Antelope Valley Commerce Center

ENERGY ANALYSIS

CITY OF PALMDALE

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LIST OF ABBREVIATED TERMS

(1)	Reference
AQIA	Air Quality Impact Analysis
BACM	Best Available Control Measures
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CPUC	California Public Utilities Commission
DMV	Department of Motor Vehicles
EIA	Energy Information Administration
EIR	Environmental Impact Report
EMFAC	Emissions Factor
FERC	Federal Energy Regulatory Commission
GPA	General Plan Amendment
GS-1	General Service Rate Schedule
GWh	Gigawatt Hour
HHDT	Heavy-Heavy Duty
Hp-hr-gal	Horsepower-Hour Per Gallon
IEPR	Integrative Energy Policy Report
ISO	Independent Service Operator
ISTEA	Intermodal Surface Transportation Efficiency Act
ITE	Institute of Transportation Engineers
kBTU	Kilo-British Thermal Units
kWh	Kilowatt Hour
LDA	Light Duty Auto
LDT1/LDT2	Light-Duty Trucks
MDAB	Mojave Desert Air Basin
MDV	Medium Duty Trucks
MHDT	Medium-Heavy Duty Trucks
mpg	Miles Per Gallon
MPO	Metropolitan Planning Organization
PG&E	Pacific Gas and Electric
Project	Antelope Valley Commerce Center
SCE	Southern California Edison
SDAB	San Diego Air Basin
SDG&E	San Diego Gas and Electric

sf	Square Feet
SoCalGas	Southern California Gas
SW Gas	Southwest Gas Company
TEA-21	Transportation Equity Act for the 21st Century
VMT	Vehicle Miles Traveled

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EXECUTIVE SUMMARY

ES.1 SUMMARY OF FINDINGS

The results of this *Antelope Valley Commerce Center Energy Analysis* is summarized below based on the significance criteria in Section 3 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines (1). Table ES-1 shows the findings of significance for potential energy impacts under CEQA.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Energy Impact #1: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	5.0	*Less Than Significant*	*n/a*
Energy Impact #2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	5.0	*Less Than Significant*	*n/a*

ES.2 MITIGATION MEASURES

Because the proposed Project does not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation nor does it conflict with or obstruct a state or local plan for renewable energy or energy efficiency, impacts would be less than significant, and no mitigation is required.

The following measures were identified in the *Antelope Valley Commerce Center Air Quality Impact Analysis* (*AQIA*) report (2). Although these measures are designed to reduce Project air quality emissions, they would also assist in the reduction of fuel and energy usage.

MM AQ-1

The Construction Contractor shall ensure that off-road diesel construction equipment used during Grading activities, complies with EPA/CARB Tier 4 emissions standards or equivalent and shall ensure that all construction equipment is tuned and maintained in accordance with the manufacturer's specifications.

MM AQ-2

The Project shall utilize "Super-Compliant" low VOC paints which have been reformulated to exceed the regulatory VOC limits put forth by AVAQMD's Rule 1113. Super-Compliant low VOC paints shall be no more than 10 grams per liter (g/L) of VOC. Alternatively, the applicant may utilize tilt-up concrete buildings that do not require the use of architectural coatings.

MM AQ-3

The Project shall implement the following measures in order to reduce operational mobile source air pollutant emissions to the extent feasible:

- Only haul trucks meeting model year 2010 engine emission standards shall be used for the on-road transport of materials to and from the Project site.
- Legible, durable, weather-proof signs shall be placed at truck access gates, loading docks, and truck parking areas that identify applicable California Air Resources Board (CARB) anti-idling regulations. At a minimum, each sign shall include: (1) instructions for truck drivers to shut off engines when not in use; (2) instructions for drivers of diesel trucks to restrict idling to no more than 5 minutes once the vehicle is stopped, the transmission is set to "neutral" or "park," and the parking brake is engaged; and (3) telephone numbers of the building facilities manager and CARB to report violations. Prior to the issuance of an occupancy permit, the City of Palmdale shall conduct a site inspection to ensure that the signs are in place.
- Prior to tenant occupancy, the Project Applicant or successor in interest shall provide documentation to the City demonstrating that occupants/tenants of the Project site have been provided documentation on funding opportunities, such as the Carl Moyer Program, that provide incentives for using cleaner-than-required engines and equipment.
- The minimum number of automobile electric vehicle (EV) charging stations required by the California Code of Regulations Title 24 shall be provided. In addition, the buildings shall include electrical infrastructure sufficiently sized to accommodate the potential installation of additional auto and truck EV charging stations in the future.
- Conduit shall be installed to tractor trailer parking areas in logical locations determined by the Project Applicant during construction document plan check, for the purpose of accommodating the future installation of EV truck charging stations at such time this technology becomes commercially available.

MM AQ-4

The Project shall implement the following measure in order to reduce operational energy source air pollutant emissions to the extent feasible:

- The Project shall include rooftop solar panels to the extent feasible, with a capacity that matches the maximum allowed for distributed solar connections to the grid.
- Install Energy Star-rated heating, cooling, lighting, and appliances.
- Provide information on energy efficiency, energy-efficient lighting and lighting control systems, energy management, and existing energy incentive programs to future tenants of the Project.
- Structures shall be equipped with outdoor electric outlets in the front and rear of the structures to facilitate use of electrical lawn and garden equipment.

MM AQ-5

The Project shall include the following language within tenant lease agreements in order to reduce operational air pollutant emissions to the extent feasible:

- Require tenants to use the cleanest technologies available and to provide the necessary infrastructure to support zero-emission vehicles, equipment, and appliances that would be

operating on site. This requirement shall apply to equipment such as forklifts, handheld landscaping equipment, yard trucks, office appliances, etc.

- Require future tenants to exclusively use zero-emission light and medium-duty delivery trucks and vans, when economically feasible.
- Tenants shall be in, and monitor compliance with, all current air quality regulations for on-road trucks including the CARB's Heavy-Duty (Tractor-Trailer) Greenhouse Gas Regulation, Periodic Smoke Inspection Program, and the Statewide Truck and Bus Regulation.

ES.3 PROJECT DESIGN FEATURES

Sustainable design features and operational programs would be incorporated into facilities developed pursuant to the currently proposed Project. The Project also incorporates and expresses the following project design features and attributes promoting sustainability. Because these features/attributes are integral to the Project, and/or are regulatory requirements, they are not considered to be mitigation measures.

WATER CONVERSATION

To reduce water demands and associated energy use, the Project is required to implement a Water Conservation Strategy and demonstrate a minimum 20% reduction in indoor and outdoor water usage when compared to baseline water demand (total expected water demand without implementation of the Water Conservation Strategy). Prior to the issuance of building permits for the Project, the Project applicant shall provide building plans that include the following water conservation measures:

- Install low-water use appliances and fixtures
- Restrict the use of water for cleaning outdoor surfaces and prohibit systems that apply water to non-vegetated surfaces
- Implement water-sensitive urban design practices in new construction
- Install rainwater collection systems where feasible.

SOLID WASTE REDUCTION

In order to reduce the amount of waste disposed at landfills, the Project will commit implement a 75% waste diversion program. Prior to the issuance of building permits for the Project, the Project applicant shall provide building plans that include the following solid waste reduction measures:

- Provide storage areas for recyclables and green waste in new construction, and food waste storage, if a pick-up service is available.
- Evaluate the potential for onsite composting.

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1 INTRODUCTION

This report presents the results of the energy analysis prepared by Urban Crossroads, Inc., for the proposed Antelope Valley Commerce Center (Project). The purpose of this report is to ensure that energy implication is considered by the City of Palmdale, as the lead agency, and to quantify anticipated energy usage associated with construction of the proposed Project, determine if the usage amounts are efficient, typical, or wasteful for the land use type, and to emphasize avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

1.1 SITE LOCATION

The Project site is located on the southeast corner of Avenue M/Columbia Way and Sierra Highway in the City of Palmdale as shown on Exhibit 1-A. The Project site is vacant with nearby sensitive land uses located to the north across Avenue M. The Project site is located approximately 0.5 miles northwest of Runway 7 at Palmdale Airport/USAF Plant 42.

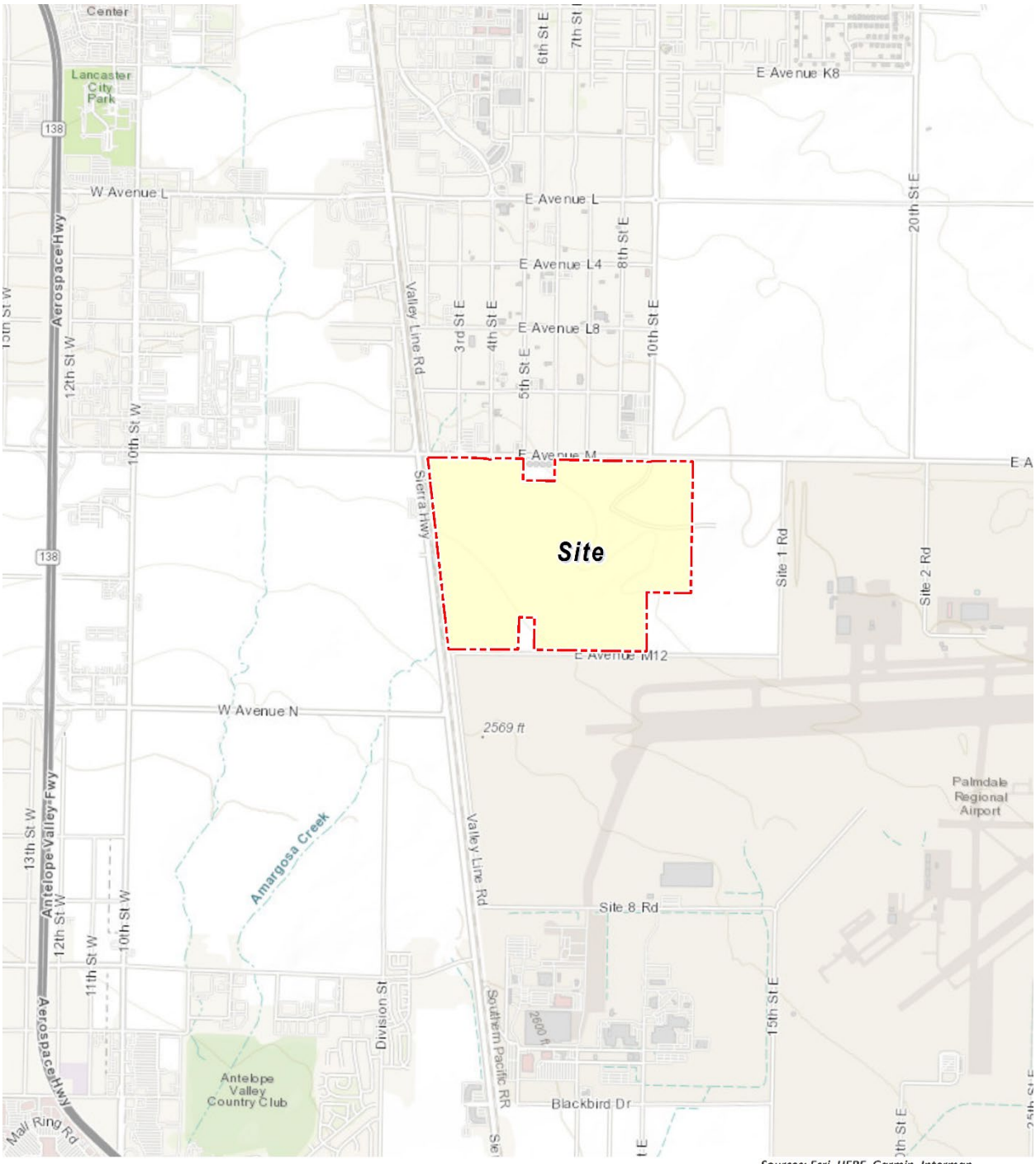
1.2 PROJECT DESCRIPTION

The Project is proposed to consist of the following uses for each phase (see Exhibit 1-B):

- Phase 1:
  - Building 1 is 136,670 square feet
  - Building 2 is 144,306 square feet
  - Building 3 is 132,695 square feet
  - Buildings 1 through 3 will assume 25% general light industrial and 75% general warehousing use
  - Building 4 is 680,469 square feet of high-cube fulfillment center (sort) warehouse use
  - Building 5 is 1,004,228 square feet with 25% high-cube cold storage warehouse use and high-cube fulfillment center (non-sort) warehouse use
  - Building 6 is 274,858 square feet with 25% manufacturing and 75% general warehousing use
- Phase 2:
  - 1,630,362 square feet of high-cube parcel hub warehousing use
  - 549,790 square feet with 25% manufacturing and 75% general warehousing use
- Phase 3:
  - 1,156,576 square feet with 25% high-cube cold storage warehouse use and 75% high-cube fulfillment (non-sort) warehousing use
  - 2,500 square feet of fast-food restaurant without drive-through window use, 2,500 square feet of fast-food restaurant with drive-through window use, 2,000 square feet of coffee shop with drive-through window use, and 53,984 square feet of commercial retail use (for a total of 60,984 square feet)
- Phase 4:
  - 2,555,556 square feet with 25% high-cube cold storage warehouse use and 75% high-cube fulfillment (non-sort) warehousing use

The proposed Project is anticipated to have an opening year of 2025 for Phase 1 and 2032 for Project Buildout. At the time this analysis was prepared, the future tenants of the proposed Project were unknown, and therefore, this study includes a conservative analysis of the proposed Project uses.

