Heatherglen Planned Development, TTM 17604, CUP 15-006

Initial Study – Mitigated Negative Declaration

Appendix I – Energy Analysis

Technical Memorandum

DATE:	May 20, 2019
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SUBJECT:	CEQA Energy Analysis for Heatherglen Residential Community

1.0 Energy

This technical memorandum provides a summary of the energy regulatory framework, discusses the existing conditions of the project site, discloses potential energy use during construction and operation of the proposed project and identifies any project design features and/or mitigation measures that may reduce energy consumption.

1.1 Existing Conditions

Electricity

Electricity is produced through the conversion of natural energy resources including water, wind, oil, gas, coal, solar, geothermal and nuclear resources into energy. The delivery of electricity to the end users requires a network of distribution components, including substations and transformers convey the electricity through transmission lines.

Southern California Edison (SCE) is the primary local public utility and energy supplier that services a majority of southern California, including the Proposed Project site, via a statewide network of power plants and transmission lines. SCE produces and purchases electricity from renewable and nonrenewable sources. SCE will supply electrical power to the Proposed Project site from electrical service lines located in the Proposed Project vicinity.

Natural Gas

Natural gas is a combustible mixture of simple hydrocarbon compounds (primarily methane) that is used as a fuel source. Natural gas consumed in California is obtained from naturally occurring reservoirs, mainly located outside the state, and delivered through high-pressure transmission pipelines. The natural gas transportation system is a nationwide network and, therefore, resource availability is typically not an issue. Natural gas satisfies almost one-third of the total energy requirements and is used in electricity generation, space heating, cooking, water heating, industrial processes, and as a transportation fuel. Quantities of natural gas are measured in billion cubic feet (Bcf), with the average home requiring approximately 1,000 cubic feet of natural gas for space-heating, water-heating, cooking, etc. for four days.

Natural gas is provided to the Proposed Project site by the Southern California Gas Company (SoCalGas). The service territory of SoCalGas encompasses approximately 20,000 square miles in diverse terrain throughout Central and Southern California, from the City of Visalia to the Mexican

border. SoCalGas receives gas supplies from several sedimentary basins in the western United States and Canada, including the Rocky Mountains and western Canada, as well as local California supplies. Natural gas for SoCalGas is delivered to the region through interstate pipelines.

2.0 Applicable Regulations

2.1 Federal Regulations

2.1.1 Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the transmission and sales of electricity, natural gas, and oi in interstate commerce, licensing of hydroelectric projects, and oversight of related environmental matters. The setting and enforcing of interstate transmission sales is also regulated by FERC.

2.1.2 Federal Energy Policy and Conservation Act

In 1975, Congress enacted the Federal Energy Policy and Conservation Act to serve the nation's energy demands and promote feasibly attainable conservation methods. This act established the first fuel economy standards for on-road motor vehicles in the United States.

2.1.3 Energy Policy Act of 2005

On August 8, 2005, President George W. Bush signed the National Energy Policy Act of 2005 into law. This comprehensive energy legislation contains several electricity-related provisions that aim to:

- Help ensure that consumers receive electricity over a dependable, modern infrastructure
- Remove outdated obstacles to investment in electricity transmission lines
- Make electric reliability standards mandatory instead of optional
- Give federal officials the authority to site new power lines in Department of Energy-designated national corridors in certain limited circumstances.

2.2 State Regulations

2.2.1 Senate Bill 1389

Senate Bill 1389 requires the development of an integrated plan for electricity, natural gas, and transportation fuels. The California Energy Commission (CEC) must adopt and transmit to the Governor and Legislature an Integrated Energy Policy Report (IEPR) every two years.

The *2019 IEPR* will continue to expand on efforts to decarbonize California's energy system while ensuring that the benefits are equitable. The *2019 IEPR* will focus on actions needed to transform the transportation sector to dramatically reduce GHG emissions while making sure that low-income and disadvantaged communities reap the benefits. The topics that will be addressed include:

Transportation - Pollution from the transportation sector must be reduced significantly to help meet the state's clean air standards and climate goals. The *2019 IEPR* analysis will include:

• Discussion of the success and benefits the Energy Commission's Alternative and Renewable Fuel Vehicle Technology Program and, more broadly, the state's efforts to reduce GHG emissions from the transportation sector.

