Final

CITY OF PLEASANTON JOHNSON DRIVE ECONOMIC DEVELOPMENT ZONE

Energy Analysis Technical Memo

Prepared for
City of Pleasanton

July 2019

ESA

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Energy Analysis Technical Memo

Executive Summary

This technical memorandum (Memo) analyzes the impacts on energy resources due to construction and operation of the Johnson Drive Economic Development Zone Project (Project) located in the City of Pleasanton (City). In accordance with the requirements under the California Environmental Quality Act (CEQA) Guidelines, specifically Appendix G, Environmental Checklist, and Appendix F, Energy Conservation, this assessment provides an estimate of energy consumption for the Project and the potential impacts from associated construction and operational activities. The assessment includes the categories and types of energy consumption resulting from the Project, the calculation procedures used in the analysis, and any assumptions or limitations.

Construction of the Project would occur in two phases. Phase 1 would begin in 2020 with a one-year duration and Phase 2 would begin in 2030 with a one-year duration. Each of the construction phases would utilize energy for necessary on-site construction activities and to transport materials, soil, and debris to and from the site. Phase 1 construction would consume approximately 114,345 gallons of diesel and 19,813 gallons of gasoline during the one-year construction timeframe. Phase 2 construction would consume approximately 64,504 gallons of diesel and 14,051 gallons of gasoline during the one-year construction timeframe.

Phase 1 diesel consumption would represent approximately 0.10 and 0.003 percent of total 2017 diesel fuel consumption in Alameda County and California, respectively. Phase 1 gasoline consumption would represent approximately 0.003 and 0.0001 percent of County and State 2017 gasoline consumption, respectively. Phase 2 diesel consumption would represent approximately 0.06 and 0.002 percent of County and State 2017 diesel consumption, respectively. Phase 2 gasoline consumption would represent approximately 0.002 and 0.0001 percent of County and State 2017 gasoline consumption, respectively. The estimated annual average construction fuel usage would represent a very small fraction of annual (2017) fuel usage in Alameda County and the State. As stated in the Health Risk Assessment prepared for the Project, Phase 1 would not require haul trucks to export rubble resulting from the demolition of existing buildings at the site; all rubble and new construction and demolition debris would be reused on-site. By using this material on-site as construction base, the Project would eliminate both disposal trips for the demolition debris and haul trips for new aggregated fill material, thus eliminating the diesel fuel consumption associated with each truck trip. The Project would comply with applicable

construction regulations that affect energy demand, such as idling restrictions that would result in less fuel combustion and energy consumption and minimize the Project's construction-related energy use. As a result, construction energy impacts would be considered **less than significant**.

Operational energy consumption would occur from building energy needs (electricity and natural gas), off-site water supply and wastewater treatment, and from transportation fuels (e.g., diesel and gasoline) used for vehicles traveling to and from the site, transportation refrigeration units (TRUs), and emergency generators. Project operations would occur in two phases. Phase 1 operations would commence in 2021 and Full Buildout operations would commence in 2031.

Phase 1 operations would have an annual electricity demand of approximately 5.19 million kilowatt-hours (kWh), which represents approximately 0.006 percent of Pacific Gas & Electric Company (PG&E) network sales for 2017. Phase 1 operations would represent approximately 0.05 percent of electricity supplied by PG&E to the County in 2017. Phase 1 operations would have an annual natural gas demand of approximately 4.43 million standard cubic feet (scf), which represents approximately 0.002 percent of the PG&E network sales for 2017. Phase 1 operations would represent approximately 0.01 percent of natural gas supplied by PG&E to the County in 2017.

Phase 1 operations would consume approximately 130,009 gallons of diesel and 1,134,300 gallons of gasoline annually associated with vehicle trips and emergency generators. Phase 1 diesel consumption would represent approximately 0.11 percent and 0.003 percent of County and State 2017 diesel consumption, respectively. Phase 1 gasoline consumption would represent approximately 0.19 percent and 0.007 percent of County and State 2017 gasoline consumption, respectively.

Full Buildout operations would have an annual electricity demand of approximately 7.07 million kWh, which represents approximately 0.009 percent of PG&E's network sales for 2017. Full Buildout operations would represent approximately 0.06 percent of electricity supplied by PG&E to the County in 2017. Full Buildout operations would have an annual natural gas demand of approximately 4.72 million scf, which represents approximately 0.002 percent of PG&E's network sales for 2017. Full Buildout operations would represent approximately 0.01 percent of natural gas supplied by PG&E to the County in 2017.

Full Buildout operations would consume approximately 303,191 gallons of diesel and 1,407,991 gallons of gasoline annually associated with vehicle trips and emergency generators. Full Buildout diesel consumption would represent approximately 0.27 and 0.008 percent of County and State 2017 diesel consumption, respectively. Full Buildout gasoline consumption would represent approximately 0.24 and 0.009 percent of County and State gasoline 2017 consumption, respectively.

The amount of energy used would represent an insubstantial fraction of the region's available energy supply and capacity. The Project would be consistent with energy efficiency standards in the applicable Title 24 Energy Efficiency Standards for Nonresidential Buildings and the Title 24 Building Energy Efficiency Standards, referred to as the California Green Building Standards (CALGreen) Code and include electric vehicle supply equipment (EVSE) to promote

transportation energy efficiency. Additionally, the Costco warehouse will install a rooftop solar PV system of at least 500 kilowatts (kW) of AC power within two years of the store opening (see the *Greenhouse Gas Technical Analysis*, section 3.2 *Project Design Features*). This system is estimated to reduce the warehouse's consumption of electricity provided by PG&E by 1,128,400 kWh annually. In addition, this analysis assumes that rooftop solar photovoltaic systems would be installed on the Phase 1 hotel(s) and retail space and on the Phase 2 retail space (or other Phase 2 development as may be approved), in compliance with Mitigation Measure GHG-2. The systems shall be designed to maximize electricity production pending the final design of each building type and shall cover a minimum of 50 percent of the available rooftop space (see the *Greenhouse Gas Technical Analysis*, section 3.2 *Project Design Features*).

Because the Project would be consistent with energy efficient building standards and promote transportation energy efficiency, it would not result in the wasteful, inefficient, and unnecessary consumption of energy or preclude opportunities for improving overall fuel efficiency and future energy conservation. As a result, operational energy impacts would be considered **less than significant**.

CITY OF PLEASANTON JOHNSON DRIVE ECONOMIC DEVELOPMENT ZONE REPORT

Energy Analysis Technical Memo

1 Introduction

This section analyzes impacts on energy resources due to construction and operation of the Project. Section 15126.2 (b) of the 2019 California Environmental Quality Act (CEQA) Guidelines (CEQA Guidelines) states that a project's energy use shall be analyzed to determine the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. The analysis should also evaluate compliance with building codes and renewable energy features that are or could be incorporated into the project. Appendix G of the CEQA Guidelines, Environmental Checklist, provides screening questions to assist lead agencies when assessing a project's potential energy impacts. Additionally, Appendix F, Energy Conservation, provides guidance on information to use when evaluating a project's energy use.

Appendix F of the CEQA Guidelines states that, in order to ensure that energy implications are considered in project decisions, the potential energy implications of a project shall be considered in an EIR, to the extent relevant and applicable to the project. Appendix F further states that a project's energy consumption and proposed conservation measures may be addressed, as relevant and applicable, in the Project Description, Environmental Setting and Impact Analysis portions of a project's Environmental Impact Report (EIR), as well as through mitigation measures and alternatives.

In accordance with Appendix G and utilizing guidance from Appendix F of the CEQA Guidelines, this EIR includes relevant information and analyses that address the energy implications of the Project. This section represents a summary of the Project's anticipated energy needs, impacts, and conservation measures.

1.1 Project Description

The Project site would be developed with approximately 148,000 square feet (sf) of club retail (Costco store) with a 20-pump (dispensers) gas station on parcel 6. Parking for up to 800 vehicles and landscaping and site improvements, including bio-retention areas to manage on-site stormwater runoff and trees planted throughout the parcel to provide shading and visual screening around the perimeter, would also be developed on this parcel. A 231-room hotel consisting of

approximately 132,000 sf and 5,000 sf of retail would be developed on parcels 9 and 10, and the remaining parcels would be developed with approximately 184,000 sf of retail space.

1.2 Environmental Setting

Electrical and gas services in the Project area are provided by PG&E. PG&E obtains its energy supplies from power plants and natural gas fields in northern California, as well as from energy purchased outside its service area and delivered through high voltage transmission lines and pipelines. Power is generated from various sources, including fossil fuel, hydroelectric, nuclear, wind, and geothermal plants; and is fed into the electrical grid system serving Northern California.

PG&E updates all load forecasts for gas and electricity services every year. Load growth forecasts for this area are currently determined using load growth projection tools that use a number of sources of data including past peak loading, population, development characteristics, and temperature history information. The tables below present the electricity, natural gas, and transportation fuel throughputs for 2017 (the most recent year for which data is available) for PG&E's entire service area and for Alameda County.

TABLE 1
ELECTRICITY AND NATURAL GAS DELIVERED TO RETAIL CUSTOMERS IN 2017 FOR ALAMEDA COUNTY AND PG&E'S SERVICE AREA

Energy Resource	Alameda County[a]	PG&E Service Area[b]
Electricity (million kWh)	11,112	82,226
Natural Gas Total Sales/Usage (million cubic feet)	36,551	234,181

NOTES:

[a] California Energy Commission, California Energy Consumption Database, 2017 Electricity and Natural Gas Consumption by County. http://ecdms.energy.ca.gov/. Accessed March 2019.

[b] PG&E, 2017 Joint Annual Report to Stakeholders, Available at: http://s1.q4cdn.com/880135780/files/doc_financials/2017/annual/2017-Annual-Report-Final.pdf. Accessed February 2019.

TABLE 2
TRANSPORTATION FUEL CONSUMPTION IN 2017 FOR ALAMEDA COUNTY AND CALIFORNIA

Energy Resource	Alameda County	California
Diesel (million gallons)	113	3,798
Gasoline (million gallons)	583	15,584

SOURCE: California Energy Commission, California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2017. Available at: https://www.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html. Accessed February 2019. Diesel is adjusted to account for retail (51%) and non-retail (49%) diesel sales.

1.3 Regulatory Setting

1.3.1 Federal

National Energy Conservation Policy Act

The National Energy Conservation Policy Act (NECPA) serves as the underlying authority for federal energy management goals and requirements. Signed into law in 1978, it has been regularly updated and amended by subsequent laws and regulations. This act is the foundation of most federal energy requirements. NECPA established energy-efficiency standards for consumer projects and includes a residential program for low-income weatherization assistance, grants and loan guarantees for energy conservation in schools and hospitals, and energy-efficiency standards for new construction. Initiatives in these areas continue today.

National Energy Policy Act of 2005

The National Energy Policy Act of 2005 sets equipment energy efficiency standards and seeks to reduce reliance on nonrenewable energy resources and provide incentives to reduce current demand on these resources. For example, under the act, consumers and businesses can attain federal tax credits for purchasing fuel-efficient appliances and products, including hybrid vehicles; constructing energy-efficient buildings; and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

Executive Order 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), signed in 2007, strengthens the key energy management goals for the federal government and sets more challenging goals than the Energy Policy Act of 2005. The energy reduction and environmental performance requirements of Executive Order 13423 were expanded upon in Executive Order 13514 (Federal Leadership in Environmental, Energy, and Economic Performance), signed in 2009.

Energy and Independence Security Act of 2007 and Corporate Average Fuel Economy Standards

The Energy and Independence Security Act of 2007 sets federal energy management requirements in several areas, including energy reduction goals for federal buildings, facility management and benchmarking, performance and standards for new buildings and major renovations, high-performance buildings, energy savings performance contracts, metering, energy-efficient product procurement, and reduction in petroleum use, including by setting automobile efficiency standards, and increase in alternative fuel use. This act also amends portions of the National Energy Policy Conservation Act.

EPA and NHTSA Joint Rulemaking for Vehicle Standards

In April 2010, the EPA and NHTSA issued a final rulemaking establishing new federal greenhouse gas and fuel economy standards for model years 2012 to 2016 passenger cars, light-duty trucks, and medium-duty passenger vehicles. In addition, on August 9, 2011, the EPA and

NHTSA finalized regulations to reduce GHGs and improve fuel efficiency of medium- and heavy-duty vehicles, including large pickup trucks and vans, semi-trucks, and all types and sizes of work trucks and buses.

In August 2016, the USEPA and NHTSA, working jointly with the California Air Resources Board (CARB), adopted the next phase (Phase 2) of the fuel economy and GHG standards for medium- and heavy-duty trucks, which apply to vehicles with model year 2018 and later.[1] In response to the USEPA's adoption of the Phase 2 standards, CARB developed the California Phase 2 standards to align with the federal Phase 2 standards in structure, timing, and stringency, but with some minor differences that are necessary to ease enforcement, align with existing California programs, and provide incentives to bring advanced technologies to market. On February 8, 2018, CARB approved the proposed California Phase 2 GHG standards and amendments to the Tractor-Trailer GHG regulation.[2]

1.3.2 State

Warren-Alquist Act

The 1975 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission (CEC). The Act established a State policy to reduce wasteful, uneconomical and unnecessary uses of energy by employing a range of measures.

California Energy Plan

California's Energy Action Plan II is the state's principal energy planning and policy document.[3] California Energy Action Plan II describes a coordinated implementation plan for state energy policies and refines and strengthens California's original Energy Action Plan I published in 2003. California Energy Action Plan II identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. It adopts a loading order of preferred energy resources to meet the state's needs and reduce reliance on natural gas and other fossil fuels, also important for achieving greenhouse gas (GHG) emission reductions from the electricity sector.

Energy efficiency and demand response are considered the first ways to meet the energy needs of California's growing population.[4] Renewable energy and distributed generation are considered the best ways to achieve this on the supply side. To the extent that energy efficiency, demand

1 United States Environmental Protection Agency, 2016. Final Rule for Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2, https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-greenhouse-gas-emissions-and-fuel-efficiency. Accessed March 2019.

