Canterwood (Tentative Tract Map No. 37439)

ENERGY ANALYSIS

COUNTY OF RIVERSIDE

PREPARED BY:

Haseeb Qureshi, MES
hqureshi@urbanxroads.com
(949) 336-5987

Alyssa Tamase
atamase@urbanxroads.com
(949) 336-5988

FEBRUARY 27, 2019

TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

(1)	Reference
AQIA	AQIA
ARB	Air Resources Board
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CEC	California Energy Commission
CPUC	California Public Utilities Commission
EVs	Electric Vehicles
EMFAC	Emissions Factor
FERC	Federal Energy Regulatory Commission
GPA	General Plan Amendment
GWh	Gigawatt Hour
HHD	Heavy-Heavy Duty
ISO	Independent Service Operator
ISTEA	Intermodal Surface Transportation Efficiency Act
ITE	Institute of Transportation Engineers
LHD	Light-Heavy Duty
MHD	Medium-Heavy Duty
Project	Canterwood (Tentative Tract Map No. 37439)
MPG	Miles Per Gallon
MPO	Metropolitan Planning Organization
SCE	Southern California Edison
SoCalGas	Southern California Gas
SF	Square Feet
TEA-21	Transportation Equity Act for the 21st Century
VMT	Vehicle Miles Traveled

This page intentionally left blank

EXECUTIVE SUMMARY

For new development such as that proposed by Canterwood (Tentative Tract Map No. 37439), compliance with California Building Standards Code Title 24 energy efficiency requirements (CalGreen), combined with the mitigation measures that are recommended by *Canterwood (Tentative Tract Map No. 37439) Greenhouse Gas Analysis*, are considered demonstrable evidence of efficient use of energy. As discussed below, the Project would provide for, and promote, energy efficiencies beyond those required under other applicable federal and State of California standards and regulations, and in so doing would meet or exceed all California Building Standards Code Title 24 standards. Moreover, energy consumed by the Project's operation is calculated to be comparable to, or less than, energy consumed by other recreational and residential uses of similar scale and intensity that are constructed and operating in California. On this basis, the Project would not result in the inefficient, wasteful, or unnecessary consumption of energy. Further, the Project would not cause or result in the need for additional energy producing facilities or energy delivery systems.

Impact Energy-1: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

The Project construction and operations would not result in the inefficient, wasteful or unnecessary consumption of energy. Further, the energy demands of the Project can be accommodated within the context of available resources and energy delivery systems. 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.

Impact Energy-1: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

The Project would implement energy-saving features and operational programs, consistent with the reduction measures set forth in the County of Riverside Climate Action Plan (CAP), to be incorporated into all residential portions developed pursuant to the Project. Notably, the Project would comply with the California Green Building Standards Code (CALGreen; CCR, Title 24, Part 11) as implemented by the County of Riverside. The Project also incorporates and expresses the design features and attributes (listed in Section 1.3 of this report) which would promote energy efficiency and sustainability.

As previously discussed, the Project would provide for, and promote, energy efficiencies beyond those required under other applicable federal and State of California standards and regulations, and in so doing would meet or exceed all California Building Standards Code Title 24 standards. Moreover, energy consumed by the Project's operation is calculated to be comparable to, or less

than, energy consumed by other recreational and residential uses of similar scale and intensity that are constructed and operating in California. On this basis, the Project would not result in the inefficient, wasteful, or unnecessary consumption of energy. Further, the Project would not cause or result in the need for additional energy producing facilities or energy delivery systems.

1 INTRODUCTION

This report presents the results of the energy analysis prepared by Urban Crossroads, Inc., for the proposed Canterwood (Tentative Tract Map No. 37439) (referred to as "Project"). The purpose of this report is to ensure that energy implication is considered by the County of Riverside, 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 proposed Canterwood (Tentative Tract Map No. 37439) site is located on the northeast corner of Leon Road and Craig Avenue in an unincorporated area of Riverside County, as shown on Exhibit 1-A. The Project site is currently vacant. Existing residential uses are located west across Leon Road, and south of the Project site on Craig Road. Existing agricultural uses in the Project study area are located north, east, and southeast of the Project site. Vacant, residential-designated uses are located immediately north and south of the Project site boundaries, and to the east on Craig Avenue. The Interstate 215 (I-215) freeway right-of-way is located roughly 3 miles west of the Project site.

1.2 PROJECT STUDY AREA

Consistent with the *Traffic Impact Analysis*, potential impacts have been assessed for two development phases. Exhibit 1-B identifies the proposed land use and planning areas which are included in Phase 1 and Phase 2. In addition to the Project, this energy study analyzes off-site improvements including a channel, sewer line, and lift station associated with Project construction. The two phases and their anticipated opening years are as follows:

- Phase 1 (2021) – 317 single-family residential units and an 8.2-acre park.
- Phase 2 (2025) – Phase 1 development plus 257 additional single-family residential units.