• Update on the status of the zero-emission vehicle market and infrastructure. There will also be an exploration of the charging infrastructure needed to meet the state's goals as

part of implementing AB 2127 (Ting, Chapter 365, Statutes of 2018).

• Update to the *Vehicle-Grid Integration Roadmap* as a follow-up to a recommendation in the *2017 IEPR*.

Energy Equity - The state must continue to advance energy equity so that low-income and disadvantaged communities share the benefits of a transformed energy sector. The analysis will include:

• Update on the implementation status of the recommendations developed in response to SB 350 in the *Low-Income Barriers Study Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-Income Customers and Small Business Contracting Opportunities in Disadvantaged Communities* and the *Low-Income Barriers Study Part B: Overcoming Barriers to Clean*

Transportation Access for Low-Income Residents.

• Assessment of whether charging station infrastructure is disproportionately deployed by population density, geographical area, and population income level as required by SB 1000 (Lara, Chapter 368, Statutes of 2018).

Energy Efficiency and Building Decarbonization - Advancements in energy efficiency and building decarbonization efforts statewide are key strategies in the state's approach to creating a clean economy. The analysis will summarize an Energy Commission report scheduled to be published this year that will include:

• Analysis of actions needed to decarbonize buildings in support of AB 3232 (Friedman, Chapter 373, Statutes of 2018).

• An update of the doubling of energy efficiency targets developed in the *2017 IEPR* as required by SB 350 and updating the *2016 Existing Building Energy Efficiency Action Plan*.

• Comparison of publicly owned utility (POU) energy efficiency targets with actual savings. (Public Utilities Code 9505, Public Resources Code [PRC] 25305.2).

Additionally, the *2019 IEPR* will:

• Consider the role of load management in minimizing renewable curtailment and facilitating the decarbonization of the electricity system in a least-cost manner. In particular, the report will examine the status of demand response.

• Evaluate the actual energy efficiency savings from negative therm interactive effects generated as a result of electricity efficiency improvements, as required in PRC 25302.2.

Electricity Sector - The Energy Commission will explore changes needed in the electricity sector to support California's 2030 goals for GHG reductions, zero-emission vehicles, and a 60 percent Renewables Portfolio Standard. The analysis will include an assessment of the POUs' progress in meeting the 2030 goals of SB 350 based on their integrated resource plans. The *2019 IEPR* will also explore the 2045 near-zero-carbon goal set by SB 100.

Electricity, Natural Gas, and Transportation Demand Forecasts - The Energy Commission will prepare a new 10-year forecast of electricity consumption and peak electricity demand for California and for

individual utility planning areas and forecast zones in the state. The Energy Commission will further enhance its electricity and natural gas demand forecast to support the energy efficiency and renewable energy goals in SB 350. This includes providing more granularity in the temporal, locational, and sector-specific electricity and natural gas demand trends. Additionally, the Energy Commission will refine its transportation forecast with updated inputs and assumptions that reflect an evolving transportation market.

Natural Gas Assessment - The Energy Commission will explore the role of natural gas in a decarbonized future. The analysis will include:

- Evaluation of the trends in natural gas prices, supply, and demand in California and the nation.
- Update of the analysis of the strategies and options for using natural gas as called for in AB 1257 (Bocanegra, Chapter 749, Statutes of 2013) and the recommendation in the *2017 IEPR* to "coordinate closely with the California Public Utilities Commission to ensure California's continued shift away from fossil fuels, including methane.

Southern California Energy Reliability – Maintaining energy reliability in Southern California requires ongoing monitoring and assessment. The *2019 IEPR* analysis will include analysis of:

- Natural gas prices as a follow up to a workshop held on January 11, 2019, as part of the *2018 IEPR Update Volume II*, on natural gas price spikes.
- Risks such as extreme weather on the reliability of the system.

Climate Adaptation - Continued actions are needed to address major climate risks to the state's communities and energy system. These actions must recognize the unique vulnerabilities climate change poses to the natural gas and electricity sectors.

