Gilman Springs Mine

ENERGY ANALYSIS

COUNTY OF RIVERSIDE

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LIST OF ABBREVIATED TERMS

(1)	Reference
AQIA	Air Quality Impact Analysis
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	Gilman Springs Mine
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 21^{st} Century
VMT	Vehicle Miles Traveled

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EXECUTIVE SUMMARY

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

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

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

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1 INTRODUCTION

This report presents the results of the energy analysis prepared by Urban Crossroads, Inc., for the proposed Gilman Springs Mine (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 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 Gilman Springs Mine Project is located on the northeast side of Gilman Springs Road and south of Bridge Street in unincorporated County of Riverside, as shown on Exhibit 1-A. State Route 79 (SR-79) is located approximately 1.1 miles southeast of the Project site, State Route 60 (SR-60) is located approximately 3.0 miles north of the Project site, and Interstate 215 (I-215) is located approximately 11.5 miles west of the Project site. Existing agricultural uses are located west and south of the Project site; vacant land is located north of the Project site; and the Lamb Canyon Landfill is located roughly 1.5 miles east of the Project site.

1.2 PROJECT DESCRIPTION

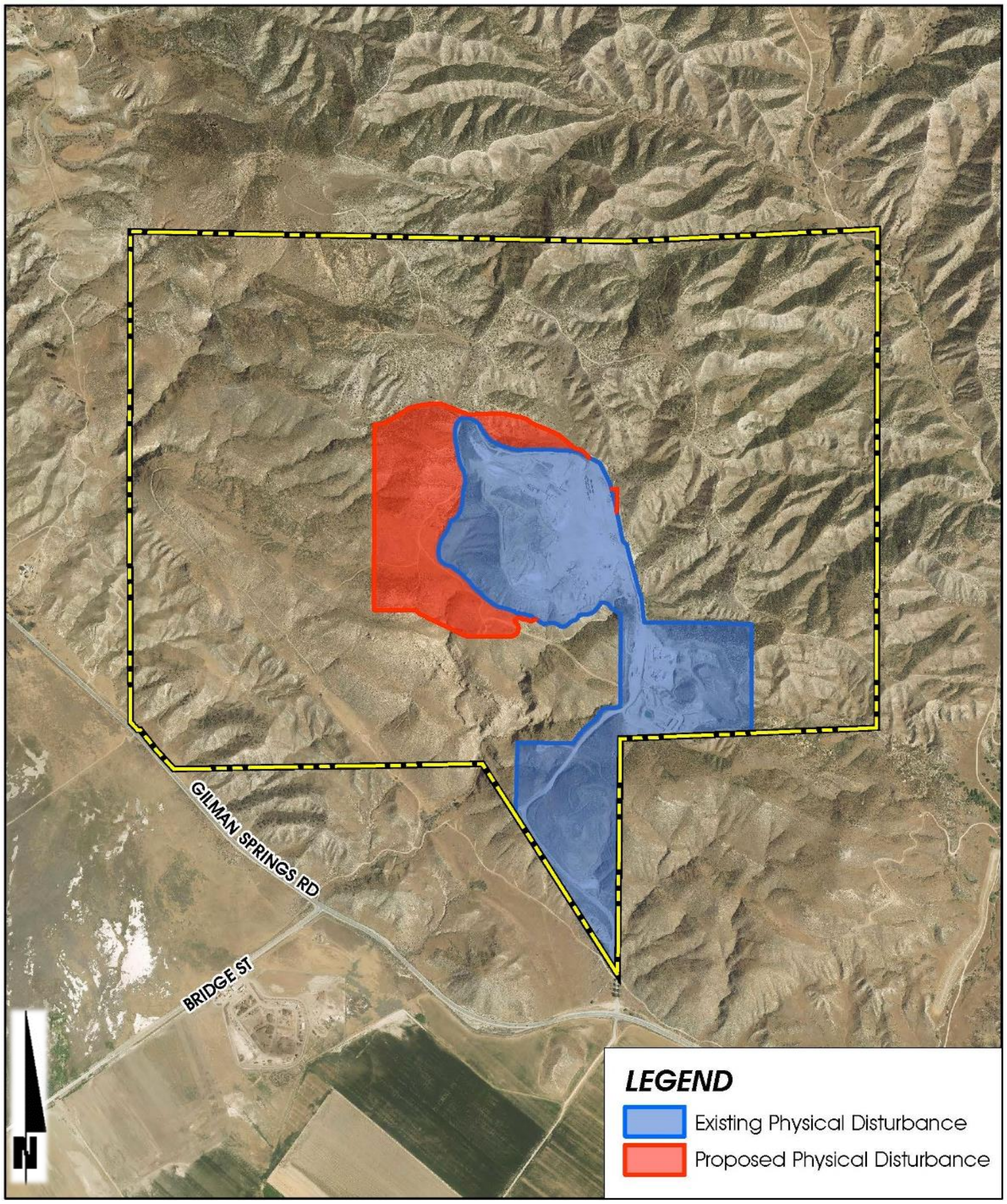
The Project's historic tonnage average is 377,675 tons per year (TPY) based on a 15-year average of historical data. The Project is proposing a permit that would allow up to 1,000,000 TPY. For impact calculations that rely on annual tonnage, the net increase over the baseline (i.e., 377,675 TPY) will be evaluated as part of the analysis. When compared to the proposed permitted maximum annual production quantity of the 1.0 million tons per year (MTPY), the Project results in a net increase of 622,235 TPY, or a 62.22-percent share of the total permitted annual production quantity. As such, the high-end estimate of daily tonnage at the site is approximately 4,000 tons per day (TPD), with approximately 1,511 TPD associated with the mine's existing operations (i.e., baseline) and 2,489 TPD attributable to the proposed Project (62.22-percent of 4,000 TPD). The Project is anticipated to be in operation by the end of 2018.

