction

Construction activities would primarily involve demolition and grubbing; grading of the Project area to establish access roads and pads for electrical equipment (inverters and step-up transformers); trenching for underground electrical collection lines; and the installation of solar equipment and security fencing. The construction of the site is estimated to take 12-18 months and would begin in 2022. A temporary, portable construction supply container would be located at the Project site at the beginning of construction and removed at the end of construction. The number of on-site construction workers for the solar project facilities is not expected to exceed 150 workers at any one time. The number of on-site construction workers for the battery storage facility and the substation is not expected to exceed 100 workers at any one time. Onsite parking would be provided for all construction workers.



Location: N:\2020\2020-142 Cedar 1 Solar\WAPS\Location_Vicinity\Cedar1_LIN_V_Arial.mxd (TR)-tracellin 9/24/2020

Map Date: 9/24/2020
 Service Layer Credits:
 Photo Source: NAIP (2018)

Figure 1. Project Location and Vicinity
 2020-142 Vega SES 4

2.0 ENERGY CONSUMPTION

2.1 Energy Types and Sources

California relies on a regional power system comprised of a diverse mix of natural gas, renewable, hydroelectric, and nuclear generation resources. Natural gas provides California with a majority of its electricity followed by renewables, large hydroelectric and nuclear (California Energy Commissions [CEC] 2020). Imperial Irrigation District (IID), the sixth largest electrical utility in California serving more than 150,000 customers in the Imperial Valley and parts of Riverside and San Diego counties, provides electrical services to the Project area. IID controls more than 1,100 megawatts of energy derived from a diverse resource portfolio that includes its own generation, and long- and short-term power purchases. Located in a region with abundant sunshine, enviable geothermal capacity, wind and other renewable potential, IID has met or exceeded all Renewable Portfolio Standard requirements to date, procuring renewable energy from diverse sources, including biomass, biowaste, geothermal, hydroelectric, solar and wind.

The Southern California Gas Company provides natural gas services to Imperial County. As the nation's largest natural gas distribution utility, the Southern California Gas Company delivers natural gas energy to 21.6 million consumers through 5.9 million meters in more than 500 communities. The Southern California Gas Company's service territory encompasses approximately 20,000 square miles throughout Central and Southern California, from Visalia to the Mexican border.

2.1.1 Energy Consumption

Electricity use is measured in kilowatt-hours (kWh), and natural gas use is measured in therms. Vehicle fuel use is typically measured in gallons (e.g. of gasoline or diesel fuel), although energy use for electric vehicles is measured in kWh.

The electricity consumption associated with all uses in Imperial County from 2015 to 2019 is shown in Table 2-1. As indicated, the demand has remained constant since 2015.

Table 2-1. Electricity Consumption in Imperial County 2015-2019	
Year	Electricity Consumption (kilowatt hours)
2019	1,415,790,908
2018	1,467,590,638
2017	1,445,167,336
2016	1,440,493,016
2015	1,419,088,130

Source: CEC 2019

The natural gas consumption associated with all uses in Imperial County from 2015 to 2019 is shown in Table 2-2. As indicated, the demand has increased since 2015.

Table 2-2. Natural Gas Consumption in Imperial County 2015-2019

Year	Natural Gas Consumption (therms)
2019	42,914,053
2018	38,729,625
2017	40,442,318
2016	36,089,854
2015	31,494,256

Source: CEC 2019

Automotive fuel consumption in Imperial County from 2016 to 2020 is shown in Table 2-3. Fuel consumption has decreased between 2016 and 2020.

Table 2-3. Automotive Fuel Consumption in Imperial County 2016-2020

Year	Total Fuel Consumption (gallons)
2020	196,177,597
2019	198,822,094
2018	201,793,138
2017	204,312,157
2016	208,822,214

Source: California Air Resources Board (CARB) 2017

2.2 Regulatory Framework

2.2.1 State

Executive Order B-55-18

In September 2018 Governor Jerry Brown Signed Executive Order (EO) B-55-18, which establishing a new statewide goal “to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter.” Carbon neutrality refers to achieving a net zero carbon dioxide emissions. This can be achieved by reducing or eliminating carbon emissions, balancing carbon emissions with carbon removal, or a combination of the two. This goal is in addition to existing statewide targets for GHG emission reduction. EO B-55-18 requires the California Air Resource Board (CARB) to “work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal.

