Replenish Big Bear Program

ENERGY ANALYSIS

BIG BEAR AREA REGIONAL WASTEWATER AGENCY

PREPARED BY:

Haseeb Qureshi
hqureshi@urbanxroads.com

Ali Dadabhoy
adadabhoy@urbanxroads.com

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LIST OF ABBREVIATED TERMS

%	Percent
(1)	Reference
AQIA	*Replenish Big Bear Program Air Quality Impact Analysis*
BACM	Best Available Control Measures
BTU	British Thermal Units
CalEEMod	California Emissions Estimator Model
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CPEP	Clean Power and Electrification Pathway
CPUC	California Public Utilities Commission
DMV	Department of Motor Vehicles
EIA	Energy Information Administration
EPA	Environmental Protection Agency
EMFAC	EMissions FACtor
FERC	Federal Energy Regulatory Commission
GHG	Greenhouse Gas
GWh	Gigawatt Hour
HHDT	Heavy-Heavy Duty Trucks
hp-hr-gal	Horsepower Hours Per Gallon
IEPR	Integrated Energy Policy Report
ISO	Independent Service Operator
ISTEA	Intermodal Surface Transportation Efficiency Act
ITE	Institute of Transportation Engineers
kBTU	Thousand-British Thermal Units
kWh	Kilowatt Hour
LDA	Light Duty Auto
LDT1/LDT2	Light-Duty Trucks
LHDT1/LHDT2	Light-Heavy Duty Trucks
MARB/IPA	March Air Reserve Base/Inland Port Airport
MDV	Medium Duty Trucks
MHDT	Medium-Heavy Duty Trucks
MMcfd	Million Cubic Feet Per Day

mpg	Miles Per Gallon
MPO	Metropolitan Planning Organization
PG&E	Pacific Gas and Electric
Project	Replenish Big Bear Program
PV	Photovoltaic
SCAB	South Coast Air Basin
BVES	Bear Valley Electric Service
SDAB	San Diego Air Basin
sf	Square Feet
SoCalGas	Southern California Gas
TEA-21	Transportation Equity Act for the 21st Century
U.S.	United States
VMT	Vehicle Miles Traveled

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EXECUTIVE SUMMARY

ES.1 SUMMARY OF FINDINGS

The results of this *Replenish Big Bear Program Energy Analysis* is summarized below based on the significance criteria in Section 5 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Statute and Guidelines (*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: Would the Project 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: Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	5.0	*Less Than Significant*	*n/a*

ES.2 PROJECT REQUIREMENTS

The Project would be required to comply with regulations imposed by the federal and state agencies that regulate energy use and consumption through various means and programs. Those that are directly and indirectly applicable to the Project and that would assist in the reduction of energy usage include:

- Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)
- The Transportation Equity Act for the 21st Century (TEA-21)
- Integrated Energy Policy Report (IEPR)
- State of California Energy Plan
- California Code Title 24, Part 6, Energy Efficiency Standards
- California Code Title 24, Part 11, California Green Building Standards Code (CALGreen)
- AB 1493 Pavley Regulations and Fuel Efficiency Standards
- California's Renewable Portfolio Standard (RPS)
- Clean Energy and Pollution Reduction Act of 2015 (SB 350)

Consistency with the above regulations is discussed in detail in section 5 of this report.

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1 INTRODUCTION

This report presents the results of the energy analysis prepared by Urban Crossroads, Inc., for the proposed Replenish Big Bear Program Project (Project). The purpose of this report is to ensure that energy implication is considered by the Big Bear Area Regional Wastewater Agency (Lead Agency), as the lead agency, and to quantify anticipated energy usage associated with construction and operation 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 within the Big Bear Valley Groundwater Management Zone (GMZ or Basin). Big Bear Lake and Baldwin Lake are located in the middle of this Basin. The overall project area consists of the Valley in the County of San Bernardino, as shown on Exhibit 1-A.

1.2 PROJECT DESCRIPTION

The proposed Project includes upgrades and additions to Big Bear Area Regional Wastewater Agency's (BBARWA) wastewater treatment plant (WWTP) to produce purified water through full advanced treatment to protect the receiving waters and their beneficial uses. The Replenish Big Bear Program would upgrade BBARWA's WWTP to produce full advanced treated water that would be retained within the Big Bear Valley watershed to be used to increase the sustainability of local water supplies, consequently, wastewater currently delivered to Lucerne Valley will be modified. The proposed Project consists of construction and operation of the various facilities which are separated into five project categories: 1) Replenish Big Bear Component 1: Lake Discharge Pipeline Alignment; 2) Replenish Big Bear Component 2: Shay Pond; 3) Replenish Big Bear Component 3: Evaporation Pond; 4) Replenish Big Bear Component 4: BBARWA WWTP Upgrades; and 5) Replenish Big Bear Component 5: Sand Canyon.

This Replenish Big Bear Component includes upgrades to the BBARWA WWTP, to include 2.2 MGD of full advanced treatment, producing up to 2,210 AFY of purified water. The upgrades include the construction of a 40,000 SF building which would provide the following upgrades and new construction in order of process flow:

- Upgrades to the Oxidation Ditches
- New Denitrification Filter
- New UF and RO filtration membranes
- New UV Disinfection
- New AOP
- New Pellet Reactor: 0.22 MGD

The BBARWA WWTP Treatment Upgrades also includes the installation of about 1,350 LF of brine pipeline anticipated to be sized between 8" to 10" from the pellet reactor to the solar evaporation ponds. Additionally, the BBARWA WWTP Treatment Upgrades also includes

installation of a 50 gpm brine pump station and a 1,520 gpm pump station at the BBARWA WWTP to pump purified water to Shay Pond and Stanfield Marsh.

REPLENISH BIG BEAR COMPONENT 2: LAKE DISCHARGE PIPELINE ALIGNMENT

The Replenish Big Bear Program would ultimately install a pipeline utilizing one of three alignments from the WWTP to Stanfield Marsh in the amount of about 19,940 LF sized at 12" in diameter.

REPLENISH BIG BEAR COMPONENT 3: SHAY POND CONVEYANCE PIPELINE

The Replenish Big Bear Program would ultimately install about 710 LF of 4" pipeline to reach Shay Pond from either an existing pipeline or a new 6" pipeline that would be 5,600 LF. As such, this Replenish Big Bear Component includes the installation of up to 6,310 LF of conveyance pipeline.