EXHIBIT 1-A: LOCATION MAP

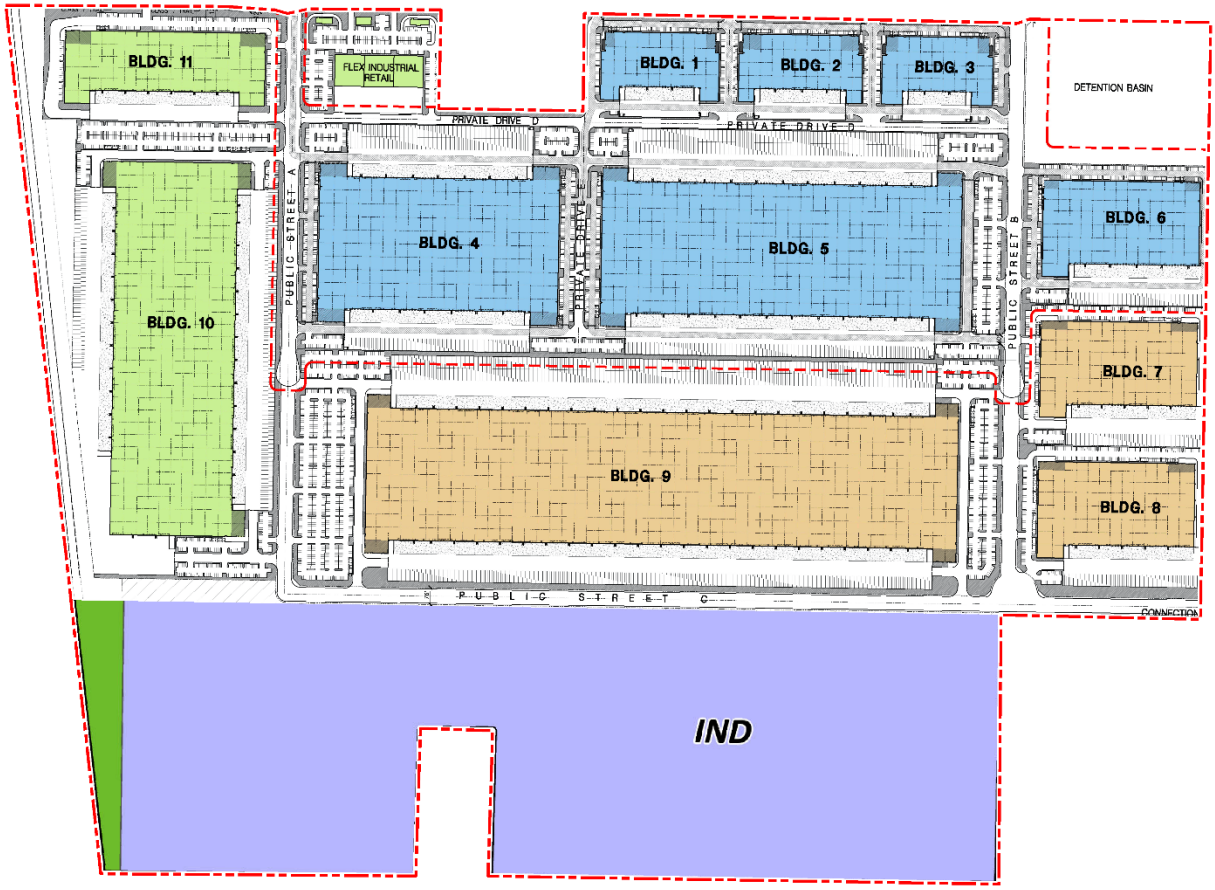


LEGEND:

Site Boundary

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS

EXHIBIT 1-B: SITE PLAN



LEGEND:

Site Boundary

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2 EXISTING CONDITIONS

This section provides an overview of the existing energy conditions in the Project region.

2.1 OVERVIEW

The most recent data for California's estimated total energy consumption and natural gas consumption is from 2021, released by the United States (U.S.) Energy Information Administration's (EIA) California State Profile and Energy Estimates in 2021 and included (3):

As of 2021, approximately 7,359 trillion British Thermal Unit (BTU) of energy was consumed

As of 2021, approximately 605 million barrels of petroleum

As of 2021, approximately 2,101 billion cubic feet of natural gas

As of 2021, approximately 1 million short tons of coal

According to the EIA, in 2022 the U.S. petroleum consumption comprised about 90% of all transportation energy use, excluding fuel consumed for aviation and most marine vessels (4). In 2022, about 251,923 million gallons (or about 5.99 million barrels) of finished petroleum products were consumed in the U.S., an average of about 690 million gallons per day (or about 16.4 million barrels per day) (5). In 2021, California consumed approximately 12,157 million gallons in motor gasoline (33.31 million per day) and approximately 3,541 million gallons of diesel fuel (9.7 million per day) (6).

The most recent data provided by the EIA for energy use in California is reported from 2021 and provided by demand sectors as follows:

Approximately 37.8% transportation sector

Approximately 23.2% industrial sector

Approximately 20.0% residential sector

Approximately 19.0% commercial sector (7)

According to the EIA, California used approximately 247,250 gigawatt hours of electricity in 2021 (8). By sector in 2021, residential uses utilized 36.5% of the state's electricity, followed by 43.9% for commercial uses, 19.2% for industrial uses, and 0.3% for transportation. Electricity usage in California for differing land uses varies substantially by the type of uses in a building, type of construction materials used in a building, and the efficiency of all electricity-consuming devices within a building (8).

According to the EIA, California used approximately 200,871 million therms of natural gas in 2021 (9). In 2021 (the most recent year for which data is available), by sector, industrial uses utilized 33% of the state's natural gas, followed by 30% used as fuel in the electric power sector, 21% from residential, 11% from commercial, 1% from transportation uses and the remaining 3% was utilized for the operations, processing and production of natural gas itself (9). While the supply of natural gas in the United States and production in the lower 48 states has increased greatly since 2008, California produces little, and imports 90% of its supply of natural gas (9).

In 2022, total system electric generation for California was 287,220 gigawatt hours (GWh). California's massive electricity in-state generation system generated approximately 203,257 GWh which accounted for approximately 71% of the electricity it uses; the rest was imported from the Pacific Northwest (12%) and the U.S. Southwest (17%) (10). Natural gas is the main source for electricity generation at 47.46% of the total in-state electric generation system power as shown in Table 2-1.

An updated summary of, and context for energy consumption and energy demands within the State is presented in "U.S. Energy Information Administration, California State Profile and Energy Estimates, Quick Facts" excerpted below (11):

- In 2022, California was the seventh-largest producer of crude oil among the 50 states, and, as of January 2022, the state ranked third in crude oil refining capacity.
- California is the largest consumer of jet fuel and second-largest consumer of motor gasoline among the 50 states.
- In 2020, California was the second-largest total energy consumer among the states, but its per capita energy consumption was less than in all but three other states.
- In 2022, renewable resources, including hydroelectric power and small-scale, customer-sited solar power, accounted for 49% of California's in-state electricity generation. Natural gas fueled another 42%. Nuclear power supplied almost all the rest.
- In 2022, California was the fourth-largest electricity producer in the nation. The state was also the nation's third-largest electricity consumer, and additional needed electricity supplies came from out-of-state generators.

As indicated below, California is one of the nation's leading energy-producing states, and California's per capita energy use is among the nation's most efficient. Given the nature of the Project, the remainder of this discussion will focus on the three sources of energy that are most relevant to the Project—namely, electricity, natural gas, and transportation fuel for vehicle trips associated with the uses planned for the Project.

TABLE 2-1: TOTAL ELECRICITY SYSTEM POWER (CALIFORNIA 2022)

Fuel Type	California In-State Generation (GWh)	% of California In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	Total Imports (GWh)	Total California Energy Mix (GWh)	Total California Power Mix
Coal	273	0.13%	181	5,716	5,897	6,170	2.15%
Natural Gas	96,457	47.46%	44	7,994	8,038	104,495	36.38%
Oil	65	0.03%	-	-	-	65	0.2%
Other (Waste Heat/Petroleum Coke)	315	0.15%	-	-	-	315	0.11%
Unspecified	-	0.0%	12,485	7,943	20,428	20,428	7.11%
Total Thermal and Unspecified	**97,110**	**47.78%**	**12,710**	**21,653**	**34,363**	**121,473**	**45.77%**
Nuclear	17,627	8.67%	397	8,342	8,739	26,366	9.18%
Large Hydro	14,607	7.19%	10,803	1,118	11,921	26,528	9.24%
Biomass	5,366	2.64%	771	25	797	6,162	2.15%
Geothermal	11,110	5.47%	253	2,048	2,301	13,412	4.67%
Small Hydro	3,005	1.48%	211	13	225	3,230	1.12%
Solar	40,494	19.92%	231	8,225	8,456	48,950	17.04%
Wind	13,938	6.86%	8,804	8,357	17,161	31,099	10.83%
Total Non-GHG and Renewables	**106,147**	**52.22%**	**21,471**	**28,129**	**49,599**	**155,747**	**54.23%**
SYSTEM TOTALS	***203,257***	***100.0%***	***34,180***	***49,782***	***83,962***	***287,220***	***100.0%***

Source: CECs 2022 Total System Electric Generation

2.2 ELECTRICITY

The usage associated with electricity use were calculated using the California Emissions Estimator Model (CalEEMod) version 2022.1.1.12. The Southern California region's electricity reliability has been of concern for the past several years due to the planned retirement of aging facilities that depend upon once-through cooling technologies, as well as the June 2013 retirement of the San Onofre Nuclear Generating Station (San Onofre). While the once-through cooling phase-out has been ongoing since the May 2010 adoption of the State Water Resources Control Board's once-through cooling policy, the retirement of San Onofre complicated the situation. California ISO studies revealed the extent to which the South California Air Basin (SCAB) and the San Diego Air Basin (SDAB) region were vulnerable to low-voltage and post-transient voltage instability concerns. A preliminary plan to address these issues was detailed in the 2013 Integrative Energy Policy Report (IEPR) after a collaborative process with other energy agencies, utilities, and air districts. Similarly, the subsequent 2022 IEPR's provides information and policy recommendations on advancing a clean, reliable, and affordable energy system (12).

California's electricity industry is an organization of traditional utilities, private generating companies, and state agencies, each with a variety of roles and responsibilities to ensure that electrical power is provided to consumers. The California Independent Service Operator (ISO) is a nonprofit public benefit corporation and is the impartial operator of the State's wholesale power grid and is charged with maintaining grid reliability, and to direct uninterrupted electrical energy supplies to California's homes and communities. While utilities still own transmission assets, the ISO routes electrical power along these assets, maximizing the use of the transmission system and its power generation resources. The ISO matches buyers and sellers of electricity to ensure that enough power is available to meet demand. To these ends, every five minutes the ISO forecasts electrical demands, accounts for operating reserves, and assigns the lowest cost power plant unit to meet demands while ensuring adequate system transmission capacities and capabilities (13).