This analysis is intended to describe emissions associated with the expected typical operational activities at the Project site.

1.3 PROJECT TRIP GENERATION

According to the *Gilman Springs Mine Traffic Impact Analysis* prepared by Urban Crossroads, Inc. the Project is expected to generate a net total of approximately 350 trip-ends per day (actual vehicles) (2). The Project trip generation includes 320 truck trip-ends per day. This study relies on the actual Project trips (as opposed to the passenger car equivalents) to accurately account for the effect of individual truck trips on the study area.

EXHIBIT 1-A: LOCATION MAP



Source: Surface Mining Permit No. 159R2 Environmental Impact Report.

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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; (3);
- Approximately 2,115 billion cubic feet of natural gas (3); and
- Approximately 15.8 billion gallons of transportation fuel (for the year 2017) (4)

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 (5)

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%) (6). 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.

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 (7).

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 industrial, 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 industrial uses planned for the Project.

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

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 (8). 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 (9).

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 (10).

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 (11).

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 are at 8%, solar energy is at 13%, and coal is at 0%. Biomass and waste sources have decreased to 0% from 1% in 2016. Natural gas is at 20% having decreased from 19% in 2016 (12).

TABLE 2-2: SCE 2017 POWER CONTENT MIX

Energy Resources	2017 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." (13)

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 (14), 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 (14). 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 (15). 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 (16), or the equivalent of 155 million gallons of gasoline.

[1] Fuel consumptions estimated utilizing information from EMFAC2014.

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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 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 (17). *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 mining use on mineral resources land use-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 (18). *The proposed Project does not include the construction of any structure or building components, such as windows; roof systems: electrical and lighting systems. As such, the Title 24 standards are not applicable to the proposed Project.*

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4 PROJECT ENERGY DEMANDS AND ENERGY EFFICIENCY MEASURES

4.1 EVALUATION CRITERIA

In compliance with Appendix G of the *State CEQA Guidelines* (1), 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* (19), 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 *Gilman Springs Mine AQIA* (Urban Crossroads, 2019) (20) was utilized in this analysis, detailing Project related operational equipment, transportation energy demands, and facility energy demands. These outputs can be referenced in Appendix 3.1.

4.3 OPERATIONAL ENERGY DEMANDS

4.3.1 OPERATIONAL EQUIPMENT FUEL ESTIMATES

Fuel consumed by operational equipment would be the primary energy resource expended over the at the Project site. Operational equipment schedules, equipment power ratings, load factors, and associated fuel consumption estimates are presented in Table 4-1. The aggregate fuel consumption rate for all equipment is estimated at 18.5 hp-hr-gal., obtained from California Air Resources Board (CARB) 2018 Emissions Factors Tables and cited fuel consumption rate factors presented in Table D-24 of the Moyer guidelines (21). For the purposes of this analysis, the calculations are based on all operational 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 4-1, Project operational activities would consume an estimated 142,552 gallons of diesel fuel annually.