2 California Air Resources Board, 2018. CA Phase 2 GHG, https://www.arb.ca.gov/msprog/onroad/caphase2ghg/caphase2ghg.htm. Accessed March 2019.

3 California Public Utilities Commission, 2005. Energy Action Plans, http://www.cpuc.ca.gov/eaps/. Accessed March 2019.

4 Demand response is the reduction of customer energy usage during peak periods in order to address system reliability and support the best use of energy infrastructure.

response, renewable resources, and distributed generation are unable to satisfy increasing energy and capacity needs, CEC supports clean and efficient fossil fuel-fired generation to meet California's energy needs. The 2008 Energy Action Plan Update provides a status update to the 2005 Energy Action Plan II and continues the goals of the original California Energy Action Plan.[5]

State of California Integrated Energy Policy Report

Senate Bill (SB) 1389 was signed into law in 2002, and requires the CEC to "conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices." These assessments and forecasts are used to develop recommendations for energy policies that conserve state resources, protect the environment, provide reliable energy, enhance the state's economy, and protect public health and safety. The CEC is required to issue a report every two years, and the most recent report is the 2016 Integrated Energy Policy Report, which provides the results of the CEC's assessments of a variety of energy issues facing California including "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".[6]

State Alternatives Fuel Plan

The State Alternatives Fuel Plan presents strategies and steps that California must take to increase the use of alternative fuels without adversely affecting air quality, water quality, or causing negative health effects.[7] The State Alternatives Fuel Plan recommends alternative fuel targets of 9 percent in 2012, 11 percent in 2017, and 26 percent by 2022. The State Alternatives Fuel Plan also presents a 2050 Vision that extends the plan outcomes and presents a transportation future that greatly reduces the energy needed for transportation, provides energy through a diverse set of transportation fuels, eliminates over-dependency on oil, and achieves an 80 percent reduction in GHG emissions. With these goals, more than 4 billion gasoline gallon equivalents (20 percent) would be displaced by alternative fuels in 2020. CEC estimates that by 2050, alternative fuels could provide more than half of the energy needed to power California's transportation system.

CARB's 2017 Update to the Climate Change Scoping Plan

CARB's Climate Change Scoping Plan, which functions as a roadmap to achieve the California GHG reductions required by Assembly Bill (AB) 32 (2006) and SB 32 (2018) through subsequently enacted regulations, is discussed in detail in the *Greenhouse Gas Technical Analysis*. On December 14, 2017, CARB approved the final version of *California's 2017 Climate*

5 California Energy Commission, 2008 Update Energy Action Plan, https://www.energy.ca.gov/2008publications/CEC-100-2008-001/CEC-100-2008-001.PDF. Accessed March 2019.

6 CEC, 2017. 2016 Integrated Energy Policy Report Update, February 2017, https://www.energy.ca.gov/2016_energypolicy/.

7 California Air Resources Board (CARB), California Energy Commission (CEC), 2007. State Alternative Fuels Plan – Commission Report, December 2007, https://www.energy.ca.gov/2007publications/CEC-600-2007-011/CEC-600-2007-011-CMF.PDF.

Change Scoping Plan (2017 Scoping Plan Update), which outlines the proposed framework of action for achieving California's new SB 32 2030 GHG target: a 40 percent reduction in GHG emissions by 2030 relative to 1990 levels (CARB 2017). The 2017 Scoping Plan Update identifies key sectors of the implementation strategy, which includes improvements in low carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water.

Senate Bill 350

SB 350 was signed into law in October 2015, and establishes a requirement for California to reduce the use of petroleum in cars by 50 percent, to generate half its electricity from renewable resources, and to increase energy efficiency by 50 percent at new and existing buildings, all by the year 2030.

Title 24, Building Standards Code and CALGreen Code

The California Energy Commission (CEC) first adopted the Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the state. These standards also have co-benefits of reducing building emissions of greenhouse gases and other pollutants as a result of reduced consumption of electricity, natural gas, and other fuels from residential and nonresidential buildings subject to the standard. The standards are updated periodically to allow for the consideration and inclusion of new energy efficiency technologies and methods.

The California Building Standards Commission (CBSC) adopted Part 11 of the Title 24 Building Energy Efficiency Standards, referred to as the California Green Building Standards (CALGreen) Code. The purpose of the CALGreen Code is to "improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: (1) Planning and design; (2) Energy efficiency; (3) Water efficiency and conservation; (4) Material conservation and resource efficiency; and (5) Environmental air quality".[8] The CALGreen Code is not intended to substitute for or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California Building Standards Commission. The CALGreen Code establishes mandatory measures for new residential and non-residential buildings. Such mandatory measures include energy efficiency, water conservation, material conservation, planning and design and overall environmental quality.[9] The CALGreen Code was most recently updated in 2016 to include new mandatory measures for residential as well as nonresidential uses; the new measures took effect on January 1, 2017.[10] California's Building Energy Efficiency

8 California Building Standards Commission (CBSC), 2010. 2010 California Green Building Standards Code, (2010).

9 Ibid.

10 California Building Standards Commission (CBSC), CALGreen, Guide to 2016 California Green Building Standards Code-Nonresidential, https://www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen. Accessed March 2019.

Standards continue to build upon the 2016 standards with implementation of the 2019 Standards that will go into effect January 1, 2020.[11] Although the CALGreen Code was adopted as part of the State's efforts to reduce GHG emissions, the standards have co-benefits of reducing energy consumption from residential and nonresidential buildings subject to the standard.

Zero Net Energy

For newly constructed low-rise homes, the State is steadily moving toward implementing zero-net energy buildings, in which energy efficiency is part of an integrated solution to developing homes that generate as much energy as they consume. The CPUC has set a goal of achieving zero net energy (ZNE) performance for all new low-rise homes constructed in or after 2020, and for all new commercial buildings constructed in or after 2030. Outstanding issues remain, however, including needing to identify compliance pathways when on-site renewable generation is not feasible, and the appropriate role for natural gas in ZNE buildings. The primary challenge is to build a technical and regulatory foundation for orchestration of energy efficiency and all other feasible distributed and customer-sited clean energy resources.

Renewables Portfolio Standard

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, which expands the State's Renewables Portfolio Standard to 33 percent renewable power by 2020. Pursuant to Executive Order S-21-09, CARB was also preparing regulations to supplement the Renewables Portfolio Standard with a Renewable Energy Standard that will result in a total renewable energy requirement for utilities of 33 percent by 2020. But on April 12, 2011, Governor Jerry Brown signed SB X1-2 to increase California's Renewables Portfolio Standard to 33 percent by 2020.

Additionally, the 100 Percent Clean Energy Act of 2018, was enacted on September 10, 2018 as SB 100. This Act accelerates the RPS Program goals as follows: (1) 50 percent renewable resources target by December 31, 2026; and (2) 60 percent renewable resources target by December 31, 2030. This Act also requires that retail sellers and local publicly owned electric utilities procure a minimum quantity of electricity products from eligible renewable energy resources so that the total kilowatt-hours of those products sold to their retail end-use customers achieve 44 percent of retail sales by December 31, 2024, 52 percent by December 31, 2027, and 60 percent by December 31, 2030. Finally, this Act establishes a state policy that eligible renewable energy resources and zero-carbon resources supply 100 percent of retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045.

[11] California Energy Commission, 2019 Building Energy Efficiency Standards, https://www.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf. Accessed March 2019.

California Air Resources Board On-Road and Off-Road Vehicle Regulations

In 2004, the California Air Resources Board (CARB) adopted an Airborne Toxic Control Measure (ATCM) to Limit Diesel-Fueled Commercial Motor Vehicle Idling in order to reduce public exposure to diesel particulate matter emissions (Title 13 California Code of Regulations [CCR] Section 2485). The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel-fueled commercial vehicles to idle for more than five minutes at any given location. While the goal of this measure is primarily to reduce public health impacts from diesel emissions, compliance with the regulation also results in energy savings in the form of reduced fuel consumption from unnecessary idling.

In addition to limiting exhaust from idling trucks, CARB also promulgated emission standards for off-road diesel construction equipment of greater than 25 horsepower (hp) such as bulldozers, loaders, backhoes and forklifts, as well as many other self-propelled off-road diesel vehicles. The In-Use Off-Road Diesel-Fueled Fleets regulation adopted by CARB on July 26, 2007 aims to reduce emissions by installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission controlled models (13 CCR Section 2449). The compliance schedule requires full implementation by 2023 in all equipment for large and medium fleets and by 2028 for small fleets.

California Assembly Bill No. 1493 (AB 1493, Pavley), (Chapter 200, Statutes of 2002)

In response to the transportation sector accounting for more than half of California's carbon dioxide (CO_2) emissions, AB 1493 (Chapter 200, Statutes of 2002), authored by Assembly Member Fran Pavley and enacted on July 22, 2002, required CARB to set GHG emission standards for passenger vehicles, light duty trucks, and other vehicles whose primary use is non-commercial personal transportation manufactured in and after 2009. Referred to as the Pavley standards, implementation of AB 1493 was delayed due to litigation, but ultimately upheld by the Supreme Court. The standards established tailpipe GHG emissions standards for model year 2012 through 2016 light-duty vehicles under Phase I and model year 2017 through 2025 light-duty vehicles under Phase II. Although these standards were adopted as part of the State's efforts to reduce GHG emissions, the standards have co-benefits of reducing energy consumption from the transportation section by improving fuel economy and reducing fuel consumption as a means to reduce emissions. The United States Environmental Protection Agency (USEPA) and United States Department of Transportation (USDOT) adopted federal equivalent standards for model year 2012 through 2016 light-duty vehicles and model year 2017 through 2025 light-duty vehicles. The federal standards are slightly different from the Pavley Phase I and Phase II standards, but the State of California has agreed not to contest these standards, in part due to the fact that while the national standard would achieve slightly lower reductions in California, it would achieve greater reductions nationally and is stringent enough to meet state GHG emission

reduction goals .[12] On November 15, 2012, CARB approved an amendment that allows manufacturers to comply with the national standards to meet state law.

California Mobile Source Strategy

In May 2016, CARB released the updated Mobile Source Strategy that demonstrates how the State can simultaneously meet air quality standards, achieve GHG emission reduction targets, decrease health risk from transportation emissions, and reduce petroleum consumption over the next fifteen years, through a transition to ZEVs, cleaner transit systems and reduction of vehicle miles traveled. The Mobile Source Strategy calls for 1.5 million ZEVs (including plug-in hybrid electric, battery-electric, and hydrogen fuel cell vehicles) by 2025 and 4.2 million ZEVs by 2030. It also calls for more stringent GHG requirements for light-duty vehicles beyond 2025 as well as GHG reductions from medium-duty and heavy-duty vehicles and increased deployment of zero-emission trucks primarily for class 3 – 7 "last mile" delivery trucks in California. Statewide, the Mobile Source Strategy would result in a 45 percent reduction in GHG emissions, and a 50 percent reduction in the consumption of petroleum-based fuels (CARB, 2016).

1.3.3 Local

City of Pleasanton General Plan

The City of Pleasanton General Plan (General Plan) is the official document used by city decision-makers and citizens to guide the long-range development of land and the conservation of resources in Pleasanton, and discusses elements related to public safety, land use, community character, transportation, economics, air quality, and other topics.[13] The General Plan sets forth objectives, policies, standards, and programs to connect the community's values and development decisions to be made by the City. The Energy Element of the General Plan contains the following goals related to energy:

> **Goal 1:** Move toward a sustainable energy future that increases renewable energy use, energy conservation, energy efficiency, energy self-sufficiency, and limits energy-related financial burdens in Pleasanton.
>
> **Goal 2:** Save transportation energy by implementing a more effective transportation system.

2 Methods

2.1 Construction Energy

Construction of the Project would require energy in the form of diesel and gasoline fuels through the use of heavy-duty construction equipment, such as excavators and forklifts, and through vehicle trips generated from worker trips and haul trucks traveling to and from the Project site. Construction activities can vary substantially from day to day, depending on the specific type of

[12] California Air Resources Board, Advanced Clean Cars Summary, http://www.arb.ca.gov/msprog/clean_cars/acc%20summary-final.pdf. Accessed March 2019.

[13] City of Pleasanton, General Plan Update, https://www.cityofpleasantonca.gov/gov/depts/cd/planning/general.asp. Accessed March 2019.

construction activity and the number of workers and vendors traveling to the site. The assessment of construction energy impacts considers these factors.

Construction of the Project would occur in two phases. Phase 1 would begin in 2020 with a one-year duration and Phase 2 in 2030 with a one-year duration. Each of the construction phases would utilize energy for necessary on-site building activities and to transport materials, soil, and debris to and from the Project site. Energy use during construction is forecasted by assuming a conservative estimate of construction activities (i.e., maximum daily equipment usage levels). The Project's construction fuel consumption is estimated based on information from the Technical Memo on Updated Air Quality Analysis for the Project (January 2019). Pertinent information includes the number and type of construction equipment that would be used during Project construction, the extent that various equipment are utilized in terms of equipment operating hours or miles driven, and the estimated duration of construction activities. Energy for construction haul truck, vendor truck, and worker commuting trips are estimated based on the number of haul truck trips and workers for the various phases of construction and the associated vehicle miles traveled (VMT). As stated in the Health Risk Assessment prepared for the Project, Phase 1 would not require haul trucks to export rubble resulting from the demolition of existing buildings at the Project site; all rubble and new construction and demolition debris would be reused on-site. By using this material on-site as construction base, the Project would eliminate both disposal trips for the demolition debris and haul trips for new aggregated fill material, thus eliminating the diesel fuel consumption associated with each truck trip.

