5.0 ALTERNATIVES

Acronyms

ALOHA	Areal Locations of Hazardous Atmospheres
bhp	Brake horsepower
Btu/scf	British Thermal Unit per standard cubic foot
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CPUC	California Public Utilities Commission
deg F	Degrees Fahrenheit
EIR	Environmental Impact Report
GE	General Electric
GWP	Glendale Water and Power
hp	horsepower
IS/MND	Initial Study/ Mitigated Negative Declaration
kW	Kilowatt
kWh	Kilowatt hour
LFG	Landfill Gas
LNG	Liquid Natural Gas
mmBtu	One million British Thermal Units
mmscfd	Million standard cubic feet per day
MW	Megawatt
MWe	Megawatts electric
NOx	Nitrogen Oxides
PHMSA	Pipeline and Hazardous Materials Safety Administration
PRC	Public Resources Code
READ	Renewable Energy Anaerobic Digester
RICE	Reciprocating internal combustion engines
RNG	Renewable NGNatural Gas
SCAQMD	South Coast Air Quality Management District
SCLF	Scholl Canyon Landfill
SCR	Selective catalytic reduction
TSA	Temperature swing adsorption
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WWTP	Wastewater treatment plant

5.1 INTRODUCTION

Under California Environmental Quality Act (CEQA), and as indicated in California Public Resources Code (PRC) Section 21002.1(a), the identification and analysis of alternatives to a proposed Project is a fundamental aspect of the environmental review process and is required to ensure the consideration of ways to mitigate or avoid the significant environmental effects of a project. Here, the Final Initial Study/ Mitigated Negative Declaration (IS/MND) for the Biogas Renewable Generation Project concluded that the proposed Project would not result in potentially significant and unavoidable environmental impacts; however, in response to various public concerns City of Glendale Planning Commission elected not to adopt the Final IS/MND and requested preparation of this Environmental Impact Report (EIR) which would provide an opportunity to explore project alternatives. This section analyzes project alternatives required for an EIR under the CEQA Guidelines. The alternatives selected for analysis represent a reasonable range that meet the project objectives, reduce project impacts is some areas, and which will assist in informed decision-making. Alternatives need be environmentally superior to the project in only some respects. Sierra Club v City of Orange (2008) 163 CA4th 523, 547; Mira Mar Mobile Community v City of Oceanside (2004) 119 CA4th 477. The CEQA Guidelines refer to alternatives that are capable of substantially reducing or avoiding any significant project impacts. (14 Cal Code Regs §15126.6(a)). Here, the proposed Project's significant impacts can be mitigated to below a level of significance, so the selection of alternatives looks at those impacts that required mitigation to see if any of those impacts could be lessened or avoided. The alternatives selected here are ones that could avoid or substantially lessen one or more effects. (14 Cal Code Regs §15126.6(c)). It should be noted that agencies are not precluded from presenting alternatives that would substantially reduce some impacts but increase others and a comparative explanation of impacts is included, although in less detail than is required for an analysis of the project's impacts. (14 Cal Code Regs §15126.6(d)).

Guidance regarding the definition of project alternatives is provided in State CEQA Guidelines Section 15126.6(a) as follows:

> *An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives.*

The State CEQA Guidelines emphasize that the selection of project alternatives be based primarily on the ability to reduce significant impacts relative to the proposed project, "even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly."[73] The State CEQA Guidelines further direct that the range of alternatives be guided by a "rule of reason," such that only those alternatives necessary to permit a reasoned choice are analyzed.[74]

In selecting project alternatives for analysis, potential alternatives should be feasible. The State CEQA Guidelines Section 15126.6(f)(1) explains that:

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[73] CEQA Guidelines, Section 15126.6(b).
[74] CEQA Guidelines, Section 15126.6(f).

> *Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site.*

The State CEQA Guidelines require the analysis of a “no project” alternative and, depending on the circumstances, evaluation of alternative location(s) for the proposed Project, if feasible. Based on the alternative’s analysis, an environmentally superior alternative is to be designated. In general, the environmentally superior alternative is the alternative with the least adverse impacts on the environment. If the environmentally superior alternative is the “no project” alternative, the EIR shall also identify another environmentally superior alternative among the other alternatives.[75]

Section 15126.6(d) of the State CEQA Guidelines states that alternatives analysis need not be presented in the same level of detail as the assessment of the proposed Project. Rather, the EIR is required to provide sufficient information to allow for meaningful evaluation, analysis, and comparison with the proposed Project. If an alternative would cause one or more significant impacts in addition to those of the proposed Project, analysis of those impacts is to be discussed, but in less detail than for the proposed Project.