REPLENISH BIG BEAR COMPONENT 4: EVAPORATION POND

The Replenish Big Bear Program would include between 23 and 57 acres of evaporation ponds at the BBARWA WWTP site. The ponds would be segmented into different storage basins to allow for evaporation of the brine stream in a cycle of filling with brine, allowing the brine to evaporate, and then removing remaining brine. This Replenish Big Bear Component includes the installation of up to 2 monitoring wells.

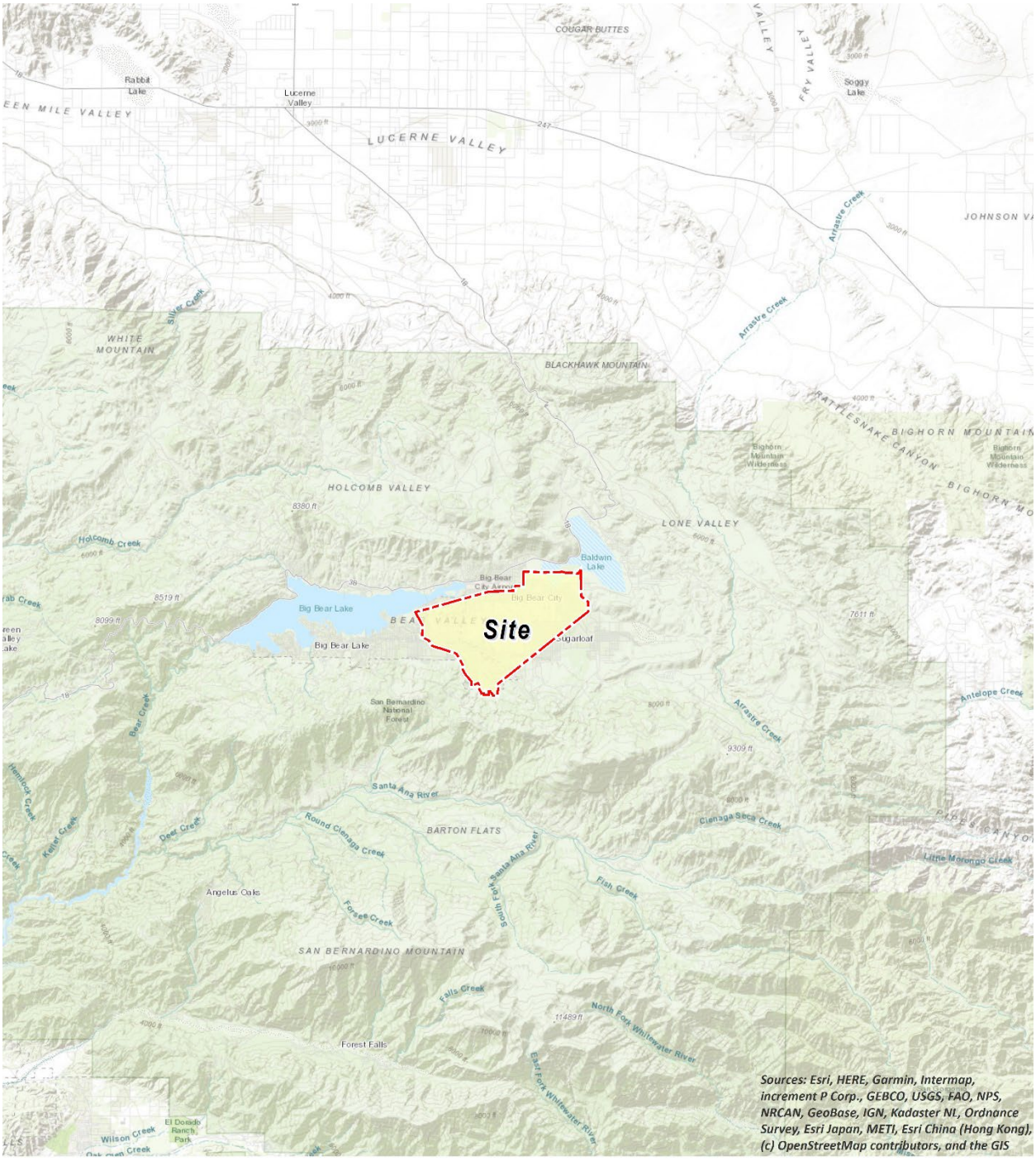
REPLENISH BIG BEAR COMPONENT 5: SAND CANYON

The Sand Canyon groundwater recharge project involves extracting Project water stored in the Lake to a temporary storage pond using existing infrastructure owned by a local resort. The Project water will then be pumped and conveyed to the Sand Canyon recharge area using a new pump station and pipeline.

As part of the Replenish Big Bear Program, the following will be constructed:

- A new 471 gpm pump station near the snowmaking pond, at the BBLDWP Sand Canyon Well site, to convey water to Sand Canyon.
- A new 8-inch pipeline that will discharge into Sand Canyon and will be approximately 7,200 feet in length.
- Two monitoring wells for groundwater recharge at Sand Canyon, as required by the future discharge permit.
- Installation of erosion control using rip rap or similar erosion control methods, at Sand Canyon.

EXHIBIT 1-A: PROJECT LOCATION MAP



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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 2020, released by the United States (U.S.) Energy Information Administration's (EIA) California State Profile and Energy Estimates in 2021 and included (2):

- As of 2020, approximately 6,923 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 2021 the U.S. petroleum consumption comprised about 77% of all transportation energy use, excluding fuel consumed for aviation and most marine vessels (3). 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) (4). 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) (5).

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 (6)

According to the EIA, California used approximately 247,250 gigawatt hours of electricity in 2021 (7). 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 (7).

According to the EIA, California used approximately 200,871 million therms of natural gas in 2021 (8). 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 (8). 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 (12). Similarly, the subsequent 2022 IEPR provides information and policy recommendations on advancing a clean, reliable, and affordable energy system.

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 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 Bear Valley Electric Service (BVES). BVES provides electric power to more than 23 thousand persons in 2 counties, within a service area encompassing approximately 32 square miles. Based on BVES's 2021 Power Content Label Mix, BVES derives electricity from the following two primary energy resources: fossil fuels and purchases from independent power producers and utilities, including out-of-state suppliers (14).

Tables 2-2 identifies BVES's specific proportional shares of electricity sources in 2021. As indicated in Table 2-2, the 2021 BVES Power Mix has renewable energy at 0.0% of the overall energy resources. (15).