The *2019 IEPR* will discuss:

- Flexible and adaptive strategies to increase the state's resilience to multiple stressors from climate change on the energy system, with attention to vulnerable populations.
- Research to increase the state's resiliency to climate change as the state progresses towards its 2030 and 2045 climate goals.

2.2.2 Assembly Bill 32

Assembly Bill 32, also known as the California Global Warming Solutions Act of 2006, commits the State to achieving year 2000 GHG emission levels by 2010 and year 1990 levels by 2020. To achieve these goals, AB 32 tasked the California Public Utilities Commission and the CEC with providing information, analysis, and recommendations to CARB regarding ways to reduce GHG emissions in the electricity and natural gas utility sectors.

2.2.3 California Building Standards Code (Title 24)

The following subsections delineate the relevant parts under California Building Standards Code (Title 24).

2.2.3.1 California Building Energy Efficiency Standards (Title 24, Part 6)

The California Building Energy Efficiency Standards for Residential and Nonresidential Buildings were adopted to ensure that building construction and system design and installation achieve energy efficiency and preserve outdoor and indoor environmental quality. The California Building Energy Efficiency Standards are updated every three years. The current California Building Energy Efficiency

Standards are the 2016 Building Energy Efficiency Standards, which became effective January 1, 2017. The 2016 Building Energy Efficiency Standards focus on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings and include requirements to enable both demand reductions during critical peak periods and future solar electric and thermal system installations. The most significant efficiency improvements to the residential standards include improvements for attics, walls, water heating, and lighting.

2.2.3.2 California Green Building Standards (Title 24, Part 11)

The California Green Building Standards Code, commonly referred to as the CALGreen Code, went into effect on January 1, 2017. The 2016 CALGreen Code includes mandatory measures for non-residential development related to site development; water use; weather resistance and moisture management; construction waste reduction, disposal, and recycling; building maintenance and operation; pollutant control; indoor air quality; environmental comfort; and outdoor air quality. Mandatory measures for residential development pertain to green building; planning and design; energy efficiency; water efficiency and conservation; material conservation and resource efficiency; environmental quality; and installer and special inspector qualifications.

2.3 Local Regulations

The City of Highland understands that energy efficiency can greatly reduce the impact of residential development and provide cost savings for its residents. On a regulatory level, the City enforces the State Energy Conservation Standards (California Code of Regulations Title 24). Residential development in Highland is evaluated for energy efficiency during the plan review process. The following elements of the City of Highland's general plan policies for encouraging energy efficiency for new construction are outlined below.

2.3.1 City of Highland General Plan-Housing Element

8.Innovative and Efficient Housing

8f. Reduce energy waste by reviewing all residential buildings for compliance with Title 24, State of California Energy Standards.

2.3.2 City of Highland General Plan-Conservation and Open Space Element

Encourage site design practices that reduce and conserve energy use.

Policies

1) Encourage energy and environmentally sustainable designs— such as "Green Development Standards"—in the design and approval of new projects.

2) Orient buildings on the site to maximize the natural ventilation provided by prevailing breezes.

3) Incorporate passive solar design techniques including building orientation, energy-saving materials, roof overhangs, and window and door placement.

4) Increase minimum building insulation standards.

5) Encourage landscape design that cools buildings and blocks solar rays, such as the planting of deciduous trees on south and west facing elevations and give Title 24 credit for landscaping.

6) Channel runoff to permeable surfaces through the design of roofs and rain gutter systems and drainage courses.

7) Encourage energy-efficient retrofitting of existing buildings, where practical, throughout the City including assisting applicants in the installation of more efficient HVAC (heating, ventilation, air conditioning) systems.

8) Distribute and participate in incentive programs for incorporation of solar and photovoltaic panels (active solar) into existing or new buildings.

9) Establish a "green building" site design incentive program, such as density or height bonuses, reduced parking requirements, expedited plan check, and recognition programs.

10) Adopt LEED (Leadership in Energy and Environmental Design) design standards for public buildings.