EXHIBIT 1-A: LOCATION MAP

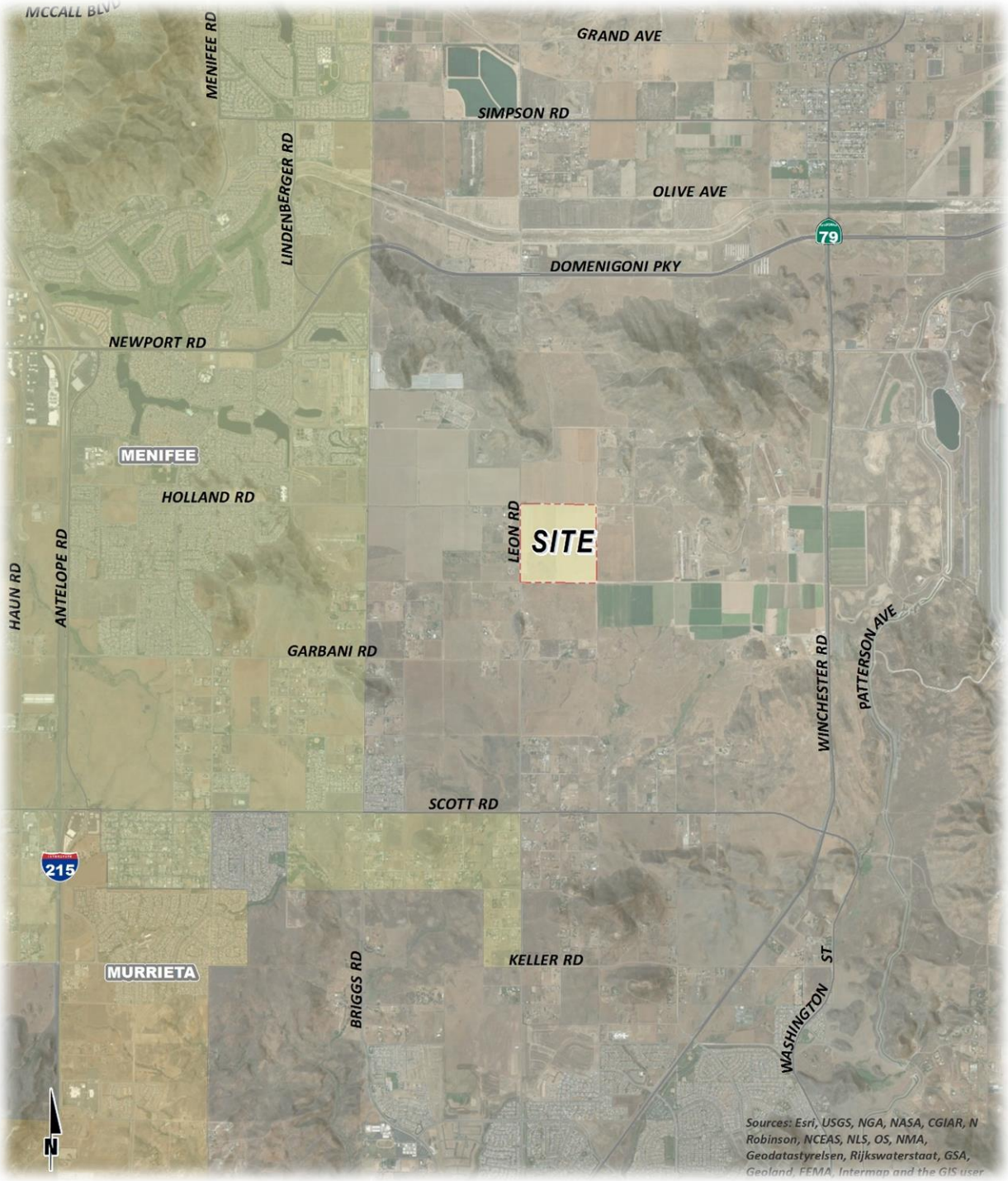
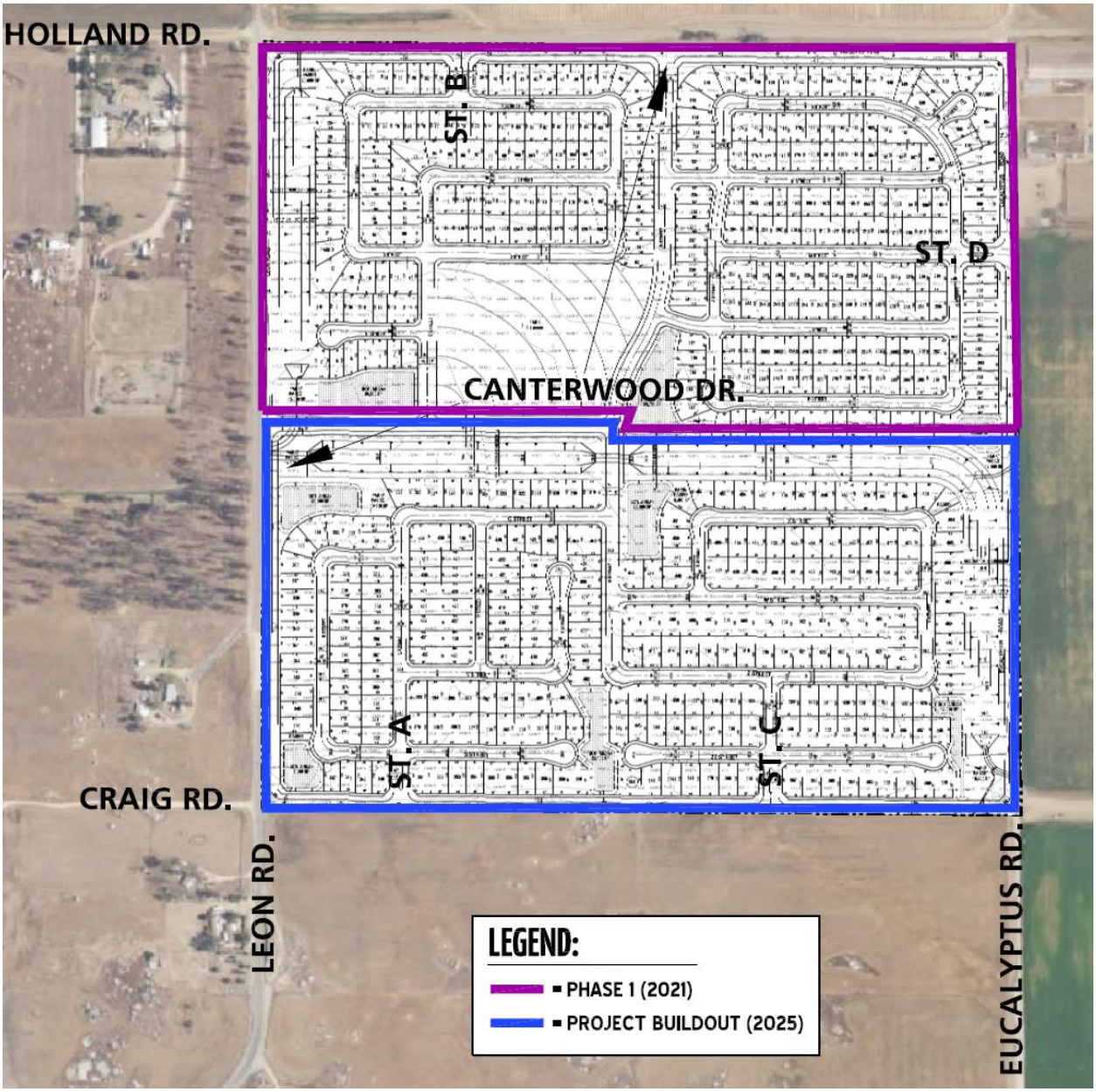


EXHIBIT 1-B: SITE PLAN



1.3 OPERATIONAL-SOURCE MITIGATION MEASURES

The Project would implement energy-saving features and operational programs, consistent with the reduction measures set forth in the County of Riverside Climate Action Plan (CAP), to be incorporated into all residential portions developed pursuant to the Project. Notably, the Project would comply with the California Green Building Standards Code (CALGreen; CCR, Title 24, Part 11) as implemented by the County of Riverside. The Project also incorporates and expresses the following design features and attributes promoting energy efficiency and sustainability. The specific measures may be substituted for feasibility so long as they achieve an equal level of total reductions/points pursuant to the County's CAP:

- Measure E1.A.1: Modestly Enhanced Insulation (walls R-13, roof/attic R-38) – 12 points.
- Measure E1.A.2: Modestly Enhanced Window (0.4 U-Factor, 0.32 SHGC) – 6 points.
- Measure E1.A.3: Modest cool roof (CRC Rated 0.20 aged solar reflectance, 0.75 thermal emittance) –10 points
- Measure E1.B.1: Modest Duct Insulation (R-6) –7 points
- Measure E1.B.2: Very High Efficiency HVAC (SEER 16/80% AFUE or 9 HSPF) – 9 points
- Measure E1.B.3: Improved Efficiency Water Heater (0.675 Energy Factor) –12 points
- Measure E1.B.5: High Efficiency Lights (50% of in-unit fixtures are high efficacy) – 10 points
- Measure E1.B.6: Energy Star Dish Refrigerator (new) –1 point
- Measure E1.B.6: Energy Star Dish Washer (new) –1 point
- Measure E1.B.6: Energy Star Dish Washing Machine (new) –1 point
- Measure E2.A.1: 30 percent of the power needs of the project –20 point
- Measure W1.B.1: Water Efficient Showerheads (2.0 gpm) – 3 points
- Measure W1.B.2: Water Efficient Toilets (1.5 gpm) – 3 points
- Measure W1.B.3: Water Efficient Faucets (1.28 gpm) – 3 points
- Measure W1.B.4: Water Efficient Dishwasher (6 gallons per cycle or less) – 1 point
- Measure W1.B.5: Water Efficient Washing Machine (Water factor <5.5) – 1 point

Although these measures are required to reduce operational emissions, it should be noted that there is no way to quantify these reductions in the CalEEMod model.

This page intentionally left blank

2 EXISTING CONDITIONS

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

2.1 OVERVIEW

The most recent data for California's estimated annual energy use is from 2016 and included:

- Approximately 7,830 trillion British Thermal Unit (BTU) of energy was consumed; (1);
- Approximately 2,115 billion cubic feet of natural gas (1); and
- Approximately 15.8 billion gallons of transportation fuel (for the year 2017) (2)

The most recent data provided by the United States Energy Information Administration (EIA) is from 2016 and illustrates energy use in California by demand sector as follows:

- Approximately 39.8 percent transportation;
- Approximately 23.7 percent industrial;
- Approximately 17.7 percent residential; and
- Approximately 18.9 percent commercial (3)

In 2017, total system electric generation for California was 292,039 gigawatt-hours (GWh). California's massive electricity in-state generation system generated approximately 206,336 GWh which accounted for approximately 71% of the electricity it uses; the rest was imported from the Pacific Northwest (14%) and the U.S. Southwest (16%) (4). Natural gas is the main source for electricity generation at 50% of the total in-state electric generation system power as shown in Table 2-1.