Senate Bill 1368

On September 29, 2006, Governor Arnold Schwarzenegger signed into law Senate Bill (SB) 1368 (Perata, Chapter 598, Statutes of 2006). The law limits long-term investments in baseload generation by the state's utilities to those power plants that meet an emissions performance standard jointly established by the CEC and the California Public Utilities Commission (CPUC).

The CEC has designed regulations that:

- Establish a standard for baseload generation owned by, or under long-term contract to, publicly owned utilities, of 1,100 pounds carbon dioxide per megawatt hour (mWh). This would encourage the development of power plants that meet California's growing energy needs while minimizing their emissions of greenhouse gas.
- Require posting of notices of public deliberations by publicly owned utilities on long-term investments on the CEC website. This would facilitate public awareness of utility efforts to meet customer needs for energy over the long term while meeting the State's standards for environmental impact.
- Establish a public process for determining the compliance of proposed investments with the emissions performance standard (EPS) (Perata, Chapter 598, Statutes of 2006).

Renewable Energy Sources (Renewable Portfolio Standards)

Established in 2002 under SB 1078, and accelerated by SB 107 (2006) and SB 2 (2011), California's Renewables Portfolio Standard (RPS) obligates investor-owned utilities, energy service providers, and community choice aggregators to procure 33 percent of their electricity from renewable energy sources by 2020. Eligible renewable resources are defined in the 2013 RPS to include biodiesel; biomass; hydroelectric and small hydro (30 megawatts or less); Los Angeles Aqueduct hydro power plants; digester gas; fuel cells; geothermal; landfill gas; municipal solid waste; ocean thermal, ocean wave, and tidal current technologies; renewable derived biogas; multi-fuel facilities using renewable fuels; solar photovoltaic; solar thermal electric; wind; and other renewables that may be defined later. Governor Jerry Brown signed SB 350 on October 7, 2015, which expands the RPS by establishing a goal of 60 percent of the total electricity sold to retail customers in California per year by December 31, 2030. In addition, SB 350 includes the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses upon which an energy efficiency program is focused) of retail customers through energy conservation and efficiency. The bill also requires the CPUC, in consultation with the CEC, establish efficiency targets for electrical and gas corporations consistent with this goal. SB 350 also provides for the transformation of the California Independent System Operator (CAISO) into a regional organization to promote the development of regional electricity transmission markets in the western states and to improve the access of consumers served by the CAISO to those markets, pursuant to a specified process. In 2018, SB 100 was signed by Governor Brown, codifying a goal of 60 percent renewable procurement by 2030 and 100 percent by 2045 Renewables Portfolio Standard.

2.3 Energy Consumption Impact Assessment

2.3.1 Thresholds of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. The Project would result in a significant impact to energy if it would do any of the following:

- 1) Result in potentially significant environmental impact due to 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 impact analysis focuses on the four sources of energy that are relevant to the proposed Project: electricity, natural gas, the equipment fuel necessary for Project construction, and the automotive fuel necessary for Project operations. Addressing energy impacts requires an agency to make a determination as to what constitutes a significant impact. There are no established thresholds of significance, statewide or locally, for what constitutes a wasteful, inefficient, and unnecessary consumption of energy for a proposed land use. For the purposes of this analysis, the amount of electricity and natural gas estimated to be consumed by the Project are quantified and compared to that consumed by all land uses in Imperial County. Similarly, the amount of fuel necessary for Project construction and operations is calculated and compared to that consumed in Imperial County.