The construction equipment would likely be diesel-fueled (with the exception of construction worker commute vehicles, which would primarily be gasoline-fueled). For the purposes of this assessment, it is assumed heavy-duty construction equipment and haul trucks would be diesel-fueled because a majority of heavy-duty construction equipment and haul trucks fleets in the state are diesel-powered. The estimated fuel economy for heavy-duty construction equipment is based on fuel consumption factors from the California Air Resources Board's (CARB) OFFROAD emissions model, which is a state-approved model for estimating emissions from off-road heavy-duty equipment. These factors are 0.41 pounds of diesel fuel per horsepower-hour for equipment less than 100 horsepower and 0.37 pounds of diesel fuel per horsepower-hour for equipment greater than 100 horsepower, along with the diesel fuel density of 7.11 pounds per gallon.[14] For a conservative analysis, haul and vendor trucks were categorized as heavy-heavy duty trucks (HHDT), which have a higher fuel use rate than all other vehicle types. Based on EMFAC2014, HHDT trucks operating in the Bay Area Air Quality Management District (BAAQMD) would have a fuel consumption rate of 0.18 gallons of diesel per mile in 2020 and 0.16 gallons of diesel per mile in 2030. Idling fuel consumption factors for haul and vendor trucks were estimated to be 0.9 gallons of diesel per hour based on a study from the United States Department of Energy (DOE).[15] For worker trips, according to EMFAC2014, passenger vehicles (light-duty automobiles and light-duty trucks) operating in the BAAQMD would have an average fuel consumption factor

[14] California Air Resources Board, 2017 Off-road Diesel Emission Factors, https://www.arb.ca.gov/msei/ordiesel/ordas_ef_fcf_2017_v7.xlsx. Accessed March 2019.

[15] U.S. Department of Energy. 2015. *Fact #861 February 23, 2015 Idle Fuel Consumption for Selected Gasoline and Diesel Vehicles*, available at https://www.energy.gov/eere/vehicles/fact-861-february-23-2015-idle-fuel-consumption-selected-gasoline-and-diesel-vehicles. Accessed March 2019.

of 0.039 gallons of gasoline per mile in 2020 and 0.028 gallons of gasoline per mile in 2030. For light-duty automobiles and light-duty trucks, EMFAC2014 data shows that these vehicle classes are overwhelmingly gasoline-powered, therefore only gasoline consumption is included for workers.

Both OFFROAD and EMFAC are incorporated into the California Emissions Estimator Model (CalEEMod) version 2016.3.2, which is a state-approved emissions model used for the Project's air quality and GHG emissions assessment. Although EMFAC2017 is currently available, EMFAC2014 was used in the energy analysis to estimate vehicle fuel consumption because construction criteria pollutant and GHG emissions were generated by CalEEMod which uses EMFAC2014 emission factors and fuel efficiencies. Therefore, this energy assessment is consistent with the modeling approach used for other environmental analyses in the EIR and consistent with general CEQA standards.

In addition to the Project's construction energy demand, the energy assessment also includes a discussion of the Project's compliance with relevant energy-related regulatory measures that would minimize the amount of energy usage during construction. Detailed construction fuel consumption calculations are provided in Appendix A of this assessment.

2.2 Operational Energy

Operation of the Project would require energy in the form of electricity and natural gas for building heating, cooling, cooking, lighting, water demand and wastewater treatment, consumer electronics, and other energy needs, and from transportation fuels (e.g., diesel and gasoline) used for vehicles traveling to and from the site, TRUs, and emergency generators.[16] Project operations would occur in two phases. Phase 1 operations would commence in 2021 and Full Buildout operations would commence in 2031.

The Project's annual electricity consumption (in kWh) for each land use type was generated by CalEEMod. Natural gas would be consumed from natural gas combustion in heaters and boilers and miscellaneous area sources. CalEEMod generated the annual natural gas consumption in thousand British thermal units (kBtu), but are presented as million scf in this analysis. Default CalEEMod energy usage rates were adjusted to reflect the 2019 Title 24 Building Energy Efficiency Standards. Detailed energy consumption calculations are provided in Appendix A.

Transportation fuel consumption from non-delivery vehicles (employees and visitors) traveling to and from the Project site were based on Project-specific trip rates, annual vehicle miles traveled as calculated by CalEEMod, and fuel consumption factors from EMFAC2014. Compared to the land uses in the Draft EIR traffic study, the square footage of some land uses have changed slightly, therefore, the travel demand (trip generation) in the Project's traffic study were prorated based on square footage for each land use.[17] According to EMFAC2014, the average fuel consumption factor for non-delivery vehicles (excluding HHDT) in the BAAQMD is

[16] This analysis thus includes energy that would be expended at locations away from the project site (e.g., off-site energy consumption, potable water pumping, and wastewater treatment and disposal).

[17] Johnson Drive Economic Development Zone Transportation Impact Analysis, Fehr & Peers, 2015.

approximately 0.043 gallons per mile for gasoline and 0.033 gallons per mile for diesel in 2021 (Phase 1) and approximately 0.034 gallons per mile for gasoline and 0.026 gallons per mile for diesel in 2031 (Full Buildout). For gasoline and diesel vehicles, gasoline vehicles account for approximately 95 percent of the total VMT and diesel vehicles accounting for approximately 5 percent of the total VMT.[18] Fuel consumption was also estimated for customer vehicle queuing/idling at the gas station assuming each vehicle would idle for 10 minutes while waiting for gasoline using the idling fuel consumption factor of 0.39 gallons per hour from the DOE.[19]

Fuel consumption was estimated separately for heavy-duty delivery truck travel, heavy-duty delivery truck idling, TRU operation, and emergency generator operations.[20] For diesel fuel use associated with heavy-duty delivery truck travel, fuel economy is based on EMFAC2017 since the criteria pollutant and GHG emissions for heavy-duty delivery truck travel were estimated using EMFAC2017. Consistent with the criteria pollutant and GHG analyses, the Costco delivery truck fleet has an average model year of 2016 based on information provided by the City; therefore, fuel consumption factors for model year 2016 were applied to Costco delivery trucks. Non-Costco delivery trucks utilized fuel consumption factors based on an aggregate model year from EMFAC2017. According to EMFAC2017, model year 2016 heavy duty delivery trucks in the BAAQMD are predicted to have a diesel fuel consumption factor of 0.14 gallons of diesel per mile in 2021 (Phase 1) and 0.15 gallons of diesel per mile in 2031 (Full Buildout). For an aggregate model year, heavy duty delivery trucks in the BAAQMD are predicted to have a diesel fuel consumption factor of 0.16 gallons of diesel per mile in 2021 (Phase 1) and 0.12 gallons of diesel per mile in 2031 (Full Buildout). Travel emissions for Costco delivery trucks, including warehouse and gasoline fuel trucks, were based on travel distances to their respective distribution facilities which were provided by the City. Costco warehouse trucks delivering goods to Costco have an estimated trip length of 24.5 miles based on the distance to the Tracy depot facility. Costco trucks delivering fuel to the gas station have an estimated trip length of 30 miles based on the distance to the nearest fuel delivery location in Benicia. Travel emissions for non-Costco delivery trucks were estimated assuming 7.3 miles per trip, which is the CalEEMod default trip length for "commercial-nonwork" trip types.[21]

For heavy-duty delivery truck idling, fuel consumption was estimated assuming 15 minutes of idling per roundtrip delivery and the idling fuel consumption factor of 0.9 gallons of diesel per hour from the DOE.[22] Diesel fuel use for TRU operation was estimated using the fuel

[18] Based on the California Air Resources Board on-road vehicle emissions model, EMFAC2014 (Modeling input: Bay Area Air Quality Management District, All Vehicle Categories except HHDT, 2021,2031. The modeling input values are considered generally representative of project buildout conditions for the region and representative of the majority of vehicles associated with project-related VMT.

[19] U.S. Department of Energy. 2015. *Fact #861 February 23, 2015 Idle Fuel Consumption for Selected Gasoline and Diesel Vehicles*, available at https://www.energy.gov/eere/vehicles/fact-861-february-23-2015-idle-fuel-consumption-selected-gasoline-and-diesel-vehicles. Accessed March 2019.

[20] Estimates of fuel consumption from these sources are consistent with the parameters used in the health risk assessment prepared for the Project.

[21] Commercial-nonwork trips represent trips associated with commercial land uses other than customers or workers, such as delivery vehicles of goods

[22] U.S. Department of Energy. 2015. *Fact #861 February 23, 2015 Idle Fuel Consumption for Selected Gasoline and Diesel Vehicles*, available at https://www.energy.gov/eere/vehicles/fact-861-february-23-2015-idle-fuel-consumption-selected-gasoline-and-diesel-vehicles. Accessed March 2019.

consumption factor of 1.33 gallons per hour from the National Renewable Energy Laboratory.[23] Diesel fuel use for emergency generators was estimated using the CO_2 emission rate of 1.15 grams CO_2 per horsepower hour and the carbon intensity of diesel fuel of 10.21 kilograms CO_2 per gallon.[24,25] Detailed fuel consumption factors are provided in Appendix A.

3 Energy Assessment

3.1 Thresholds of Significance

For the impacts analyzed in this section, the Project would have a significant impact related to energy if it were to:

a) result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or

b) conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Appendix F of the CEQA Guidelines recommends the following considerations for evaluating energy impacts, as applicable:

- The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal. If appropriate, the energy intensiveness of materials maybe discussed.
- The effects of the project on local and regional energy supplies and on requirements for additional capacity.
- The effects of the project on peak and base period demands for electricity and other forms of energy.
- The degree to which the project complies with existing energy standards.
- The effects of the project on energy resources.
- The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

23 National Renewable Energy Laboratory. 2010. *Emissions of Transport Refrigeration Units with CARB Diesel, Gas-to-Liquid Diesel, and Emissions Control Devices*. Available at https://www.nrel.gov/docs/fy10osti/46598.pdf. Accessed March 2019.

24 USEPA. 1996. *AP 42, Fifth Edition, Volume I Chapter 3: Stationary Internal Combustion Sources; 3.3 Gasoline And Diesel Industrial Engines*. Table 3.3-1. Available at https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s03.pdf. Accessed March 2019.

25 The Climate Registry. 2018. *2018 Default Emission Factors*. Available at https://www.theclimateregistry.org/wp-content/uploads/2018/06/The-Climate-Registry-2018-Default-Emission-Factor-Document.pdf. Accessed March 2019.

3.2 Project Impacts

ENERGY-1: Would the Project result in a potentially significant environmental impact to due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Construction Energy Use

Construction energy consumption during Phase 1 and Phase 2 would result primarily from transportation fuels (e.g., diesel and gasoline) used for haul and vendor trucks, heavy-duty off-road construction equipment, and construction workers commute trips for travel to and from the site. This analysis provides the estimated maximum construction energy consumption for the purposes of evaluating the associated impacts on energy resources.

Off-road equipment associated with construction would include equipment such as backhoes, dozers, and excavators. Fuel consumption is based on the equipment type, quantity and usage during construction activities and fuel consumption factors from the OFFROAD model. Fuel consumption for off-road equipment, haul/vendor trucks, and workers are shown in **Table 3, Estimated Project Construction Fuel Usage**.

TABLE 3
ESTIMATED PROJECT CONSTRUCTION FUEL USAGE

	Phase 1 Fuel Consumption (gallons)		Phase 2 Fuel Consumption (gallons)	
Category [a]	**Diesel**	**Gasoline**	**Diesel**	**Gasoline**
Fuel Use by Source				
Off-Road Equipment	86,786	0	46,186	0
Haul/Vendor	27,559	0	18,318	0
Workers	0	19,813		14,051
Total	114,345	19,813	64,504	14,051
Fuel Usage Comparisons				
Alameda County	113,725,490	583,000,000	113,725,490	583,000,000
Project Percent of Alameda County	0.10%	0.003%	0.06%	0.002%
California	3,798,039,216	15,584,000,000	3,798,039,216	15,584,000,000
Project Percent of California	0.003%	0.0001%	0.002%	0.0001%

NOTES:
[a] Categories defined as follows:
Off-Road Equipment = operating energy use from heavy-duty equipment, such as bulldozers, cranes, and excavators. Energy was modeled using CalEEMod and OFFROAD2017.
Haul/Vendor = Travel and idling energy use from heavy-duty on-road vendor/haul trucks. Energy use was modeled using CalEEMod and EMFAC2014.
Workers = Operating energy use from employee vehicles. Energy use was modeled using EMFAC2014.

ABBREVIATIONS:
CalEEMod = CALifornia Emissions Estimator MODel
EMFAC2014 = EMission FACtors model, version 2014

SOURCE: ESA, 2019

Phase 1 off-road equipment would consume approximately 86,786 gallons of diesel fuel during its one-year duration from 2020 to 2021. Phase 2 off-road equipment would consume approximately 46,186 gallons of diesel fuel during its one-year duration in 2030. Haul trucks would be used to haul material to and from the Project site. Vendor trucks would be used to deliver supplies necessary for Project construction. Based on the proposed development program and engineering estimates that form the basis of the construction-related impact analyses, it is estimated that Phase 1 haul and vendor trucks would result in approximately 155,600 vehicle miles traveled (VMT) and Phase 2 haul and vendor trucks would result in approximately 115,080 VMT. Based on the information described above, Phase 1 and Phase 2 construction diesel fuel consumption for on-road haul and vendor trucks would total approximately 27,559 gallons and 18,318 gallons, respectively.

The number of construction workers required at the site would vary based on the phase of construction and activity taking place. The transportation fuel required by construction workers to travel to and from the Project site would depend on the total number of worker trips estimated for the duration of construction activity for each phase. Based on the proposed development program and engineering estimates that form the basis of the construction-related impact analyses, Phase 1 worker commute trips would total approximately 511,855 VMT and Phase 2 worker commute trips would total approximately 493,085 VMT. For light-duty automobiles and light-duty trucks, EMFAC2014 data shows that these vehicle classes are overwhelmingly gasoline-powered, therefore only gasoline consumption was analyzed for workers. Assuming construction worker light-duty automobiles and light-duty trucks have an average fuel consumption factor consistent with the EMFAC2014 model, workers would consume approximately 19,813 gallons and 14,051 gallons of gasoline during construction of Phase 1 and Phase 2, respectively.