TABLE 2-2: BVES 2021 POWER CONTENT MIX

Energy Resources	2021 BVES Power Mix
Eligible Renewable	**0.0%**
Biomass & Waste	0.0%
Geothermal	0.0%
Eligible Hydroelectric	0.0%
Solar	0.0%
Wind	0.0%
Coal	**0.0%**
Large Hydroelectric	**0.0%**
Natural Gas	**1.4%**
Nuclear	**0.0%**
Other	**0.0%**
Unspecified Sources of power*	98.6%
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 that deliver out-of-state natural gas to California gas utilities 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 California Public Utilities Commission 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.

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 (6), 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.

[1] Fuel consumptions estimated utilizing information from EMFAC2021.

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 (6). 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).

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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 United States Department of Transportation, the United States Department of Energy, and the United States 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)

The 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. TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. 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. 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, 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 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: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, 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. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas (GHG) emissions. The 2022 version of Title 24 was adopted by the CEC and became effective on January 1, 2023. The 2022 Title 24 standards require solar photovoltaic systems for new homes, establish requirements for newly constructed healthcare facilities, encourage demand responsive technologies for residential buildings, and update indoor and outdoor lighting standards for nonresidential buildings.

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 EV 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 33% of total retail sales by 2020 (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 California Energy Commission (CEC), and local publicly owned utilities.

- Reorganize the Independent System Operator (ISO) to develop more regional electrify 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).

3.2.7 100 PERCENT CLEAN ENERGY ACT OF 2018 (SB 100)

In September 2018, the legislature approved, and the Governor signed SB 100, which builds on the targets established in SB 1078 and SB 350. Most notably, SB 100 sets a goal of powering all retail electricity sold in California with renewable and zero-carbon resources. Additionally, SB 100 updates the interim renewables target from 50% to 60% by 2030.

3.2.8 EXECUTIVE ORDER N-79-20 AND ADVANCED CLEAN CARS II

On August 25, 2022 CARB approved the Advanced Clean Cars II rule, which codifies the goals set out in Executive Order N-79-20 and establishes a year-by-year roadmap such that by 2035, 100% of new cars and light trucks sold in California will be zero-emission vehicles. Under this regulation, automakers are required to accelerate deliveries of zero-emission light-duty vehicles, beginning with model year 2026. CARB estimates that between 2026 and 2040, the regulation would reduce GHG emissions by a cumulative 395 million metric tons, equivalent to reducing petroleum use by 915 million barrels.

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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 2022.1.1.12 outputs for the *Replenish Big Bear Program Air Quality Impact Analysis* (24) was utilized in this analysis, detailing Project related construction equipment, transportation energy demands, and facility energy demands.

CONSTRUCTION DURATION

Construction is anticipated to begin in January 2025 and will last through January 2027 (24). The construction schedule utilized in the analysis, shown in Table 4-1, represents a "worst-case" analysis scenario. The duration of construction activity and associated equipment represents a reasonable approximation of the expected construction fleet as required per *CEQA Guidelines* (25).

TABLE 4-1: CONSTRUCTION DURATION

Construction Activity	Start Date	End Date	Days
Replenish Big Bear Component 1: BBARWA WWTP Upgrades	Jan 2025	Jan 2027	515
Replenish Big Bear Component 2: Lake Discharge Pipeline Alignment	May 2025	Oct 2026	370
Replenish Big Bear Component 3: Shay Pond Conveyance Pipeline	May 2025	Oct 2026	370
Replenish Big Bear Component 4: Evaporation Pond	May 2025	Oct 2026	370
Replenish Big Bear Component 5: Sand Canyon	May 2025	Oct 2026	370

CONSTRUCTION EQUIPMENT

Table 4-2 summarizes the equipment fleets and durations modeled for each construction activity.

TABLE 4-2: CONSTRUCTION EQUIPMENT ASSUMPTIONS

Equipment	CalEEMod Equivalent	Amount	Hours Per Day
Replenish Big Bear Component 1: BBARWA WWTP Upgrades			
Dozers	Rubber Tired Dozers	1	8
Graders	Graders	1	8
Cranes	Cranes	1	8
Backhoes	Tractors/Loaders/Backhoes	1	8
Drill Rig	Bore/Drill Rig	1	8
Cement Trucks	Off-Highway Trucks	1	8
Forklifts	Forklifts	1	4
Backhoes	Tractors/Loaders/Backhoes	1	4
Front Loaders	Crawler Tractors	1	4
Dump/Delivery Trucks	Off-Highway Trucks	2	8
Replenish Big Bear Component 2: Lake Discharge Pipeline Alignment			
Excavator	Excavator	1	8
Backhoe	Tractors/Loaders/Backhoes	1	8
Compaction Equipment	Plate Compactor	1	8
Pickup Trucks	Off-Highway Trucks	2	8
Paver	Paver	1	8
Roller	Roller	1	8
Water Truck	Off-Highway Trucks	1	8
Traffic Control Signage and Devices	Signal Boards	1	8
Dump/Delivery Trucks	Off-Highway Trucks	10	8
Backhoe	Tractors/Loaders/Backhoes	1	6
Compactor	Plate Compactor	1	6
Roller/Vibrator	Roller	1	6
Pavement Cutter	Concrete/Industrial Saws	1	6
Grinder	Concrete/Industrial Saws	1	6
Haul Truck	Off-Highway Trucks	1	6
Dump Truck	Off-Highway Trucks	2	6
Water Truck	Off-Highway Trucks	1	4
Excavator	Excavator	1	4
Paving Machine	Pavers	1	2

Equipment	CalEEMod Equivalent	Amount	Hours Per Day
Replenish Big Bear Component 3: Shay Pond Conveyance Pipeline			
Excavator	Excavator	1	8
Backhoe	Tractors/Loaders/Backhoes	1	8
Compaction Equipment	Plate Compactor	1	8
Pickup Trucks	Off-Highway Trucks	2	8
Roller	Roller	1	8
Water Truck	Off-Highway Trucks	1	8
Traffic Control Signage and Devices	Signal Boards	1	8
Dump/Delivery Trucks	Off-Highway Trucks	10	8
Backhoe	Tractors/Loaders/Backhoes	1	6
Compactor	Plate Compactor	1	6
Roller/Vibrator	Roller	1	6
Haul Truck	Off-Highway Trucks	1	6
Dump Truck	Off-Highway Trucks	2	6
Water Truck	Off-Highway Trucks	1	4
Excavator	Excavator	1	4
Replenish Big Bear Component 4: Evaporation Pond			
Bulldozers	Rubber Tired Dozers	2	8
Front End Loaders	Crawler Tractors	2	8
Water Truck	Off-Highway Trucks	2	8
Scrapers	Scraper	7	8
Excavators	Excavator	2	8
Dump Trucks	Off-Highway Trucks	4	8
Replenish Big Bear Component 5: Sand Canyon			
Drill Rig	Bore/Drill Rig	1	8
Cranes	Cranes	1	4
Forklifts	Forklifts	1	4
Backhoes	Tractors/Loaders/Backhoes	1	4
Front Loaders	Crawler Tractors	1	4
Cement Trucks	Off-Highway Trucks	1	8
Excavator	Excavator	1	8
Backhoe	Tractors/Loaders/Backhoes	1	8