TABLE 2-1: TOTAL ELECTRICITY SYSTEM POWER (CALIFORNIA 2017)

Fuel Type	California In-State Generation (GWh)	Percent of California In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	California Power Mix (GWh)	Percent California Power Mix
Coal	302	0.15%	409	11,364	12,075	4.13%
Large Hydro	36,920	17.89%	4531	1,536	42,987	14.72%
Natural Gas	89,564	43.40%	46	8,705	98,315	33.67%
Nuclear	17,925	8.69%	0	8,594	26,519	9.08%
Oil	33	0.02%	0	0	33	0.01%
Other	409	0.20%	0	0	409	0.14%
Renewables	61,183	29.65%	12,502	10,999	84,684	29.00%
Biomass	5,827	2.82%	1,015	32	6,874	2.35%
Geothermal	11,745	5.69%	23	937	12,705	4.35%
Small Hydro	6,413	3.11%	1449	5	7,867	2.70%
Solar	24,331	11.79%	0	5,465	29,796	10.20%
Wind	12,867	6.24%	10,015	4,560	27,442	9.40%
Unspecified Sources of Power	N/A	N/A	22,385	4,632	27,017	9.25%
Total	**206,336**	**100%**	**39,873**	**45,830**	**292,039**	**100%**

Source: https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html

A 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:

- California was the fourth-largest producer of crude oil among the 50 states in 2017, after Texas, North Dakota, and Alaska, and, as of January 2018, third in oil refining capacity after Texas and Louisiana.
- California is the largest consumer of jet fuel among the 50 states and accounted for one-fifth of the nation's jet fuel consumption in 2016.
- California's total energy consumption is second-highest in the nation, but, in 2016, the state's per capita energy consumption ranked 48th, due in part to its mild climate and its energy efficiency programs.
- In 2017, California ranked second in the nation in conventional hydroelectric generation and first as a producer of electricity from solar, geothermal, and biomass resources.
- In 2017, solar PV and solar thermal installations provided about 16% of California's net electricity generation (5).

As indicated above, California is one of the nation's leading energy-producing states, and California per capita energy use is among the nation's most efficient. Given the nature of the proposed Project being residential and commercial uses, the remainder of this discussion will

focus on the three sources of energy that are most relevant to the project—namely, electricity and natural gas for residential and commercial, and transportation fuel for vehicle trips associated with residential and commercial uses planned for the Project.

2.2 ELECTRICITY

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 had revealed the extent to which the Southern 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 (2013 IEPR) after a collaborative process with other energy agencies, utilities, and air districts (6). If the resource development outlined in the preliminary plan continues as detailed, reliability in Southern California would likely be assured; however, tight resource margins have led energy agencies and the ARB to develop a contingency plan. This contingency plan was discussed at a public workshop in Los Angeles on August 20, 2014, and is detailed within this Section (7).

Electricity is provided to the Project by Southern California Edison (SCE). SCE provides electric power to more than 14 million persons in 15 counties and in 180 incorporated cities, within a service area encompassing approximately 50,000 square miles. 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 (8).

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 [such as SCE] 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 sufficient 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 (9).

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, transmission owners (investor-owned utilities such as SCE) 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.

Table 2-2 identifies SCE's specific proportional shares of electricity sources in 2017. As indicated in Table 2-2, the 2017 SCE Power Mix has renewable energy at 32% of the overall energy resources. Geothermal resources are at 8%, wind power is at 10%, large hydroelectric sources is at 8%, solar energy is at 13%, and coal is at 0%. Biomass and waste sources have decreased to 0% from 11% in 2015. Natural gas is at 20% having decreased from 47% in 2015 (10).

TABLE 2-2: SCE 2017 POWER CONTENT MIX

Energy Resources	2016 SCE Power Mix
Eligible Renewable	**32%**
Biomass & waste	0%
Geothermal	8%
Small Hydroelectric	1%
Solar	13%
Wind	10%
Coal	**0%**
Large Hydroelectric	**8%**
Natural Gas	**20%**
Nuclear	**6%**
Other	**0%**
Unspecified Sources of power*	34%
Total	**100%**

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

2.3 NATURAL GAS

The usage associated with natural gas use were calculated using the CalEEMod model. The following summary of natural gas resources and service providers, delivery systems, and associated regulation is excerpted from information provided by the California Public Utilities Commission (CPUC).

> "The California Public Utilities Commission (PUC) 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.
>
> The vast majority of California's natural gas customers are residential and small commercial customers, referred to as "core" customers, who accounted for approximately 32% of the natural gas delivered by California utilities in 2012. Large

consumers, like electric generators and industrial customers, referred to as "noncore" customers, accounted for approximately 68% of the natural gas delivered by California utilities in 2012.

The PUC regulates the California utilities' natural gas rates and natural gas services, including in-state transportation over the utilities' transmission and distribution pipeline systems, storage, procurement, metering and billing. Most of the natural gas used in California comes from out-of-state natural gas basins. In 2012, California customers received 35% of their natural gas supply from basins located in the Southwest, 16% from Canada, 40% from the Rocky Mountains, and 9% from basins located within California. California gas utilities may soon also begin receiving biogas into their pipeline systems.

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 consumers are the Gas Transmission Northwest Pipeline, Kern River Pipeline, Transwestern Pipeline, El Paso Pipeline, Ruby Pipeline, Questar Southern Trails and Mojave Pipeline. 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, the PUC often participates in FERC regulatory proceedings to represent the interests of California natural gas consumers.

Most of the natural gas transported via the interstate pipelines, as well as some of the California-produced natural gas, is delivered into the PG&E and SoCalGas intrastate natural gas transmission pipeline systems (commonly referred to as California's "backbone" natural gas pipeline system). Natural gas on the utilities' backbone pipeline systems is then delivered into the local transmission and distribution pipeline systems, or to natural gas storage fields. Some large noncore customers take natural gas directly off the high-pressure backbone pipeline systems, while core customers and other noncore customers take natural gas off the utilities' distribution pipeline systems. The PUC has regulatory jurisdiction over 150,000 miles of utility-owned natural gas pipelines, which transported 82% of the total amount of natural gas delivered to California's gas consumers in 2012.

SDG&E and Southwest Gas' southern division are wholesale customers of SoCalGas, and currently receive all of their natural gas from the SoCalGas system (Southwest Gas also provides natural gas distribution service in the Lake Tahoe area). Some other municipal wholesale customers are the cities of Palo Alto, Long Beach, and Vernon, which are not regulated by the CPUC.

Some of the natural gas delivered to California customers may be delivered directly to them without being transported over the regulated utility systems. For example, the Kern River/Mojave pipeline system can deliver natural gas directly to some large customers, "bypassing" the utilities' systems. Much of California-produced natural gas is also delivered directly to large consumers.

> PG&E and SoCalGas own and operate several natural gas storage fields that are located in northern and southern California. 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 natural gas demand and allow California natural gas customers to secure natural gas supplies more efficiently. (A portion of the Gill Ranch facility is owned by PG&E).
>
> California's regulated utilities do not own any natural gas production facilities. All of the natural gas sold by these utilities must be purchased from suppliers and/or marketers. The price of natural gas sold by suppliers and marketers was deregulated by the FERC in the mid-1980's and is determined by "market forces." However, the PUC decides whether California's utilities have taken reasonable steps in order to minimize the cost of natural gas purchased on behalf of their core customers." (11)

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 PUC 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. In March 2018, the Department of Motor Vehicles (DMV) identified 35 million registered vehicles in California (12), and those vehicles (as noted previously) consume an estimated 19 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 170,000 miles of highways and major roadways, more than 27 million passenger vehicles and light trucks, and almost 8 million medium- and heavy-duty vehicles (12). While gasoline consumption has been declining since 2008 it is still by far the dominant fuel. Petroleum comprises about 92 percent of all transportation energy use, excluding fuel consumed for aviation and most marine vessels (13). Nearly 19 billion gallons of on-highway fuel are burned each year, including 15.1 billion gallons of gasoline (including ethanol) and 3.9 billion gallons of diesel fuel (including biodiesel and renewable diesel). In 2016, Californians also used 194 million therms of natural gas as a transportation fuel (14), or the equivalent of 155 million gallons of gasoline.