11) Participate in the CEEP (Community Energy Efficiency Program) Certificate and Recognition Program.

12) Encourage a grey water recycling plan.

3.0 Impacts and Mitigation

3.1 Threshold

Appendix F of the California Environmental Quality Act (CEQA) requires a discussion of the potential energy impacts of proposed project, with particular emphasis on whether the proposed project would result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. Further, the proposed project should not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The analysis below demonstrates compliance with these energy thresholds.

3.2 Construction Energy Consumption

Construction of the proposed project would last for approximately four years. Construction activities would consume energy through the operation of heavy off-road equipment, trucks, and worker traffic. Construction equipment fuel consumption was based on equipment lists generated using California Emissions Estimator Model (CalEEMod) default values and input from the project applicant. The construction equipment summarized in Table 1 is anticipated to be used in each phase of the project. The fuel consumption of off-road equipment calculated in this analysis is based on the fuel consumption rates in the OFFROAD 2011 statewide data sets as well as the horsepower, usage hours, and load factors from CalEEMod as part of the proposed project's air quality analysis.

Based on the information in Table 1 and the anticipated construction schedule, construction equipment would result in the consumption of approximately 272,397 gallons of diesel fuel over the entire construction period.

Worker, vendor, and haul trips would result in approximately 15,935 VMT over the entire construction period. As part of the proposed project cut and fill would be balanced on site therefore no haul trips would result in the consumption of fuel during construction. A countywide average fuel consumption of 20.48 mpg was used to determine fuel consumption from worker and vendor trips because these trips would occur in a variety of different vehicle types and classes (CNRA 2009). As a result, is it estimated that construction worker and vendor trips would result in the consumption of approximately 344,421 gallons of fuel during the entire construction phase.

Although the proposed project would result in the consumption of an estimated 272,397 gallons of diesel and 344,421 gallons of gasoline during construction, the project is designed to balance the grading on site. This would substantially reduce the amount of potential haul trips associated with the

Table 1. Construction Equipment Usage

Construction Phase Name	Off Road Equipment Type	Off Road Equipment Unit Amount	Usage Hours	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	3	8	247	0.4
Site Preparation	Tractors/Loaders/Backhoes	4	8	97	0.37
Grading	Excavators	2	8	158	0.38
Grading	Graders	1	8	187	0.41
Grading	Rubber Tired Dozers	1	8	247	0.4
Grading	Scrapers	2	8	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8	97	0.37
Building Construction	Cranes	1	7	231	0.29
Building Construction	Forklifts	3	8	89	0.2
Building Construction	Generator Sets	1	8	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7	97	0.37
Building Construction	Welders	1	8	46	0.45
Paving	Pavers	2	8	130	0.42
Paving	Paving Equipment	2	8	132	0.36
Paving	Rollers	2	8	80	0.38
Architectural Coating	Air Compressors	1	6	78	0.48

import and export of soil for construction of the proposed project, which in turn would reduce the amount of fuel required by the project. Additionally, construction equipment fleet turnover and increasingly stringent state and federal regulations on engine efficiency combined with local, state, and federal regulations limiting engine idling times and require recycling of construction debris, would further reduce the amount of transportation fuel demand during project construction. Considering these reductions in transportation fuel use, the proposed project would not result in the wasteful and inefficient use of energy resources during construction and impacts would be **less than significant**.

3.1.2 Operation Energy Consumption

During operations the proposed project would consume natural gas for space heating, water heating, and cooking associated with the residential land uses on the project site. The natural gas consumption was estimated for each of the project's land uses based on the CalEEMod default values. Based on these calculations the proposed project is estimated to consume approximately 7,536,660 thousand British thermal units of natural gas per year during operation.

In addition to the consumption of natural gas, the proposed project would use electricity for lighting, appliances, and other uses associated with the project's land uses. Annual electricity demand by utilizing CalEEMod default values for project's specific land uses. Based on this methodology the proposed project is estimated to use approximately 1,901,510 kilowatt-hours (kWh) of electricity per year. The project design includes installation of solar panels on site, however the number of solar panels and the amount of electricity that will be produced has not yet been determined.