Equipment	CalEEMod Equivalent	Amount	Hours Per Day
Compaction Equipment	Plate Compactor	1	8
Pickup Trucks	Off-Highway Trucks	2	8
Paver	Paver	1	8
Roller	Roller	1	8
Water Truck	Off-Highway Trucks	1	8
Traffic Control Signage and Devices	Signal Boards	1	8
Dump/Delivery Trucks	Off-Highway Trucks	10	8
Backhoe	Tractors/Loaders/Backhoes	1	6
Compactor	Plate Compactor	1	6
Roller/Vibrator	Roller	1	6
Pavement Cutter	Concrete/Industrial Saws	1	6
Grinder	Concrete/Industrial Saws	1	6
Haul Truck	Off-Highway Trucks	1	6
Dump Truck	Off-Highway Trucks	2	6
Water Truck	Off-Highway Trucks	1	4
Excavator	Excavator	1	4
Paving Machine	Pavers	1	2
Compactor	Plate Compactor	1	2

Source: Construction equipment based on information provided by BBARWA and the Project Team. It should be noted that the Haul/Dump/Delivery trucks are modeled into the Trips & VMT section of CalEEMod.

4.2.1 CALEEMOD

In May 2023 the California Air Pollution Control Officers Association (CAPCOA) in conjunction with other California air districts, including the South Coast Air Quality Management District (SCAQMD), released the latest version of CalEEMod version 2022.1.1.12. 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 (26). 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 Appendix 4.1.

4.2.2 EMISSION FACTORS MODEL

On May 2, 2022, the EPA approved the 2021 version of the EMissions FACtor model (EMFAC) 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 CARB to project changes in future emissions from on-road mobile sources (27). 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 the analysis, the 2025, 2026, 2027 analysis years were utilized to determine the average vehicle fuel economy used throughout the duration of the Project. Output from the EMFAC2021 model runs are provided in Appendix 4.2.

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.

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 (28).

As shown on Table 4-3, the total power cost of the on-site electricity usage during the construction of the Project is estimated to be approximately $126,967.83.

TABLE 4-3: 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
BBARWA WWTP Upgrades	$2.50	173.805	24	$10,428.28
Lake Discharge Pipeline Alignment	$2.50	3,092.766	17	$3,813.68
Shay Pond Conveyance Pipeline	$2.50	28.314	17	$1,203.35
Evaporation Pond	$2.50	141.135	17	$105,524.29
Sand Canyon	$2.50	2,482.924	17	$5,998.22
TOTAL CONSTRUCTION POWER COST				***$126,967.83***

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 4-3) by the utility provider cost per kilowatt hour (kWh) of electricity.

PROJECT CONSTRUCTION ELECTRICITY USAGE

The BVES's general service rate schedule were used to determine the Project's electrical usage. As of March 1, 2023, BVES's general service rate is $0.25 per kilowatt hours (kWh) of electricity for general services (29). As shown on Table 4-4, the total electricity usage from on-site Project construction related activities is estimated to be approximately 505,164 kWh.

TABLE 4-4: CONSTRUCTION ELECTRICITY USAGE

Land Use	Cost per kWh	Project Construction Electricity Usage (kWh)
Proposed Project		
BBARWA WWTP Upgrades	$0.25	41,491
Lake Discharge Pipeline Alignment	$0.25	15,173
Shay Pond Conveyance Pipeline	$0.25	4,788
Evaporation Pond	$0.25	419,847
Sand Canyon	$0.25	23,865
TOTAL CONSTRUCTION ELECTRICITY USAGE		***505,164***

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.

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 (30). 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[2]. As presented on Table 4-5, Project construction activities would consume an estimated 565,550 gallons of diesel fuel. 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.

[2] 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

Construction Activity	Duration (Days)	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
BBARWA WWTP Upgrades								
Linear, Grading & Excavation	30	Bore/Drill Rigs	83	1	8	0.5	332	538
		Off-Highway Trucks	376	1	8	0.38	1,143	1,854
		Tractors/Loaders/Backhoes	84	1	4	0.37	124	202
Building Construction	465	Rubber Tired Dozers	367	1	8	0.4	1,174	29,519
		Graders	148	1	8	0.41	485	12,202
		Cranes	367	1	8	0.29	851	21,401
		Tractors/Loaders/Backhoes	84	1	8	0.37	249	6,250
		Off-Highway Trucks	376	2	8	0.38	2,286	57,461
		Crawler Tractors	87	1	4	0.43	150	3,761
		Forklifts	82	1	4	0.2	66	1,649
BBARWA WWTP UPGRADES - CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***134,836***
Lake Discharge Pipeline Alignment								
Linear, Grading & Excavation	190	Excavators	36	1	8	0.38	109	1,124
		Tractors/Loaders/Backhoes	84	1	8	0.37	249	2,554
		Plate Compactors	8	1	8	0.43	28	283
		Signal Boards	6	1	8	0.82	39	404
		Off-Highway Trucks	376	1	8	0.38	1,143	11,739
Linear, Drainage, Utilities, & Sub-Grade	190	Tractors/Loaders/Backhoes	84	1	6	0.37	186	1,915
		Plate Compactors	8	1	6	0.43	21	212
		Rollers	36	1	6	0.38	82	843
		Off-Highway Trucks	376	1	4	0.38	572	5,870
		Excavators	36	1	4	0.38	55	562
		Pavers	81	1	2	0.42	68	699
		Plate Compactors	8	1	2	0.43	7	71
Demolition	70	Concrete/Industrial Saws	33	2	6	0.73	289	1,094
LAKE DISCHARGE PIPELINE ALIGNMENT - CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***27,369***