[1] Fuel consumptions estimated utilizing information from EMFAC2014.

This page intentionally left blank

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 are three federal agencies with substantial influence over energy policies and programs. On the state level, the PUC and the California Energy Commissions (CEC) are two agencies with authority over different aspects of energy. Relevant federal and state energy-related laws and plans are summarized below. Project consistency with applicable federal and state regulations is also presented in *italicized* text.

3.1 FEDERAL REGULATIONS

Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)

The Intermodal Surface Transportation Efficiency Act of 1991 (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. *Transportation and access to the Project site is provided primarily 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.*

The Transportation Equity Act for the 21st Century (TEA-21)

The Transportation Equity Act for the 21st Century (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. *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 vehicle miles traveled, takes advantage of existing infrastructure systems, and promotes land use compatibilities 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.*

3.2 CALIFORNIA REGULATIONS

Integrated Energy Policy Report

Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the California Energy Commission 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 § 25301a]). The Energy Commission prepares these assessments and associated policy recommendations every two years, with updates in alternate years, as part of the Integrated Energy Policy Report.

The 2016 Integrated Energy Policy Report (2016 IEPR) was published in February 2017, and continues to work towards improving electricity, natural gas, and transportation fuel energy use in California. The 2016 IEPR focuses on a variety of topics such as including the environmental performance of the electricity generation system, landscape-scale planning, the response to the gas leak at the Aliso Canyon natural gas storage facility, transportation fuel supply reliability issues, updates on Southern California electricity reliability, methane leakage, climate adaptation activities for the energy sector, climate and sea level rise scenarios, and the California Energy Demand Forecast (15). *Electricity would be provided to the Project by Southern California Edison (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 2016 IEPR.*

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 a number of strategies, including assistance to public agencies and fleet operators and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access. *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 vehicle miles traveled, takes advantage of existing infrastructure systems, and promotes land use compatibilities through the introduction of recreational and residential uses on a residential-designated site. 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.*

California Code Title 24, Part 6, Energy Efficiency Standards

California Code of Regulations 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 GHG emissions. The 2016 version of Title 24 was adopted by the California Energy Commission (CEC) and became effective on January 1, 2017 and is applicable to the Project.

The CEC indicates that the 2019 Title 24 standards will require solar photovoltaic systems for new homes, establish requirements for newly constructed healthcare facilities, encourage demand responsive technologies for residential buildings, update indoor and outdoor lighting for nonresidential buildings. The CEC anticipates that single-family homes built with the 2019 standards will use approximately 7 percent less energy compared to the residential homes built under the 2016 standards. Additionally, after implementation of solar photovoltaic systems, homes built under the 2019 standards will about 53 percent less energy than homes built under the 2016 standards. Nonresidential buildings will use approximately 30 percent less energy due to lighting upgrades (16).

This page intentionally left blank

4 PROJECT ENERGY DEMANDS AND ENERGY EFFICIENCY MEASURES

4.1 EVALUATION CRITERIA

In compliance with Appendix G of the *State CEQA Guidelines* (17)*,* this report analyzes the project's anticipated energy use 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

In addition, Appendix F of the *State CEQA Guidelines* (18)*,* 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.

4.2 METHODOLOGY

Information from the CalEEMod 2016.3.2 outputs for the *Canterwood (Tentative Tract Map No. 37439) AQIA* (Urban Crossroads, 2019) (19) was utilized in this analysis, detailing Project related construction equipment, transportation energy demands, and facility energy demands. These outputs can be referenced in Appendix 3.1.

4.3 CONSTRUCTION ENERGY DEMANDS

4.3.1 CONSTRUCTION EQUIPMENT ELECTRICITY USAGE ESTIMATES

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. Based on the 2017 National Construction Estimator, Richard Pray (2017) (20), the typical power cost per 1,000 square feet of building construction per month is estimated to be $2.32. For the Canterwood (Tentative Tract Map No. 37439) development, the Project consists of the development of 574 single-family residential uses and an 8.2-acre park. Based on Table 4-1, the total power cost of the on-site electricity usage during the construction of the proposed Project is estimated to be approximately $2,097,449.27. Additionally, as of June 1, 2018, SCE's domestic rate schedule (D) for a residential land use is $.09 per kWh of electricity (21). As shown on Table 4-2, the total electricity usage from on-site Project construction related activities is estimated to be approximately 29,963,561 kWh.

TABLE 4-1: PROJECT CONSTRUCTION POWER COST

Power Cost (per 1,000 SF of building per month of construction)	**Total Building Size** (1,000 SF)	**Construction Duration** (months)	**Total Project Construction Power Cost**
$2.32	11,300.92	80	$2,097,449.27

TABLE 4-2: PROJECT CONSTRUCTION ELECTRICITY USAGE

Cost per kWh	**Total Project Construction Electricity Usage (kWh)**
$0.07	22,169,425

4.3.2 CONSTRUCTION EQUIPMENT FUEL ESTIMATES

Fuel consumed by construction equipment would be the primary energy resource expended over the course of Project construction. Project construction activity timeline estimates, construction equipment schedules, equipment power ratings, load factors, and associated fuel consumption estimates are presented in Table 4-3. Eight-hour daily use of all equipment is assumed. The aggregate fuel consumption rate for all equipment is estimated at 18.5 hp-hr-gal., obtained from California Air Resources Board (ARB) 2018 Emissions Factors Tables and cited fuel consumption rate factors presented in Table D-24 of the Moyer guidelines (22). For the purposes of this analysis, the calculations are based on all construction equipment being diesel-powered which is standard practice consistent with industry standards. Diesel fuel would be supplied by existing commercial fuel providers serving the County and region.

As presented in Table 4-3, Project construction activities would consume an estimated 458,656 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.

TABLE 4-3: CONSTRUCTION EQUIPMENT FUEL CONSUMPTION ESTIMATES

Activity/Duration	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
Phase 1							
Mass Grading (155 days)	Graders	187	1	8	0.41	613	5,139
	Rubber Tired Dozers	247	2	8	0.40	1,581	13,245
	Scrapers	367	4	8	0.48	5,637	47,230
Site Preparation (60 days)	Rubber Tired Dozers	247	1	8	0.40	790	2,563
	Tractors/Loaders/Backhoes	97	1	8	0.37	287	931
Building Construction (750 days)	Cranes	231	2	8	0.29	1,072	43,453
	Forklifts	89	6	8	0.20	854	34,638
	Generator Sets	84	2	8	0.74	995	40,320
	Tractors/Loaders/Backhoes	97	6	8	0.37	1,723	69,840
	Welders	46	2	8	0.45	331	13,427
Paving (110 days)	Pavers	130	2	8	0.42	874	5,194
	Paving Equipment	132	2	8	0.36	760	4,521
	Rollers	80	2	8	0.38	486	2,892
Architectural Coating (110 days)	Air Compressors	78	1	8	0.48	300	1,781
Phase 2							
Site Preparation (40 days)	Rubber Tired Dozers	247	1	8	0.40	790	1,709
	Tractors/Loaders/Backhoes	97	1	8	0.37	287	621
Building Construction (600 days)	Cranes	231	2	8	0.29	1,072	34,762
	Forklifts	89	6	8	0.20	854	27,710
	Generator Sets	84	2	8	0.74	995	32,256
	Tractors/Loaders/Backhoes	97	6	8	0.37	1,723	55,872
	Welders	46	2	8	0.45	331	10,742
Paving (75 days)	Pavers	130	2	8	0.42	874	3,542
	Paving Equipment	132	2	8	0.36	760	3,082
	Rollers	80	2	8	0.38	486	1,972
Architectural Coating (75 days)	Air Compressors	78	1	8	0.48	300	1,214
CONSTRUCTION FUEL DEMAND (gallons diesel fuel)							***458,656***

4.3.3 CONSTRUCTION WORKER FUEL ESTIMATES

It is assumed that all construction worker trips are from light duty autos (LDA) along area roadways. With respect to estimated VMT, the construction worker trips would generate an estimated 3,926,664 VMT (19). Data regarding Project related construction worker trips were based on CalEEMod 2016.3.2 model defaults utilized within the AQIA.