TABLE 4-1: OPERATIONAL EQUIPMENT FUEL CONSUMPTION ESTIMATES

Activity	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
Project Operations	Skid Steer	51	1	2	0.73	74	1,469
	Off-Highway Trucks	394	2	6	0.38	1,797	35,447
	Tractors/Loaders/Backhoes	318	1	8	0.36	916	18,069
	Other Material Handling Equipment	501	1	6	0.36	1,082	21,351
	Rubber Tired Dozers	380	2	5	0.36	1,368	26,990
	Rubber Tired Dozers	570	1	4	0.40	912	17,994
	Other General Industrial Equipment	354	1	8	0.38	1,076	21,232
OPERATIONAL FUEL DEMAND (GALLONS DIESEL FUEL)							***142,552***

4.3.2 WORKER FUEL ESTIMATES

It is assumed that all worker trips are from light duty autos (LDA) along area roadways. With respect to estimated VMT, the worker trips would generate an estimated 101,945 VMT (20). Data regarding Project related 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 (22). EMFAC 2014 was run for the LDA vehicle class within the California sub-area for a 2018 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 2018 are estimated to have a fuel efficiency of 26.50 miles per gallon (mpg). Table 4-2 provides an estimated annual fuel consumption resulting from the Project generated by light duty autos related to worker trips. Based on Table 4-2, it is estimated that 3,847 gallons of fuel will be consumed related to worker trips during full operation of the proposed Project.

TABLE 4-2: WORKER FUEL CONSUMPTION ESTIMATES

Activity	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Project Operations	19	14.7	101,945	26.50	3,847
				TOTAL WORKER FUEL CONSUMPTION	***3,847***

4.3.3 VENDOR FUEL ESTIMATES

With respect to estimated VMT, the vendor trips would generate an estimated 1,815,875 VMT along area roadways (20). It is all vendor trips are from heavy-heavy duty trucks (HHD). These assumptions are consistent with the assumptions presented in the AQIA (20). Vehicle fuel efficiencies for HHD trucks were estimated using information generated within EMFAC 2014. For purposes of this analysis, EMFAC 2014 was run for the HHD vehicle class within the California sub-area for a 2018 calendar year. Data from EMFAC 2014 is shown in Appendix 3.2.

As generated by EMFAC 2014, an aggregated fuel economy of HHD trucks ranging from model year 1974 to model year 2018 are estimated to have a fuel efficiency of 5.71 mpg. Based on Table 4-3, it is estimated that 318,210 gallons of fuel will be consumed related to vendor trips (heavy-heavy duty trucks) during full operations of the proposed Project.

TABLE 4-3: VENDOR FUEL CONSUMPTION ESTIMATES (HHD TRUCKS)

Activity	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Vendor					
Project Operations	199	25	1,815,875	5.71	318,210
				PROJECT HEAVY DUTY TRUCK TOTAL	***318,210***

As summarized on Table 4-4, the Project will result in 1,917,820 annual VMT and an estimated annual fuel consumption of 322,057 gallons of fuel.

<u>Enhanced Vehicle Fuel Efficiencies</u>

Estimated annual fuel consumption estimates presented previously in Tables 4-4 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.

TABLE 4-4: PROJECT-GENERATED TRAFFIC ANNUAL FUEL CONSUMPTION (ALL VEHICLES)

Vehicle Type	Annual Miles Traveled	Estimated Annual Fuel Consumption (gallons)
Light Duty Autos	101,945	3,847
HHD Trucks	1,815,875	318,210
Total (All Vehicles)	**1,917,820**	**322,057**

As noted in the Project's AQIA, the Project is anticipated to serve a regional need and will likely reduce vehicle miles traveled (VMT) in the long term by diverting trips that would otherwise travel to other aggregate facilities in the region.