Part of the ISO's charge is to plan and coordinate grid enhancements to ensure that electrical power is provided to California consumers. To this end, utilities file annual transmission expansion/modification plans to accommodate the State's growing electrical needs. The ISO reviews and either approves or denies the proposed additions. In addition, and perhaps most importantly, the ISO works with other areas in the western United States electrical grid to ensure that adequate power supplies are available to the State. In this manner, continuing reliable and affordable electrical power is assured to existing and new consumers throughout the State.

Electricity is currently provided to the Project site by Southern California Edison (SCE). SCE provides electric power to more than 15 million persons in 15 counties and in 180 incorporated cities, within a service area encompassing approximately 50,000 square miles. Based on SCE's 2021 Power Content Label Mix, SCE derives electricity from varied energy resources including: fossil fuels, hydroelectric generators, nuclear power plants, geothermal power plants, solar power generation, and wind farms. SCE also purchases from independent power producers and utilities, including out-of-state suppliers (14).

Table 2-2 presents SCE's specific proportional shares of electricity sources in 2021. As indicated in Table 2-2, the 2021 SCE Power Mix has renewable energy at 31.4% of the overall energy resources. Geothermal resources are at 5.7%, wind power is at 10.2%, large hydroelectric sources are at 2.3%, solar energy is at 14.9%, and coal is at 0% (15).

TABLE 2-2: SCE 2021 POWER CONTENT MIX

Energy Resources	2021 SCE Power Mix
Eligible Renewable	**31.4%**
Biomass & Waste	0.1%
Geothermal	5.7%
Eligible Hydroelectric	0.5%
Solar	14.9%
Wind	10.2%
Coal	**0.0%**
Large Hydroelectric	**2.3%**
Natural Gas	**22.3%**
Nuclear	**9.2%**
Other	**0.2%**
Unspecified Sources of power*	34.6%
Total	**100%**

* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources

2.3 NATURAL GAS

The following summary of natural gas customers and volumes, supplies, delivery of supplies, storage, service options, and operations is excerpted from information provided by the California Public Utilities Commission (CPUC).

> *"The CPUC regulates natural gas utility service for approximately 10.8 million customers that receive natural gas from Pacific Gas and Electric (PG&E), Southern California Gas (SoCalGas), San Diego Gas & Electric (SDG&E), Southwest Gas, and several smaller natural gas utilities. The CPUC also regulates independent storage operators: Lodi Gas Storage, Wild Goose Storage, Central Valley Storage and Gill Ranch Storage.*
>
> *California's natural gas utilities provide service to over 11 million gas meters. SoCalGas and PG&E provide service to about 5.9 million and 4.3 million customers, respectively, while SDG&E provides service to over 800, 000 customers. In 2018, California gas utilities forecasted that they would deliver about 4740 million cubic feet per day (MMcfd) of gas to their customers, on average, under normal weather conditions.*
>
> *The overwhelming majority of natural gas utility customers in California are residential and small commercials customers, referred to as "core" customers. Larger volume gas*

customers, like electric generators and industrial customers, are called "noncore" customers. Although very small in number relative to core customers, noncore customers consume about 65% of the natural gas delivered by the state's natural gas utilities, while core customers consume about 35%.

A significant amount of gas (about 19%, or 1131 MMcfd, of the total forecasted California consumption in 2018) is also directly delivered to some California large volume consumers, without being transported over the regulated utility pipeline system. Those customers, referred to as "bypass" customers, take service directly from interstate pipelines or directly from California producers.

SDG&E and Southwest Gas' southern division are wholesale customers of SoCalGas, i.e., they receive deliveries of gas from SoCalGas and in turn deliver that gas to their own customers. (Southwest Gas also provides natural gas distribution service in the Lake Tahoe area.) Similarly, West Coast Gas, a small gas utility, is a wholesale customer of PG&E. Some other wholesale customers are municipalities like the cities of Palo Alto, Long Beach, and Vernon, which are not regulated by the CPUC.

Natural gas from out-of-state production basins is delivered into California via the interstate natural gas pipeline system. The major interstate pipelines are Gas Transmission Northwest Pipeline, Kern River Pipeline, Transwestern Pipeline, El Paso Pipeline, Ruby Pipeline, Mojave Pipeline, and Tuscarora. Another pipeline, the North Baja - Baja Norte Pipeline takes gas off the El Paso Pipeline at the California/Arizona border and delivers that gas through California into Mexico. While the Federal Energy Regulatory Commission (FERC) regulates the transportation of natural gas on the interstate pipelines, and authorizes rates for that service, the CPUC may participate in FERC regulatory proceedings to represent the interests of California natural gas consumers.

The gas transported to California gas utilities via the interstate pipelines, as well as some of the California-produced gas, is delivered into the PG&E and SoCalGas intrastate natural gas transmission pipelines systems (commonly referred to as California's "backbone" pipeline system). Natural gas on the utilities' backbone pipeline systems is then delivered to the local transmission and distribution pipeline systems, or to natural gas storage fields. Some large volume noncore customers take natural gas delivery directly off the high-pressure backbone and local transmission pipeline systems, while core customers and other noncore customers take delivery off the utilities' distribution pipeline systems. The state's natural gas utilities operate over 100,000 miles of transmission and distribution pipelines, and thousands more miles of service lines.

Bypass customers take most of their deliveries directly off the Kern/Mojave pipeline system, but they also take a significant amount of gas from California production.

PG&E and SoCalGas own and operate several natural gas storage fields that are located within their service territories in northern and southern California, respectively. These storage fields, and four independently owned storage utilities - Lodi Gas Storage, Wild Goose Storage, Central Valley Storage, and Gill Ranch Storage - help meet peak seasonal

and daily natural gas demand and allow California natural gas customers to secure natural gas supplies more efficiently. PG&E is a 25% owner of the Gill Ranch Storage field. These storage fields provide a significant amount of infrastructure capacity to help meet California's natural gas requirements, and without these storage fields, California would need much more pipeline capacity in order to meet peak gas requirements .

Prior to the late 1980s, California regulated utilities provided virtually all natural gas services to all their customers. Since then, the Commission has gradually restructured the California gas industry in order to give customers more options while assuring regulatory protections for those customers that wish to, or are required to, continue receiving utility-provided services.

The option to purchase natural gas from independent suppliers is one of the results of this restructuring process. Although the regulated utilities procure natural gas supplies for most core customers, core customers have the option to purchase natural gas from independent natural gas marketers, called "core transport agents" (CTA). Contact information for core transport agents can be found on the utilities' web sites. Noncore customers, on the other hand, make natural gas supply arrangements directly with producers or with marketers.

Another option resulting from the restructuring process occurred in 1993, when the Commission removed the utilities' storage service responsibility for noncore customers, along with the cost of this service from noncore customers' transportation rates. The Commission also encouraged the development of independent storage fields, and in subsequent years, all the independent storage fields in California were established. Noncore customers and marketers may now take storage service from the utility or from an independent storage provider (if available), and pay for that service, or may opt to take no storage service at all. For core customers, the Commission assures that the utility has adequate storage capacity set aside to meet core requirements, and core customers pay for that service.

In a 1997 decision, the Commission adopted PG&E's "Gas Accord", which unbundled PG&E's backbone transmission costs from noncore transportation rates. This decision gave customers and marketers the opportunity to obtain pipeline capacity rights on PG&E's backbone transmission pipeline system, if desired, and pay for that service at rates authorized by the Commission. The Gas Accord also required PG&E to set aside a certain amount of backbone transmission capacity in order to deliver gas to its core customers. Subsequent Commission decisions modified and extended the initial terms of the Gas Accord. The "Gas Accord" framework is still in place today for PG&E's backbone and storage rates and services and is now simply referred to as PG&E Gas Transmission and Storage (GT&S).

In a 2006 decision, the Commission adopted a similar gas transmission framework for Southern California, called the "firm access rights" system. SoCalGas and SDG&E implemented the firm access rights (FAR) system in 2008, and it is now referred to as the backbone transmission system (BTS) framework. As under the PG&E backbone

transmission system, SoCalGas backbone transmission costs are unbundled from noncore transportation rates. Noncore customers and marketers may obtain, and pay for, firm backbone transmission capacity at various receipt points on the SoCalGas system. A certain amount of backbone transmission capacity is obtained for core customers to assure meeting their requirements.

Many if not most noncore customers now use a marketer to provide for several of the services formerly provided by the utility. That is, a noncore customer may simply arrange for a marketer to procure its supplies, and obtain any needed storage and backbone transmission capacity, in order to assure that it will receive its needed deliveries of natural gas supplies. Core customers still mainly rely on the utilities for procurement service, but they have the option to take procurement service from a CTA. Backbone transmission and storage capacity is either set aside or obtained for core customers in amounts to assure very high levels of service.

In order properly operate their natural gas transmission pipeline and storage systems, PG&E and SoCalGas must balance the amount of gas received into the pipeline system and delivered to customers or to storage fields. Some of these utilities' storage capacity is dedicated to this service, and under most circumstances, customers do not need to precisely match their deliveries with their consumption. However, when too much or too little gas is expected to be delivered into the utilities' systems, relative to the amount being consumed, the utilities require customers to more precisely match up their deliveries with their consumption. And, if customers do not meet certain delivery requirements, they could face financial penalties. The utilities do not profit from these financial penalties - the amounts are then returned to customers as a whole. If the utilities find that they are unable to deliver all the gas that is expected to be consumed, they may even call for a curtailment of some gas deliveries. These curtailments are typically required for just the largest, noncore customers. It has been many years since there has been a significant curtailment of core customers in California." (16)

As indicated in the preceding discussions, natural gas is available from a variety of in-state and out-of-state sources and is provided throughout the State in response to market supply and demand. Complementing available natural gas resources, biogas may soon be available via existing delivery systems, thereby increasing the availability and reliability of resources in total. The CPUC oversees utility purchases and transmission of natural gas to ensure reliable and affordable natural gas deliveries to existing and new consumers throughout the State.

Based on information provided by the Project applicant, no natural gas would be used as a result of the Project, and as such use of natural gas is not considered in the analysis.

2.4 TRANSPORTATION ENERGY RESOURCES

The Project would generate additional vehicle trips with resulting consumption of energy resources, predominantly gasoline and diesel fuel. The Department of Motor Vehicles (DMV) identified 36.2 million registered vehicles in California (7), and those vehicles consume an

estimated 17.2 billion gallons of fuel each year[1]. Gasoline (and other vehicle fuels) are commercially provided commodities and would be available to the Project patrons and employees via commercial outlets.

California's on-road transportation system includes 396,616 lane miles, more than 26.6 million passenger vehicles and light trucks, and almost 9.0 million medium- and heavy-duty vehicles (7). While gasoline consumption has been declining since 2008 it is still by far the dominant fuel. California is the second-largest consumer of petroleum products, after Texas, and accounts for 8% of the nation's total consumption. The State is the largest U.S. consumer of motor gasoline and jet fuel, and 83% of the petroleum consumed in California is used in the transportation sector (17).

California accounts for less than 1% of total U.S. natural gas reserves and production. As with crude oil, California's natural gas production has experienced a gradual decline since 1985. In 2021, about 33% of the natural gas delivered to consumers went to the State's industrial sector, and about 31% was delivered to the electric power sector. Natural gas fueled more than two-fifths of the State's utility-scale electricity generation in 2021. The residential sector, where three-fifths of California households use natural gas for home heating, accounted for 22% of natural gas deliveries. The commercial sector received 12% of the deliveries to end users and the transportation sector consumed the remaining 1% (17).

[1] Fuel consumptions estimated utilizing information from EMFAC2021.

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3 REGULATORY BACKGROUND

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the U.S. Department of Transportation, the U.S. Department of Energy, and the U.S. Environmental Protection Agency (EPA) are three federal agencies with substantial influence over energy policies and programs. On the state level, the CPUC and the CEC are two agencies with authority over different aspects of energy. Relevant federal and state energy-related laws and plans are summarized below.

3.1 FEDERAL REGULATIONS

3.1.1 INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991 (ISTEA)

ISTEA promoted the development of inter-modal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. ISTEA contained factors that Metropolitan Planning Organizations (MPOs) were to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, MPOs adopted explicit policies defining the social, economic, energy, and environmental values guiding transportation decisions.

3.1.2 THE TRANSPORTATION EQUITY ACT FOR THE 21ST CENTURY (TEA-21)

The TEA-21 was signed into law in 1998 and builds upon the initiatives established in the ISTEA legislation, discussed above. The TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. The TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. The TEA-21 also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of Intelligent Transportation Systems (ITS), to help improve operations and management of transportation systems and vehicle safety.