Vehicle fuel efficiencies for LDA were estimated using information generated within the 2014 version of the Emissions FACtor model (EMFAC) developed by the Air Resources Board (ARB). EMFAC 2014 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 ARB to project changes in future emissions from on-road mobile sources (23). EMFAC 2014 was run for the LDA vehicle class within the California sub-area for a 2025 calendar year. Data from EMFAC 2014 is shown in Appendix 3.2.

As generated by EMFAC 2014, an aggregated fuel economy of LDAs ranging from model year 1974 to model year 2025 are estimated to have a fuel efficiency of 34.99 miles per gallon (MPG). Table 4-4 provides an estimated annual fuel consumption resulting from the Project generated by light duty autos related to construction worker trips. Based on Table 4-4, it is estimated that 112,234 gallons of fuel will be consumed related to construction worker trips during full construction of the proposed Project. Project 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 4-4: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES (1 OF 2)

Construction Activity	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Vendor					
Phase 1					
Mass Grading (155 days)	18	14.7	41,013	34.99	1,172
Site Preparation (60 days)	5	14.7	4,410	34.99	126
Building Construction (750 days)	264	14.7	2,910,600	34.99	83,192
Paving (110 days)	15	14.7	24,255	34.99	693
Architectural Coating (110 days)	53	14.7	85,701	34.99	2,450

TABLE 4-4: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES (2 OF 2)

Construction Activity	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Phase 2					
Site Preparation (40 days)	5	14.7	2,940	34.99	84
Building Construction (600 days)	93	14.7	820,260	34.99	23,445
Paving (75 days)	15	14.7	16,538	34.99	473
Architectural Coating (75 days)	19	14.7	20,948	34.99	599
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION					***112,234***

4.3.4 CONSTRUCTION VENDOR/HAULING FUEL ESTIMATES

With respect to estimated VMT, the construction vendor/hauling trips would generate an estimated 587,880 VMT along area roadways (19). It is assumed that 50% of all vendor trips are from medium-heavy duty trucks (MHD) and 50% are from heavy-heavy duty trucks (HHD). It is assumed that 100% of all hauling trips are from HHD. These assumptions are consistent with the 2016.3.2 CalEEMod defaults utilized within the Canterwood (Tentative Tract Map No. 37439) (19). Vehicle fuel efficiencies for MHD and HHD trucks were estimated using information generated within EMFAC 2014. For purposes of this analysis, EMFAC 2014 was run for the MHD and HHD vehicle class within the California sub-area for a 2025 calendar year. Data from EMFAC 2014 is shown in Appendix 3.2.

As generated by EMFAC 2014, an aggregated fuel economy of MHD trucks ranging from model year 1974 to model year 2025 are estimated to have a fuel efficiency of 8.67 mpg. Additionally, HHD trucks are estimated to have a fuel efficiency of 6.29 mpg.

Table 4-5 and Table 4-6 shows the estimated fuel economy of MHD and HHD trucks accessing the Project site. Based on Table 4-5, fuel consumption from construction vendor trips (medium duty trucks) will total approximately 33,886 gallons. As per Table 4-6, fuel consumption from construction vendor trips (heavy duty trucks) will total approximately 76,739 gallons. The total fuel consumption from construction vendor trips is 80,625 mpg. 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 4-5: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES (MHD TRUCKS) [2]

Construction Activity	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Vendor					
Phase 1					
Building Construction (750 days)	46	6.9	238,050	8.67	27,443
Phase 2					
Building Construction (600 days)	13.5	6.9	55,890	8.67	6,443
PROJECT MEDIUM DUTY TRUCK TOTAL					***33,886***

TABLE 4-6: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES (HHD TRUCKS)

Construction Activity	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Vendor					
Phase 1					
Building Construction (750 days)	46	6.9	238,050	6.29	37,852
Phase 2					
Building Construction (600 days)	13.5	6.9	55,890	6.29	8,887
PROJECT HEAVY DUTY TRUCK TOTAL					***46,739***

4.3.5 CONSTRUCTION ENERGY EFFICIENCY/CONSERVATION MEASURES

The equipment used for Project construction would conform to CARB regulations and CA 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

[2] Assumptions for the vendor trip length and vehicle miles traveled are consistent with 2016.3.2 model defaults utilized within the Canterwood (Tentative Tract Map No. 37439) Air Quality Impact Analysis.

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.

4.3.6 SUMMARY

The estimated power cost of on-site electricity usage during the construction of the proposed Project is assumed to be around $2,097,449.27. 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 around 22,169,425 kWh.

Construction equipment used by the Project would result in single event consumption of approximately 458,656 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. Best available control measures inform construction equipment operators of this requirement. Enforcement of idling limitations is realized through periodic site inspections conducted by County building officials, and/or in response to citizen complaints.

Construction worker trips for full construction of the proposed Project would result in the estimated fuel consumption of 112,234 gallons of fuel. Additionally, fuel consumption from construction vendor trips (medium and heavy-duty trucks) will total approximately 80,625 gallons. Diesel fuel would be supplied by County and regional commercial vendors. Indirectly, construction energy efficiencies and energy conservation would be achieved through the use of bulk purchases, transport and use of construction materials. The 2016 IEPR released by the California Energy Commission has shown that fuel efficiencies are getting better within on and off-road vehicle engines due to more stringent government requirements (24). As supported by the preceding discussions, Project construction energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

4.4 OPERATIONAL ENERGY DEMANDS

Energy consumption in support of or related to Project operations would include transportation energy demands (energy consumed by employee and patron vehicles accessing the Project site) and facilities energy demands (energy consumed by building operations and site maintenance activities).

4.4.1 TRANSPORTATION ENERGY 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.

With respect to estimated VMT, and based on the trip frequency and trip length methodologies cited in the Project's AQIA, the Project would generate an estimated 18,321,815 annual VMT along area roadways for all passenger cars with full build-out of the Project (19). As generated by EMFAC 2014, an aggregated fuel economy of LDAs ranging from model year 1974 to model year 2025 are estimated to have a fuel efficiency of 34.99 mpg. Table 4-7 provides an estimated range of annual fuel consumption resulting from Project generated LDAs. Based on Table 4-7, it is estimated that 523,684 gallons of fuel will be consumed from Project generated LDA trips.

TABLE 4-7: PROJECT-GENERATED PASSENGER CAR TRAFFIC ANNUAL FUEL CONSUMPTION

Annual Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Annual Fuel Consumption (gallons)
18,321,815	34.99	523,684

4.4.2 FACILITY ENERGY DEMANDS

Project building operations and Project site maintenance activities would result in the consumption of natural gas and electricity. Natural gas would be supplied to the Project by The Gas Company; electricity would be supplied to the Project by Southern California Edison. Annual natural gas and electricity demands of the Project are summarized in Table 4-8.

Energy use in buildings is divided into energy consumed by the built environment and energy consumed by uses that are independent of the construction of the building such as in plug-in appliances. In California, the California Building Standards Code Title 24 governs energy consumed by the built environment, mechanical systems, and some types of fixed lighting (25). Non-building energy use, or "plug-in" energy use can be further subdivided by specific end-use (refrigeration, cooking, appliances, etc.).

TABLE 4-8: PROJECT ANNUAL OPERATIONAL ENERGY DEMAND SUMMARY

Natural Gas Demand	**kBTU/year**
City Park	0
Single-Family Housing	17,562,200
Total Project Natural Gas Demand	**17,562,200**
Electricity Demand	**kWh/year**
City Park	0
Single-Family Housing	5,003,260
Total Project Electricity Demand	**5,003,260**

4.4.3 OPERATIONAL ENERGY EFFICIENCY/CONSERVATION MEASURES

Energy efficient/energy conserving design features and operational programs that would be implemented under the Project are summarized below. Also noted in the following discussions, 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).