Based on fuel consumption data from the California Energy Commission (CEC), in 2017, Alameda County consumed 583 million gallons of gasoline and 113 million gallons of diesel. Furthermore, California consumed 15,584 million gallons of gasoline and 3,798 million gallons of diesel in 2017.[26]

Based on the estimated fuel usage amounts presented above, Phase 1 construction would consume approximately 114,345 of diesel and 19,813 gallons of gasoline. Phase 2 construction would

[26] California Energy Commission, California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2017. Available at: https://www.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html. Accessed February 2019. Diesel is adjusted to account for retail (51%) and non-retail (49%) diesel sales.

consume approximately 64,504 of diesel and 14,051 gallons of gasoline. Phase 1 diesel consumption would represent approximately 0.10 and 0.003 percent of County and State 2017 diesel consumption, respectively. Phase 1 gasoline consumption would represent approximately 0.003 and 0.0001 percent of County and State 2017 gasoline consumption, respectively. Phase 2 diesel consumption would represent approximately 0.06 and 0.002 percent of County and State 2017 diesel consumption, respectively. Phase 2 gasoline consumption would represent approximately 0.002 and 0.0001 percent of County and State 2017 gasoline consumption, respectively. A comparison of the Project's estimated fuel usage to County and State annual 2017 fuel usage is provided in Table 1.

Construction of the Project is not expected to require substantial electricity usage. Electricity use during construction would be variable depending on lighting needs and the use of electric-powered equipment and would be temporary for the duration of construction activities. If electric-powered construction equipment or vehicles are used, they would replace diesel- and gasoline-fueled equipment assumed in this analysis. Therefore, it is expected that construction electricity use would generally be considered as temporary and negligible and accounted for in the fuel estimates discussed above.

As discussed above, construction of the Project would require temporary and short-term energy supplies and would not represent a substantial fraction of the available energy supply in terms of equipment and transportation fuels. Phase 1 construction would reuse all rubble and new construction and demolition debris on-site as construction base, thus eliminating fuel consumption from trucks trips associated with debris disposal and import of new fill material. Based on the available data, construction would utilize energy for necessary on-site activities and to transport materials, soil, and debris to and from the site. It is reasonable to conclude that idling restrictions would result in less fuel combustion and energy consumption and minimize the Project's construction-related energy use. Costco warehouses are typically constructed of prefabricated structural steel containing approximately 80 percent recycled content. This would reduce material deliveries to the site during Phase 1A as compared to a typical masonry building, reducing diesel fuel use for vendor trips. In addition, as required under Mitigation Measure M-AQ-1, all off-road equipment greater than 50 horsepower is required to have engines that meet United States Environmental Protection Agency (USEPA) Tier 3 off-road emission standards. Although the standards do not require equipment to be more fuel efficient, manufacturers can partly meet the standards with more fuel-efficient equipment, and as engine technology improves over time, both emissions and fuel use declines in off-road engines. Therefore, construction of the Project would not result in the wasteful, inefficient, or unnecessary consumption of energy, and impacts would be considered **less than significant.**

Operational Energy Use

Operational energy consumption would occur from building energy needs, transportation fuels (e.g., diesel and gasoline) used for vehicles traveling to and from the site, TRUs, and emergency generators. This analysis provides the estimated maximum annual operational energy consumption for the purposes of evaluating the associated impacts on energy resources. The operation of the Project would generate demand for electricity, natural gas, and water, as well as

generate wastewater requiring conveyance, treatment, and disposal off-site. Operation of the Project would also result in transportation-related energy use, including gasoline and diesel for heavy-duty delivery trucks, TRU operation, and emergency generators operations.

In addition, as part of the Project's development, existing land uses would be removed along with their associated energy use. Energy use for existing land uses includes electricity, natural gas, and transportation fuels, similar to the Project's energy use. However, energy use for existing land uses to be removed was not calculated and included in the analysis below. Therefore, the energy use estimates for the Project below are an overestimate of the net energy use associated with the Project because they don't account for reduced energy use under existing conditions. In actuality, the net energy use of the Project would be less than what is presented below.

A summary of the Project's operational estimated energy usage is shown in **Table 4**, **Estimated Project Electricity and Natural Gas Usage**, and **Table 5**, **Estimated Project Transportation Fuel Usage**.

TABLE 4
ESTIMATED ANNUAL PROJECT ELECTRICITY AND NATURAL GAS USAGE FOR PHASE 1 AND FULL BUILDOUT

Source	Phase 1 (2021)	Full Buildout (2031)
Project Electricity Consumption (million kWh) [a]	5.19	7.07
Percent of Total PG&E 2017 Sales	0.006%	0.009%
Percent of Alameda County PG&E 2017 Sales	0.05%	0.06%
Project Natural Gas Consumption (million scf)	4.43	4.72
Percent of Total PG&E 2017 Sales	0.002%	0.002%
Percent of Alameda County PG&E 2017 Sales	0.01%	0.01%

NOTES:

[a] Electricity supplied by PG&E would be reduced through installation of rooftop solar PV systems, which are Project Design Features. These features would replace PG&E electricity with on-site renewable energy generation. Please refer to the *Greenhouse Gas Technical Analysis* for more information (see the *Greenhouse Gas Technical Analysis*, section 3.2 *Project Design Features*).

SOURCES:

1. ESA, 2019
2. PG&E, 2017 Joint Annual Report to Stakeholders, Available at: http://s1.q4cdn.com/880135780/files/doc_financials/2017/annual/2017-Annual-Report-Final.pdf. Accessed February 2019.

TABLE 5
ESTIMATED ANNUAL PROJECT TRANSPORTATION FUEL USAGE FOR PHASE 1 AND FULL BUILDOUT

Category	Phase 1 (2021) Fuel Consumption (gallons)		Full Buildout (2031) Fuel Consumption (gallons)	
	Diesel	**Gasoline**	**Diesel**	**Gasoline**
Non-Delivery Vehicles (Running)	37,793	1,094,309	52,573	1,368,000
Light-Duty Vehicles (Idling at Gas Station)	0	39,991	0	39,991
Delivery Vehicles	72,789	0	191,118	0
TRUs	14,357	0	54,430	0
Generators	5,070	0	5,070	0
Total [a]	*130,009*	*1,134,300*	*303,191*	*1,407,991*
Fuel Usage Comparisons				
Alameda County	113,725,490	583,000,000	113,725,490	583,000,000
Project Percent of Alameda County	0.11%	0.19%	0.27%	0.24%
California	3,798,039,216	15,584,000,000	3,798,039,216	15,584,000,000
Project Percent of California	0.003%	0.007%	0.008%	0.009%

NOTES:

[a] Categories defined as follows:
Non-Delivery vehicles (running) = Energy use from daily commercial non-delivery vehicle trips. Energy use estimated using EMFAC2014
Light-duty vehicles (idling at gas station) = Energy use from autos idling and queueing in line at gas station. Energy use was estimated using idling fuel use rates from the U.S. Department of Energy (2015) and assumes an idling time of 10 minutes per vehicle.
Delivery Vehicles = Energy use from daily commercial delivery vehicle trips, including idling and running. Energy use was estimated using EMFAC2017 and idling fuel use rates from the U.S. Department of Energy (2015) and assuming an idling duration of 15 minutes per roundtrip.
TRUs = Energy use from daily TRU operations at commercial land uses. Energy use was estimated using fuel consumption values from NREL (2010).
Generators = Energy use from diesel-powered emergency generators. Energy use was estimated using the carbon content of diesel fuel from the Climate Action Registry (2018).

ABBREVIATIONS:
TRUs = Transportation Refrigeration Units
EMFAC2014 = EMission FACtors model, version 2014
EMFAC2017 = EMission FACtors model, version 2017

SOURCES:
1. ESA, 2019
2. California Energy Commission, California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2017. Available at: https://www.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html. Accessed February 2019. Diesel is adjusted to account for retail (51%) and non-retail (49%) diesel sales.

Based on the proposed development program and engineering estimates that form the basis of the operational-related impact analyses, the Project would have an electricity demand of approximately 5.19 million kWh for Phase 1 in 2021 and 7.07 million kWh for Full Buildout in 2031. These values include electricity for water supply and wastewater treatment.

To put the Project's electricity consumption into perspective, the value is compared to the PG&E network demand, which is the utility provider for the Project region. In 2017, PG&E had annual electric deliveries to all customers of approximately 82,226 million kWh.[27] Phase 1 and Full Buildout operations would represent approximately 0.006 and 0.009 percent of the PG&E

27 PG&E, 2017 Join Annual Report to Stakeholders, Available at: http://s1.q4cdn.com/880135780/files/doc_financials/2017/annual/2017-Annual-Report-Final.pdf. Accessed February 2019.

network sales for 2017, respectively, which is a relatively very small fraction. PG&E had annual electricity deliveries to Alameda County of approximately 11,112 million kWh in 2017.[28] Phase 1 and Full Buildout operations would represent approximately 0.05 and 0.06 percent electricity supplied to the County in 2017, respectively. Furthermore, PG&E's infrastructure accounts for and accommodates an increase in energy demand and load growth. As discussed in Section 1.2, *Environmental Setting*, PG&E updates all load forecasts, including peak load forecasts, for gas and electricity services every year. In addition, the installation of rooftop solar PV on the Costco warehouse and all other buildings (see the *Greenhouse Gas Technical Analysis*, section 3.2 *Project Design Features*) would reduce the amount of electricity necessary for PG&E to supply to the Project (see the *Greenhouse Gas Technical Analysis* for more information). Therefore, electricity service and supply impacts from PG&E are not anticipated.

Based on the proposed development program and engineering estimates, the Project would have an annual natural gas demand of approximately 4.43 million scf for Phase 1 in 2021 and 4.72 million scf for Full Buildout in 2031. To put the natural gas consumption into perspective, the value is compared to the PG&E network demand, which is the regional utility provider. PG&E had natural gas sales of approximately 234,181 million scf in 2017. Both Phase 1 and Full Buildout operations would represent approximately 0.002 percent of the PG&E network sales for 2017, which is a very small fraction. PG&E had natural gas sales of approximately 36,551 million scf within Alameda County in 2017. Both Phase 1 and Full Buildout operations would represent approximately 0.01 percent of the PG&E network sales for 2017. For the same reasons as discussed above for electricity service and supply, natural gas service and supply impacts from PG&E are not anticipated due to PG&E's annual load growth planning. Consequently, given the ample regional natural gas supplies available, the Project would not have a significant impact on regional natural gas supply or require additional capacity to be constructed.

Operation of the Project would also result in transportation-related energy use. Transportation fuels of gasoline and diesel would be provided by local or regional suppliers and vendors. Vehicles would require a fraction of a percent of the total state's transportation fuel consumption. Non-delivery vehicles (employees and visitors) traveling to and from the Project site would consume approximately 37,793 gallons of diesel and 1,094,309 gallons of gasoline during Phase 1 in 2021 and 52,573 gallons of diesel and 1,368,000 gallons of gasoline during Full Buildout in 2031. Fuel consumption for customer vehicle queuing/idling at the gas station is anticipated to be 39,991 gallons of gasoline during both Phase 1 in 2021 and Full Buildout in 2031. Heavy duty delivery trucks would consume approximately 72,789 gallons of diesel during Phase 1 in 2021 and 191,118 gallons of diesel during Full Buildout in 2031 (these vehicles are not anticipated to consume gasoline). The Project would also consume diesel fuel for the operation of TRUs on delivery vehicles and for the operation and testing of emergency generators located at the Costco warehouse and hotel. Phase 1 operations would consume approximately 19,427 gallons of diesel from these sources in 2021. Full Buildout operations would consume approximately 59,500 gallons of diesel from these sources in 2031.

28 PG&E, 2017 Join Annual Report to Stakeholders, Available at: http://s1.q4cdn.com/880135780/files/doc_financials/2017/annual/2017-Annual-Report-Final.pdf. Accessed February 2019.

In total, Phase 1 operations would consume approximately 1,134,300 gallons of gasoline and 130,009 gallons of diesel annually starting in 2021. Full Buildout operations would consume approximately 1,407,991 gallons of gasoline and 303,191 gallons of diesel annually starting in 2031. Phase 1 operational diesel consumption would represent approximately 0.11 percent and 0.003 percent of County and State annual diesel fuel consumption, respectively. Phase 1 operational gasoline consumption would represent approximately 0.19 percent and 0.007 percent of County and State annual gasoline fuel consumption, respectively. Full Buildout diesel consumption would represent approximately 0.27 percent and 0.008 percent of County and State annual diesel fuel consumption, respectively. Full Buildout gasoline consumption would represent approximately 0.24 percent and 0.009 percent of County and State annual gasoline fuel consumption, respectively. Total annual fuel consumption for the Project would therefore represent a small fraction of County and State annual transportation fuel consumption. Overall, the Project would not have a substantial impact on the local or regional fuel supplies or require additional capacity to be constructed.

Operation of the Project would result in energy demand from building energy use and transportation-related energy use associated with vehicles traveling to and from the Project Site. The Project would also consume transportation fuels (diesel and gasoline) for TRUs and emergency generators. The total amount of energy used by the Project would represent a small fraction of the region's available energy supply and capacity. Because the Project would be consistent with energy efficient building standards and promote transportation energy efficiency through bike and pedestrian improvements and the installation of electric vehicle supply equipment (see Impact ENERGY-2 below), and would install rooftop solar PV systems on all buildings (see the *Greenhouse Gas Technical Analysis*, section 3.2 *Project Design Features*), it would not result in the wasteful, inefficient, and unnecessary consumption of energy. Overall, the Project would not have a substantial impact on the local or regional energy or fuel supplies or require additional capacity to be constructed. Therefore, operation of the Project would not result in the wasteful, inefficient, or unnecessary consumption of energy and would not increase the need for new energy infrastructure or preempt opportunities for future energy conservation. Therefore, operational energy impacts would be **less than significant.**

ENERGY-2: Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Construction Energy Use

As discussed in Section 1.3.2 above, CARB has adopted the ATCM to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter. This measure prohibits diesel-fueled commercial vehicles greater than 10,000 pounds from idling for more than five minutes at any given time (13 CCR Section 2485). The Project would also be required to utilize construction contractors that demonstrate compliance with applicable CARB regulations governing the accelerated retrofitting, repowering, or replacement of heavy duty diesel equipment

(13 CCR Section 2449). The regulation aims to reduce emissions by requiring the installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models.