Construction Activity	Duration (Days)	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
Shay Pond Conveyance Pipeline								
Linear, Grading & Excavation	190	Signal Boards	6	1	8	0.82	39	404
		Excavators	36	1	8	0.38	109	1,124
		Tractors/Loaders/Backhoes	84	1	8	0.37	249	2,554
		Plate Compactors	8	1	8	0.43	28	283
		Rollers	36	1	8	0.38	109	1,124
		Off-Highway Trucks	376	1	8	0.38	1,143	11,739
Linear, Drainage, Utilities, & Sub-Grade	190	Tractors/Loaders/Backhoes	84	1	6	0.37	186	1,915
		Plate Compactors	8	1	6	0.43	21	212
		Rollers	36	1	6	0.38	82	843
		Excavators	36	1	4	0.38	55	562
		Off-Highway Trucks	376	1	4	0.38	572	5,870
SHAY POND CONVEYANCE PIPELINE - CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***26,630***
Evaporations Ponds								
Site Preparation	380	Rubber Tired Dozers	367	2	8	0.4	2,349	48,246
		Crushing/Proc. Equipment	12	2	2	0.85	41	838
		Off-Highway Trucks	376	2	8	0.38	2,286	46,957
		Scrapers	423	7	8	0.48	11,370	233,551
		Excavators	36	2	8	0.38	219	4,496
EVAPORATIONS PONDS - CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***334,088***
Sand Canyon								
Linear, Grading & Excavation	190	Tractors/Loaders/Backhoes	84	1	4	0.37	124	1,277
		Crawler Tractors	87	1	4	0.43	150	1,537
		Excavators	36	1	8	0.38	109	1,124
		Plate Compactors	8	1	8	0.43	28	283
		Pavers	81	1	8	0.42	272	2,795
		Rollers	36	1	8	0.38	109	1,124
		Off-Highway Trucks	376	1	8	0.38	1,143	11,739

Construction Activity	Duration (Days)	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
		Signal Boards	6	1	8	0.82	39	404
Linear, Drainage, Utilities, & Sub-Grade	190	Cranes	367	1	4	0.29	426	4,372
		Forklifts	82	1	4	0.2	66	674
		Tractors/Loaders/Backhoes	84	1	8	0.37	249	2,554
		Plate Compactors	8	1	6	0.43	21	212
		Rollers	36	1	6	0.38	82	843
		Excavators	36	1	4	0.38	55	562
Linear, Drainage, Utilities, & Sub-Grade	190	Off-Highway Trucks	376	1	4	0.38	572	5,870
		Pavers	81	1	2	0.42	68	699
Demolition	20	Concrete/Industrial Saws	33	2	6	0.73	289	313
Building Construction	220	Bore/Drill Rigs	83	1	8	0.5	332	3,948
		Plate Compactors	8	1	2	0.43	7	82
		Tractors/Loaders/Backhoes	84	1	6	0.37	186	2,218
SAND CANYON - CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***42,628***
TOTAL CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***565,550***

4.3.4 CONSTRUCTION TRIPS AND VMT

Construction generates on-road vehicle emissions from vehicle usage for workers, hauling, and vendors commuting to and from the site. The number of workers, hauling, and vendor trips are presented below in Table 4-6. It should be noted that the trip length for workers, hauling, and vendor trips were adjusted to 100 miles based on BBARWA and the Project Team provided data.

TABLE 4-6: CONSTRUCTION TRIPS AND VMT

Construction Activity	One-Way Trips per Day			Trip Length		
	Worker	Vendor	Hauling	Worker	Vendor	Hauling
BBARWA WWTP Upgrades						
Demolition	50	25	46	100	100	100
Building Construction	50	7	2	100	100	100
Linear, Grading & Excavation	50	0	0	100	10.2	100
Lake Discharge Pipeline Alignment						
Demolition	5	0	21	100	10.2	100
Linear, Grading & Excavation	15	0	36	100	10.2	100
Linear, Drainage, Utilities, & Sub-Grade	18	0	0	100	10.2	20
Shay Pond Conveyance Pipeline						
Linear, Grading & Excavation	2	13	5	100	100	20
Linear, Drainage, Utilities, & Sub-Grade	0	0	0	18.5	10.2	20
Evaporation Ponds						
Site Preparation	10	0	11	100	10.2	100
Sand Canyon						
Demolition	5	0	19	100	10.2	100
Linear, Grading & Excavation	20	0	18	100	10.2	100
Building Construction	5	6	0	100	100	20
Linear, Drainage, Utilities, & Sub-Grade	20	0	0	100	10.2	20

4.3.5 CONSTRUCTION WORKER FUEL ESTIMATES

With respect to estimated VMT for the Project, the construction worker trips would generate an estimated 4,532,000 VMT during construction (24). Based on CalEEMod methodology, it is assumed that 50% of all worker trips are from light-duty-auto vehicles (LDA), 25% are from light-duty-trucks (LDT1[3]), and 25% are from light-duty-trucks (LDT2[4]). Data regarding Project related construction worker trips were based on CalEEMod defaults utilized within the AQIA.

[3] 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.

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

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 (27). EMFAC2021 was run for the LDA, LDT1, and LDT2 vehicle class within the San Bernardino South Coast sub-area for the 2025, 2026, 2027 calendar years. Data from EMFAC2021 is shown in Appendix 4.2.

Tables 4-7 through 4-9 provide estimated annual fuel consumption resulting from Project construction worker trips. Based on Tables 4-7 through 4-9, it is estimated that 157,463 gallons of fuel will be consumed related to construction worker trips 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 on-going or permanent commitment of fuel resources for this purpose.

TABLE 4-7: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES – LDA

Category	**Construction Activity**	**Duration** (Days)	**Worker** (Trips/Day)	**Trip Length** (miles)	**Vehicle Miles Traveled**	**Average Vehicle Fuel Economy** (mpg)	**Estimated Fuel Consumption** (gallons)
BBARWA WWTP Upgrades	**2025**						
	Demolition	21	25	100	52,500	32.57	1,612
	Building Construction	226	25	100	565,000	32.57	17,349
	2026						
	Building Construction	239	25	100	597,500	33.47	17,849
	Linear, Grading & Excavation	23	25	100	57,500	33.47	1,718
	2027						
	Linear, Grading & Excavation	7	25	100	17,500	34.38	509
Lake Discharge Pipeline Alignment	**2025**						
	Demolition	71	3	100	17,750	32.57	545
	Linear, Grading & Excavation	175	8	100	131,250	32.57	4,030
	2026						
	Linear, Grading & Excavation	15	8	100	11,250	33.47	336
	Linear, Drainage, Utilities, & Sub-Grade	190	9	100	166,250	33.47	4,966
Shay Pond Conveyance Pipeline	**2025**						
	Linear, Grading & Excavation	175	1	100	17,500	32.57	537
	2026						
	Linear, Grading & Excavation	15	1	100	1,500	33.47	45
	Linear, Drainage, Utilities, & Sub-Grade	190	0	18.5	0	33.47	0