3.2 CALIFORNIA REGULATIONS

3.2.1 INTEGRATED ENERGY POLICY REPORT (IEPR)

Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial integrated energy policy report that assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (Public Resources Code § 25301[a]). The CEC prepares these assessments and associated policy recommendations every two years, with updates in alternate years, as part of the Integrated Energy Policy Report.

The 2022 IEPR was adopted February, 2023, and continues to work towards improving electricity, natural gas, and transportation fuel energy use in California. The 2022 IEPR introduces a new

framework for embedding equity and environmental justice at the CEC and the California Energy Planning Library which allows for easier access to energy data and analytics for a wide range of users. Additionally, energy reliability, western electricity integration, gasoline cost factors and price spikes, the role of hydrogen in California's clean energy future, fossil gas transition and distributed energy resources are topics discussed within the 2022 IEPR (18).

3.2.2 STATE OF CALIFORNIA ENERGY PLAN

The 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 State Energy 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 least environmental and energy costs. To further this policy, the plan identifies several strategies, including assistance to public agencies and fleet operators and encouragement of urban designs that reduce vehicle miles traveled (VMT) and accommodate pedestrian and bicycle access.

3.2.3 CALIFORNIA CODE TITLE 24, PART 6, ENERGY EFFICIENCY STANDARDS

California Code of Regulations (CCR) Title 24 Part 6: The California Energy Code was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption.

The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. CCR, Title 24, Part 11: California Green Building Standards Code (CALGreen) is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect on August 1, 2009, and is administered by the California Building Standards Commission.

CALGreen is updated on a regular basis, with the most recent approved update consisting of the 2022 California Green Building Code Standards that became effective on January 1, 2023. The CEC anticipates that the 2022 energy code will provide $1.5 billion in consumer benefits and reduce GHG emissions by 10 million metric tons (19). The Project would be required to comply with the applicable standards in place at the time building permit document submittals are made. These require, among other items (20):

NONRESIDENTIAL MANDATORY MEASURES

- Short-term bicycle parking. If the new project or an additional alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5% of new visitor motorized vehicle parking spaces being added, with a minimum of one two-bike capacity rack (5.106.4.1.1).
- Long-term bicycle parking. For new buildings with tenant spaces that have 10 or more tenant-occupants, provide secure bicycle parking for 5% of the tenant-occupant vehicular parking spaces with a minimum of one bicycle parking facility (5.106.4.1.2).
- Designated parking for clean air vehicles. In new projects or additions to alterations that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2 (5.106.5.2).

- EV charging stations. New construction shall facilitate the future installation of EV supply equipment. The compliance requires empty raceways for future conduit and documentation that the electrical system has adequate capacity for the future load. The number of spaces to be provided for is contained in Table 5.106. 5.3.3 (5.106.5.3). Additionally, Table 5.106.5.4.1 specifies requirements for the installation of raceway conduit and panel power requirements for medium- and heavy-duty electric vehicle supply equipment for warehouses, grocery stores, and retail stores.
- Outdoor light pollution reduction. Outdoor lighting systems shall be designed to meet the backlight, uplight and glare ratings per Table 5.106.8 (5.106.8).
- Construction waste management. Recycle and/or salvage for reuse a minimum of 65% of the nonhazardous construction and demolition waste in accordance with Section 5.408.1.1. 5.405.1.2, or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent (5.408.1).
- Excavated soil and land clearing debris. 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reuse or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed (5.408.3).
- Recycling by Occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage, and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics, organic waste, and metals or meet a lawfully enacted local recycling ordinance, if more restrictive (5.410.1).
- Water conserving plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:
  - Water Closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush (5.303.3.1)
  - Urinals. The effective flush volume of wall-mounted urinals shall not exceed 0.125 gallons per flush (5.303.3.2.1). The effective flush volume of floor- mounted or other urinals shall not exceed 0.5 gallons per flush (5.303.3.2.2).
  - Showerheads. Single showerheads shall have a minimum flow rate of not more than 1.8 gallons per minute and 80 psi (5.303.3.3.1). When a shower is served by more than one showerhead, the combine flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gallons per minute at 80 psi (5.303.3.3.2).
  - Faucets and fountains. Nonresidential lavatory faucets shall have a maximum flow rate of not more than 0.5 gallons per minute at 60 psi (5.303.3.4.1). Kitchen faucets shall have a maximum flow rate of not more than 1.8 gallons per minute of 60 psi (5.303.3.4.2). Wash fountains shall have a maximum flow rate of not more than 1.8 gallons per minute (5.303.3.4.3). Metering faucets shall not deliver more than 0.20 gallons per cycle (5.303.3.4.4). Metering faucets for wash fountains shall have a maximum flow rate not more than 0.20 gallons per cycle (5.303.3.4.5).
- Outdoor potable water uses in landscaped areas. Nonresidential developments shall comply with a local water efficient landscape ordinance or the current California Department of Water Resources' Model Water Efficient Landscape Ordinance (MWELO), whichever is more stringent (5.304.1).

- Water meters. Separate submeters or metering devices shall be installed for new buildings or additions in excess of 50,000 sf or for excess consumption where any tenant within a new building or within an addition that is project to consume more than 1,000 gallons per day (GPD) (5.303.1.1 and 5.303.1.2).
- Outdoor water uses in rehabilitated landscape projects equal or greater than 2,500 sf. Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 sf requiring a building or landscape permit (5.304.3).
- Commissioning. For new buildings 10,000 sf and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements (5.410.2).

3.2.4 AB 1493 PAVLEY REGULATIONS AND FUEL EFFICIENCY STANDARDS

California AB 1493, enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Under this legislation, CARB adopted regulations to reduce GHG emissions from non-commercial passenger vehicles (cars and light-duty trucks). Although aimed at reducing GHG emissions, specifically, a co-benefit of the Pavley standards is an improvement in fuel efficiency and consequently a reduction in fuel consumption.

3.2.5 CALIFORNIA'S RENEWABLE PORTFOLIO STANDARD (RPS)

First established in 2002 under Senate Bill (SB) 1078, California's Renewable Portfolio Standards (RPS) requires retail sellers of electric services to increase procurement from eligible renewable resources to 44% of total retail sales by 2024 (21).

3.2.6 CLEAN ENERGY AND POLLUTION REDUCTION ACT OF 2015 (SB 350)

In October 2015, the legislature approved, and the Governor signed SB 350, which reaffirms California's commitment to reducing its GHG emissions and addressing climate change. Key provisions include an increase in the renewables portfolio standard (RPS), higher energy efficiency requirements for buildings, initial strategies towards a regional electricity grid, and improved infrastructure for electric vehicle charging stations. Specifically, SB 350 requires the following to reduce statewide GHG emissions:

- Increase the amount of electricity procured from renewable energy sources from 33% to 50% by 2030, with interim targets of 40% by 2024, and 25% by 2027.
- Double the energy efficiency in existing buildings by 2030. This target will be achieved through the California Public Utility Commission (CPUC), the CEC, and local publicly owned utilities.
- Reorganize the Independent System Operator (ISO) to develop more regional electricity transmission markets and to improve accessibility in these markets, which will facilitate the growth of renewable energy markets in the western United States (California Leginfo 2015).

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4 PROJECT ENERGY DEMANDS AND ENERGY EFFICIENCY MEASURES

4.1 EVALUATION CRITERIA

Per Appendix F of the *State CEQA Guidelines* (22), states that the means of achieving the goal of energy conservation includes the following:

- Decreasing overall per capita energy consumption;
- Decreasing reliance on fossil fuels such as coal, natural gas and oil; and
- Increasing reliance on renewable energy sources.

In compliance with Appendix G of the *State CEQA Guidelines* (23), this report analyzes the project's anticipated energy use during construction and operations to determine if the Project would:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

4.2 METHODOLOGY

Information from the CalEEMod version 2022.1 outputs for the AQIA (2) was utilized in this analysis, detailing Project related construction equipment, transportation energy demands, and facility energy demands.

4.2.1 CALEEMOD

In May 2022 the California Air Pollution Control Officers Association (CAPCOA) in conjunction with other California air districts, including the Antelope Valley Air Quality Management District (AVAQMD), released the latest version of CalEEMod version 2022.1. The purpose of this model is to calculate construction-source and operational-source criteria pollutant (VOCs, NO_X, SO_X, CO, PM_{10}, and $PM_{2.5}$) and GHG emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (24). Accordingly, the latest version of CalEEMod has been used for this Project to determine construction and operational air quality emissions. Output from the model runs for both construction and operational activity are provided in Appendices 4.1 through 4.4.

4.2.2 EMISSION FACTORS MODEL

On May 2, 2022, the EPA approved the 2021 version of the EMissions FACtor model (EMFAC2021) web database for use in State Implementation Plan and transportation conformity analyses. EMFAC2021 is a mathematical model that was developed to calculate emission rates, fuel consumption, VMT from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the California Air Resources Board (CARB) to project changes in future emissions from on-road mobile sources (25). This energy study utilizes the different fuel types for each vehicle class from the annual EMFAC2021 emission inventory in order to derive

the average vehicle fuel economy which is then used to determine the estimated annual fuel consumption associated with vehicle usage during Project construction and operational activities. For purposes of analysis, the 2024 through 2032 analysis years were utilized to determine the average vehicle fuel economy used throughout the construction duration of the Project.

4.3 CONSTRUCTION ENERGY DEMANDS

The focus within this section is the energy implications of the construction process, specifically the power cost from on-site electricity consumption during construction of the proposed Project.

4.3.1 CONSTRUCTION POWER COST

The total Project construction power costs is the summation of the products of the area (sf) by the construction duration and the typical power cost.

CONSTRUCTION DURATION

Construction is expected to commence in June 2024 and will last through January 2032 (2). The construction schedule utilized in the analysis, shown in Table 4-1. The construction schedule utilized in the analysis represents a "worst-case" analysis scenario should construction occur any time after the respective dates since emission factors for construction decrease as time passes and the analysis year increases due to emission regulations becoming more stringent.[2] The duration of construction activity and associated equipment represents a reasonable approximation of the expected construction fleet as required per *CEQA Guidelines*.

TABLE 4-1: CONSTRUCTION DURATION

Construction Activity	Start Date	End Date	Days
Phase 1			
Site Preparation	6/3/2024	7/12/2024	30
Grading	7/15/2024	11/1/2024	80
Building Construction	11/4/2024	10/31/2025	260
Paving	7/1/2025	7/28/2025	20
Architectural Coating	7/1/2025	8/25/2025	40
Phase 2			
Site Preparation	6/1/2026	7/10/2026	30
Grading	7/13/2026	9/11/2026	45
Building Construction	9/14/2026	9/10/2027	260

[2] As shown in the CalEEMod User's Guide Version 2022.1, Section 4.3 "Off-Road Equipment" as the analysis year increases, emission factors for the same equipment pieces decrease due to the natural turnover of older equipment being replaced by newer less polluting equipment and new regulatory requirements.

Construction Activity	Start Date	End Date	Days
Paving	7/1/2027	7/28/2027	20
Architectural Coating	7/1/2027	8/25/2027	40
Phase 3			
Site Preparation	6/1/2028	7/12/2028	30
Grading	7/13/2028	9/13/2028	45
Building Construction	9/14/2028	9/12/2029	260
Paving	7/2/2029	7/27/2029	20
Architectural Coating	7/2/2029	8/24/2029	40
Phase 4			
Site Preparation	10/1/2030	11/11/2030	30
Grading	11/12/2030	1/13/2031	45
Building Construction	1/14/2031	1/12/2032	260
Paving	11/3/2031	11/28/2031	20
Architectural Coating	11/3/2031	12/26/2031	40

PROJECT CONSTRUCTION POWER COST

The *2023 National Construction Estimator* identifies a typical power cost per 1,000 sf of construction per month of $2.50, which was used to calculate the Project's total construction power cost (26). As shown on Table 4-2, the total power cost of the on-site electricity usage during the construction of the Project is estimated to be approximately $571,632.35.