As described above the proposed project would result in a long-term increase in demand for electricity and natural gas. However, the project would be designed according to the most recent Title 24 standards of the California Code of Regulations. Part 6 of Title 24 specifically establishes energy efficiency standards for residential and non-residential buildings constructed in the State of California in order to reduce energy demand and consumption. Part 6 is updated periodically to incorporate and

consider new energy efficiency technologies and methodologies. The most recent amendments, referred to as the 2016 standards, became effective on January 1, 2017. The proposed project would meet current Title 24 requirements. These measures would reduce inefficient, wasteful and unnecessary consumption of energy to the extent feasible. Therefore, impacts from the wasteful or inefficient use of electricity or natural gas during operation of the project would be **less than significant**.

Water Treatment, Conveyance, and Distribution

Water used for both indoor and outdoor requires electricity for water treatment, conveyance, and distribution. The proposed project's water demand was calculated based on default values for the specific land uses proposed by the project in CalEEMod for the project's specific land uses. Based on this methodology the proposed project is estimated to use approximately 13.22 million gallons of indoor water per year as well as 8.33 million gallons of outdoor water per year. This would result in a total of approximately 299,085 kWh per year of electricity for indoor and outdoor water treatment, conveyance, and distribution (CEC 2006).

Although the proposed project would result in electricity use from the treatment, conveyance, and distribution of water to the project site, the project would also require all water fixtures to be compliant with the 2016 California Green Building Standards Code and updated amendments of the County Landscape Ordinance, which would reduce the amount of water used by the project and require compliance with regulations relating to drought conditions. Therefore, the proposed project would not result in the wasteful or inefficient use of electricity for water treatment, conveyance, and distribution and impacts would be **less than significant**.

Wastewater Service

Wastewater generation is included in the CalEEMod data for water, discussed above under Water-Related Energy. Additionally, energy demand related to wastewater treatment is accounted for in the CEC's recommended water-energy proxies based on the water-use cycles for indoor and outdoor uses, as described above (CEC 2006). It should be noted that the energy consumption associated with the proposed project's water demand (including wastewater conveyance) was estimated using the CEC-recommended water energy proxies for southern California, which include substantial energy usage associated with water conveyance and distribution. Since the project includes on-site utilization of reclaimed water, the project's water-related energy demand is likely overstated.

The incremental increase of energy use associated with implementation of the project would not require the construction of new energy facilities and sources of energy that would not otherwise be needed to serve the region. Wastewater service would require an extension of sewer line. The energy added for the extension and use of these facilities combined with the project's estimated electricity and natural gas consumption would not result in additional energy generation or transmission infrastructure due to the location and capacity of existing energy infrastructure near the project site. Therefore, the project would not result in the wasteful or inefficient use of electricity for wastewater treatment, and impacts would be **less than significant**.

Fuel Consumption

During operation of the proposed project, vehicle trips would be generated by the proposed project's specific land uses. The proposed project's specific land uses were modeled in CalEEMod using default vehicle trip generation rates for park, residential, and other uses on the project site. The vehicle trips generated would result in approximately 6,830,784 VMT. Based on a countywide average fuel consumption of 20.43 mpg, the proposed project would result in the consumption of an estimated 334,351 gallons of transportation fuel.

Various federal and state regulations including the Low Carbon Fuel Standard, Pavley Clean Car Standards, and Low Emission Vehicle Program would serve to reduce the project's transportation fuel consumption progressively into the future. Therefore, the project would be designed to avoid the wasteful and inefficient use of transportation fuel during operations and impacts would be **less than significant**.

It should be noted that state and federal regulatory requirements addressing fuel efficiency are expected to increase fuel efficiency over time as older, less fuel-efficient vehicles are retired. The federal CAFE standards and AB 1493 fuel efficiency standard (analogous to the federal CAFÉ standard), as well as light/heavy vehicle efficiency/hybridization programs, all contribute to increased fuel efficiency and therefore would reduce vehicle fuel energy consumption rates over time. While the project would increase the consumption of gasoline and diesel proportionately with projected population growth, the increase would be accommodated within the projected growth as part of the energy projections for the state and the region and would not require the construction of new regional energy production facilities. Because gasoline and diesel are transported via truck to individual service stations, the increase in demand also is not anticipated to require major improvements to local fueling infrastructure. Therefore, energy impacts related to fuel consumption/efficiency during project operations would be **less than significant**.