Category	Construction Activity	Duration (Days)	Worker (Trips/Day)	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Evaporation Ponds	**2025**						
	Site Preparation	175	5	100	87,500	32.57	2,687
	2026						
	Site Preparation	205	5	100	102,500	33.47	3,062
Sand Canyon	**2025**						
	Demolition	21	2.5	100	5,250	32.57	161
	Linear, Grading & Excavation	174	10	100	174,000	32.57	5,343
	Building Construction	144	2.5	100	36,000	32.57	1,105
	2026						
	Linear, Grading & Excavation	16	10	100	16,000	33.47	478
	Building Construction	77	2.5	100	19,250	33.47	575
	Linear, Drainage, Utilities, & Sub-Grade	190	10	100	190,000	33.47	5,676
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION – LDA							***68,584***

TABLE 4-8: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES – LDT1

Category	Construction Activity	Duration (Days)	Worker (Trips/Day)	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
BBARWA WWTP Upgrades	**2025**						
	Demolition	21	12.5	100	26,250	25.11	1,045
	Building Construction	226	12.5	100	282,500	25.11	11,249
	2026						
	Building Construction	239	12.5	100	298,750	25.64	11,650
	Linear, Grading & Excavation	23	12.5	100	28,750	25.64	1,121
	2027						
	Linear, Grading & Excavation	7	12.5	100	8,750	26.20	334
Lake Discharge Pipeline Alignment	**2025**						
	Demolition	71	1	100	8,875	25.11	353
	Linear, Grading & Excavation	175	4	100	65,625	25.11	2,613
	2026						
	Linear, Grading & Excavation	15	4	100	5,625	25.64	219
	Linear, Drainage, Utilities, & Sub-Grade	190	4	100	83,125	25.64	3,241
Shay Pond Conveyance Pipeline	**2025**						
	Linear, Grading & Excavation	175	0.5	100	8,750	25.11	348
	2026						
	Linear, Grading & Excavation	15	0.5	100	750	25.64	29
	Linear, Drainage, Utilities, & Sub-Grade	190	0	18.5	0	25.64	0

Category	Construction Activity	Duration (Days)	Worker (Trips/Day)	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Evaporation Ponds	**2025**						
	Site Preparation	175	2.5	100	43,750	25.11	1,742
	2026						
	Site Preparation	205	2.5	100	51,250	25.64	1,998
Sand Canyon	**2025**						
	Demolition	21	1.25	100	2,625	25.11	105
	Linear, Grading & Excavation	174	5	100	87,000	25.11	3,464
	Building Construction	144	1.25	100	18,000	25.11	717
	2026						
	Linear, Grading & Excavation	16	5	100	8,000	25.64	312
	Building Construction	77	1.25	100	9,625	25.64	375
	Linear, Drainage, Utilities, & Sub-Grade	190	5	100	95,000	25.64	3,704
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION – LDT1							***44,621***

TABLE 4-9: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES – LDT2

Category	Construction Activity	Duration (Days)	Worker (Trips/Day)	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
BBARWA WWTP Upgrades	**2025**						
	Demolition	21	12.5	100	26,250	25.24	1,040
	Building Construction	226	12.5	100	282,500	25.24	11,193
	2026						
	Building Construction	239	12.5	100	298,750	25.93	11,520
	Linear, Grading & Excavation	23	12.5	100	28,750	25.93	1,109
	2027						
	Linear, Grading & Excavation	7	12.5	100	8,750	26.60	329
Lake Discharge Pipeline Alignment	**2025**						
	Demolition	71	1	100	8,875	25.24	352
	Linear, Grading & Excavation	175	4	100	65,625	25.24	2,600
	2026						
	Linear, Grading & Excavation	15	4	100	5,625	25.93	217
	Linear, Drainage, Utilities, & Sub-Grade	190	4	100	83,125	25.93	3,205
Shay Pond Conveyance Pipeline	**2025**						
	Linear, Grading & Excavation	175	0.5	100	8,750	25.24	347
	2026						
	Linear, Grading & Excavation	15	0.5	100	750	25.93	29
	Linear, Drainage, Utilities, & Sub-Grade	190	0	18.5	0	25.93	0

Category	Construction Activity	Duration (Days)	Worker (Trips/Day)	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Evaporation Ponds	**2025**						
	Site Preparation	175	2.5	100	43,750	25.24	1,733
	2026						
	Site Preparation	205	2.5	100	51,250	25.93	1,976
Sand Canyon	**2025**						
	Demolition	21	1.25	100	2,625	25.24	104
	Linear, Grading & Excavation	174	5	100	87,000	25.24	3,447
	Building Construction	144	1.25	100	18,000	25.24	713
	2026						
	Linear, Grading & Excavation	16	5	100	8,000	25.93	308
	Building Construction	77	1.25	100	9,625	25.93	371
	Linear, Drainage, Utilities, & Sub-Grade	190	5	100	95,000	25.93	3,663
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION – LDT2							***44,258***
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION – LDA, LDT1 & LDT2							***157,463***

4.3.6 CONSTRUCTION VENDOR/HAULING FUEL ESTIMATES

With respect to estimated VMT, the construction vendor and hauling trips (vehicles that deliver/export materials to and from the site during construction) would generate an estimated 3,706,415 VMT along area roadways for the Project over the duration of construction activity (24). It is assumed that 50% of all vendor trips are from medium-heavy duty trucks (MHDT), 50% of vendor trips are from heavy-heavy duty trucks (HHDT), and 100% of all hauling trips are from HHDTs. These assumptions are consistent with the CalEEMod defaults utilized within the within the AQIA (24). Vehicle fuel efficiencies for MHDTs and HHDTs were estimated using information generated within EMFAC2021. EMFAC2021 was run for the MHDT and HHDT vehicle classes within the San Bernardino South Coast sub-area for the 2025, 2026, 2027 calendar years. Data from EMFAC2021 is shown in Appendix 4.2.

Based on Tables 4-10 through 4-12, it is estimated that 583,562 gallons of fuel will be consumed related to construction vendor and hauling trips during full construction of the Project.

It should be noted that construction vendor and hauling trips would represent a “single-event” gasoline fuel demand and would not require on-going or permanent commitment of fuel resources for this purpose.