TABLE 4-2: CONSTRUCTION POWER COST

Land Use	Power Cost (per 1,000 SF of construction per month)	Size (1,000 SF)	Construction Duration (months)	Project Construction Power Cost
Phase 1				
General Light Industrial	$2.50	103.418	16	$4,136.72
Manufacturing	$2.50	68.715	16	$2,748.60
Warehousing	$2.50	516.396	16	$20,655.84
High-Cube Fulfillment (Non-Sort)	$2.50	753.171	16	$30,126.84
High-Cube Fulfillment (Sort)	$2.50	680.469	16	$27,218.76
High-Cube Cold Storage Warehouse	$2.50	251.057	16	$10,042.28
Parking Lot	$2.50	656.338	16	$26,253.52
Other Asphalt Surfaces	$2.50	2,000.417	16	$80,016.69
PHASE 1 TOTAL PROJECT CONSTRUCTION COST				***$201,199.25***

Land Use	Power Cost (per 1,000 SF of construction per month)	Size (1,000 SF)	Construction Duration (months)	Project Construction Power Cost
Phase 2				
Manufacturing	$2.50	137.448	15	$5,154.30
Warehousing	$2.50	412.342	15	$15,462.83
High-Cube Parcel Hub	$2.50	1630.362	15	$61,138.58
Parking Lot	$2.50	732.652	15	$27,474.45
Other Asphalt Surfaces	$2.50	1,786.121	15	$66,979.55
PHASE 2 TOTAL PROJECT CONSTRUCTION COST				***$176,209.70***
Phase 3				
High-Cube Fulfillment (Non-Sort)	$2.50	867.432	15	$32,528.70
High-Cube Cold Storage Warehouse	$2.50	289.144	15	$10,842.90
Fast-Food Restaurant Without-Drive Thru	$2.50	2.5	15	$93.75
Fast-Food Restaurant With-Drive Thru	$2.50	2.5	15	$93.75
Coffe Shop With Drive Thru	$2.50	2	15	$75.00
Commercial Retail	$2.50	53.984	15	$2,024.40
Parking Lot	$2.50	241.004	15	$9,037.65
Other Asphalt Surfaces	$2.50	1,384.815	15	$51,930.57
PHASE 3 TOTAL PROJECT CONSTRUCTION COST				***$106,626.72***
Phase 4				
High-Cube Cold Storage	$2.50	137.448	15	$5,154.30
High-Cube Fulfillment (Non-Sort)	$2.50	412.342	15	$15,462.83
Other Asphalt Surfaces	$2.50	1,786.121	15	$66,979.55
PHASE 4 TOTAL PROJECT CONSTRUCTION COST				***$87,596.67***
TOTAL CONSTRUCTION POWER COST				***$571,632.35***

4.3.2 CONSTRUCTION ELECTRICITY USAGE

The total Project construction electricity usage is the summation of the products of the power cost (estimated in Table 4-2) by the utility provider cost per kilowatt hour (kWh) of electricity.

PROJECT CONSTRUCTION ELECTRICITY USAGE

The SCE's general service rate schedule was used to determine the Project's electrical usage. As of January 1, 2023, SCE's general service rate is $0.13 per kilowatt hours (kWh) of electricity for industrial and commercial services (27). As shown on Table 4-3, the total electricity usage from on-site Project construction related activities is estimated to be approximately 4,339,754 kWh.

TABLE 4-3: CONSTRUCTION ELECTRICITY USAGE

Land Use	Cost per kWh	Project Construction Electricity Usage (kWh)
Phase 1		
General Light Industrial	$0.13	31,405
Manufacturing	$0.13	20,867
Warehousing	$0.13	156,816
High-Cube Fulfillment (Non-Sort)	$0.13	228,719
High-Cube Fulfillment (Sort)	$0.13	206,641
High-Cube Cold Storage Warehouse	$0.13	76,240
Parking Lot	$0.13	199,313
Other Asphalt Surfaces	$0.13	607,476
PHASE 1 TOTAL PROJECT CONSTRUCTION ELECTRICTY USAGE (kWh)		***1,527,477***
Phase 2		
Manufacturing	$0.13	39,131
Warehousing	$0.13	117,392
High-Cube Parcel Hub	$0.13	464,156
Parking Lot	$0.13	208,582
Other Asphalt Surfaces	$0.13	508,499
PHASE 2 TOTAL PROJECT CONSTRUCTION ELECTRICTY USAGE (kWh)		***1,337,760***
Phase 3		
High-Cube Fulfillment (Non-Sort)	$0.13	246,953
High-Cube Cold Storage Warehouse	$0.13	82,318
Fast-Food Restaurant Without-Drive Thru	$0.13	712
Fast-Food Restaurant With-Drive Thru	$0.13	712
Coffe Shop With Drive Thru	$0.13	569
Commercial Retail	$0.13	15,369
Parking Lot	$0.13	68,613
Other Asphalt Surfaces	$0.13	394,250
PHASE 3 TOTAL PROJECT CONSTRUCTION ELECTRICTY USAGE (kWh)		***809,495***
Phase 4		
High-Cube Cold Storage	$0.13	39,131
High-Cube Fulfillment (Non-Sort)	$0.13	117,392
Other Asphalt Surfaces	$0.13	508,499
PHASE 4 TOTAL PROJECT CONSTRUCTION ELECTRICTY USAGE (kWh)		***665,022***
TOTAL CONSTRUCTION ELECTRICITY USAGE		***4,339,754***

4.3.3 CONSTRUCTION EQUIPMENT FUEL ESTIMATES

Fuel consumed by construction equipment would be the primary energy resource expended over the course of Project construction.

CONSTRUCTION EQUIPMENT

Site specific construction fleet may vary due to specific project needs at the time of construction. The associated construction equipment was generally based on CalEEMod defaults. A detailed summary of construction equipment assumptions by phase is provided at Table 4-4.

TABLE 4-4: CONSTRUCTION EQUIPMENT ASSUMPTIONS

Phase Name	Equipment[1]	Number	Hours Per Day
Phase 1			
Site Preparation	Rubber Tired Dozers	5	8
	Crawler Tractors	7	8
Grading	Excavators	1	8
	Graders	3	8
	Rubber Tired Dozers	2	8
	Scrapers	6	8
	Crawler Tractors	2	8
Building Construction	Cranes	1	8
	Forklifts	3	8
	Generator Sets	3	8
	Welders	2	8
	Crawler Tractors	3	8
Paving	Pavers	2	8
	Paving Equipment	4	8
	Rollers	4	8
Architectural Coating	Air Compressors	2	8
Phases 2-4			
Site Preparation	Rubber Tired Dozers	5	8
	Crawler Tractors	7	8
Grading	Excavators	1	8
	Graders	3	8
	Rubber Tired Dozers	2	8
	Scrapers	6	8

Phase Name	Equipment[1]	Number	Hours Per Day
	Crawler Tractors	2	8
Building Construction	Cranes	1	8
	Forklifts	3	8
	Generator Sets	3	8
	Welders	2	8
	Crawler Tractors	3	8
Paving	Pavers	2	8
	Paving Equipment	4	8
	Rollers	4	8
Architectural Coating	Air Compressors	2	8

[1] In order to account for fugitive dust emissions, Crawler Tractors were used in lieu of Tractors/Loaders/Backhoes.

PROJECT CONSTRUCTION EQUIPMENT FUEL CONSUMPTION

Project construction activity timeline estimates, construction equipment schedules, equipment power ratings, load factors, and associated fuel consumption estimates are presented in Table 4-5. The aggregate fuel consumption rate for all equipment is estimated at 18.5 horsepower hour per gallon (hp-hr-gal.), obtained from CARB 2018 Emissions Factors Tables and cited fuel consumption rate factors presented in Table D-24 of the Moyer guidelines (28). For the purposes of this analysis, the calculations are based on all construction equipment being diesel-powered which is consistent with industry standards. Diesel fuel would be supplied by existing commercial fuel providers serving the Project area and region[3]. As presented in Table 4-5, Project construction activities would consume an estimated 381,590 gallons of diesel fuel.

[3] Based on Appendix A of the CalEEMod User's Guide, Construction consists of several types of off-road equipment. Since the majority of the off-road construction equipment used for construction projects are diesel fueled, CalEEMod assumes all of the equipment operates on diesel fuel.

TABLE 4-5: CONSTRUCTION EQUIPMENT FUEL CONSUMPTION ESTIMATES

Phase Name	Duration (Days)	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption
Phase 1								
Site Preparation	30	Rubber Tired Dozers	367	5	8	0.4	5,872	9,522
		Crawler Tractors	87	7	8	0.43	2,095	3,397
Grading	80	Excavators	36	1	8	0.38	109	473
		Graders	148	3	8	0.41	1,456	6,298
		Rubber Tired Dozers	367	2	8	0.4	2,349	10,157
		Scrapers	423	6	8	0.48	9,746	42,145
		Crawler Tractors	87	2	8	0.43	599	2,588
Building Construction	260	Cranes	367	1	8	0.29	851	11,966
		Forklifts	82	3	8	0.2	394	5,532
		Generator Sets	14	3	8	0.74	249	3,494
		Crawler Tractors	87	3	8	0.43	898	12,618
		Welders	46	2	8	0.45	331	4,655
Paving	20	Pavers	81	2	8	0.42	544	588
		Paving Equipment	89	4	8	0.36	1,025	1,108
		Rollers	36	4	8	0.38	438	473
Architectural Coating	40	Air Compressors	37	2	8	0.48	284	614
PHASE 1 CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***115,630***
Phase 2								
Site Preparation	30	Rubber Tired Dozers	367	5	8	0.4	5,872	9,522
		Crawler Tractors	87	7	8	0.43	2,095	3,397
Grading	45	Excavators	36	1	8	0.38	109	266
		Graders	148	3	8	0.41	1,456	3,542
		Rubber Tired Dozers	367	2	8	0.4	2,349	5,713

Phase Name	Duration (Days)	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption
		Scrapers	423	6	8	0.48	9,746	23,706
		Crawler Tractors	87	2	8	0.43	599	1,456
Building Construction	260	Cranes	367	1	8	0.29	851	11,966
		Forklifts	82	3	8	0.2	394	5,532
		Generator Sets	14	3	8	0.74	249	3,494
		Crawler Tractors	87	3	8	0.43	898	12,618
		Welders	46	2	8	0.45	331	4,655
Paving	20	Pavers	81	2	8	0.42	544	588
		Paving Equipment	89	4	8	0.36	1,025	1,108
		Rollers	36	4	8	0.38	438	473
Architectural Coating	40	Air Compressors	37	2	8	0.48	284	614
PHASE 2 CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***88,653***
Phase 3								
Site Preparation	30	Rubber Tired Dozers	367	5	8	0.4	5,872	9,522
		Crawler Tractors	87	7	8	0.43	2,095	3,397
Grading	45	Excavators	36	1	8	0.38	109	266
		Graders	148	3	8	0.41	1,456	3,542
		Rubber Tired Dozers	367	2	8	0.4	2,349	5,713
		Scrapers	423	6	8	0.48	9,746	23,706
		Crawler Tractors	87	2	8	0.43	599	1,456
Building Construction	260	Cranes	367	1	8	0.29	851	11,966
		Forklifts	82	3	8	0.2	394	5,532
		Generator Sets	14	3	8	0.74	249	3,494
		Crawler Tractors	87	3	8	0.43	898	12,618
		Welders	46	2	8	0.45	331	4,655
Paving	20	Pavers	81	2	8	0.42	544	588

Phase Name	Duration (Days)	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption
		Paving Equipment	89	4	8	0.36	1,025	1,108
		Rollers	36	4	8	0.38	438	473
Architectural Coating	40	Air Compressors	37	2	8	0.48	284	614
PHASE 3 CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***88,653***
Phase 4								
Site Preparation	30	Rubber Tired Dozers	367	5	8	0.4	5,872	9,522
		Crawler Tractors	87	7	8	0.43	2,095	3,397
Grading	45	Excavators	36	1	8	0.38	109	266
		Graders	148	3	8	0.41	1,456	3,542
		Rubber Tired Dozers	367	2	8	0.4	2,349	5,713
		Scrapers	423	6	8	0.48	9,746	23,706
		Crawler Tractors	87	2	8	0.43	599	1,456
Building Construction	260	Cranes	367	1	8	0.29	851	11,966
		Forklifts	82	3	8	0.2	394	5,532
		Generator Sets	14	3	8	0.74	249	3,494
		Crawler Tractors	87	3	8	0.43	898	12,618
		Welders	46	2	8	0.45	331	4,655
Paving	20	Pavers	81	2	8	0.42	544	588
		Paving Equipment	89	4	8	0.36	1,025	1,108
		Rollers	36	4	8	0.38	438	473
Architectural Coating	40	Air Compressors	37	2	8	0.48	284	614
PHASE 4 CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***88,653***
TOTAL CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***381,590***

Project construction would represent a "single-event" diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

4.3.4 CONSTRUCTION TRIPS AND VMT

Construction generates on-road vehicle emissions from vehicle usage for workers, vendors, and haul truck commuting to and from the site. The number of workers, vendor, and haul trips are presented below in Table 4-6. It should be noted that for vendor trips, specifically, CalEEMod only assigns vendor trips to the Building Construction phase. Vendor trips would likely occur during all phases of construction. As such, the CalEEMod defaults for vendor trips have been adjusted based on a ratio of the total vendor trips to the number of days of each subphase of activity.