The Project would also not result in a substantial increase in demand or transmission service, resulting in the need for new or expanded sources of energy supply or new or expanded energy delivery systems or infrastructure.

Enhanced Vehicle Fuel Efficiencies

Estimated annual fuel consumption estimates presented previously in Table 4-7 represent likely potential maximums that would occur in 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.

4.5 SUMMARY

4.5.1 TRANSPORTATION ENERGY DEMANDS

Annual vehicular trips and related VMT generated by the Project would result in an estimated 18,321,815 gallons of fuel consumption per year for LDAs for the year 2025. The total estimated annual fuel consumption from Project generated VMT would result in a fuel demand 523,684 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 warehouse uses of similar scale and configuration, as reflected respectively in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Ed., 2017); and California Emissions Estimator Model (CalEEMod) v2016.3.2. That is, the Project does not propose uses or operations that would inherently result in excessive and wasteful vehicle trips and VMT, nor associated excess and wasteful vehicle energy consumption.

Enhanced fuel economies realized pursuant to federal and state regulatory actions, and related transition of LDAs to alternative energy sources (e.g., electricity, natural gas, bio fuels, 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. As supported by the preceding discussions, Project transportation energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

4.5.2 FACILITY ENERGY DEMANDS

Project facility operational energy demands are estimated at: 17,562,000 kBTU/year of natural gas; and 5,003,260 kWh/year of electricity. Natural gas would be supplied to the Project by The Gas Company; electricity would be supplied by Southern California Edison. Although it is our understanding that the Existing Project does not utilize natural gas nor would the Project utilize natural gas, natural gas emissions are calculated herein as a conservative measure. The Project proposes conventional warehouse uses reflecting contemporary energy efficient/energy conserving designs and operational programs. Uses proposed by the Project are not inherently energy intensive, and the Project energy demands in total would be comparable to, or less than, other warehouse projects of similar scale and configuration.

5 CONCLUSION

Impact Energy-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. Further, the energy demands of the Project can be accommodated within the context of available resources and energy delivery systems. 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.

Impact Energy-1: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

The Project would implement energy-saving features and operational programs, consistent with the reduction measures set forth in the County of Riverside Climate Action Plan (CAP), to be incorporated into all residential portions developed pursuant to the Project. Notably, the Project would comply with the California Green Building Standards Code (CALGreen; CCR, Title 24, Part 11) as implemented by the County of Riverside. The Project also incorporates and expresses the design features and attributes (listed in Section 1.3 of this report) which would promote energy efficiency and sustainability.

As previously discussed, the Project would provide for, and promote, energy efficiencies beyond those required under other applicable federal and State of California standards and regulations, and in so doing would meet or exceed all California Building Standards Code Title 24 standards. Moreover, energy consumed by the Project's operation is calculated to be comparable to, or less than, energy consumed by other recreational and residential uses of similar scale and intensity that are constructed and operating in California. On this basis, the Project would not result in the inefficient, wasteful, or unnecessary consumption of energy. Further, the Project would not cause or result in the need for additional energy producing facilities or energy delivery systems.

6 REFERENCES

1. **Administration, U.S. Energy Information.** California State Profile and Energy Estimates. [Online] https://www.eia.gov/state/?sid=CA#tabs-3.
2. **California Energy Commission.** *Transportation Energy Demand Forecast 2018-2030.* 2018.
3. **U.S. Energy Information Administration.** California Energy Consumption by End-Use Sector. *California State Profile and Energy Estimates.* [Online] https://www.eia.gov/state/?sid=CA#tabs-2.
4. **California Energy Commission.** Total System Electric Generation. *CA.gov.* [Online] https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html.
5. **U.S. Energy Information Administration.** State Profile and Energy Estimates. *Independent Statistics and Analysis.* [Online] http://www.eia.gov/state/?sid=CA#tabs2..
6. **California Energy Commission.** 2013 Integrated Energy Policy Report. [Online] 2013. http://www.energy.ca.gov/2013publications/CEC-100-2013-001/CEC-100-2013-001-CMF.pdf.
7. —. *2014 IEPR Update.* 2014.
8. —. California Energy Almanac. *Utility Energy Supply Plans from 2013.* [Online] https://www.energy.ca.gov/almanac/electricity_data/s-2_supply_forms_2013/.
9. **California ISO.** Understanding the ISO. [Online] http://www.caiso.com/about/Pages/OurBusiness/UnderstandingtheISO/default.aspx.
10. **Southern California Edison.** 2017 Power Content Label. *Southern California Edison.* [Online] 2017. https://www.sce.com/sites/default/files/inline-files/2017PCL_0.pdf.
11. **California Public Utilities Commission.** Natural Gas and California. [Online] http://www.cpuc.ca.gov/general.aspx?id=4802.
12. **Department of Motor Vehicles.** *State of California Department of Motor Vehicles Statistics For Publication January Through December 2017.* 2018.
13. **U.S. Energy Information Administration.** Use of Energy in the United States Explained Energy Use for Transportation. [Online] https://www.eia.gov/energyexplained/?page=us_energy_transportation.
14. —. Natural Gas Consumption by End Use. [Online] https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCA_a.htm.
15. **California Energy Commission Staff.** *2016 Integrated Energy Policy Report Update.* 2016.
16. **The California Energy Commission.** 2019 Building Energy Efficiency Standards . *California Energy Commission.* [Online] 2018. https://www.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf.
17. **Professionals, Association of Environmental.** 2018 California Environmental Quality Act (CEQA) Statute and Guidelines. [Online] 2018. http://resources.ca.gov/ceqa/docs/2018_CEQA_Statutes_and_Guidelines.pdf.
18. **State of California.** *California Environmental Quality Act Guideline, California Public Resources Code, Title 14, Division 6, Chapter 3,.*
19. **Urban Crossroads, Inc.** *Canterwood (Tentative Tract Map No. 37439) Air Quality Impact Analysis.* 2019.

20. **Pray, Richard.** *2017 National Construction Estimator.* Carlsbad : Craftsman Book Company, 2017.
21. **Southern California Edison.** Schedule D Domestic Service. *Regulatory Information - Rates Pricing.* [Online] https://www1.sce.com/NR/sc3/tm2/pdf/ce12-12.pdf.
22. **California Air Resources Board.** *Methods to Find the Cost-Effectiveness of Funding Air Quality Projects For Evaluating Motor Vehicle Registration Fee Projects And Congestion Mitigation and Air Quality Improvement (CMAQ) Projects, Emission Factor Tables.* 2018.
23. **California Department of Transportation.** EMFAC Software. [Online] http://www.dot.ca.gov/hq/env/air/pages/emfac.htm.
24. **California Energy Commission.** *2016 Integrated Energy Policy Report.* 2016.
25. **State of California.** Title 24, Part 6, of the California Code of Regulations. *California's Energy Efficiency Standards for Residential and Nonresidential Buildings.* [Online] http://www.energy.ca.gov/title24/.

7 CERTIFICATION

The contents of this air study report represent an accurate depiction of the environmental impacts associated with the proposed Canterwood (Tentative Tract Map No. 37439) Project. 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 (949) 336-5987.

Haseeb Qureshi
Senior Associate
URBAN CROSSROADS, INC.
260 E. Baker, Suite 200
Costa Mesa, CA 92626
(949) 336-5987
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

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 – California Air Resources Board • August, 2007
AB2588 Regulatory Standards – Trinity Consultants • November, 2006
Air Dispersion Modeling – Lakes Environmental • June, 2006

This page intentionally left blank

APPENDIX 3.1:

CALEEMOD EMISSIONS MODEL OUTPUTS

Canterwood Phase 1 & 2 (Operations)

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	8.20	Acre	8.20	357,192.00	0
Single Family Housing	574.00	Dwelling Unit	149.98	5,650,456.00	1642

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2021
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Lot Acreage based on Site Plan, SF based on largest floor plan of 9,844 SF.

Construction Phase - Operations Run Only.

Off-road Equipment - Operations Run Only.

Trips and VMT - Operations Run Only.