TABLE 4-10: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES – MHDT

Category	Construction Activity	Duration (Days)	Vendor (Trips/Day)	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
BBARWA WWTP Upgrades	**2025**						
	Demolition	21	13	100	26,250	8.46	3,104
	Building Construction	226	3	100	73,450	8.46	8,684
	2026						
	Building Construction	239	3	100	77,675	8.59	9,046
Shay Pond Conveyance Pipeline	**2025**						
	Linear, Grading & Excavation	175	7	100	113,750	8.46	13,449
	2026						
	Linear, Grading & Excavation	15	7	100	9,750	8.59	1,135
Sand Canyon	**2025**						
	Building Construction	144	3	100	43,200	8.46	5,108
	2026						
	Building Construction	77	3	100	23,100	8.59	2,690
TOTAL CONSTRUCTION VENDOR FUEL CONSUMPTION – MHDT							***43,216***

TABLE 4-11: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES – HHDT

Category	Construction Activity	Duration (Days)	Vendor (Trips/Day)	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
BBARWA WWTP Upgrades	**2025**						
	Demolition	21	13	100	26,250	6.13	4,282
	Building Construction	226	3	100	73,450	6.13	11,982
	2026						
	Building Construction	239	3	100	77,675	6.24	12,447
Shay Pond Conveyance Pipeline	**2025**						
	Linear, Grading & Excavation	175	7	100	113,750	6.13	18,557
	2026						
	Linear, Grading & Excavation	15	7	100	9,750	6.24	1,562
Sand Canyon	**2025**						
	Building Construction	144	3	100	43,200	6.13	7,047
	2026						
	Building Construction	77	3	100	23,100	6.24	3,702
TOTAL CONSTRUCTION VENDOR FUEL CONSUMPTION – HHDT							***59,580***

TABLE 4-12: CONSTRUCTION HAULING FUEL CONSUMPTION ESTIMATES – HHDT

Category	**Construction Activity**	**Duration** (Days)	**Hauling** (Trips/Day)	**Trip Length** (miles)	**Vehicle Miles Traveled**	**Average Vehicle Fuel Economy** (mpg)	**Estimated Fuel Consumption** (gallons)
BBARWA WWTP Upgrades	**2025**						
	Demolition	21	46	100	96,600	6.13	15,759
	Building Construction	226	2	100	48,590	6.13	7,927
	2026						
	Building Construction	239	46	100	1,099,400	6.24	176,179
Lake Discharge Pipeline Alignment	**2025**						
	Demolition	71	21	100	149,100	6.13	24,323
	Linear, Grading & Excavation	175	36	100	630,000	6.13	102,775
	2026						
	Linear, Grading & Excavation	15	36	100	54,000	6.24	8,654
Shay Pond Conveyance Pipeline	**2025**						
	Linear, Grading & Excavation	175	5	100	87,500	6.13	14,274
	2026						
	Linear, Grading & Excavation	15	5	100	7,500	6.24	1,202
Evaporation Ponds	**2025**						
	Linear, Grading & Excavation	175	11	100	192,500	6.13	31,403
	2026						
	Linear, Grading & Excavation	205	11	100	225,500	6.24	36,136

Category	**Construction Activity**	**Duration** (Days)	**Hauling** (Trips/Day)	**Trip Length** (miles)	**Vehicle Miles Traveled**	**Average Vehicle Fuel Economy** (mpg)	**Estimated Fuel Consumption** (gallons)
Sand Canyon	**2025**						
	Demolition	21	19	100	39,375	6.13	6,423
	Linear, Grading & Excavation	174	18	100	313,200	6.13	51,094
	2026						
	Linear, Grading & Excavation	16	18	100	28,800	6.24	4,615
TOTAL CONSTRUCTION HAULING FUEL CONSUMPTION – HHDT							***480,765***
TOTAL CONSTRUCTION VENDOR/HAULING FUEL CONSUMPTION – MHDT & HHDT							***583,562***

4.3.7 CONSTRUCTION ENERGY EFFICIENCY/CONSERVATION MEASURES

The equipment used for Project construction would conform to CARB regulations and California emissions standards. 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 employed in construction of the Project would therefore not result in inefficient wasteful, or unnecessary consumption of fuel.

The Project would utilize construction contractors which practice compliance 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.

Additionally, certain incidental construction-source energy efficiencies would likely accrue through implementation of California regulations and best available control measures (BACM). More specifically, California Code of Regulations 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. To this end, “grading plans shall reference the requirement that a sign shall 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 informed that engines are to be turned off at or prior to five minutes of idling. Enforcement of idling limitations is realized through periodic site inspections conducted by County building officials, and/or in response to citizen complaints.

Indirectly, construction energy efficiencies and energy conservation would be achieved for the proposed development through energy efficiencies realized from bulk purchase, transport and use of construction materials.

A full analysis related to the energy needed to form construction materials is not included in this analysis due to a lack of detailed Project-specific information on construction materials. 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, the 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 minimal transportation fuel demands (fuel consumed by maintenance 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

In terms of operational energy demands, the proposed Project involves the construction of monitoring wells, conveyance facilities and ancillary facilities, evaporation ponds, advanced water purification facilities, and associated improvements. The proposed Project does not include any substantive new stationary or mobile sources of emissions, and therefore, by its very nature, will not generate substantive amounts of energy demand from Project operations. The Project does not propose a trip-generating land use and while it is anticipated that the Project would require intermittent maintenance, such maintenance would be minimal requiring a negligible amount of traffic trips on an annual basis.

4.4.2 OPERATIONAL ENERGY DEMANDS

Project building operations activities would result in the consumption of natural gas and electricity, which would be supplied to the Project by Southwest Gas Corp. and BVES. As summarized on Table 4-14 the Project would result in 760,427 kBTU/year of natural gas and a net electricity demand of 147,883 kWh/year of electricity after netting out the 3,652,117 kWh/year of electricity generated by the project's photovoltaic solar design feature.

Land Use	Natural Gas Demand (kBTU/year)	Electricity Demand (kWh/year)
Warehouse	760,427	3,800,000
Parking Lot	0	19,079
TOTAL PROJECT ENERGY DEMAND	**760,427**	**3,819,079**
Solar Generation (kWh/year)	***N/A***	***3,652,117***
NET ENERGY DEMANDS	**760,427**	**147,883**

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 $126,967.83. Additionally, based on the assumed power cost, it is estimated that the total electricity usage during construction, after full Project build-out, is calculated to be approximately 505,164 kWh.