TABLE 4-6: CONSTRUCTION TRIPS AND VMT

Phase Name	Worker Trips Per Day	Vendor Trips Per Day
Phase 1		
Site Preparation	30	32
Grading	35	84
Building Construction	997	273
Paving	25	0
Architectural Coating	199	0
Phase 2		
Site Preparation	30	32
Grading	35	48
Building Construction	916	277
Paving	25	0
Architectural Coating	183	0
Phase 3		
Site Preparation	30	18
Grading	35	27
Building Construction	506	155
Paving	25	0
Architectural Coating	101	0
Phase 4		
Site Preparation	30	38
Grading	35	56
Building Construction	1073	325
Paving	25	0
Architectural Coating	215	0

4.3.5 CONSTRUCTION WORKER FUEL ESTIMATES

With respect to estimated VMT for the Project, the construction worker trips (personal vehicles used by workers commuting to the Project from home) would generate an estimated 17,555,853 VMT during the 61 months of construction (2). Based on CalEEMod methodology, it is assumed that 50% of all construction worker trips are from light-duty-auto vehicles (LDA), 25% are from light-duty-trucks (LDT1[4]), and 25% are from light-duty-trucks (LDT2[5]). Data regarding Project related construction worker trips were based on CalEEMod defaults utilized within the Project's AQIA.

Vehicle fuel efficiencies for LDA, LDT1, and LDT2 were estimated using information generated within the 2021 version of the EMFAC developed by CARB. EMFAC2021 is a mathematical model that was developed to calculate emission rates, fuel consumption, and VMT from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the CARB to project changes in future emissions from on-road mobile sources (25). EMFAC2021 was run for the LDA, LDT1, and LDT2 vehicle class within the California sub-area for the 2024 through 2032 calendar years. Data from EMFAC2021 is shown in Appendix 4.5.

As shown in Table 4-7 through 4-9, the estimated annual fuel consumption resulting from Project construction worker trips is 785,820 gallons during full construction of the Project. It should be noted that construction worker trips would represent a "single-event" gasoline fuel demand and would not require ongoing or permanent commitment of fuel resources for this purpose.

TABLE 4-7: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES (LDA)

Construction Activity	Duration (Days)	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Phase 1						
2024						
Site Preparation	30	8	18.5	4,163	31.04	134
Grading	80	9	18.5	12,950	31.04	417
Building Construction	42	249	18.5	193,667	31.04	6,240
2025						
Building Construction	218	249	18.5	1,005,225	31.88	31,536
Paving	20	6	18.5	2,313	31.88	73
Architectural Coating	40	50	18.5	36,815	31.88	1,155
Phase 2						
2026						
Site Preparation	30	8	18.5	4,163	32.71	127
Grading	45	9	18.5	7,284	32.71	223

[4] Vehicles under the LDT1 category have a gross vehicle weight rating (GVWR) of less than 6,000 lbs. and equivalent test weight (ETW) of less than or equal to 3,750 lbs.

[5] Vehicles under the LDT2 category have a GVWR of less than 6,000 lbs. and ETW between 3,751 lbs. and 5,750 lbs.

Construction Activity	Duration (Days)	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Building Construction	79	229	18.5	334,684	32.71	10,232
2027						
Building Construction	181	229	18.5	766,807	33.38	22,973
Paving	20	6	18.5	2,313	33.38	69
Architectural Coating	40	46	18.5	33,855	33.38	1,014
Phase 3						
2028						
Site Preparation	30	8	18.5	4,163	34.18	122
Grading	45	9	18.5	7,284	34.18	213
Building Construction	77	127	18.5	180,199	34.18	5,272
2029						
Building Construction	183	127	18.5	428,266	34.97	12,246
Paving	20	6	18.5	2,313	34.97	66
Architectural Coating	40	25	18.5	18,685	34.97	534
Phase 4						
2030						
Site Preparation	30	8	18.5	4,163	35.75	116
Grading	36	9	18.5	5,828	35.75	163
2031						
Grading	9	9	18.5	1,457	36.51	40
Building Construction	252	268	18.5	1,250,582	36.51	34,254
Paving	20	6	18.5	2,313	36.51	63
Architectural Coating	40	54	18.5	39,775	36.51	1,089
2032						
Building Construction	8	268	18.5	39,701	37.23	1,066
TOTAL CONSTRUCTION WORKER (LDA) FUEL CONSUMPTION						***129,439***

TABLE 4-8: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES (LDT1)

Construction Activity	Duration (Days)	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Phase 1						
2024						
Site Preparation	30	8	18.5	4,163	24.70	169
Grading	80	9	18.5	12,950	24.70	524
Building Construction	42	249	18.5	193,667	24.70	7,842
2025						

Construction Activity	Duration (Days)	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Building Construction	218	249	18.5	1,005,225	25.12	40,012
Paving	20	6	18.5	2,313	25.12	92
Architectural Coating	40	50	18.5	36,815	25.12	1,465
Phase 2						
2026						
Site Preparation	30	8	18.5	4,163	25.59	163
Grading	45	9	18.5	7,284	25.59	285
Building Construction	79	229	18.5	334,684	25.59	13,079
2027						
Building Construction	181	229	18.5	766,807	25.95	29,547
Paving	20	6	18.5	2,313	25.95	89
Architectural Coating	40	46	18.5	33,855	25.95	1,305
Phase 3						
2028						
Site Preparation	30	8	18.5	4,163	26.43	158
Grading	45	9	18.5	7,284	26.43	276
Building Construction	77	127	18.5	180,199	26.43	6,818
2029						
Building Construction	183	127	18.5	428,266	26.92	15,909
Paving	20	6	18.5	2,313	26.92	86
Architectural Coating	40	25	18.5	18,685	26.92	694
Phase 4						
2030						
Site Preparation	30	8	18.5	4,163	27.43	152
Grading	36	9	18.5	5,828	27.43	212
2031						
Grading	9	9	18.5	1,457	27.93	52
Building Construction	252	268	18.5	1,250,582	27.93	44,771
Paving	20	6	18.5	2,313	27.93	83
Architectural Coating	40	54	18.5	39,775	27.93	1,424
2032						
Building Construction	8	268	18.5	39,701	28.43	1,397
TOTAL CONSTRUCTION WORKER (LDT1) FUEL CONSUMPTION						***166,602***

TABLE 4-9: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES (LDT2)

Construction Activity	Duration (Days)	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Phase 1						
2024						
Site Preparation	30	15	18.5	8,325	24.35	342
Grading	80	18	18.5	25,900	24.35	1,063
Building Construction	42	499	18.5	387,335	24.35	15,904
2025						
Building Construction	218	499	18.5	2,010,451	25.09	80,128
Paving	20	13	18.5	4,625	25.09	184
Architectural Coating	40	100	18.5	73,630	25.09	2,935
Phase 2						
2026						
Site Preparation	30	15	18.5	8,325	25.83	322
Grading	45	18	18.5	14,569	25.83	564
Building Construction	79	458	18.5	669,367	25.83	25,915
2027						
Building Construction	181	458	18.5	1,533,613	26.41	58,078
Paving	20	12.5	18.5	4,625	26.41	175
Architectural Coating	40	91.5	18.5	67,710	26.41	2,564
Phase 3						
2028						
Site Preparation	30	15	18.5	8,325	27.05	308
Grading	45	18	18.5	14,569	27.05	539
Building Construction	77	253	18.5	360,399	27.05	13,323
2029						
Building Construction	183	253	18.5	856,532	27.66	30,968
Paving	20	13	18.5	4,625	27.66	167
Architectural Coating	40	51	18.5	37,370	27.66	1,351
Phase 4						
2030						
Site Preparation	30	15	18.5	8,325	28.24	295
Grading	36	18	18.5	11,655	28.24	413
2031						
Grading	9	18	18.5	2,914	28.78	101
Building Construction	252	537	18.5	2,501,163	28.78	86,913
Paving	20	13	18.5	4,625	28.78	161

Construction Activity	Duration (Days)	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Architectural Coating	40	108	18.5	79,550	28.78	2,764
2032						
Building Construction	8	537	18.5	79,402	29.27	2,713
TOTAL CONSTRUCTION WORKER (LDT2) FUEL CONSUMPTION						***328,190***
TOTAL CONSTRUCTION WORKER (LDA, LDT1 & LDT2) FUEL CONSUMPTION						***785,820***

4.3.6 CONSTRUCTION VENDOR FUEL ESTIMATES

With respect to estimated VMT, the construction vendor trips (vehicles that deliver materials to the site during construction) would generate an estimated 2,896,953 VMT along area roadways for the Project over the duration of construction activity (2). It is assumed that 50% of all vendor trips are from medium-heavy duty trucks (MHD), 50% of all vendor trips are from heavy-heavy duty trucks (HHD). These assumptions are consistent with the CalEEMod defaults utilized within the within the AQIA (2).

Vehicle fuel efficiencies for MHDs and HHDs were estimated using information generated within EMFAC2021. EMFAC2021 was run for the MHD and HHD vehicle classes within the California sub-area for the 2024 through 2032 calendar years. Data from EMFAC2021 is shown in Appendix 4.3.

Based on Table 4-10 and 4-11, it is estimated that 546,493 gallons of fuel will be consumed related to construction vendor trips during full construction of the Project. It should be noted that Project construction vendor trips would represent a “single-event” diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

TABLE 4-10: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES (MHDT)

Construction Activity	Duration (Days)	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Phase 1						
2024						
Site Preparation	30	16	10.2	4,896	8.43	581
Grading	80	42	10.2	34,272	8.43	4,068
Building Construction	42	137	10.2	58,477	8.43	6,941
2025						
Building Construction	218	137	10.2	303,521	8.54	35,537
Phase 2						
2026						
Site Preparation	30	16	10.2	4,896	8.67	565

Construction Activity	Duration (Days)	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Grading	45	24	10.2	11,016	8.67	1,270
Building Construction	79	139	10.2	111,603	8.67	12,870
2027						
Building Construction	181	139	10.2	255,699	8.81	29,014
Phase 3						
2028						
Site Preparation	30	9	10.2	2,754	9.02	305
Grading	45	14	10.2	6,197	9.02	687
Building Construction	77	78	10.2	60,869	9.02	6,747
2029						
Building Construction	183	78	10.2	144,662	9.29	15,578
Phase 4						
2030						
Site Preparation	30	19	10.2	5,814	9.61	605
Grading	36	28	10.2	10,282	9.61	1,069
2031						
Grading	9	28	10.2	2,570	10.02	256
Building Construction	252	163	10.2	417,690	10.02	41,674
2032						
Building Construction	8	163	10.2	13,260	10.47	1,266
TOTAL CONSTRUCTION WORKER (MHDT) FUEL CONSUMPTION						***159,033***

TABLE 4-11: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES (HHDT)

Construction Activity	Duration (Days)	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Phase 1						
2024						
Site Preparation	30	16	10.2	4,896	6.37	768
Grading	80	42	10.2	34,272	6.37	5,376
Building Construction	42	137	10.2	58,477	6.37	9,173
2025						
Building Construction	218	137	10.2	303,521	6.50	46,700