2.3.2 Methodology

Levels of construction and operational related energy consumption estimated to be consumed by the Project include the number of kWh of electricity, therms of natural gas and gallons of gasoline. Modeling was based on Project specific information such as construction timing and equipment as well as site operations. Energy consumption estimates were calculated using the California Emissions Estimator Model (CalEEMod), version 2016.3.2. CalEEMod is a statewide land use computer model designed to quantify resources associated with both construction and operations from a variety of land use projects.

2.3.3 Impact Analysis

2.4 Energy Consumption

The Project is proposing the development of a 100 MW alternating current PV energy generation system with an integrated 100 MW battery on approximately 531.53 acres of land. Operations of the proposed Project would not result in the consumption of electricity or natural gas and thus, would not contribute to the County wide usage and would directly support the RPS goal of increasing the percentage of electricity procured from renewable sources.

Therefore, this impact analysis focuses on the two sources of energy that are most relevant to the Project: the equipment fuel necessary for construction and the automotive fuel necessary for ongoing maintenance activities. The amount of total construction-related fuel use was estimated using ratios provided in the Climate Registry's General Reporting Protocol for the Voluntary Reporting Program, Version 2.1. The amount of operational fuel use was estimated using CARB's EMFAC2017 computer program, which provides projections for typical daily fuel usage in Imperial County. This analysis conservatively assumes that all of the automobile trips projected to arrive at the Project during operations would be new to Imperial County.

Energy consumption associated with the proposed Project is summarized in Table 2-4. Project increases in automotive fuel consumption are compared with the countywide fuel consumption in 2020, the most recent full year of data.

Table 2-4. Proposed Project Energy and Fuel Consumption		
Energy Type	Annual Energy Consumption	Percentage Increase Countywide
Electricity Consumption ¹	0 kilowatt-hours	0.00000 percent
Natural Gas ¹	0 therms	0.00000 percent
<i>Automotive Fuel Consumption</i>		
Project Construction 2022 ²	77,931 gallons	0.03971 percent
Project Construction 2023 ²	45,123 gallons	0.02299 percent
Project Operations ³	128 gallons	0.00006 percent

Source: ¹CalEEMod; ²Climate Registry 2016; ³EMFAC2017 (CARB 2017)

Notes: The Project increases in electricity and natural gas consumption are compared with all uses in Imperial County in 2019, the latest data available. The Project increases in automotive fuel consumption are compared with the countywide fuel consumption in 2020, the most recent full year of data.

Fuel necessary for Project construction would be required for the operation and maintenance of construction equipment and the transportation of materials to the Project site. The fuel expenditure necessary to construct the solar facility and infrastructure would be temporary, lasting only as long as Project construction. As indicated in Table 2-4, the Project's gasoline fuel consumption during the one-time construction period is estimated to be 77,931 gallons during 2022 construction and 45,123 gallons during 2023 construction. This would increase the annual countywide gasoline fuel use in the county by 0.03971 percent and 0.02299 percent respectively. As such, Project construction would have a nominal effect on local and regional energy supplies. No unusual Project characteristics would necessitate the use of construction equipment that would be less energy efficient than at comparable construction sites in the region or the state. Construction contractors would purchase their own gasoline and diesel fuel from local suppliers and would judiciously use fuel supplies to minimize costs due to waste and subsequently maximize profits. Additionally, construction equipment fleet turnover and increasingly stringent state and federal regulations on engine efficiency combined with state regulations limiting engine idling times and requiring recycling of construction debris, would further reduce the amount of transportation fuel demand during Project construction. For these reasons, it is expected that construction fuel consumption associated with the Project would not be any more inefficient, wasteful, or unnecessary than other similar development projects of this nature.

Once construction is completed the Project would be remotely controlled. No employees would be based at the Project site. The only operational emissions associated with the Project would be associated with motor vehicle use for routine maintenance work and site security as well as panel upkeep and cleaning. A conservative estimate of one vehicle trip per day generated by the Project was assumed. This is a conservative estimate as most days would require no operational related vehicle trips. As indicated in Table 2-4, this would estimate to a consumption of approximately 128 gallons of automotive fuel per year, which would increase the annual countywide automotive fuel consumption by 0.00006 percent. Fuel consumption associated with both the construction equipment needed to construction the Project and the vehicle trips generated by the Project during ongoing maintenance activities would not be considered inefficient, wasteful, or unnecessary in comparison to other similar developments in the region.