While intended to reduce construction criteria pollutant emissions, compliance with the above anti-idling and emissions regulation would also result in efficient use of construction-related energy and the minimization or elimination of wasteful and unnecessary consumption of energy. According to the CARB staff report that was prepared at the time the anti-idling ATCM was being proposed for adoption in late 2004/early 2005, the regulation was estimated to reduce non-essential idling and associated emissions of diesel particulate matter and nitrogen oxide (NO_X) emissions by 64 and 78 percent respectively in analysis year 2009.[29] These reductions in emissions are directly attributable to overall reduced idling times and reduced idling fuel combustion as a result of compliance with the regulation, and the Project's compliance would result in total energy savings of approximately 974 gallons of diesel fuel, assuming a fuel reduction equivalent to the percent reduction of particulate matter or NO_X as estimated by CARB (the lesser value [i.e., 64 percent] is used as a conservative assumption). These savings are incorporated into Table 3.

Additional construction fuel savings would be expected from the In-Use Off-Road Diesel-Fueled Fleets regulation, although it is difficult to quantify since the regulation is based on a construction contractor's total fleet of equipment and does not regulate specific equipment that could be used for an individual Project. As required under Mitigation Measure M-AQ-1, all off-road equipment greater than 50 horsepower is required to have engines that meet USEPA Tier 3 off-road emission standards. Although the standards do not require equipment to be more fuel efficient, manufacturers can partly meet the standards with more fuel-efficient equipment, and as engine technology improves over time, both emissions and fuel use declines in off-road engines. While some level of construction fuel savings would be expected from the In-Use Off-Road Diesel-Fueled Fleets regulation, estimates are not included in the energy savings calculations for the Project since the underlying regulation applies to construction contractor's total fleet of equipment and not to specific equipment. Based on the available data, construction would utilize energy for necessary on-site activities and to transport materials, soil, and debris to and from the site. It is reasonable to conclude that idling restrictions would result in less fuel combustion and energy consumption and minimize the Project's construction-related energy use.

Construction of the Project would require temporary and short-term energy supplies and would not represent a substantial fraction of the available energy supply in terms of equipment and transportation fuels and would not substantially affect existing local and regional supply and capacity. Furthermore, construction of the Project would use equipment that would be consistent with the energy standards applicable to construction equipment including limiting idling fuel consumption and using contractors that comply with applicable CARB regulatory standards that affect energy efficiency. Finally, because Project construction will entail energy demands largely associated with equipment and transportation fuels, construction of the Project would not increase

[29] CARB, 2004. Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, Appendix F, July 2004, https://www.arb.ca.gov/regact/idling/idling.htm, accessed November 2016.

demands on the electric power network during peak and base period demand periods. As a result, the Project's construction energy use would not conflict with or obstruct state or local plans for renewable energy or energy efficiency, therefore, impacts would be considered **less than significant**.

Operational Energy Use

The Project would comply with or exceed the applicable provisions of the Title 24 standards and the CALGreen Code in effect at the time of building permit issuance. Examples of energy measures in the Title 24 standards and the CALGreen Code include energy efficiency metrics and performance standards for appliances, space-conditioning equipment (i.e., heating, ventilation and air conditioning [HVAC]), water heating systems, windows and doors, insulation, lighting, and roofing materials; indoor and outdoor water use efficiency and conservation performance metrics; and requirements to provide solar-ready buildings with a minimum solar zone area (solar zone is defined as a section of the roof designated and reserved for the future installation of a solar electric or solar thermal system). California's Build Energy Efficiency Standards continue to build upon the 2016 standards with implementation of the 2019 Standards that will go into effect January 1, 2020.[30] The Project's modeling incorporated the 2019 Title 24 standards for its commercial land uses. According to the California Energy Commission, non-residential buildings would use about 30 percent less energy compared to the 2016 Title 24 Standards.[31]

The California Public Utilities Commission (CPUC) has also designed the Zero Net Energy Action Plan to make new residential and commercial construction in California zero net energy by 2030 in order to meet the state's GHG goals. The ZNE Action Plan's key milestones are achieved by improving and expanding Title 24 standards based on the future state of energy efficiency technologies and innovations, providing incentives, mandating carbon benchmarking and labeling, and developing performance data. Furthermore, Title 24 only regulates a portion of a buildings energy usage primarily related to lighting, heating, cooling, ventilation, and water heating; therefore, is it not possible to speculate how future Title 24 standards would reduce the overall energy profile of a building. As a result, the energy estimates provided above are considered conservative estimates, as they do not take into account anticipated energy reductions from future potentially applicable standards beyond the 2019 Title 24 standards, which are not yet known or available. Nonetheless, the Project would be built to achieve or exceed the energy efficiency metrics in the applicable Title 24 standards and the CALGreen Code in affect at the time of building permit issuance, including any ZNE requirements for new commercial buildings. Therefore, the Project's increase in electrical demand would not have a substantial impact on the local or regional electrical supplies or require additional capacity to be constructed. In addition, given the ample regional natural gas supplies available, the Project would not have a significant impact on regional natural gas supply or require additional capacity to be constructed.

30 California Energy Commission, 2019 Building Energy Efficiency Standards, https://www.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf. March 2019.

31 Ibid.

In addition, the Costco facility would include a number of sustainability features to reduce building energy use. All Costco stores have an Energy Management System. Costco's warehouse designs are consistent with the requirements of Leadership in Energy and Environmental Design (LEED) for green building design and construction. Buildings are designed with high efficiency HVAC systems and reflective roofs that lessen the heat gain on the roof. Mechanical heat from refrigeration systems is captured to preheat hot water tanks. All indoor and outdoor lighting in new construction utilizes high-efficiency LED technology.[32] Additionally, consistent with the Project Design Features, Costco shall install a rooftop solar PV system of at least 500 kilowatts (KW) of AC power within two years of the warehouse opening. Costco estimates that the rooftop system would consist of more than 2,000 modules with a total rating of 540,000 watts, and produce approximately 1,128,400 kWh of clean electricity annually. For all other land uses at the Project site, rooftop solar photovoltaic systems will be installed on the Phase 1 hotel(s) and retail space and on the Phase 2 retail space (or other Phase 2 development as may be approved). The systems shall be designed to maximize electricity production pending the final design of each building type and shall cover a minimum of 50 percent of the available rooftop space (see the *Greenhouse Gas Technical Analysis*, section 3.2 *Project Design Features*, for more information).

With respect to operational transportation-related fuel usage, the Project would support statewide efforts to improve transportation energy efficiency and promote efficient transportation alternatives. The Project would include the installation of electric vehicle supply equipment (EVSE) pursuant to Section 5.106.5.3, Electric Vehicle Charging of the CALGreen Code.[33] Six percent of the Costco warehouse parking spaces would be prewired during construction to accommodate EVSE. In addition, the City is requiring as a condition of approval that Costco install 10 EV charging stations to be operational at the opening of the store in 2021. These stations will support the future use of electric and hybrid-electric vehicles by employees and visitors traveling to and from the site, and would reduce the Project's consumption of gasoline and diesel. Use of EVs will increase overall demand for electricity from the utility (i.e., PG&E). The Project's other commercial land uses would comply with requirements of Section 5.106.5.3. Alternative-fueled, electric, and hybrid vehicles, to the extent these types of vehicles would be utilized by employees and visitors traveling to and from the site, would reduce the Project's consumption of gasoline and diesel; however, the effect would be minimal in the current vehicle market, but as electric vehicles proliferate in response to the state policy (e.g., Mobile Source Strategy) and regulatory environment, they will increase overall demand for electricity. Plug-in electric vehicles generally obtain battery power from utilities, which as discussed in Section 1.3.2, are required to provide an increasing share of electricity from renewable sources under the State's Renewables Portfolio Standard. Therefore, while plug-in electric vehicles would replace traditional transportation fuels (i.e., gasoline) with utility provided electricity, the electricity would be provided by an increasing share of renewable sources resulting in an overall reduction in energy resource consumption.

The Project would also improve transportation efficiency. Bicycle lanes will be maintained on Johnson Drive, buffered bicycle lanes would improve bicycle safety along the corridor, and

[32] Costco Wholesale Corporation, 2019. Sustainability – Buildings. Available: https://www.costco.com/sustainability-buildings.html. Accessed: April 2019.

Johnson Drive would be widened to the west to accommodate a new bike lane. Final design of all improvements along Johnson Drive shall maintain or enhance existing bicycles, transit, and pedestrian facilities. The project will maximize the benefits of the location of the EDZ area as an infill site located along transportation corridors and near transit by encouraging the development of both locally and regionally accessible uses in the EDZ area. The Project would include re-zoning of parcels within the EDZ area to allow a mix of uses that would be located near existing local-serving commercial areas including light industrial, office, commercial, retail, and institutional uses. Overall, operational transportation-related fuel usage would not substantially affect existing local and regional supply and capacity.

The City's applicable General Plan Energy Element goals call for increasing energy conservation, energy efficiency, and energy self-sufficiency. The Project would be consistent with this goal by achieving or exceeding the energy efficiency metrics in the applicable Title 24 standards and the CALGreen Code and by supporting statewide efforts to improve transportation energy efficiency thereby reducing energy consumption and associated air pollutant emissions.

The Project would be consistent with energy efficiency standards in the applicable Title 24 standards and the CALGreen Code and include EVSE to promote transportation energy efficiency. Additionally, the Costco warehouse would be designed to be solar ready; installation of rooftop solar in the future would reduce the amount of electricity that PG&E would need to provide.[34] The Project would not preclude opportunities for improving overall fuel efficiency and future energy conservation. Furthermore, due to PG&E's load planning process, the relatively small energy demand from the Project, including demand during peak times, would be expected to be accommodated within PG&E's projected and planned for capacity. In addition, the installation of rooftop solar PV on all buildings would reduce the demand for PG&E electricity (see the *Greenhouse Gas Technical Analysis*, section 3.2 *Project Design Features*). Overall, the Project would not have a substantial impact on the local or regional energy supplies or require additional capacity to be constructed. Consequently, the Project's operational energy use would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Therefore, operational energy impacts would be considered **less than significant**.

4 Conclusion

Based on the estimated annual fuel usage for the Project presented above, Phase 1 construction would consume approximately 114,345 of diesel and 19,813 gallons of gasoline during its one-year duration. Phase 2 construction would consume approximately 64,504 of diesel and 14,051 gallons of gasoline during its one-year duration. Phase 1 diesel consumption would represent approximately 0.10 and 0.003 percent of County and State 2017 diesel consumption, respectively. Phase 1 gasoline consumption would represent approximately 0.003 and 0.0001 percent of County and State 2017 gasoline consumption, respectively. Phase 2 diesel consumption would represent approximately 0.06 and 0.002 percent of County and State 2017 diesel consumption, respectively. Phase 2 gasoline consumption would represent approximately 0.002 and 0.0001

[34] Costco has installed solar electricity generating panels on selected stores in the Bay Area, including, but not necessarily limited to, Livermore (closest to the Pleasanton site), Richmond, Hayward, Fremont, Redwood City, Santa Clara, and at least two stores in San José. No determination has been made with respect to this store.

percent of County and State 2017 gasoline consumption, respectively. Phase 1 construction would reuse all rubble and new construction and demolition debris on-site, thus eliminating fuel consumption from trucks trips associated with debris disposal and import of new fill material. The Project would comply with applicable construction regulations that affect energy demand, such as the ATCM idling restrictions and the In-Use Off-Road Diesel-Fueled Fleets regulation that would result in reduced fuel consumption and minimize the Project's construction-related energy use. As a result, construction energy impacts would be considered **less than significant**.

Operational energy consumption would occur from building energy needs and from transportation fuels (e.g., diesel and gasoline) used for vehicles traveling to and from the site, TRUs, and emergency generators. The Project would have an electricity demand of approximately 5.19 million kWh and 7.07 million kWh for Phase 1 and Full Buildout, respectively. These values include electricity for water supply and wastewater treatment. Phase 1 and Full Buildout operations electricity use would represent approximately 0.006 and 0.009 percent of the PG&E network sales for 2017, respectively, which is a relatively very small fraction. Also, Project operations would represent approximately 0.05 and 0.06 percent of electricity supplied to the County in 2017 for Phase 1 and Full Buildout operations, respectively. In addition, the installation of rooftop solar PV on all buildings would reduce the demand for PG&E electricity (see the *Greenhouse Gas Technical Analysis*, section 3.2 *Project Design Features*). The Project would have an annual natural gas demand of approximately 4.43 million scf and 4.72 million scf for Phase 1 and Full Buildout, respectively. Both Phase 1 and Full Buildout operations natural gas use would represent approximately 0.002 percent of the PG&E network sales for 2017, which is a very small fraction. Both Phase 1 and Full Buildout operations would represent approximately 0.01 percent of natural gas supplied to the County in 2017.

Phase 1 operations would consume approximately 1,134,300 gallons of gasoline and 130,009 gallons of diesel. Full Buildout operations would consume approximately 1,407,991 gallons of gasoline and 303,191 gallons of diesel. Phase 1 consumption would represent approximately 0.11 and 0.003 percent of County and State 2017 diesel consumption, respectively. Phase 1 gasoline consumption would represent approximately 0.19 and 0.007 percent of County and State 2017 gasoline consumption, respectively. Full Buildout diesel consumption would represent approximately 0.27 and 0.008 percent of County and State 2017 diesel consumption, respectively. Full Buildout gasoline consumption would represent approximately 0.24 and 0.009 percent of County and State 2017 gasoline consumption, respectively. Total annual fuel consumption for the Project would therefore represent a small fraction of County and State transportation fuel consumption.