The United States Environmental Protection Agency (USEPA) maintains landfill gas (LFG) to energy project information through the Landfill Methane Outreach Program and Landfill Gas Energy Project Database. **Table 53** below presents operational and planned LFG to energy projects in the State of California. While the USEPA maintains information on projects throughout the United States, **Table 53** is limited to those in California to provide insight on how other landfills currently or plan to beneficially utilize LFG within the regulatory setting of California. As shown in **Table 53**, the predominant beneficial use of LFG in California is generation of electricity at the LFG source.

[75] CEQA Guidelines, Section 15126.6(e)(2).

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Table 53 Operational and Planned LFG to Energy Projects in California

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
BOILER								
Acme LF	Operational	Project #1	1/1/1982	Direct	--	--	--	1.5
City of Sacramento Landfill	Operational	Project #1	1/1/1990	Direct	fuel for almond grower's boilers	--	--	1.6
Cold Canyon LF Solid Waste Disposal Site	Operational	Project #1	1/1/1999	Direct	LFG piped 2 miles to oilfield to fuel steam generators, the steam is used to increase the productivity of the oil wells, LFG providing 20% of fuel needs	--	--	1.008
COGENERATION								
Acme LF	Operational	Project #2	1/1/1999	Electricity	IC engine	1.9	--	--
Monterey Peninsula SLF	Operational	Project #1, Expansion #5	1/1/2006	Electricity	Replacement: (1) Caterpillar 3520 replaced Caterpillar 3516	1.6	1.6	--
North Miramar SLF	Operational	Combination Project #1 (MBC Cogen)	6/30/1997	Electricity	Plant with (8) 800-kW Caterpillar 3516 engines produces 6.4 MW of electricity, 10 mmBtu/hr of 180 F water, & 6 mmBtu/hr of chilled water (2.8 MW used onsite, balance sold to the grid)	6.4	6.4	4.41
Santa Maria Regional Landfill	Operational	Project #1	8/15/2007	Electricity	GE-Jenbacher JGS320 engine	1	--	0.432
Savage Canyon LF	Operational	Project #1	8/1/2006	Electricity	Reciprocating engine	2	--	1.008
Shoreline LF at Mountain View	Operational	Project #3	11/1/2005	Electricity	1.25-mile pipeline delivers processed gas to (3) 970-kW generators to power buildings, waste heat used in absorption chillers and to heat water, the total heat recovery for all 3 engines is ~25 mmBtu/hr	2.91	2.91	--

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
University of California at Davis SLF	Operational	Project #1	4/22/2014	Electricity	Renewable Energy Anaerobic Digester (READ) project blends LFG with biogas from university's food/other waste AD to generate electricity from microturbines; AD will divert 20,000 tons/yr of waste; secondary product from AD is fertilizer and soil amendments	0.14	0.8	--
West Miramar SLF	Operational	Combination Project #1 (MBC Cogen)	6/30/1997	Electricity	plant with (8) 800-kW Caterpillar 3516 engines produces 6.4 MW of electricity, 10 mmBtu/hr of 180 F water, & 6 mmBtu/hr of chilled water (2.8 MW used onsite, balance sold to the grid)	6.4	6.4	4.41
COMBINED CYCLE								
Mission Hills	Operational	Project #1	1/1/1984	Electricity	4.5-mile pipeline delivers LFG to (2) 14.5 MW combustion turbine generators fueled by 65% NG/35% LFG and (1) condensing steam turbine electric generator	7.5	29	2.88
Olinda Alpha SLF	Operational	Project #3	6/28/2012	Electricity	2-train, 2-stage siloxane removal system; (4) Solar turbines each with a Rentech HRSG to capture waste exhaust heat to supply steam to a single Dresser Rand steam turbine generator for 45% project efficiency; post-combustion SCR to control N_2O	20.5	32.5	11
DIRECT THERMAL								
Palo Alto LF	Operational	Project #2	8/1/2005	Direct	sewage sludge drying operations at WWTP, LFG used in place of NG	--	--	0.648
FUEL CELL								
Coyote Canyon SLF	Planned	Project #2	12/31/2020	Electricity	(2) 2.35 Mwac FCE SureSource Hydrogen carbonate fuel cell power plants producing 1270 kg of vehicle quality hydrogen daily, 46 mmBtu/hr input	4	--	2.736