Vehicle Trips - Trip Rates from TIA by Urban Crossroads

Woodstoves - Gas Stoves Only.

Canterwood Phase 1 & 2 (Operations) - Riverside-South Coast County, Annual

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	120.00	1.00
tblConstructionPhase	PhaseEndDate	9/14/2018	4/2/2018
tblFireplaces	NumberGas	487.90	574.00
tblFireplaces	NumberNoFireplace	57.40	0.00
tblFireplaces	NumberWood	28.70	0.00
tblLandUse	LandUseSquareFeet	1,033,200.00	5,650,456.00
tblLandUse	LotAcreage	186.36	149.98
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblTripsAndVMT	WorkerTripNumber	0.00	18.00
tblVehicleTrips	ST_TR	22.75	1.96
tblVehicleTrips	ST_TR	9.91	9.54
tblVehicleTrips	SU_TR	16.74	2.19
tblVehicleTrips	SU_TR	8.62	8.55
tblVehicleTrips	WD_TR	1.89	0.78
tblVehicleTrips	WD_TR	9.52	9.44
tblWoodstoves	NumberCatalytic	28.70	0.00
tblWoodstoves	NumberNoncatalytic	28.70	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	5.0000e-005	4.0000e-005	3.8000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0882	0.0882	0.0000	0.0000	0.0882
Maximum	**5.0000e-005**	**4.0000e-005**	**3.8000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0882**	**0.0882**	**0.0000**	**0.0000**	**0.0882**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	5.0000e-005	4.0000e-005	3.8000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0882	0.0882	0.0000	0.0000	0.0882
Maximum	**5.0000e-005**	**4.0000e-005**	**3.8000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0882**	**0.0882**	**0.0000**	**0.0000**	**0.0882**

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

Canterwood Phase 1 & 2 (Operations) - Riverside-South Coast County, Annual

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-1-2018	6-30-2018	0.0001	0.0001
		Highest	0.0001	0.0001

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	22.3828	0.1875	5.9831	1.0700e-003		0.0423	0.0423		0.0423	0.0423	0.0000	147.5083	147.5083	0.0120	2.5300e-003	148.5616
Energy	0.0947	0.8092	0.3444	5.1700e-003		0.0654	0.0654		0.0654	0.0654	0.0000	2,531.3310	2,531.3310	0.0838	0.0308	2,542.6034
Mobile	1.6773	14.4189	21.1112	0.0924	6.9956	0.0677	7.0634	1.8744	0.0636	1.9379	0.0000	8,557.3873	8,557.3873	0.4345	0.0000	8,568.2489
Waste						0.0000	0.0000		0.0000	0.0000	136.8017	0.0000	136.8017	8.0848	0.0000	338.9204
Water						0.0000	0.0000		0.0000	0.0000	11.8648	273.2033	285.0681	1.2299	0.0311	325.0860
Total	**24.1548**	**15.4157**	**27.4386**	**0.0986**	**6.9956**	**0.1755**	**7.1711**	**1.8744**	**0.1713**	**2.0457**	**148.6665**	**11,509.4299**	**11,658.0964**	**9.8449**	**0.0644**	**11,923.4203**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	22.3828	0.1875	5.9831	1.0700e-003		0.0423	0.0423		0.0423	0.0423	0.0000	147.5083	147.5083	0.0120	2.5300e-003	148.5616
Energy	0.0947	0.8092	0.3444	5.1700e-003		0.0654	0.0654		0.0654	0.0654	0.0000	2,531.3310	2,531.3310	0.0838	0.0308	2,542.6034
Mobile	1.6773	14.4189	21.1112	0.0924	6.9956	0.0677	7.0634	1.8744	0.0636	1.9379	0.0000	8,557.3873	8,557.3873	0.4345	0.0000	8,568.2489
Waste						0.0000	0.0000		0.0000	0.0000	136.8017	0.0000	136.8017	8.0848	0.0000	338.9204
Water						0.0000	0.0000		0.0000	0.0000	11.8648	273.2033	285.0681	1.2299	0.0311	325.0860
Total	**24.1548**	**15.4157**	**27.4386**	**0.0986**	**6.9956**	**0.1755**	**7.1711**	**1.8744**	**0.1713**	**2.0457**	**148.6665**	**11,509.4299**	**11,658.0964**	**9.8449**	**0.0644**	**11,923.4203**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/1/2018	4/2/2018	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

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

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	4.0000e-005	3.8000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0882	0.0882	0.0000	0.0000	0.0882
Total	**5.0000e-005**	**4.0000e-005**	**3.8000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0882**	**0.0882**	**0.0000**	**0.0000**	**0.0882**

3.2 Site Preparation - 2018

Mitigated Construction On-Site

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

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	4.0000e-005	3.8000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0882	0.0882	0.0000	0.0000	0.0882
Total	**5.0000e-005**	**4.0000e-005**	**3.8000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0882**	**0.0882**	**0.0000**	**0.0000**	**0.0882**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.6773	14.4189	21.1112	0.0924	6.9956	0.0677	7.0634	1.8744	0.0636	1.9379	0.0000	8,557.3873	8,557.3873	0.4345	0.0000	8,568.2489
Unmitigated	1.6773	14.4189	21.1112	0.0924	6.9956	0.0677	7.0634	1.8744	0.0636	1.9379	0.0000	8,557.3873	8,557.3873	0.4345	0.0000	8,568.2489

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	6.40	16.07	17.96	27,135	27,135
Single Family Housing	5,418.56	5,475.96	4907.70	18,294,680	18,294,680
Total	5,424.96	5,492.03	4,925.66	18,321,815	18,321,815

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.542116	0.037578	0.185203	0.118503	0.016241	0.005141	0.017392	0.068695	0.001383	0.001183	0.004582	0.000945	0.001038
Single Family Housing	0.542116	0.037578	0.185203	0.118503	0.016241	0.005141	0.017392	0.068695	0.001383	0.001183	0.004582	0.000945	0.001038

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,594.1457	1,594.1457	0.0658	0.0136	1,599.8488
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,594.1457	1,594.1457	0.0658	0.0136	1,599.8488
NaturalGas Mitigated	0.0947	0.8092	0.3444	5.1700e-003		0.0654	0.0654		0.0654	0.0654	0.0000	937.1853	937.1853	0.0180	0.0172	942.7546
NaturalGas Unmitigated	0.0947	0.8092	0.3444	5.1700e-003		0.0654	0.0654		0.0654	0.0654	0.0000	937.1853	937.1853	0.0180	0.0172	942.7546

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1.75622e+007	0.0947	0.8092	0.3444	5.1700e-003		0.0654	0.0654		0.0654	0.0654	0.0000	937.1853	937.1853	0.0180	0.0172	942.7546
Total		**0.0947**	**0.8092**	**0.3444**	**5.1700e-003**		**0.0654**	**0.0654**		**0.0654**	**0.0654**	**0.0000**	**937.1853**	**937.1853**	**0.0180**	**0.0172**	**942.7546**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1.75622e+007	0.0947	0.8092	0.3444	5.1700e-003		0.0654	0.0654		0.0654	0.0654	0.0000	937.1853	937.1853	0.0180	0.0172	942.7546
Total		**0.0947**	**0.8092**	**0.3444**	**5.1700e-003**		**0.0654**	**0.0654**		**0.0654**	**0.0654**	**0.0000**	**937.1853**	**937.1853**	**0.0180**	**0.0172**	**942.7546**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	5.00326e+006	1,594.1457	0.0658	0.0136	1,599.8488
Total		**1,594.1457**	**0.0658**	**0.0136**	**1,599.8488**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	5.00326e+006	1,594.1457	0.0658	0.0136	1,599.8488
Total		**1,594.1457**	**0.0658**	**0.0136**	**1,599.8488**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	22.3828	0.1875	5.9831	1.0700e-003		0.0423	0.0423		0.0423	0.0423	0.0000	147.5083	147.5083	0.0120	2.5300e-003	148.5616
Unmitigated	22.3828	0.1875	5.9831	1.0700e-003		0.0423	0.0423		0.0423	0.0423	0.0000	147.5083	147.5083	0.0120	2.5300e-003	148.5616