The amount of energy used would represent an insubstantial fraction of the region's available energy supply and capacity. The Project would be consistent with energy efficiency standards in the applicable Title 24 standards and the CALGreen Code and include EVSE to promote transportation energy efficiency. Additionally, the Costco warehouse would be designed to be solar ready which would reduce its consumption of electricity provided by PG&E. Because the Project would be consistent with energy efficient building standards and promote transportation energy efficiency, it would not result in the wasteful, inefficient, and unnecessary consumption of energy. The Project would not preclude opportunities for improving overall fuel efficiency and

future energy conservation. Overall, the Project would not have a substantial impact on the local or regional energy supplies or require additional capacity to be constructed. As a result, operational energy impacts would be considered **less than significant**.

APPENDIX A

Construction Energy Consumption
Transportation Fuel Consumption

Operational Energy Consumption
Electricity and Natural Gas Consumption
Transportation Fuel Consumption

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Energy Calculations
Construction Energy

Transportation Fuel Consumption

Annual Fuel Consumption Summary

Category	Phase 1 (2020)	Phase 2 (2030)
Diesel fuel for heavy-duty construction equipment	86,786	46,186
Diesel fuel for haul/Vendor trucks	27,559	18,318
Gasoline fuel for workers	19,813	14,051
Total Diesel Consumption	114,345	64,504
Total Gasoline Consumption	19,813	14,051
Construction Phase Duration (years)	1	1
Annual Average Gallons Diesel	**114,345**	**64,504**
Annual Average Gallons Gasoline	**19,813**	**14,051**

	Diesel	Gas	Diesel	Gas
Source	**Phase 1**		**Phase 2**	
Off-Road Equipment	86,786	-	46,186	-
Haul/Vendor	27,559	-	18,318	-
Worker	-	19,813		14,051
Total	**114,345**	**19,813**	**64,504**	**14,051**
Alameda County[1]	113,725,490	583,000,000	113,725,490	583,000,000
Project % of Alameda County	0.10%	0.003%	0.06%	0.002%
California	3,798,039,216	15,584,000,000	3,798,039,216	15,584,000,000
Project % of California	0.003%	0.0001%	0.002%	0.0001%

1. California Energy Commission, California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2017
https://www.energy.ca.gov/almanac/transportation_data/gasoline/2010-2017_A15_Results.xlsx
Diesel is adjusted to account for retail (51%) and non-retail (49%) diesel sales.

Off-Road Equipment

Equipment ≤ 100 HP

Parameter	Phase 1 (2020)	Phase 2 (2030)
pounds diesel fuel/hp-hr (lb/hp-hr):[1]	0.41	0.41
diesel fuel density (lb/gal):[1]	7.11	7.11
diesel gallons/hp-hr (gal/hp-hr):	0.06	0.06
Total hp-hr :	587,502.24	373,310.80
Total diesel consumption (gal):	33,718.43	21,425.37

Equipment > 100 HP

Parameter	Value	Value
pounds diesel fuel/hp-hr (lb/hp-hr):[1]	0.37	0.37
diesel fuel density (lb/gal):[1]	7.11	7.11
diesel gallons/hp-hr (gal/hp-hr):	0.05	0.05
Total hp-hr:	1,027,940.88	479,626.32
Total diesel gallons:	53,067.89	24,760.91

Total diesel gallons (off-road equipment):	**86,786.31**	**46,186.28**

1. 2017 Off-road Diesel Emission Factors, cells B30 and B31

Phase	Equipment	# of Equipment	Hours/ Day	HP	Load Factor	Days	Total hp-hr
Phase 1A-Grading/Excavation	Graders	1	8	187	0.41	30	18,401
Phase 1A-Grading/Excavation	Rubber Tired Dozers	1	8	247	0.40	30	23,712
Phase 1A-Grading/Excavation	Scrapers	6	8	367	0.48	30	253,670
Phase 1A-Grading/Excavation	Off-Highway Trucks	1	8	402	0.38	30	36,662
Phase 1A-Grading/Excavation	Tractors/Loaders/Backhoes	1	8	97	0.37	30	8,614
Phase 1A-Drainage/Utilities/Sub-Grade	Dumpers/Tenders	1	8	16	0.38	7	340
Phase 1A-Drainage/Utilities/Sub-Grade	Off-Highway Tractors	3	8	124	0.44	7	9,166
Phase 1A-Drainage/Utilities/Sub-Grade	Off-Highway Trucks	2	8	402	0.38	7	17,109
Phase 1A-Drainage/Utilities/Sub-Grade	Rollers	3	8	80	0.38	7	5,107
Phase 1A-Drainage/Utilities/Sub-Grade	Skid Steer Loaders	2	8	65	0.37	7	2,694
Phase 1A-Foundations/Concrete Pour	Cement and Mortar Mixers	60	8	9	0.56	15	36,288
Phase 1A-Foundations/Concrete Pour	Forklifts	3	8	89	0.20	15	6,408
Phase 1A-Foundations/Concrete Pour	Generator Sets	1	8	84	0.74	15	7,459
Phase 1A-Foundations/Concrete Pour	Pumps	1	8	84	0.74	15	7,459
Phase 1A-Building Construction	Graders	2	8	187	0.41	60	73,603
Phase 1A-Building Construction	Off-Highway Tractors	10	8	124	0.44	60	261,888
Phase 1A-Building Construction	Generator Sets	1	8	84	0.74	60	29,837
Phase 1A-Building Construction	Welders	1	8	46	0.45	60	9,936
Phase 1A-Architectural Coatings	Air Compressors	1	8	78	0.48	50	14,976
Phase 1A-Paving	Off-Highway Tractors	3	8	124	0.44	7	9,166

Phase	Equipment	# of Equipment	Hours/ Day	HP	Load Factor	Days	Total hp-hr
Phase 1A-Paving	Off-Highway Trucks	3	8	402	0.38	7	25,664
Phase 1A-Paving	Paving Equipment	2	8	132	0.36	7	5,322
Phase 1A-Paving	Rollers	3	8	80	0.38	7	5,107
Phase 1A-Paving	Skid Steer Loaders	1	8	65	0.37	7	1,347
Phase 1B-Grading/Excavation	Excavators	1	8	158	0.38	51	24,496
Phase 1B-Grading/Excavation	Graders	1	8	187	0.41	51	31,281
Phase 1B-Grading/Excavation	Rubber Tired Dozers	1	8	247	0.40	51	40,310
Phase 1B-Grading/Excavation	Off-Highway Trucks	1	8	402	0.38	51	62,326
Phase 1B-Grading/Excavation	Tractors/Loaders/Backhoes	3	8	97	0.37	51	43,929
Phase 1B-Drainage/Utilities/Sub-Grade	Rubber Tired Dozers	3	8	247	0.40	11	26,083
Phase 1B-Drainage/Utilities/Sub-Grade	Tractors/Loaders/Backhoes	4	8	97	0.37	11	12,633
Phase 1B-Foundations/Concrete Pour	Cranes	1	8	231	0.29	22	11,790
Phase 1B-Foundations/Concrete Pour	Forklifts	3	8	89	0.20	22	9,398
Phase 1B-Foundations/Concrete Pour	Generator Sets	1	8	84	0.74	22	10,940
Phase 1B-Foundations/Concrete Pour	Tractors/Loaders/Backhoes	3	8	97	0.37	22	18,950
Phase 1B-Foundations/Concrete Pour	Pumps	1	8	84	0.74	22	10,940
Phase 1B-Building Construction	Cranes	1	8	231	0.29	148	79,316
Phase 1B-Building Construction	Forklifts	4	8	89	0.20	148	84,301
Phase 1B-Building Construction	Generator Sets	1	8	84	0.74	148	73,597
Phase 1B-Building Construction	Tractors/Loaders/Backhoes	3	8	97	0.37	148	127,481
Phase 1B-Building Construction	Welders	2	8	46	0.45	148	49,018
Phase 1B-Architectural Coatings	Air Compressors	1	8	78	0.48	18	5,391
Phase 1B-Paving	Pavers	2	8	130	0.42	11	9,610
Phase 1B-Paving	Paving Equipment	2	8	132	0.36	11	8,364
Phase 1B-Paving	Rollers	2	8	80	0.38	11	5,350

Phase	Equipment	# of Equipment	Hours/ Day	HP	Load Factor	Days	Total hp-hr
Phase 2-Demolition	Concrete/Industrial Saws	1	8	81	0.73	20	9,461
Phase 2-Demolition	Excavators	2	8	158	0.38	20	19,213
Phase 2-Demolition	Rubber Tired Dozers	1	8	247	0.40	20	15,808
Phase 2-Grading/Excavation	Excavators	1	8	158	0.38	20	9,606
Phase 2-Grading/Excavation	Graders	2	8	187	0.41	20	24,534
Phase 2-Grading/Excavation	Rubber Tired Dozers	1	8	247	0.40	20	15,808
Phase 2-Grading/Excavation	Scrapers	6	8	367	0.48	20	169,114
Phase 2-Grading/Excavation	Off-Highway Trucks	2	8	402	0.38	20	48,883
Phase 2-Grading/Excavation	Tractors/Loaders/Backhoes	2	8	97	0.37	20	11,485
Phase 2-Drainage/Utilities/Sub-Grade	Rubber Tired Dozers	3	8	247	0.40	25	59,280
Phase 2-Drainage/Utilities/Sub-Grade	Tractors/Loaders/Backhoes	4	8	97	0.37	25	28,712
Phase 2-Foundations/Concrete Pour	Cranes	1	8	231	0.29	15	8,039
Phase 2-Foundations/Concrete Pour	Forklifts	3	8	89	0.20	15	6,408
Phase 2-Foundations/Concrete Pour	Generator Sets	1	8	84	0.74	15	7,459
Phase 2-Foundations/Concrete Pour	Tractors/Loaders/Backhoes	3	8	97	0.37	15	12,920
Phase 2-Foundations/Concrete Pour	Pumps	1	8	84	0.74	15	7,459
Phase 2-Building Construction	Cranes	1	8	231	0.29	140	75,029
Phase 2-Building Construction	Forklifts	3	8	89	0.20	140	59,808
Phase 2-Building Construction	Generator Sets	1	8	84	0.74	140	69,619
Phase 2-Building Construction	Tractors/Loaders/Backhoes	3	8	97	0.37	140	120,590
Phase 2-Building Construction	Welders	1	8	46	0.45	140	23,184
Phase 2-Architectural Coatings	Air Compressors	1	8	78	0.48	20	5,990
Phase 2-Paving	Pavers	2	8	130	0.42	21	18,346
Phase 2-Paving	Paving Equipment	2	8	132	0.36	21	15,967
Phase 2-Paving	Rollers	2	8	80	0.38	21	10,214

Phase 1	**Total ≤ 100**	587,502
	Total >100	1,027,941

Phase 2	**Total ≤ 100**	373,311
	Total >100	479,626

On-Road Haul/Vendor Trucks

Parameter	Phase 1 (2020)	Phase 2 (2030)
EMFAC2017 Diesel Fuel Consumption Factor (gal/mile):[1]	0.18	0.16
Total Haul Truck VMT (miles):	155,600	115,080
Total VMT diesel gallons (on-road haul trucks):	**27,243.51**	**18,085.16**
HHDT Idling Fuel Consumption Factor (gal/min):[2]	0.015	0.015
Total Haul Truck Idle-Minutes per Year (minutes):	58,350	43,155
Total Idling diesel gallons (on-road haul trucks)[3]:	**315.09**	**233.04**
Total diesel gallons (on-road haul trucks):	**27,559**	**18,318**

Without ATCM		Gallons Saved	
875.25	647.325	560.16	414.29
		Total Savings	**974**

1. California Air Resources Board, EMFAC2014 (BAAQMD; Annual; CY 2020,2030; Aggregate MY; Aggregate Speed,DSL)
2. 1. Idle Fuel Consumption for Selected Gasoline and Diesel Vehicles, US Department of Energy. Accessed February 2019. https://www.energy.gov/eere/vehicles/fact-861-february-23-2015-idle-fuel-consumption-selected-gasoline-and-diesel-vehicles
3. Incorporates estimated fuel savings from Anit-Idling Regulation (64 percent based on estimated CARB emissions reductions)
   Source: California Air Resources Board (CARB), 2004. Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, Appendix F, July 2004, https://www.arb.ca.gov/regact/idling/isorappf.pdf.