The fact is that aggregate will be consumed with or without the proposed Project. The Project will not have an effect on demand for aggregate but will have an effect on the distance that aggregates travel within the region in the long term. Project aggregate made available by the proposed expansion area will replace materials hauled from farther distances in the long term and supply new demand for aggregate that will occur in the Riverside County region. This rationale is supported by Dr. Peter Berk's "Working Paper No. 994 – A Note on the Environmental Costs of Aggregate" (Department of Agricultural and Resource Economics and Policy, Division of Agricultural and Natural Resources, University of California Berkley, January 2005) (23). Dr. Berk states that:

> *"The opening of a new quarry for aggregates will change the pattern of transportation of aggregates in the area served by the quarry. In this note, we will show that, so long as aggregate producers are cost minimizing, the new pattern of transportation requires less truck transport than the pattern of transportation that existed before the opening of the new quarry. Since the costs of providing aggregates falls, it is reasonable to assume that the price of delivered aggregates also will fall. This note also shows that*

> *the demand expansion effect is of very small magnitude. Since the demand increase from a new quarry is quite small, the dominant effect is that the quarries are on average closer to the users of aggregates and, as a result, the truck mileage for aggregate hauling decreases. To summarize the effects of a new quarry project:*
>
> > *a) The project in itself will not significantly increase the demand for construction materials in the region through market forces, which include the downward pressure on pricing.*
> > *b) Truck traffic (i.e. vehicle miles traveled) in the region will not increase and may decrease as a result of the project."*

In its guidance document *CEQA and Climate Change* the California Air Pollution Control Officers Association (CAPCOA) lists various mitigation measures that can be implemented to reduce AQ and GHG emissions for various projects. One particular mitigation measure for reducing AQ and GHG emissions during construction activity is Mitigation Measure C-5 "Use of Local Building Materials." The Project will provide local building materials to serve the demand for aggregate resources in the local area, thus resulting in a reduction in fuel usage and emissions associated with transport of materials from sources of aggregate products located further away.

4.3.4 FACILITY ENERGY DEMANDS

The Project will not result in an increase in the amount of natural gas associated with aggregate usage (since aggregate usage does not currently use any natural gas).

The Project will result in an increase in electricity associated with the aggregate production. Based on project permits, the proposed increase in aggregate production from approximately 377,675 TPY to 1.0 million TPY represents a 264.8% increase in the quantity of material processed over baseline conditions. In order to process the additional 622,235 TPY, electricity usage is expected to increase proportionally by approximately 264.8%. Electricity would be supplied by Southern California Edison. The Project proposes conventional mining uses reflecting contemporary energy efficient/energy conserving designs and operational programs. Additionally, as noted previously, aggregate will be consumed with or without the proposed Project and the Project likely facilitates a more efficient use of energy demand as a whole by providing a local source for aggregate production in the Project vicinity. The Project energy demands in total would be comparable to, or less than, other aggregate facilities of similar scale and configuration.

4.4 SUMMARY

4.4.1 OPERATIONAL EQUIPMENT FUEL ESTIMATES

Operational equipment used by the Project would result in an annual consumption of approximately 142,552 gallons of diesel fuel. Operational equipment use of fuel would not be atypical for the type of operations proposed because there are no aspects of the Project's proposed operational process that are unusual or energy-intensive, and Project operational equipment would conform to the applicable CARB emissions standards, acting to promote equipment fuel efficiencies.

4.4.2 TRANSPORTATION ENERGY DEMANDS

Annual vehicular trips and related VMT generated by the Project would result in an estimated 3,847 gallons of fuel consumption per year for LDAs. Additionally, the Project would result in an estimated 318,210 gallons of fuel consumption per year for HHD trucks. The total estimated annual fuel consumption from Project generated VMT would result in a fuel demand 322,057 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 mining 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.

4.4.3 FACILITY ENERGY DEMANDS

The Project will not result in an increase in the amount of natural gas associated with aggregate usage (since aggregate usage does not currently use any natural gas).

The Project will result in an increase in electricity associated with the aggregate production. Based on project permits, the proposed increase in aggregate production from approximately 377,675 TPY to 1.0 million TPY represents a 264.8% increase in the quantity of material processed over baseline conditions. In order to process the additional 622,235 TPY, electricity usage is expected to increase proportionally by approximately 264.8%. Electricity would be supplied by Southern California Edison. The Project proposes conventional mining uses reflecting contemporary energy efficient/energy conserving designs and operational programs. Additionally, as noted previously, aggregate will be consumed with or without the proposed Project and the Project likely facilitates a more efficient use of energy demand as a whole by providing a local source for aggregate production in the Project vicinity. The Project energy demands in total would be comparable to, or less than, other aggregate facilities of similar scale and configuration.