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.7678					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	20.4213					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0139	0.1190	0.0507	7.6000e-004		9.6200e-003	9.6200e-003		9.6200e-003	9.6200e-003	0.0000	137.8387	137.8387	2.6400e-003	2.5300e-003	138.6578
Landscaping	0.1798	0.0685	5.9324	3.1000e-004		0.0327	0.0327		0.0327	0.0327	0.0000	9.6696	9.6696	9.3700e-003	0.0000	9.9038
Total	**22.3828**	**0.1875**	**5.9831**	**1.0700e-003**		**0.0423**	**0.0423**		**0.0423**	**0.0423**	**0.0000**	**147.5083**	**147.5083**	**0.0120**	**2.5300e-003**	**148.5616**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.7678					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	20.4213					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0139	0.1190	0.0507	7.6000e-004		9.6200e-003	9.6200e-003		9.6200e-003	9.6200e-003	0.0000	137.8387	137.8387	2.6400e-003	2.5300e-003	138.6578
Landscaping	0.1798	0.0685	5.9324	3.1000e-004		0.0327	0.0327		0.0327	0.0327	0.0000	9.6696	9.6696	9.3700e-003	0.0000	9.9038
Total	**22.3828**	**0.1875**	**5.9831**	**1.0700e-003**		**0.0423**	**0.0423**		**0.0423**	**0.0423**	**0.0000**	**147.5083**	**147.5083**	**0.0120**	**2.5300e-003**	**148.5616**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	285.0681	1.2299	0.0311	325.0860
Unmitigated	285.0681	1.2299	0.0311	325.0860

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 9.77015	34.5852	1.4300e-003	3.0000e-004	34.7089
Single Family Housing	37.3984 / 23.5773	250.4829	1.2285	0.0308	290.3771
Total		**285.0681**	**1.2299**	**0.0311**	**325.0860**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 9.77015	34.5852	1.4300e-003	3.0000e-004	34.7089
Single Family Housing	37.3984 / 23.5773	250.4829	1.2285	0.0308	290.3771
Total		**285.0681**	**1.2299**	**0.0311**	**325.0860**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	136.8017	8.0848	0.0000	338.9204
Unmitigated	136.8017	8.0848	0.0000	338.9204

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.71	0.1441	8.5200e-003	0.0000	0.3571
Single Family Housing	673.22	136.6576	8.0762	0.0000	338.5634
Total		**136.8017**	**8.0848**	**0.0000**	**338.9204**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.71	0.1441	8.5200e-003	0.0000	0.3571
Single Family Housing	673.22	136.6576	8.0762	0.0000	338.5634
Total		**136.8017**	**8.0848**	**0.0000**	**338.9204**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

This page intentionally left blank

APPENDIX 3.2:

EMFAC 2014 MODEL OUTPUTS

EMFAC2014 (v1.0.7) Emissions Inventory
Region Type: Air District
Region: South Coast AQMD
Calendar Year: 2020
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Population	VMT	Fuel_Consumption	Fuel_Consumption	Total Fuel	VMT	Total VMT	Miles per G	Vehicle Class
South Coast AQMD	2025	HHDT	Aggregated	Aggregated	GAS	940.1710382	119043.6416	24.27356382	24273.56382	2442636.032	119043.6416	15361711.72	6.29	HHDT
South Coast AQMD	2025	HHDT	Aggregated	Aggregated	DSL	103677.305	15242668.08	2418.362468	2418362.468		15242668.08			
South Coast AQMD	2025	LDA	Aggregated	Aggregated	GAS	6593607.405	215137558.4	6720.774503	6720774.503	6781952.626	215137558.4	237275853	34.99	LDA
South Coast AQMD	2025	LDA	Aggregated	Aggregated	DSL	76739.13844	2608526.986	61.17812243	61178.12243		2608526.986			
South Coast AQMD	2025	LDA	Aggregated	Aggregated	ELEC	475151.43	19529767.66	0	0		19529767.66			
South Coast AQMD	2025	LDT1	Aggregated	Aggregated	GAS	553771.5975	18114855.57	667.6030939	667603.0939	668077.3295	18114855.57	18139310.74	27.15	LDT1
South Coast AQMD	2025	LDT1	Aggregated	Aggregated	DSL	537.2707383	14346.10743	0.474235623	474.2356234		14346.10743			
South Coast AQMD	2025	LDT1	Aggregated	Aggregated	ELEC	328.6859103	10109.06035	0	0		10109.06035			
South Coast AQMD	2025	LDT2	Aggregated	Aggregated	GAS	2479313.813	87716077.14	3562.074606	3562074.606	3567761.765	87716077.14	87901373.72	24.64	LDT2
South Coast AQMD	2025	LDT2	Aggregated	Aggregated	DSL	5085.780367	185296.5785	5.687159155	5687.159155		185296.5785			
South Coast AQMD	2025	LHDT1	Aggregated	Aggregated	GAS	95086.40645	2612217.883	235.1171751	235117.1751	399264.2306	2612217.883	6084477.044	15.24	LHDT1
South Coast AQMD	2025	LHDT1	Aggregated	Aggregated	DSL	103184.755	3472259.16	164.1470555	164147.0555		3472259.16			
South Coast AQMD	2025	LHDT2	Aggregated	Aggregated	GAS	23388.57706	793759.4588	76.08586887	76085.86887	163204.5158	793759.4588	2488794.459	15.25	LHDT2
South Coast AQMD	2025	LHDT2	Aggregated	Aggregated	DSL	45986.89756	1695035.001	87.11864692	87118.64692		1695035.001			
South Coast AQMD	2025	MCY	Aggregated	Aggregated	GAS	334510.5865	2108289.522	60.25554682	60255.54682	60255.54682	2108289.522	2108289.522	34.99	MCY
South Coast AQMD	2025	MDV	Aggregated	Aggregated	GAS	1502799.645	48129334.41	2680.545094	2680545.094	2725793.173	48129334.41	49266751.22	18.07	MDV
South Coast AQMD	2025	MDV	Aggregated	Aggregated	DSL	32349.54487	1137416.815	45.24807955	45248.07955		1137416.815			MDV
South Coast AQMD	2025	MH	Aggregated	Aggregated	GAS	34614.02611	276682.5718	36.92430073	36924.30073	44498.91299	276682.5718	355041.2576	7.98	MH
South Coast AQMD	2025	MH	Aggregated	Aggregated	DSL	9685.541521	78358.68587	7.574612262	7574.612262		78358.68587			
South Coast AQMD	2025	MHDT	Aggregated	Aggregated	GAS	20351.08907	981249.5605	137.0735912	137073.5912	1085273.838	981249.5605	9413937.472	8.67	MHDT
South Coast AQMD	2025	MHDT	Aggregated	Aggregated	DSL	159519.3847	8432687.912	948.2002471	948200.2471		8432687.912			
South Coast AQMD	2025	OBUS	Aggregated	Aggregated	GAS	9575.414757	416890.2169	57.03436093	57034.36093	124142.3168	416890.2169	922295.3883	7.43	OBUS
South Coast AQMD	2025	OBUS	Aggregated	Aggregated	DSL	6203.61635	505405.1714	67.1079559	67107.9559		505405.1714			
South Coast AQMD	2025	SBUS	Aggregated	Aggregated	GAS	2860.382171	104017.0675	9.034698749	9034.698749	36793.43845	104017.0675	306888.4014	8.34	SBUS
South Coast AQMD	2025	SBUS	Aggregated	Aggregated	DSL	5369.08142	202871.3338	27.7587397	27758.7397		202871.3338			
South Coast AQMD	2025	UBUS	Aggregated	Aggregated	GAS	2646.186736	288496.06	56.37808784	56378.08784	142702.6392	288496.06	721412.5193	5.06	UBUS
South Coast AQMD	2025	UBUS	Aggregated	Aggregated	DSL	3970.158356	432916.4593	86.32455134	86324.55134		432916.4593			