Phase	Total One-Way Trips	Miles/Trip	VMT	Idle Minutes
Phase 1A-Grading/Excavation	800	20	16,000	6,000
Phase 1A-Drainage/Utilities/Sub-Grade	0	20	0	0
Phase 1A-Foundations/Concrete Pour	1,200	20	24,000	9,000
Phase 1A-Building Construction	2,100	20	42,000	15,750
Phase 1A-Architectural Coatings	0	20	0	0
Phase 1A-Paving	14	20	280	105
Phase 1B-Grading/Excavation	680	20	13,600	5,100
Phase 1B-Drainage/Utilities/Sub-Grade	0	20	0	0
Phase 1B-Foundations/Concrete Pour	1,020	20	20,400	7,650
Phase 1B-Building Construction	1,944	20	38,880	14,580
Phase 1B-Architectural Coatings	0	20	0	0
Phase 1B-Paving	22	20	440	165
Phase 2-Demolition	0	20	0	0
Phase 2-Grading/Excavation	1,240	20	24,800	9,300
Phase 2-Drainage/Utilities/Sub-Grade	0	20	0	0
Phase 2-Foundations/Concrete Pour	1,860	20	37,200	13,950
Phase 2-Building Construction	2,612	20	52,240	19,590
Phase 2-Architectural Coatings	0	20	0	0
Phase 2-Paving	42	20	840	315

Phase 1 Total Haul Truck VMT:	155,600		
Phase 2 Total Haul Truck VMT:	115,080		
		Phase 1 Total Idle Minutes:	58,350
		Phase 2 Total Idle-Minutes:	43,155

On-Road Workers (LDA, LDT1, LDT2)

Parameter	Phase 1 (2020)	Phase 2 (2030)
EMFAC2017 Gasoline Fuel Consumption Factor (gal/mile):[1]	0.039	0.028
Total Worker VMT (miles):	511,855	493,085
Total VMT gasoline gallons (workers):	**19,813**	**14,051**

1. California Air Resources Board, EMFAC2014 (BAAQMD; LDA, LDT1, LDT2; CY 2020,2030; Aggregate MY; Aggregate Speed,GAS)

Phase	Days	One-Way Trips/Day	Miles/Trip	VMT
Phase 1A-Grading/Excavation	30	26	10.8	8,424
Phase 1A-Drainage/Utilities/Sub-Grade	7	28	10.8	2,117
Phase 1A-Foundations/Concrete Pour	15	164	10.8	26,568
Phase 1A-Building Construction	60	300	10.8	194,400
Phase 1A-Architectural Coatings	50	60	10.8	32,400
Phase 1A-Paving	7	30	10.8	2,268
Phase 1B-Grading/Excavation	51	18	10.8	9,914
Phase 1B-Drainage/Utilities/Sub-Grade	11	18	10.8	2,138
Phase 1B-Foundations/Concrete Pour	22	24	10.8	5,702
Phase 1B-Building Construction	148	138	10.8	220,579
Phase 1B-Architectural Coatings	18	28	10.8	5,443
Phase 1B-Paving	11	16	10.8	1,901
Phase 2-Demolition	20	10	10.8	2,160
Phase 2-Grading/Excavation	20	36	10.8	7,776
Phase 2-Drainage/Utilities/Sub-Grade	25	18	10.8	4,860
Phase 2-Foundations/Concrete Pour	15	24	10.8	3,888
Phase 2-Building Construction	140	304	10.8	459,648
Phase 2-Architectural Coatings	20	62	10.8	13,392
Phase 2-Paving	21	6	10.8	1,361
			Phase 1 Worker VMT	511,855
			Phase 2 Worker VMT	493,085

Haul/Vendor (HHDT) Fuel Factor

Year	VMT (mi/day)	Fuel Consumption (1000gal/day)	gal/mi	mi/gal
2020	4143457.66	725.46	0.18	5.7
2030	5127373.40	805.78	0.16	6.4

EMFAC 2014 Webdatabase

Worker (LDA, LDT1, LDT2) Fuel Consumption Factor

Year/Vehicle Category	VMT (mi/day)	Fuel Consumption (1000gal/day)	gal/mi	CalEEMod Worker Fleet Distribution
2020				
LDA	93944227.22	3220.70	0.03	0.50
LDT1	6961770.774	282.11	0.04	0.25
LDT2	33008227.02	1510.01	0.05	0.25
2030				
LDA	92581327.13	2407.53	0.03	0.50
LDT1	6643709.806	193.38	0.03	0.25
LDT2	35180101.77	1156.44	0.03	0.25

EMFAC 2014 Webdatabase

Year	Weighted Fuel Consumption Factor (gal/mi)	Weighted Fuel Economy (mi/gal)
2020	0.039	25.8
2030	0.028	35.1

Idle Consumption at Idle for Selected Gasoline and Diesel Vehicles

Vehicle Type	Fuel Type	Engine Size (liter)	Gross Vehicle Weight (GVW) (lb)	Idling fuel use (Gal/hr with no load)	Idling fuel use (Gal/min with no load)
Tractor-Semitrailer	Diesel	-	80,000	0.64	0.0107
Bucket Truck	Diesel	-	37,000	0.90	0.0150
Combination Truck	Diesel	-	32,000	0.49	0.0082
Transit Bus	Diesel	-	30,000	0.97	0.0162
Medium Heavy Truck	Diesel	6-10	23,000-33,000	0.44	0.0073
Tow Truck	Diesel	-	26,000	0.59	0.0098
Delivery Truck	Diesel	-	19,500	0.84	0.0140
Medium Heavy Truck	Gas	5-7	19,700-26,000	0.84	0.0140
Compact Sedan	Diesel	2	-	0.17	0.0028
Large Sedan	Gas	4.6	-	0.39	0.0065
Compact Sedan	Gas	2	-	0.16	0.0027

https://www.energy.gov/eere/vehicles/fact-861-february-23-2015-idle-fuel-consumption-selected-gasoline-and-diesel-vehicles

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Energy Calculations
Operational Energy

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Electricity and Natural Gas Consumption

Operational Energy Analysis - Phase 1 (2021)

Electricity[4]	kWh/yr	GWh/yr	
Discount Club	4000440.00	4.00	
Gasoline/Service Station	19482.20	0.02	
Hotel	832920.00	0.83	
Other Non-Asphalt Surfaces	0.00	0.00	
Parking Lot	112167.00	0.11	
Parking Lot	34412.40	0.03	
Strip Mall	41400.00	0.04	
Total	**5,040,822**		**5.041**
Total (including water, see below)	**5,191,040**		**5.191**
Existing Energy Consumption			
Net Project Energy Consumption	**5,191,040**		**5.191**

Electricity	GWh/yr
PG&E 2017 Annual Sold Electricity[1]	82,226
Alameda County Consumption[2]	11,112
Project Annual	5.19
Existing Annual	-
Net Project Annual	5.19
Percent Net Project of PG&E	0.006%
Perncent of Alameda County	0.05%

Water[4]	Mgal/yr
Discount Club	4.000
Gasoline/Service Station	0.428
Hotel	6.511
Other Non-Asphalt Surfaces	-
Parking Lot	-
Strip Mall	0.597
Total	**11.537**

Electricity Intensity Factors	kWh/Mgal
Electricity Factor - Supply	9,727
Electricity Factor - Treat	111
Electricity Factor - Distribute	1,272
Electricity Factor - Wastewater Treatment	1,911

Electricity from Water Demand	kWh/yr	GWh/yr
Total	**150,218**	**0.150**

Source: California Air Resources Board, CalEEMod, Version 2016.3.2.

Natural Gas[4]	kBtu/yr	cubic foot (cf)[3]	Per day Usag
Discount Club	245,680	236,914	
Gasoline/Service Station	57,797	55,735	
Hotel	4,282,080	4,129,296	
Other Non-Asphalt Surfaces	0	-	
Parking Lot	0	-	
Strip Mall	8,300	8,004	
Project Total	**4,593,857**	**4,429,949**	12,137
Existing Total			
Project Net Total	**4,593,857**	**4,429,949**	**12,137**

Natural Gas	million cubic foot (cf)
PG&E's 2017 Sold Natural Gas[1]	234,181
Alameda County Consumption[2]	36,551
Project Annual	4.4
Existing Annual	
Net Project Annual	4.4
Percent Net Project of SoCalGas	0.002%
Perncent of Alameda County	0.01%

1) PG&E, 2017 Join Annual Report to Stakeholders, p.19, Available at: http://s1.q4cdn.com/880135780/files/doc_financials/2017/annual/2017-Annual-Report-Final.pdf

2) California Energy Commission, California Energy Consumption Dateabase, 2017 Electricity and Natural Gas Consumption by County. http://ecdms.energy.ca.gov/. Accessed March 2019.

3) Conversion factor of 1,037 Btu per cubic foot based on United States Energy Information Administration data
https://www.eia.gov/tools/faqs/faq.php?id=45&t=8

4) Values from CalEEMod Output file for Phase 1 Operations

Operational Energy Analysis - Full Buildout (2031)

Electricity	kWh/yr	GWh/yr
Discount Club	4000440.00	4.00
Gasoline/Service Station	19482.20	0.02
Hotel	832920.00	0.83
Other Non-Asphalt Surfaces	0.00	0.00
Parking Lot	112167.00	0.11
Parking Lot	114345.00	0.11
Parking Lot	34412.40	0.03
	1523830.00	1.52
Total	**6,637,597**	**6.638**
Total (including water, see below)	**7,074,116**	**7.074**
Existing Energy Consumption		
Net Project Energy Consumption	**7,074,116**	**7.074**

Electricity	GWh/yr
PG&E 2017 Annual Sold Electricity[1]	82,226
Alameda County Consumption[2]	11,112
Project Annual	7.07
Existing Annual	-
Net Project Annual	7.07
Percent Net Project of PG&E	0.009%
Perncent of Alameda County	0.06%

Water	Mgal/yr
Discount Club	4.000
Gasoline/Service Station	0.428
Hotel	6.511
Other Non-Asphalt Surfaces	-
Parking Lot	-
Strip Mall	22.585
	-
Total	**33.524**

Electricity Intensity Factors	kWh/Mgal
Electricity Factor - Supply	9,727
Electricity Factor - Treat	111
Electricity Factor - Distribute	1,272
Electricity Factor - Wastewater Treatment	1,911

Electricity from Water Demand	kWh/yr	GWh/yr
Total	**436,519**	**0.437**

Source: California Air Resources Board, CalEEMod, Version 2016.3.2.

Natural Gas	kBtu/yr	cubic foot (cf)	Per day Usage
Discount Club	245,680	236,914	
Gasoline/Service Station	57,797	55,735	
Hotel	4,282,080	4,129,296	
Other Non-Asphalt Surfaces	0	-	
Parking Lot	0	-	
Strip Mall	305,501	294,601	
Strip Mall	8,300	8,004	
Project Total	**4,899,358**	**4,724,550**	12,943.97
Existing Total			
Project Net Total	**4,899,358**	**4,724,550**	**12,944**

Natural Gas	million cubic foot (cf)
PG&E's 2017 Sold Natural Gas[1]	234,181
Alameda County Consumption[2]	36,551
Project Annual	4.72
Existing Annual	
Net Project Annual	4.72
Percent Net Project of PG&E	0.002%
Perncent of Alameda County	0.01%

1) PG&E, 2017 Join Annual Report to Stakeholders, p.19, Available at: http://s1.q4cdn.com/880135780/files/doc_financials/2017/annual/2017-Annual-Report-Final.pdf

2) California Energy Commission, California Energy Consumption Dateabase, 2017 Electricity and Natural Gas Consumption by County. http://ecdms.energy.ca.gov/. Accessed March 2019.

3) Conversion factor of 1,037 Btu per cubic foot based on United States Energy Information Administration data
https://www.eia.gov/tools/faqs/faq.php?id=45&t=8

4) Values from CalEEMod Output file for Full Buildout Operations

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Transportation Fuel Consumption

Operational Fuel Consumption

Diesel Fuel Consumption Summary	Phase 1 (2021)		Full Buildout (2031)	
Source	**DSL**	**GAS**	**DSL**	**GAS**
Non-HHDT (Running)	37,793	1,094,309	52,573	1,368,000
Light Duty (Idling) @ Gas Station	0	39,991	0	39,991
Delivery Vehicles (HHDT)	72,789	0	191,118	0
TRU	14,357	0	54,430	0
Generators	5,070	0	5,070	0
Total	**130,009**	**1,134,300**	**303,191**	**1,407,991**

Source	**Phase 1 (2021)**		**Full Buildout (2031)**	
	Diesel	**Gas**	**Diesel**	**Gas**
Total	**130,009**	**1,134,300**	**303,191**	**1,407,991**
Alameda County[1]	113,725,490	583,000,000	113,725,490	583,000,000
Project % of Alameda County	0.11%	0.19%	0.27%	0.24%
California[1]	3,798,039,216	15,584,000,000	3,798,039,216	15,584,000,000
Project % of California	0.003%	0.0073%	0.008%	0.009%

California Energy Commission, California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2017
https://www.energy.ca.gov/almanac/transportation_data/gasoline/2010-2017_A15_Results.xlsx
Diesel is adjusted to account for retail (51%) and non-retail (49%) diesel sales.

Project Trip Generation

Table 1: Previous Trips Generation Estimates - Phase 1 (2021)[1]

Land Use	Size	Unit		Weekday Trips	Saturday Trips	Weekday Trip Rate	Saturday Trip Rate
Retail	24	1000sqft		1,000	1,170	42.6	49.8
Club Retail with Fuel	148	1000sqft		10,710	11,060	72.4	74.7
Hotel (150 Rooms)	88	1000sqft		1,230	1,230	14.0	14.0
			Total	**12,940**	**13,460**		
	Reductions[1]	Pass By Trips (Retail)		300	350		
		Pass By Trips (Club Retail with Fuel)		3,750	2,210		
			Total After Reductions	**8,890**	**10,900**		

Table 2: Previous Trips Generation Estimates - Full Buildout (2031)[1]

Land Use	Size	Unit		Weekday Trips	Saturday Trips	Weekday Trip Rate	Saturday Trip Rate
Retail	246	1000sqft		10,510	12,300	42.6	49.9
			30% Reduction	3,153	3,690		
			Net Trips	**7,357**	**8,610**		

Table 3: Updated Trips Generation Estimates - Phase 1 (2021)

Land Use	Size	Unit	Weekday Trip Rate	Saturday Trip Rate		Weekday Trips	Saturday Trips
Retail	5	1000sqft	42.6	49.8		213	249
Club Retail with Fuel	148	1000sqft	72.4	74.7		10,710	11,060
Hotel (231 Rooms)	132	1000sqft	14.0	14.0		1,845	1,845
					Total	**12,768**	**13,154**
					Pass By Trips (Retail)	64	75
				Reductions[1]	Pass By Trips (Club Retail with Fuel)	3,750	2,210

Trip Rates for CalEEMod	Weekday Trip Rate	Saturday Trip Rate
Retail	**29.82**	**34.89**
Club Retail with Fuel	**47.03**	**59.80**
Hotel (231 Rooms)*	**7.99**	**7.99**

**CalEEMod uses vehicle trips per room instead of SF*

Vehicle Type	Fleet Distribution	Fleet Distribution**
LDA	0.59	0.594046867
LDT1	0.06	0.064403952
LDT2	0.21	0.208695384
MDV	0.13	0.132853797

**These values entered in CalEEMod, all other vehicle categories zeroed-out, only these light-duty vehicle categories are evaluated.*

		Weekday Trips	Saturday Trips
Net Total			
Retail		149	174
Club Retail with Fuel		6,960	8,850
Hotel (231 Rooms)		1,845	1,845
Weighted Daily Trips			
Retail		156	
Club Retail with Fuel		7,500	
Hotel (231 Rooms)		1,845	
	Total After Reductions	**8,954**	**10,869**
	Weighted Daily Trips	**9,501**	

Table 4: Updated Trips Generation Estimates - Full Buildout (2031)

Land Use	Size	Unit	Weekday Trip Rate	Saturday Trip Rate		Weekday Trips	Saturday Trips
Retail	184	1000sqft	43	50		7,849	9,185
Trip Rates for CalEEMod	**Weekday Trip Rate**	**Saturday Trip Rate**			**Total**	**7,849**	**9,185**
Retail	**29.85**	**34.94**		**Reductions**[1]	Pass By Trips (Retail)	2,355	2,756
					Total After Reductions	**5,494**	**6,430**
					Weighted Daily Trips	**5,596**	

Hotel/Retail Trucks

Land Use	Weighted Daily Trucks
Phase 2-Retail	165
Phase 1-Retail	4
Phase 1-Hotel	54

Phase 2 Retail Trucks

Weekday Trips	Weekend Trips
157	184
Weighted Daily Trucks	
112.45	52.64

1) Johnson Drive Economic Development Zone Transportation Impact Analysis, Fehr & Peers, 2015.