Construction Activity	Duration (Days)	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Paving	20	0	10.2	0	6.50	0
Architectural Coating	40	0	10.2	0	6.50	0
Phase 2						
2026						
Site Preparation	30	16	10.2	4,896	6.64	737
Grading	45	24	10.2	11,016	6.64	1,659
Building Construction	79	139	10.2	111,603	6.64	16,810
2027						
Building Construction	181	139	10.2	255,699	6.80	37,606
Paving	20	0	10.2	0	6.80	0
Architectural Coating	40	0	10.2	0	6.80	0
Phase 3						
2028						
Site Preparation	30	9	10.2	2,754	6.98	395
Grading	45	14	10.2	6,197	6.98	888
Building Construction	77	78	10.2	60,869	6.98	8,721
2029						
Building Construction	183	78	10.2	144,662	7.17	20,184
Paving	20	0	10.2	0	7.17	0
Architectural Coating	40	0	10.2	0	7.17	0
Phase 4						
2030						
Site Preparation	30	19	10.2	5,814	7.36	790
Grading	36	28	10.2	10,282	7.36	1,397
2031						
Grading	9	28	10.2	2,570	7.56	340
Building Construction	252	163	10.2	417,690	7.56	55,273
Paving	20	0	10.2	0	7.56	0
Architectural Coating	40	0	10.2	0	7.56	0
2032						
Building Construction	8	163	10.2	13,260	7.75	1,710
TOTAL CONSTRUCTION WORKER (HHDT) FUEL CONSUMPTION						***208,527***
TOTAL CONSTRUCTION WORKER (MHDT & HHDT) FUEL CONSUMPTION						***546,493***

4.3.7 CONSTRUCTION ENERGY EFFICIENCY/CONSERVATION MEASURES

Starting in 2014, CARB adopted the nation's first regulation aimed at cleaning up off-road construction equipment such as bulldozers, graders, and backhoes. These requirements ensure fleets gradually turnover the oldest and dirtiest equipment to newer, cleaner models and prevent fleets from adding older, dirtier equipment. As such, the equipment used for Project construction would conform to CARB regulations and California emissions standards. It should also be noted that there are no unusual Project characteristics or construction processes that would require the use of equipment that would be more energy intensive than is used for comparable activities; or equipment that would not conform to current emissions standards (and related fuel efficiencies). Equipment utilized in the construction of the Project would therefore not result in inefficient wasteful, or unnecessary consumption of fuel.

Construction contractors would be required to comply with applicable CARB regulation regarding retrofitting, repowering, or replacement of diesel off-road construction equipment. Additionally, CARB has adopted the Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other Toxic Air Contaminants. Compliance with anti-idling and emissions regulations would result in a more efficient use of construction-related energy and the minimization or elimination of wasteful or unnecessary consumption of energy. Idling restrictions and the use of newer engines and equipment would result in less fuel combustion and energy consumption.

Additional construction-source energy efficiencies would occur due to required California regulations and best available control measures (BACM). For example, CCR Title 13, Motor Vehicles, Section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than five minutes, thereby precluding unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. Section 2449(d)(3) requires that grading plans shall reference the requirement that a sign must be posted on-site stating that construction workers need to shut off engines at or before five minutes of idling." In this manner, construction equipment operators are required to be informed that engines are to be turned off at or prior to five minutes of idling.

A full analysis related to the energy needed to form construction materials is not included in this analysis because at this time, an analysis of the energy needed to create Project-related construction materials would be extremely speculative and thus has not been prepared.

In general, construction processes promote conservation and efficient use of energy by reducing raw materials demands, with related reduction in energy demands associated with raw materials extraction, transportation, processing, and refinement. Use of materials in bulk reduces energy demands associated with preparation and transport of construction materials as well as the transport and disposal of construction waste and solid waste in general, with corollary reduced demands on area landfill capacities and energy consumed by waste transport and landfill operations.

4.4 OPERATIONAL ENERGY DEMANDS

Energy consumption in support of or related to Project operations would include transportation fuel demands (fuel consumed by passenger car and truck vehicles accessing the Project site), fuel demands from operational equipment, and facilities energy demands (energy consumed by building operations and site maintenance activities).

4.4.1 TRANSPORTATION FUEL DEMANDS

Energy that would be consumed by Project-generated traffic is a function of total VMT and estimated vehicle fuel economies of vehicles accessing the Project site. The VMT per vehicle class was determined by evaluating in the vehicle fleet mix and the total VMT. As with worker and vendors trips, operational vehicle fuel efficiencies were estimated using information generated within EMFAC2021 developed by CARB (25). EMFAC2021 was run for the Los Angeles County (Mojave Desert) area for the 2025, 2027, 2029 and 2032 calendar year. Data from EMFAC2021 is shown in Appendix 4.5.

In order to account for the possibility of refrigerated uses (cold storage) that would be accommodated by the up to 251,057-sf of high-cube cold storage use identified for Phase 1, up to 289,144-sf of high-cube cold storage use identified for Phase 3 and up to 638,889-sf of high-cube cold storage use identified for Phase 4, it is assumed that all trucks accessing this land use are presumed to also have transport refrigeration units (TRUs). Therefore, for modeling purposes 190 two-way truck trips during Phase 1, 218 two-way truck trips during Phase 3 and 480 two-way truck trips during Phase 4 have been estimated to include TRUs. TRUs are also accounted for during on-site and off-site travel. TRU calculations are based on EMFAC2021.

The estimated transportation energy demands are summarized on Table 4-12. As summarized on Table 4-12 the Project at Buildout would result in 190,792,749 annual VMT and an estimated annual fuel consumption of 11,884,520 gallons of fuel.

TABLE 4-12: TOTAL PROJECT-GENERATED TRAFFIC ANNUAL FUEL CONSUMPTION

Vehicle Type	Average Vehicle Fuel Economy (mpg)	Annual VMT	Estimated Annual Fuel Consumption (gallons)
Phase 1			
LDA	31.88	21,798,878	683,873
LDT1	25.12	1,668,611	66,417
LDT2	25.09	6,743,598	268,772
MDV	20.20	5,592,841	276,832
LHDT1	16.57	2,844,379	171,663
LHDT2	16.15	804,014	49,778
MHDT	8.54	3,301,093	101,807
HHDT	6.50	10,530,712	1,620,245
MCY	41.84	1,059,263	25,315

Vehicle Type	Average Vehicle Fuel Economy (mpg)	Annual VMT	Estimated Annual Fuel Consumption (gallons)
TRUs			88,855
	TOTAL (ALL VEHICLES)	***54,343,388***	***3,353,556***
Phase 2			
LDA	33.38	23,896,598	715,915
LDT1	25.95	1,710,771	65,921
LDT2	26.41	7,479,373	283,244
MDV	21.17	5,870,594	277,355
LHDT1	17.30	3,679,050	212,667
LHDT2	16.61	1,045,254	62,924
MHDT	8.81	5,820,915	101,807
HHDT	6.80	17,284,077	2,541,973
MCY	42.07	1,133,819	26,949
	TOTAL (ALL VEHICLES)	***67,920,451***	***4,288,755***
Phase 3			
LDA	34.97	12,479,544	356,858
LDT1	26.92	841,634	31,264
LDT2	27.66	3,982,998	144,005
MDV	22.20	1,968,564	88,689
LHDT1	18.32	2,118,172	115,649
LHDT2	17.33	627,709	36,225
MHDT	9.29	1,549,725	101,807
HHDT	7.17	5,157,614	719,606
OBUS	6.47	8,532	1,319
UBUS	4.23	8,824	2,088
MCY	42.41	1,573,587	37,107
SBUS	8.25	40,898	4,955
MH	5.87	78,012	13,292
TRUs			100,992
	TOTAL (ALL VEHICLES)	***30,435,811***	***1,753,855***
Phase 4			
LDA	37.23	11,506,065	309,076
LDT1	28.43	717,445	25,237
LDT2	29.27	3,799,436	129,801
MDV	23.64	2,642,773	111,777
LHDT1	20.35	3,806,017	187,019

Vehicle Type	Average Vehicle Fuel Economy (mpg)	Annual VMT	Estimated Annual Fuel Consumption (gallons)
LHDT2	18.86	1,128,021	59,815
MHDT	10.47	2,969,375	101,807
HHDT	7.75	10,998,985	1,418,741
MCY	42.84	524,981	12,255
TRUs			132,825
TOTAL (ALL VEHICLES)		***38,093,099***	***2,488,353***
TOTAL (ALL VEHICLES PHASES 1-4)		***190,792,749***	***11,884,520***

4.4.2 ON-SITE CARGO HANDLING EQUIPMENT FUEL DEMANDS

It is common for warehouse buildings to require the operation of exterior cargo handling equipment in the building's truck court areas. For this particular Project, the following on-site operational equipment was assumed with the assumption of 75 horsepower (hp), diesel-powered tractors/loaders/backhoes operating at 4 hours a day[6] for 365 days of the year:

- Phase 1 includes eleven (11) pieces of on-site cargo handling equipment
- Phase 2 includes nine (9) pieces of on-site cargo handling equipment
- Phase 3 includes six (6) pieces of on-site cargo handling equipment
- Phase 4 includes ten (10) pieces of on-site cargo handling equipment

Project operational activity estimates and associated fuel consumption estimates are based on the annual EMFAC2021 offroad emissions for the 2025, 2027, 2029 and 2032 operational year and were used to derive the total annual fuel consumption associated with on-site equipment. As presented in Table 4-13, Project on-site equipment would consume an estimated 98,098 gallons of diesel.

TABLE 4-13: ON-SITE CARGO HANDLING EQUIPMENT FUEL CONSUMPTION ESTIMATES

Equipment	Quantity	Usage Hours	Days of Operation	EMFAC2021 Fuel Consumption (gal./yr)	EMFAC2021 Activity (hrs./yr)	Total Fuel Consumption
Cargo Handling Equipment	11	4	365	178	95	29,974
ON-SITE CARGO HANDLING EQUIPMENT FUEL DEMAND (GALLONS FUEL)						***29,974***
Cargo Handling Equipment	9	4	365	187	100	24,525
ON-SITE CARGO HANDLING EQUIPMENT FUEL DEMAND (GALLONS FUEL)						***24,525***

[6] Based on Table II-3, Port and Rail Cargo Handling Equipment Demographics by Type, from CARB's Technology Assessment: Mobile Cargo Handling Equipment document, a single piece of equipment could operate up to 2 hours per day (Total Average Annual Activity divided by Total Number Pieces of Equipment). As such, the analysis conservatively assumes that the tractor/loader/backhoe would operate up to 4 hours per day.

Equipment	Quantity	Usage Hours	Days of Operation	EMFAC2021 Fuel Consumption (gal./yr)	EMFAC2021 Activity (hrs./yr)	Total Fuel Consumption
Cargo Handling Equipment	6	4	365	198	106	16,350
ON-SITE CARGO HANDLING EQUIPMENT FUEL DEMAND (GALLONS FUEL)						***16,350***
Cargo Handling Equipment	10	4	365	215	115	27,250
ON-SITE CARGO HANDLING EQUIPMENT FUEL DEMAND (GALLONS FUEL)						***27,250***
PHASES 1-4 ON-SITE CARGO HANDLING EQUIPMENT FUEL DEMAND (GALLONS FUEL)						***98,098***

MM AQ-5 requires that on-site cargo handling equipment would be electric and therefore would not generate any fuel consumption. Nonetheless the estimated fuel consumption is still shown above for purposes of full disclosure.

4.4.3 FACILITY ENERGY DEMANDS

Project building operations activities would result in the consumption of electricity and natural gas, which would be supplied to the Project by SCE and SoCalGas. Annual electricity demands of the Project are summarized in Table 4-14. As summarized on Table 4-14, the commercial portion of the Project would result in 1,129,120 kBTU/year of natural gas demand and 59,689,613 kWh/year of electricity demand.

Based on information provided by the Project Applicant, the industrial portion of the Project would not use natural gas for the building envelope. As such, natural gas consumption has been analyzed for the commercial portion and not the industrial portion of the Project in this study.