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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 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-2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

The Project would provide for, and promote, energy efficiencies beyond those required under other applicable federal and State of California standards and regulations. Moreover, energy consumed by the Project's operation is calculated to be comparable to, or less than, energy consumed by other aggregate facilities 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.

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6 REFERENCES

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7 CERTIFICATION

The contents of this energy analysis report represent an accurate depiction of the environmental impacts associated with the proposed Gilman Springs Mine 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.

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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
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Air Dispersion Modeling – Lakes Environmental • June, 2006

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APPENDIX 3.1:

CALEEMOD EMISSIONS MODEL OUTPUTS

Gilman Springs Mine

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.4 **Precipitation Freq (Days)** 28

Climate Zone 10 **Operational Year** 2018

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 -

Construction Phase - 7 day per week 365 per year

Off-road Equipment - Equipment list based on data provided by project applicant

Trips and VMT - Data on TIA

Construction Off-road Equipment Mitigation - Tiers based on data provided by project applicant

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	0.00	365.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	12/31/2017	12/31/2018
tblOffRoadEquipment	HorsePower	65.00	51.00
tblOffRoadEquipment	HorsePower	402.00	394.00
tblOffRoadEquipment	HorsePower	97.00	318.00
tblOffRoadEquipment	HorsePower	168.00	501.00
tblOffRoadEquipment	HorsePower	203.00	380.00
tblOffRoadEquipment	HorsePower	247.00	570.00
tblOffRoadEquipment	HorsePower	88.00	354.00
tblOffRoadEquipment	LoadFactor	0.37	0.36
tblOffRoadEquipment	LoadFactor	0.40	0.36
tblOffRoadEquipment	LoadFactor	0.34	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks

tblOffRoadEquipment	OffRoadEquipmentType		Other Material Handling Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	25.00
tblTripsAndVMT	VendorTripNumber	0.00	199.00
tblTripsAndVMT	VendorVehicleClass	HDT_Mix	HHDT
tblTripsAndVMT	WorkerTripNumber	0.00	19.00

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	1.0420	20.6877	6.0094	0.0460	0.8207	0.3766	1.1973	0.2250	0.3482	0.5731	0.0000	4,358.399 8	4,358.399 8	0.5309	0.0000	4,371.672 5
Maximum	**1.0420**	**20.6877**	**6.0094**	**0.0460**	**0.8207**	**0.3766**	**1.1973**	**0.2250**	**0.3482**	**0.5731**	**0.0000**	**4,358.399 8**	**4,358.399 8**	**0.5309**	**0.0000**	**4,371.672 5**

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	0.5281	18.0112	7.9782	0.0460	0.8207	0.1894	1.0101	0.2250	0.1874	0.4123	0.0000	4,358.398 5	4,358.398 5	0.5309	0.0000	4,371.671 2
Maximum	**0.5281**	**18.0112**	**7.9782**	**0.0460**	**0.8207**	**0.1894**	**1.0101**	**0.2250**	**0.1874**	**0.4123**	**0.0000**	**4,358.398 5**	**4,358.398 5**	**0.5309**	**0.0000**	**4,371.671 2**

	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	**49.32**	**12.94**	**-32.76**	**0.00**	**0.00**	**49.71**	**15.64**	**0.00**	**46.18**	**28.05**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2018**	**3-31-2018**	5.3208	4.5341
2	**4-1-2018**	**6-30-2018**	5.3315	4.5361
3	**7-1-2018**	**9-30-2018**	5.3901	4.5860
		Highest	5.3901	4.5860

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Energy	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
Mobile	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
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						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**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Energy	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
Mobile	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
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						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**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

	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	Project Operations	Building Construction	1/1/2018	12/31/2018	7	365	