State and Local Plans for Renewable Energy/Energy Efficiency

The purpose of the proposed Project is the construction of a renewable energy and storage facility in Imperial County. Once in operation, it will decrease the need for energy from fossil fuel-based power plants in the state. The result would be a net increase in electricity resources available to the regional grid, generated from a renewable source. Therefore, the Project would directly support the RPS goal of increasing the percentage of electricity procured from renewable sources. Additionally, the Project would also be consistent with the County's General Plan Conservation and Open Space Element, Objective 9.2 which encourages renewable energy developments. Therefore, the Project would directly support state and local plans for renewable energy development.

3.0 REFERENCES

- CARB. 2017. EMFAC2017 Web Database Emissions Inventory. <https://www.arb.ca.gov/emfac/2017/>.
- CEC. 2020. 2019 Total System Electric Generations in Gigawatt Hours.
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- Climate Registry. 2016. *General Reporting Protocol for the Voluntary Reporting Program version 2.1*. January 2016. <http://www.theclimateregistry.org/wp-content/uploads/2014/11/General-Reporting-Protocol-Version-2.1.pdf>

LIST OF ATTACHMENTS

Attachment A - Energy Consumption Modeling Output

ATTACHMENT A

Energy Consumption Modeling Output

Action	Carbon Dioxide Equivalents (CO ₂ e) in Metric Tons ¹	Conversion of Metric Tons to Kilograms ²	Construction Equipment Emission Factor ²	Total Gallons of Fuel Consumed
Project Construction	791	791000	10.15	77,931
		Per Climate Registry Equation 13e	Per Climate Registry Equation 13e	
	Per CalEEMod Output Files.			

Total Gallons Consumed During 2022 Project Construction:

77,931

Notes:

Fuel used by all construction equipment, including vehicle hauling trucks, assumed to be diesel.

Sources:

¹ECORP Consulting, 2021.

²Climate Registry. 2016. *General Reporting Protocol for the Voluntary Reporting Program version 2.1*. January 2016.
<http://www.theclimateregistry.org/wp-content/uploads/2014/11/General-Reporting-Protocol-Version-2.1.pdf>

Proposed Project Total Construction-Related and Operational Gasoline Usage				
Action	Carbon Dioxide Equivalents (CO ₂ e) in Metric Tons ¹	Conversion of Metric Tons to Kilograms ²	Construction Equipment Emission Factor ²	Total Gallons of Fuel Consumed
Project Construction	458	458000	10.15	45,123
<div>Per CalEEMod Output Files.</div> <div>Per Climate Registry Equation 13e</div> <div>Per Climate Registry Equation 13e</div>				

Total Gallons Consumed During 2023 Project Construction: 45,123

Notes:
Fuel used by all construction equipment, including vehicle hauling trucks, assumed to be diesel.

Sources:
¹ECORP Consulting, 2021.

²Climate Registry. 2016. *General Reporting Protocol for the Voluntary Reporting Program version 2.1*. January 2016.
<http://www.theclimateregistry.org/wp-content/uploads/2014/11/General-Reporting-Protocol-Version-2.1.pdf>

Total Gallons During Project Operations ³								
Area	Sub-Area	Cal. Year	Season	Veh_tech	EMFAC 2011 Category	Fuel_GAS Output	Daily Total	ANNUAL TOTAL
Sub-Areas	Imperial	2023	Annual	All Vehicles	All Vehicles ⁴	0.000350094	0.350093775	127.8

Sources:
³Californai Air Resource Board. 2017. EMFAC2017 Mobile Emissions Model.

Notes:
⁴Excluding Heavy-Duty Highway Trucks, T6 Agricultural Truck, T6 Instate Construction (heavy and small), T7 Agricultural Truck, T7 CAIRP Construction, T7 Single Construction, T7 Tractor Truck, and T7 Tractor Construction