TRU Operation

TRU Fuel Consumption

Source	Input
Costco	
Daily Trucks[1]	10
Trucks per Hour	1
Percent box trucks with TRUs[1]	75%
TRU operation/trip (hrs)[1]	2
Annual hours of TRU operation	5,475
Phase 1 - Retail/Hotel	
Daily one-way trips	58
Daily Trucks	29
Trucks per Hour	3
Percent semi trucks with TRUs[1]	25%
TRU operation/trip (hrs)[1]	2
Annual hours of TRU operation	5,320
Phase 2 - Onsite Businesses	
Daily one-way trips	330
Daily Trucks	165
Trucks per Hour	17
Percent semi trucks with TRUs[1]	25%
TRU operation/trip (hrs)[1]	2
Annual hours of TRU operation	30,130

Parameters for TRU Trucks	
TRU horsepower[2]	34
TRU load factor	0.46

TRU Diesel Consumption - Phase 1 (2021)

Source	Year	Annual Hours of TRU Operation	TRU Fuel Factor (gal/hr)[3]	Annual Diesel Consumption (gal/year)
Costco	2021	5,475	1.33E+00	7,281.75
Phase 1 - Retail/Hotel	2021	5,320	1.33E+00	7,075.57
			Total	**14,357**

Full Buildout TRU Diesel Consumption

Source	Year	Annual Hours of TRU Operation	TRU Fuel Factor (gal/hr)[3]	Annual Diesel Consumption (gal/year)
Costco	2031	5,475	1.33E+00	7,281.75
Phase 1 - Retail/Hotel	2031	5,320	1.33E+00	7,075.57
Phase 2 - Onsite Businesses	2031	30,130	1.33E+00	40,072.35
			Total	**54,430**

Notes:

1 Johnson Drive HRA Assumptions

2 ARB 2011 Staff Report: Amendments for the ATCM for TRUs, table III-1: https://www.arb.ca.gov/regact/2011/tru2011/truisor.pdf

3 NREL, Emissions of Transport Refrigeration Units with CARB Diesel, Gas-to-Liquid Diesel, and Emissions Control Devices, p.5. Accessed February 2019. https://www.nrel.gov/docs/fy10osti/46598.pdf

Costco Emergency Generator Fuel Consumption - Phase 1 (2021)

Conversion Factors	
HP/kW	1.3
CO2 kg/gal[1]	10.21
g/lb	453.6

Generator Rating:	1,000	kW
	1,341	HP
Load Factor[2]:	0.74	
Engine Emissions Tier:	Rule 1470 Compliant	
Operating Hours per Unit[3]:	2	hours/day
	50	hours/year

Emergency Generator Emissions

	Greenhouse Gases	
Units	**CO_2**	**CO_2e**
metric tons/yr	**25.88**	**26.12**

Fuel Consumption

Phase	Total CO_2 (MT/yr)	Fuel Type	Fuel Factor ($kgCO_2/gal$)[1]	Gallons
Phase 1/Full Buildout	25.88	Diesel	10.21	2,535

1 Climate Registry, Table 13.1, https://www.theclimateregistry.org/wp-content/uploads/2018/06/The-Climate-Registry-2018-Default-Emission-Factor-Document.pdf

2 Load Factor based on CalEEMod Generator Set Load Factor

3 Number of hours permitted for testing and maintenance consistent with BAAQMD Regulation 9-8-330.3

Source: ESA 2019.

Hotel Emergency Generator Fuel Consumption - Phase 1 (2021)

Conversion Factors	
HP/kW	1.3
CO2 kg/gal[1]	10.21
g/lb	453.6

Generator Rating:	1,000	kW
	1,341	HP
Load Factor[2]:	0.74	
Engine Emissions Tier:	Rule 1470 Compliant	
Operating Hours per Unit[3]:	2	hours/day
	50	hours/year

Emergency Generator Emissions

	Greenhouse Gases	
Units	**CO_2**	**CO_2e**
metric tons/yr	**25.88**	**26.12**

Fuel Consumption

Phase	Total CO_2 (MT/yr)	Fuel Type	Fuel Factor ($kgCO_2/gal$)[1]	Gallons
Phase 1/Full Buildout	25.88	Diesel	10.21	2,535

1 Climate Registry, Table 13.1, https://www.theclimateregistry.org/wp-content/uploads/2018/06/The-Climate-Registry-2018-Default-Emission-Factor-Document.pdf

2 Load Factor based on CalEEMod Generator Set Load Factor

3 Number of hours permitted for testing and maintenance consistent with BAAQMD Regulation 9-8-330.3

Source: ESA 2019.

Non-Delivery Vehicles (excludes HHDT) Running Fuel Consumption

					Fuel Distribution			
Phase	Operational Year	Annual VMT (miles)[1]	DSL Fuel Factor (gal/mi)	GAS Fuel Factor (gal/mi)	DSL % of VMT	GAS % of VMT	Annual DSL Consumption (gal/year)	Annual Gas Consumption (gal/year)
Phase 1	2021	26,560,520	0.033	0.043	0.043	0.957	37,793	1,094,309
Full Buildout	2031	42,635,645	0.026	0.034	0.047	0.953	52,573	1,368,000

1. Annual VMT generated from Phase 1 Operations and Full Buildout CalEEMod runs

Light-Duty Vehicle Idling Fuel Consumption at Gas Station

Phase	Year	Trips per Day (In/Out)	# of Cars Idling per Day	Idling Duration (min)	LD Idling Fuel Factor (gal/min)	Days/yr	Annual Gasoline Consumption (gal/year)
Phase 1	2021	3371	1686	10	6.50E-03	365	39,991
Full Buildout	2031	3371	1686	10	6.50E-03	365	39,991

HHDT Running Fuel Consumption - Phase 1 (2021)

Source	Year	# of Trucks per Day	Total Truck Trips per Day (In/Out)	Trip Length (mi)	Running Fuel Factor (gal/mi)[1]	Days/yr	Annual Diesel Consumption (gal/year)
Costco	2021	10	20	24.5	0.143	365	25,590
Gas Station	2021	6	12	30.0	0.143	365	18,801
Phase 1 - Retail/Hotel	2021	29	58	7.3	0.159	365	24,690
						Total	**69,081**

HHDT Running Fuel Consumption - Full Buildout (2031)

Source	Year	# of Trucks per Day	Total Truck Trips per Day (In/Out)	Trip Length (mi)	Running Fuel Factor (gal/mi)	Days/yr	Annual Diesel Consumption (gal/year)
Costco	2031	10	20	24.5	0.149	365	26,628
Gas Station	2031	6	12	30.0	0.149	365	19,564
Phase 1 - Retail/Hotel	2031	29	58	7.3	0.123	365	19,158
Phase 2- Trucks	2031	165	330	7.3	0.123	365	108,501
						Total	**173,852**

1. Costco trucks utilize fuel factor for HHDT with model year 2016. Non-Costco trucks utilize fuel factor for HHDT with an aggregate model year.

HHDT Idling Fuel Consumption - Phase 1 (2021)

Source	Year	# of Trucks per Day	Idling Minutes	Truck Idling Fuel Factor (gal/min)	Days/yr	Annual Diesel Consumption (gal/year)
Costco	2021	10	15	0.0150	365	821
Gas Station	2021	6	15	0.0150	365	493
Phase 1 - Retail/Hotel	2021	29	15	0.0150	365	2,394
					Total	**3,708**

HHDT Idling Fuel Consumption - Full Buildout (2031)

Source	Year	# of Trucks per Day	Idling Minutes	Truck Idling Fuel Factor (gal/min)	Days/yr	Annual Diesel Consumption (gal/year)
Costco	2031	10	15	0.0150	365	821
Gas Station	2031	6	15	0.0150	365	493
Phase 1 - Retail/Hotel	2031	29	15	0.0150	365	2,394
Phase 2- Trucks	2031	165	15	0.0150	365	13,558
					Total	**17,266**

Delivery Vehicle (HHDT) Diesel Fuel Factors-Aggregate Model Year

Year	Sum of Fuel Consumption (1000gal/day)	Sum of VMT (mi/day)	Running Fuel Factor (gal/mi)
2021	680.41	4280954.94	0.159
2031	647.24	5248129.57	0.123

EMFAC2017 Webdatabase

Delivery Vehicle (HHDT) Diesel Fuel Factors-Model Year 2016

Year	Sum of Fuel Consumption (1000gal/day)	Sum of VMT (mi/day)	Running Fuel Factor (gal/mi)
2021	110.77	774182.14	0.143
2031	37.14	249483.46	0.149

EMFAC2017 Webdatabase

Non-Delivery Vehicle Fuel Consumption Factors

	DSL		GAS		DSL	GAS
Vehicle Category	Fuel Consumption (1000gal/day)	VMT (mi/day)	Fuel Consumption (1000gal/day)	VMT (mi/day)	Fuel Factor (gal/mi)	
Phase 1 (2021)						
LDA	28.57	1091742.42	3130.06	94103223.24	0.026	0.033
LDT1	0.19	5384.54	270.00	6877709.64	0.035	0.039
LDT2	2.24	66742.35	1470.30	33244983.27	0.034	0.044
LHDT1	83.64	1474370.38	149.59	1445203.01	0.057	0.104
LHDT2	39.11	624468.58	33.55	296973.00	0.063	0.113
MCY	0.00	0.00	27.61	1014757.34	0.000	0.027
MDV	17.67	403356.55	1132.22	19068059.33	0.044	0.059
MH	3.04	29434.15	15.95	106178.67	0.103	0.150
MHDT	322.86	2691523.38	50.41	324938.85	0.120	0.155
OBUS	36.05	260197.24	27.80	183307.44	0.139	0.152
SBUS	16.07	116308.14	2.99	35086.09	0.138	0.085
UBUS	66.29	283737.06	23.97	119997.41	0.234	0.200
Full Buildout (2031)						
LDA	25.09	1244391.88	2366.26	92623256.35	0.020	0.026
LDT1	0.08	3646.21	189.19	6653857.99	0.022	0.028
LDT2	1.97	77479.16	1138.48	35374330.42	0.025	0.032
LHDT1	74.88	1408404.94	88.62	892252.78	0.053	0.099
LHDT2	40.20	683864.70	30.57	282723.18	0.059	0.108
MCY	0.00	0.00	27.88	1027669.00	0.000	0.027
MDV	17.19	512263.83	831.49	18952119.96	0.034	0.044
MH	2.75	27283.76	13.86	95908.03	0.101	0.145
MHDT	374.53	3227472.52	54.24	361901.45	0.116	0.150
OBUS	39.77	297795.65	29.25	198318.10	0.134	0.147
SBUS	15.91	118287.61	4.25	50998.79	0.135	0.083
UBUS	39.64	184186.31	26.74	138503.16	0.215	0.193

EMFAC2014 Webdatabase

	DSL	GAS	DSL	GAS
Year	Weighted Fuel Factor (gal/mi)		Weighted Fuel Economy (mi/gal)	
2021	0.033	0.043	30.2	23.2
2031	0.026	0.034	38.4	29.7

Year	VMT Percentage per fuel	
2021	4.3%	95.7%
2031	4.7%	95.3%

Fleet Mix used in CalEEMod (excludes HHDT)

Vehicle Category	Fleet Mix
LDA	0.60349
LDT1	0.03742
LDT2	0.19918
LHDT1	0.01293
LHDT2	0.00543
MCY	0.00577
MDV	0.10936
MH	0.00069
MHDT	0.02017
OBUS	0.00279
SBUS	0.00095
UBUS	0.00181

Idle Consumption at Idle for Selected Gasoline and Diesel Vehicles

Vehicle Type	Fuel Type	Engine Size (liter)	Gross Vehicle Weight (GVW) (lb)	Idling fuel use (Gal/hr with no load)	Idling fuel use (Gal/min with no load)
Tractor-Semitrailer	Diesel	-	80,000	0.64	0.0107
Bucket Truck	Diesel	-	37,000	0.90	0.0150
Combination Truck	Diesel	-	32,000	0.49	0.0082
Transit Bus	Diesel	-	30,000	0.97	0.0162
Medium Heavy Truck	Diesel	6-10	23,000-33,000	0.44	0.0073
Tow Truck	Diesel	-	26,000	0.59	0.0098
Delivery Truck	Diesel	-	19,500	0.84	0.0140
Medium Heavy Truck	Gas	5-7	19,700-26,000	0.84	0.0140
Compact Sedan	Diesel	2	-	0.17	0.0028
Large Sedan	Gas	4.6	-	0.39	0.0065
Compact Sedan	Gas	2	-	0.16	0.0027

https://www.energy.gov/eere/vehicles/fact-861-february-23-2015-idle-fuel-consumption-selected-gasoline-and-diesel-vehicles