References

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Appendix A: Energy Calculations

Construction Fuel Usage

PhaseName	Off Road Equipment Type	Off Road Equipment Unit Amount	UsageHours	HorsePower	LoadFactor	Avg. Daily Factor	Number of days	Diesel Fuel Usage
Site Preparation	Rubber Tired Dozers	3	8	247	0.4	0.6	40	2,845
Site Preparation	Tractors/Loaders/Backhoes	4	8	97	0.37	0.6	40	1,378
Grading	Excavators	2	8	158	0.38	0.6	110	3,170
Grading	Graders	1	8	187	0.41	0.6	110	2,024
Grading	Rubber Tired Dozers	1	8	247	0.4	0.6	110	2,608
Grading	Scrapers	2	8	367	0.48	0.6	110	9,301
Grading	Tractors/Loaders/Backhoes	2	8	97	0.37	0.6	110	1,895
Building Construction	Cranes	1	7	231	0.29	0.6	1110	15,615
Building Construction	Forklifts	3	8	89	0.2	0.6	1110	14,226
Building Construction	Generator Sets	1	8	84	0.74	0.6	1110	16,559
Building Construction	Tractors/Loaders/Backhoes	3	7	97	0.37	0.6	1110	25,098
Building Construction	Welders	1	8	46	0.45	0.6	1110	5,514
Paving	Pavers	2	8	130	0.42	0.6	75	1,966
Paving	Paving Equipment	2	8	132	0.36	0.6	75	1,711
Paving	Rollers	2	8	80	0.38	0.6	75	1,094
Architectural Coating	Air Compressors	1	6	78	0.48	0.6	75	505
Gallons of construction diesel fuel								**105,511**

Phase Name	Worker Trips	Days	Vendor Trips	Length per trip (miles)		Total Length (miles)		Avg Daily Factor	Gallons of Fuel	
				Worker Trip Length	Vendor Trip Length	Total Vendor Trips	Total Haul Trips		Gasoline	Diesel Fuel
Site Preparation	126	40		14.7	6.9	1,852	-	0.6	2,171	
Grading	160	110		14.7	6.9	2,352	-	0.6	7,580	
Building Construction	693	1110	207	14.7	6.9	10,187	1,428	0.6	331,280	166,886
Paving	90	75		14.7	6.9	1,323	-	0.6	2,907	
Architectural Coating	15	75		14.7	6.9	221	-	0.6	484	
Total Gasoline						15,935			**344,421**	166,886
subtotal from construction										105,511
Total construction Diesel fuel										**272,397**

EMFAC2011 Emissions Inventory												
Region Type: Air Basin												
Region: South Coast												
Calendar Year: 2019												
Season: Annual												
Vehicle Classification: EMFAC2011 Categories												
Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	Trips	Fuel_GAS	Fuel_DSL	Miles per Gallon
						(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(1000 gallons/day)	(1000 gallons/day)	
South Coast	2019	Annual	LDA	GAS	Aggregated	Aggregated	5919080.897	201726794.5	37369376.96	8872.432331	0	22.7
South Coast	2019	Annual	LDT1	GAS	Aggregated	Aggregated	693717.2286	23623176.31	4202494.757	1200.094998	0	19.7
South Coast	2019	Annual	LDT2	GAS	Aggregated	Aggregated	1960776.565	71580572.68	12342715.58	4265.262875	0	16.8
South Coast	2019	Annual	T7 tractor	DSL	Aggregated	Aggregated	4217.99922	331838.0226	0	0	57.98147024	5.7
Average fuel consumption												20.48
Notes: Consistent with CalEEMod, a construction work trip is assumed to be a composite of 50% LDA, 25% LDT1 and 25% for LDT2. Used EMFAC 2011 Categories:												
for construction as EMFAC2011 has specific categories for vehicle class T7.												