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
Project Operations	Skid Steer Loaders	1	2.00	51	0.37
Project Operations	Off-Highway Trucks	2	6.00	394	0.38
Project Operations	Tractors/Loaders/Backhoes	1	8.00	318	0.36
Project Operations	Other Material Handling Equipment	1	6.00	501	0.36
Project Operations	Cranes	0	4.00	231	0.29
Project Operations	Forklifts	0	6.00	89	0.20
Project Operations	Rubber Tired Loaders	2	5.00	380	0.36
Project Operations	Rubber Tired Dozers	1	4.00	570	0.40
Project Operations	Other General Industrial Equipment	1	8.00	354	0.38
Project Operations	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
Project Operations	9	19.00	199.00	0.00	14.70	25.00	20.00	LD_Mix	HHDT	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Project Operations - 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					
Off-Road	0.7720	9.0384	4.4358	0.0120		0.3303	0.3303		0.3038	0.3038	0.0000	1,091.4857	1,091.4857	0.3398	0.0000	1,099.9805
Total	**0.7720**	**9.0384**	**4.4358**	**0.0120**		**0.3303**	**0.3303**		**0.3038**	**0.3038**	**0.0000**	**1,091.4857**	**1,091.4857**	**0.3398**	**0.0000**	**1,099.9805**

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	0.2512	11.6351	1.4268	0.0336	0.7826	0.0461	0.8287	0.2149	0.0441	0.2589	0.0000	3,232.9487	3,232.9487	0.1901	0.0000	3,237.7013
Worker	0.0188	0.0142	0.1468	3.8000e-004	0.0381	2.4000e-004	0.0384	0.0101	2.2000e-004	0.0103	0.0000	33.9654	33.9654	1.0100e-003	0.0000	33.9907
Total	**0.2700**	**11.6493**	**1.5736**	**0.0340**	**0.8207**	**0.0463**	**0.8670**	**0.2250**	**0.0443**	**0.2693**	**0.0000**	**3,266.9141**	**3,266.9141**	**0.1911**	**0.0000**	**3,271.6920**

3.2 Project Operations - 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					
Off-Road	0.2581	6.3619	6.4045	0.0120		0.1431	0.1431		0.1431	0.1431	0.0000	1,091.4844	1,091.4844	0.3398	0.0000	1,099.9792
Total	**0.2581**	**6.3619**	**6.4045**	**0.0120**		**0.1431**	**0.1431**		**0.1431**	**0.1431**	**0.0000**	**1,091.4844**	**1,091.4844**	**0.3398**	**0.0000**	**1,099.9792**

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	0.2512	11.6351	1.4268	0.0336	0.7826	0.0461	0.8287	0.2149	0.0441	0.2589	0.0000	3,232.9487	3,232.9487	0.1901	0.0000	3,237.7013
Worker	0.0188	0.0142	0.1468	3.8000e-004	0.0381	2.4000e-004	0.0384	0.0101	2.2000e-004	0.0103	0.0000	33.9654	33.9654	1.0100e-003	0.0000	33.9907
Total	**0.2700**	**11.6493**	**1.5736**	**0.0340**	**0.8207**	**0.0463**	**0.8670**	**0.2250**	**0.0443**	**0.2693**	**0.0000**	**3,266.9141**	**3,266.9141**	**0.1911**	**0.0000**	**3,271.6920**

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	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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

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
User Defined Industrial	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.527920	0.040740	0.182967	0.130733	0.020108	0.005812	0.016781	0.065303	0.001324	0.001284	0.004728	0.000989	0.001311

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	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
NaturalGas Unmitigated	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

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					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**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

	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					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**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**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

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	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

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

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APPENDIX 3.2:

EMFAC 2014 MODEL OUTPUTS

EMFAC2014 (v1.0.7) Emissions Inventory
Region Type: Air District
Region: South Coast AQMD
Calendar Year: 2018
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	2018	HHDT	Aggregated	Aggregated	GAS	775.1922158	98754.39497	21.57029878	21570.29878	2169813.107	98754.39497	12382109.21	5.71	HHDT
South Coast AQMD	2018	HHDT	Aggregated	Aggregated	DSL	88602.97312	12283354.82	2148.242808	2148242.808		12283354.82			
South Coast AQMD	2018	LDA	Aggregated	Aggregated	GAS	6078361.062	212964235.7	8169.420147	8169420.147	8223928.392	212964235.7	217931809.5	26.50	LDA
South Coast AQMD	2018	LDA	Aggregated	Aggregated	DSL	49850.77136	1907209.837	54.50824446	54508.24446		1907209.837			
South Coast AQMD	2018	LDA	Aggregated	Aggregated	ELEC	64965.4746	3060363.981	0	0		3060363.981			
South Coast AQMD	2018	LDT1	Aggregated	Aggregated	GAS	527415.9852	17859812.77	808.5880432	808588.0432	809339.2642	17859812.77	17892599.9	22.11	LDT1
South Coast AQMD	2018	LDT1	Aggregated	Aggregated	DSL	715.4372263	19171.02877	0.751221032	751.2210321		19171.02877			
South Coast AQMD	2018	LDT1	Aggregated	Aggregated	ELEC	432.3698805	13616.10277	0	0		13616.10277			
South Coast AQMD	2018	LDT2	Aggregated	Aggregated	GAS	2111711.532	79373483.07	4066.558221	4066558.221	4071352.577	79373483.07	79503591.13	19.53	LDT2
South Coast AQMD	2018	LDT2	Aggregated	Aggregated	DSL	3030.486911	130108.0652	4.794355794	4794.355794		130108.0652			
South Coast AQMD	2018	LHDT1	Aggregated	Aggregated	GAS	135954.4736	4060725.78	374.5618737	374561.8737	537329.7014	4060725.78	7308282.092	13.60	LHDT1
South Coast AQMD	2018	LHDT1	Aggregated	Aggregated	DSL	88693.33158	3247556.312	162.7678277	162767.8277		3247556.312			
South Coast AQMD	2018	LHDT2	Aggregated	Aggregated	GAS	26194.96998	912648.95	91.01285608	91012.85608	170077.7167	912648.95	2352918.1	13.83	LHDT2
South Coast AQMD	2018	LHDT2	Aggregated	Aggregated	DSL	35906.55457	1440269.15	79.06486067	79064.86067		1440269.15			
South Coast AQMD	2018	MCY	Aggregated	Aggregated	GAS	270168.7101	1863363.45	52.73624584	52736.24584	52736.24584	1863363.45	1863363.45	35.33	MCY
South Coast AQMD	2018	MDV	Aggregated	Aggregated	GAS	1483335.815	50033297.26	3424.880775	3424880.775	3460732.688	50033297.26	50782245.43	14.67	MDV
South Coast AQMD	2018	MDV	Aggregated	Aggregated	DSL	18133.33411	748948.1749	35.85191269	35851.91269		748948.1749			MDV
South Coast AQMD	2018	MH	Aggregated	Aggregated	GAS	39871.50572	325129.9569	44.53809263	44538.09263	53067.2256	325129.9569	411873.457	7.76	MH
South Coast AQMD	2018	MH	Aggregated	Aggregated	DSL	10017.35619	86743.50012	8.529132967	8529.132967		86743.50012			
South Coast AQMD	2018	MHDT	Aggregated	Aggregated	GAS	19698.42983	985821.9803	143.0599777	143059.9777	937917.6001	985821.9803	7868715.631	8.39	MHDT
South Coast AQMD	2018	MHDT	Aggregated	Aggregated	DSL	125336.8235	6882893.651	794.8576224	794857.6224		6882893.651			
South Coast AQMD	2018	OBUS	Aggregated	Aggregated	GAS	7948.79934	379378.7355	53.577161	53577.161	110004.9113	379378.7355	783667.3668	7.12	OBUS
South Coast AQMD	2018	OBUS	Aggregated	Aggregated	DSL	4773.257883	404288.6314	56.42775032	56427.75032		404288.6314			
South Coast AQMD	2018	SBUS	Aggregated	Aggregated	GAS	2019.99616	78907.14165	7.000654307	7000.654307	35146.82653	78907.14165	281030.6797	8.00	SBUS
South Coast AQMD	2018	SBUS	Aggregated	Aggregated	DSL	5275.834198	202123.538	28.14617222	28146.17222		202123.538			
South Coast AQMD	2018	UBUS	Aggregated	Aggregated	GAS	2193.809032	258319.8069	52.34672622	52346.72622	177689.5806	258319.8069	845541.9306	4.76	UBUS
South Coast AQMD	2018	UBUS	Aggregated	Aggregated	DSL	4992.521214	587222.1237	125.3428544	125342.8544		587222.1237			