Construction equipment used by the Project would result in single event consumption of approximately 565,550 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. Enforcement of idling limitations is realized through periodic site inspections conducted by City building officials, and/or in response to citizen complaints.

Construction worker trips for full construction of the Project would result in the estimated fuel consumption of 157,463 gallons of fuel. Additionally, fuel consumption from construction hauling and vendor trips (MHDTs and HHDTs) will total approximately 583,562 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 (31). 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

Facility Energy Demands

Project facility operational energy demands are estimated at: 760,427 kBTU/year of natural gas and 147,883 kWh/year of electricity. Natural gas would be supplied to the Project by Southwest Gas Corp.; electricity would be supplied by BVES. The Project does not propose uses that are inherently energy intensive and the energy demands in total would be comparable to other land uses of similar scale and configuration.

Lastly, the Project will comply with the applicable Title 24 standards. Compliance itself with applicable Title 24 standards will ensure that the Project energy demands would not be inefficient, wasteful, or otherwise unnecessary.

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5 CONCLUSIONS

5.1 ENERGY IMPACT 1

Would the Project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Impact Analysis

A significant impact would occur if the proposed Project would result in the inefficient, wasteful, or unnecessary use of energy.

Construction

Based on CalEEMod estimations within the modeling output files used to estimate GHG emissions, construction-related vehicle trips would result in approximately 8.2 million VMT and consume an estimated 741,025 gallons of gasoline and diesel combined during future development projects construction phases. Additionally, on-site construction equipment would consume an estimated 565,550 gallons of diesel fuel. Limitations on idling of vehicles and equipment and requirements that equipment be properly maintained would result in fuel savings. California Code of Regulations, Title 13, Sections 2449 and 2485, limit idling from both on-road and off-road diesel- powered equipment and are enforced by the ARB. Additionally, given the cost of fuel, contractors and owners have a strong financial incentive to avoid wasteful, inefficient, and unnecessary consumption of energy during construction.

Due to the temporary nature of construction and the financial incentives for developers and contractors to use energy-consuming resources in an efficient manner, the construction phase of the proposed project would not result in wasteful, inefficient, and unnecessary consumption of energy. Therefore, the construction-related impacts related to electricity and fuel consumption would be less than significant.

Operation

Electricity and Natural Gas

Operation of the proposed project would consume energy as part of building operations and transportation activities. Building operations would involve energy consumption for multiple purposes and based on CalEEMod energy use estimations, operations for the Project would result in approximately 147,883 kWh of electricity and 760,427 kBTU/year of natural gas annually.

The Project would be designed and constructed in accordance with the City's latest adopted energy efficiency standards, which are based on the California Title 24 energy efficiency standards. Title 24 standards include a broad set of energy conservation requirements that apply to the structural, mechanical, electrical, and plumbing systems in a building. For example, the Title 24 Lighting Power Density requirements define the maximum wattage of lighting that can be used in a building based on its square footage. Title 24 standards are widely regarded as the

most advanced energy efficiency standards, would help reduce the amount of energy required for lighting, water heating, and heating and air conditioning in buildings and promote energy conservation.

Fuel

As mentioned previously, the proposed Project does not include any substantive new stationary or mobile sources of emissions, and therefore, by its very nature, will not generate substantive amounts of energy demand from Project operations. The Project does not propose trip-generating land use and while it is anticipated that the Project would require intermittent maintenance, such maintenance would be minimal requiring a negligible amount of traffic trips on an annual basis. For these reasons, operational-related transportation fuel consumption would not result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources. Therefore, the operational impact related to vehicle fuel consumption would be less than significant.

5.2 ENERGY IMPACT 2

Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Impact Analysis

A significant impact would occur if the proposed Project would conflict with or obstruct a State or local plan for renewable energy or energy efficiency.

Construction

As discussed in Section 5.1, above, the proposed project would result in energy consumption through the combustion of fossil fuels in construction vehicles, worker commute vehicles, and construction equipment, and the use of electricity for temporary buildings, lighting, and other sources. California Code of Regulations Title 13, Sections 2449 and 2485, limit idling from both on- road and off-road diesel-powered equipment and are enforced by the ARB. The proposed project would comply with these regulations. There are no policies at the local level applicable to energy conservation specific to the construction phase. Thus, it is anticipated that construction of the proposed project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing energy use or increasing the use of renewable energy. Therefore, construction- related energy efficiency and renewable energy standards consistency impacts would be less than significant.

Operation

California's Renewable Portfolio Standard (RPS) establishes a goal of renewable energy for local providers to be 44 percent by 2040. Similarly, the State is promoting renewable energy targets to meet the 2022 Scoping Plan greenhouse gas emissions reductions. As discussed in Section 5.1, above, the Project would result in approximately 147,883 kWh of electricity and 760,427 kBTU/year of natural gas annually.

The Project would be designed and constructed in accordance with the City's latest adopted energy efficiency standards, which are based on the California Title 24 energy efficiency standards. Title 24 standards include a broad set of energy conservation requirements that apply to the structural, mechanical, electrical, and plumbing systems in a building. For example, the Title 24 Lighting Power Density requirements define the maximum wattage of lighting that can be used in a building based on its square footage. Title 24 standards are widely regarded as the most advanced energy efficiency standards, would help reduce the amount of energy required for lighting, water heating, and heating and air conditioning in buildings and promote energy conservation.

Compliance with the aforementioned mandatory measures would ensure that future development projects would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing energy use or increasing the use of renewable energy. Therefore, operational energy efficiency and renewable energy standards consistency impacts would be less than significant.

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7 CERTIFICATIONS

The contents of this energy analysis report represent an accurate depiction of the environmental impacts associated with the proposed Replenish Big Bear Program. The information contained in this energy analysis 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.

Haseeb Qureshi
Principal
Urban Crossroads, Inc.
hqureshi@urbanxroads.com

EDUCATION

Master of Science in Environmental Studies
California State University, Fullerton • May 2010

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

PROFESSIONAL AFFILIATIONS

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

PROFESSIONAL CERTIFICATIONS

Planned Communities and Urban Infill – Urban Land Institute • June 2011
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APPENDIX 4.1:

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APPENDIX 4.2:

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APPENDIX 4.3:

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APPENDIX 4.4:

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APPENDIX 4.5:

CALEEMOD PROJECT COMPONENT 5 EMISSIONS MODEL OUTPUTS

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APPENDIX 4.6:

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