TABLE 4-14: PROJECT ANNUAL OPERATIONAL ENERGY DEMAND SUMMARY

Land Use	Natural Gas Demand (kBTU/year)	Electricity Demand (kWh/year)
Phase 1		
General Light Industrial	0	992,062
Manufacturing	0	659,165
Warehousing	0	2,416,921
High-Cube Fulfillment (Non-Sort)	0	3,525,114
High-Cube Fulfillment (Sort)	0	3,184,842
High-Cube Cold Storage Warehouse	0	4,854,956
Parking Lot	0	575,049
Other Asphalt Surfaces	0	0
TOTAL PROJECT ENERGY DEMAND (PHASE 2)	***0***	***16,208,108***
Phase 2		
Manufacturing	0	1,318,502

Land Use	Natural Gas Demand (kBTU/year)	Electricity Demand (kWh/year)
Warehousing	0	1,929,910
High-Cube Parcel Hub	0	7,630,686
Parking Lot	0	641,827
Other Asphalt Surfaces	0	0
TOTAL PROJECT ENERGY DEMAND (PHASE 2)	**0**	***11,520,926***
Phase 3		
High-Cube Fulfillment (Non-Sort)	0	4,059,897
High-Cube Cold Storage Warehouse	0	5,591,485
Fast-Food Restaurant Without-Drive Thru	287,829	86,576
Fast-Food Restaurant With-Drive Thru	287,829	86,576
Coffee Shop With Drive Thru	230,263	69,261
Commercial Retail	323,199	530,197
Parking Lot	0	211,017
Other Asphalt Surfaces	0	0
TOTAL PROJECT ENERGY DEMAND (PHASE 3)	***1,129,120***	***10,635,007***
Phase 4		
High-Cube Cold Storage	0	12,354,875
High-Cube Fulfillment (Non-Sort)	0	8,970,697
Other Asphalt Surfaces	0	0
TOTAL PROJECT ENERGY DEMAND (PHASE 4)	***0***	***21,325,572***
TOTAL PROJECT ENERGY DEMAND (PHASES 1-4)	***1,129,120***	***59,689,613***

4.4.4 Operational Energy Efficiency/Conservation Measures

Energy efficiency/energy conservation attributes of the Project would be complemented by increasingly stringent state and federal regulatory actions addressing vehicle fuel economies and vehicle emissions standards; and enhanced building/utilities energy efficiencies mandated under California building codes (e.g., Title24, California Green Building Standards Code).

Enhanced Vehicle Fuel Efficiencies

Project annual fuel consumption estimates presented previously in Table 4-9 represent likely potential maximums that would occur for the Project. Under subsequent future conditions, average fuel economies of vehicles accessing the Project site can be expected to improve as older, less fuel-efficient vehicles are removed from circulation, and in response to fuel economy and emissions standards imposed on newer vehicles entering the circulation system.

Enhanced fuel economies realized pursuant to federal and state regulatory actions, and related transition of vehicles to alternative energy sources (e.g., electricity, natural gas, biofuels, hydrogen cells) would likely decrease future gasoline fuel demands per VMT. Location of the

Project proximate to regional and local roadway systems tends to reduce VMT within the region, acting to reduce regional vehicle energy demands.

4.5 SUMMARY

4.5.1 CONSTRUCTION ENERGY DEMANDS

The estimated power cost of on-site electricity usage during the construction of the Project is assumed to be approximately $571,632.35Additionally, based on the assumed power cost, it is estimated that the total electricity usage during construction, after full Project buildout, is calculated to be approximately 4,339,754 kWh.

Construction equipment used by the Project would result in single event consumption of approximately 381,590 gallons of diesel fuel. Construction equipment use of fuel would not be atypical for the type of construction proposed because there are no aspects of the Project's proposed construction process that are unusual or energy-intensive, and Project construction equipment would conform to the applicable CARB emissions standards, acting to promote equipment fuel efficiencies.

CCR Title 13, Title 13, Motor Vehicles, Section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than 5 minutes, thereby precluding unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. BACMs inform construction equipment operators of this requirement.

Construction worker trips for full construction of the Project would result in the estimated fuel consumption of 785,820 gallons of fuel. Additionally, fuel consumption from construction vendor trips (MHDs and HHDs) will total approximately 546,493 gallons. Diesel fuel would be supplied by City and regional commercial vendors. Indirectly, construction energy efficiencies and energy conservation would be achieved using bulk purchases, transport and use of construction materials. The 2022 IEPR released by the CEC has shown that fuel efficiencies are getting better within on and off-road vehicle engines due to more stringent government requirements (29). As supported by the preceding discussions, Project construction energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

4.5.2 OPERATIONAL ENERGY DEMANDS

TRANSPORTATION ENERGY DEMANDS

Annual vehicular trips and related VMT generated by the operation of the Project would result in a fuel demand of 11,884,520 gallons of fuel.

Fuel would be provided by current and future commercial vendors. Trip generation and VMT generated by the Project are consistent with other industrial uses of similar scale and configuration, as reflected respectively in the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Ed., 2021); and CalEEMod. As such, Project operations would not result in excessive and wasteful vehicle trips and VMT, nor excess and wasteful vehicle energy consumption compared to other industrial uses.

It should be noted that the state strategy for the transportation sector for medium and heavy-duty trucks is focused on making trucks more efficient and expediting truck turnover rather than reducing VMT from trucks. This is in contrast to the passenger vehicle component of the transportation sector where both per-capita VMT reductions and an increase in vehicle efficiency are forecasted to be needed to achieve the overall state emissions reductions goals.

Heavy duty trucks involved in goods movements are generally controlled on the technology side and through fleet turnover of older trucks and engines to newer and cleaner trucks and engines. The first battery-electric heavy-heavy duty trucks are being tested this year and SCAQMD is looking to integrate this new technology into large-scale truck operations. The following state strategies reduce GHG emissions from the medium and heavy-duty trucks:

- CARB's Mobile Source Strategy focuses on reducing GHGs through the transition to zero and low emission vehicles and from medium-duty and heavy-duty trucks.
- CARB's Sustainable Freight Action Plan establishes a goal to improve freight efficiency by 25% by 2030, deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize both zero and near-zero emission freight vehicles and equipment powered by renewable energy by 2030.
- CARB's Emissions Reduction Plan for Ports and Goods Movement (Goods Movement Plan) in California focuses on reducing heavy-duty truck-related emissions focus on establishment of emissions standards for trucks, fleet turnover, truck retrofits, and restriction on truck idling (CARB 2006). While the focus of Goods Movement Plan is to reduce criteria air pollutant and air toxic emissions, the strategies to reduce these pollutants would also generally have a beneficial effect in reducing GHG emissions.
- CARB's On-Road Truck and Bus Regulation (2010) requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Newer heavier trucks and buses must meet particulate matter filter requirements beginning January 1, 2012. Lighter and older heavier trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent (30).
- CARB's Heavy-Duty (Tractor-Trailer) GHG Regulation requires SmartWay tractor trailers that include idle-reduction technologies, aerodynamic technologies, and low-rolling resistant tires that would reduce fuel consumption and associated GHG emissions.

The proposed Project would implement project design features that would facilitate the accessibility, parking, and loading of trucks on-site.

Enhanced fuel economies realized pursuant to federal and state regulatory actions, and related transition of vehicles to alternative energy sources (e.g., electricity, natural gas, biofuels, hydrogen cells) would likely decrease future gasoline fuel demands per VMT. Location of the Project proximate to regional and local roadway systems tends to reduce VMT within the region, acting to reduce regional vehicle energy demands. The Project would implement sidewalks, facilitating and encouraging pedestrian access. Facilitating pedestrian and bicycle access would reduce VMT and associated energy consumption. In compliance with the California Green Building Standards Code and City requirements, the Project would promote the use of bicycles as an alternative mean of transportation by providing short-term and/or long-term bicycle

parking accommodations. As supported by the preceding discussions, Project transportation energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

ON-SITE CARGO HANDLING EQUIPMENT FUEL DEMANDS

As previously stated, it is common for industrial buildings to require the operation of exterior cargo handling equipment in the building's truck court areas. On-site cargo handling equipment used by the Project would result in approximately 98,098 gallons of diesel. On-site equipment use of fuel would not be atypical for the type of construction proposed because there are no aspects of the Project's proposed operations that are unusual or energy-intensive, and Project on-site equipment would conform to the applicable CARB emissions standards, acting to promote equipment fuel efficiencies.

FACILITY ENERGY DEMANDS

Project facility operational energy demands are estimated at: 1,129,120 kBTU/year of natural gas for the commercial portion and 59,689,613 kWh/year of electricity. Natural gas would be supplied to the Project by SoCalGas; electricity would be supplied by SCE. The Project proposes conventional industrial and commercial uses reflecting contemporary energy efficient/energy conserving designs and operational programs. The Project does not propose uses that are inherently energy intensive and the energy demands in total would be comparable to other industrial and commercial uses of similar scale and configuration.

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5 CONCLUSIONS

5.1 ENERGY IMPACT 1

Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

As supported by the preceding analyses, Project construction and operations would not result in the inefficient, wasteful, or unnecessary consumption of energy. The Project would therefore not cause or result in the need for additional energy producing or transmission facilities. The Project would not engage in wasteful or inefficient uses of energy and aims to achieve energy conservations goals within the State of California.

5.2 ENERGY IMPACT 2

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

The Project's consistency with the applicable state and local plans is discussed below.

CONSISTENCY WITH ISTEA

Transportation and access to the Project site is provided by the local and regional roadway systems. The Project would not interfere with, nor otherwise obstruct intermodal transportation plans or projects that may be realized pursuant to the ISTEA because SCAG is not planning for intermodal facilities on or through the Project site.

CONSISTENCY WITH TEA-21

The Project site is located along major transportation corridors with proximate access to the Interstate freeway system. The site selected for the Project facilitates access, acts to reduce VMT, takes advantage of existing infrastructure systems, and promotes land use compatibility through collocation of similar uses. The Project supports the strong planning processes emphasized under TEA-21. The Project is therefore consistent with, and would not otherwise interfere with, nor obstruct implementation of TEA-21.

CONSISTENCY WITH IEPR

Electricity would be provided to the Project by SCE. SCE's *Clean Power and Electrification Pathway* (CPEP) white paper builds on existing state programs and policies. As such, the Project is consistent with, and would not otherwise interfere with, nor obstruct implementation the goals presented in the 2022 IEPR.

Additionally, the Project will comply with the applicable Title 24 standards which would ensure that the Project energy demands would not be inefficient, wasteful, or otherwise unnecessary. As such, development of the proposed Project would support the goals presented in the 2022 IEPR.

CONSISTENCY WITH STATE OF CALIFORNIA ENERGY PLAN

The Project site is located along major transportation corridors with proximate access to the Interstate freeway system. The site selected for the Project facilitates access and takes advantage of existing infrastructure systems. The Project therefore supports urban design and planning processes identified under the State of California Energy Plan, is consistent with, and would not otherwise interfere with, nor obstruct implementation of the State of California Energy Plan.

CONSISTENCY WITH CALIFORNIA CODE TITLE 24, PART 6, ENERGY EFFICIENCY STANDARDS

As previously stated, CCR, Title 24, Part 11: CALGreen is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect on January 1, 2009, and is administered by the California Building Standards Commission. CALGreen is updated on a regular basis, with the most recent approved update consisting of the 2022 California Green Building Code Standards that were published on July 1, 2022 and will become effective on January 1, 2023. The Project would be required to comply with the applicable standards in place at the time plan check submittals are made.

CONSISTENCY WITH AB 1493

AB 1493 is not applicable to the Project as it is a statewide measure establishing vehicle emissions standards. No feature of the Project would interfere with implementation of the requirements under AB 1493.

CONSISTENCY WITH RPS

California's RPS is not applicable to the Project as it is a statewide measure that establishes a renewable energy mix. No feature of the Project would interfere with implementation of the requirements under RPS.

CONSISTENCY WITH SB 350

The proposed Project would use energy from SCE, which have committed to diversifying their portfolio of energy sources by increasing energy from wind and solar sources. No feature of the Project would interfere with implementation of SB 350. Additionally, the Project would be designed and constructed to implement the energy efficiency measures for new industrial developments and would include several measures designed to reduce energy consumption.

CONSISTENCY WITH CITY OF PALMDALE GENERAL PLAN 2045

As stated in Section ES.2 of this study, energy-saving features and operational programs would be incorporated into facilities developed pursuant to the currently proposed Project. These measures would help with the City's goal of reducing energy usage and make Palmdale a more sustainable community.

As shown above, the Project would not conflict with any of the state or local plans. As such, a less than significant impact is expected.

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7 CERTIFICATIONS

The contents of this energy report represent an accurate depiction of the environmental impacts associated with the proposed Antelope Valley Commerce Center. The information contained in this energy report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at hqureshi@urbanxroads.com.

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EDUCATION

Master of Science in Environmental Studies
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Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June, 2006

PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Professionals
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June, 2013
Planned Communities and Urban Infill – Urban Land Institute • June, 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008
Principles of Ambient Air Monitoring – CARB • August, 2007
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