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
GAS TURBINE								
Altamont Landfill & Resource Recovery Facility	Operational	Project #1	1/1/1989	Electricity	(2) Solar Centaur units (nameplate 3.1 MW each) installed in 1988	4.7	6.2	--
BKK Landfill-Phases I & II	Shutdown	Project #1	1/1/1985	Electricity	--	4.3	--	--
	Operational	Project #1, Replacement	1/1/1997	Electricity	Solar Taurus 60	4.9	4.9	--
Calabasas SLF	Operational	Project #2	7/12/2010	Electricity	(3) Solar Mercury 50 turbines	13.8	--	5.6
Chiquita Canyon SLF	Operational	Project #1	11/23/2010	Electricity	(2) Solar Mercury 50 turbines	6	9.2	3.9
Highway 59 Landfill	Planned	Project #1	12/31/2018	Electricity	Dresser-Rand KG2 non-combustion gas turbine in externally fired configuration with Ener-Core's Power Oxidizer Technology (oxidation of the dilute gas occurs in seconds, produces heat and removes pollutants); steam (22 mmBtu/hr) from the waste heat	2	--	--
San Marcos LF	Operational	Project #1	1/1/1989	Electricity	2 recuperated gas turbines driving 933 kW generator; 2 Saturn units installed in 1988	1.7	1.866	1
Sunshine Canyon Landfill	Operational	Project #2	9/1/2014	Electricity	(5) Solar Mercury 50 CTG turbines, each at 43.28 mmBtu/hr and driving a nominal 4.9 MW electric generator	20	20	12
Sycamore SLF	Shutdown	Project #1	12/31/1988	Electricity	(2) 10.8 mmBtu/hr Saturn recuperated gas turbines driving 933 kW generators	1.48	1.866	--
	Operational	Project #1, Expansion #1	4/1/2004	Electricity	(1) 45 mmBtu/hr Centaur gas turbine	2.5	--	--

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
	Operational	Project #1, Replacement Units	5/16/2011	Electricity	(2) Solar turbines rated at 1.2 MW each	1.5	2.4	--
MICROTURBINE								
Acme LF	Operational	Project #3	8/1/2003	Electricity	4 70kW Ingersoll-Rand microturbines	0.28	0.28	0.216
All Purpose Landfill	Operational	Project #2	12/18/2009	Electricity	(3) Ingersoll-Rand 250-kW microturbines	0.75	0.75	0.34
BKK Landfill-Phases I & II	Planned	Project #3	1/31/2019	Electricity	(1) EC-250 Ecostation at 250 kW; patented Power Oxidizer technology generates clean power from low-quality gases	0.25	--	--
Burbank LF Site No. 3	Operational	Project #3	4/1/2005	Electricity	(10) 30 kW Capstone microturbines and (1) 250 kW Ingersoll-Rand microturbine	0.55	0.55	--
Colton Sanitary Landfill	Operational	Project #1	3/1/2003	Electricity	--	1.2	--	0.864
Operating Industries, Inc. LF (OII)	Operational	Project #1	8/12/2002	Electricity	6 Ingersoll-Rand microturbines rated at 70 kW each	0.42	0.42	0.36
Shoreline LF at Mountain View	Operational	Project #2	12/1/2004	Electricity	(2) 70 kW Ingersoll-Rand microturbines	0.14	0.14	0.086
Toland Road SLF	Operational	Project #1	8/1/2004	Electricity	(1) 70 kW Ingersoll-Rand microturbine	0.07	0.07	--
Toyon Canyon LF	Planned	Project #2	12/31/2019	Electricity	(1) EC-250 EcoStation at 250 kW and (2) EC-333 EcoStations; patented Power Oxidizer technology generates clean power from low-quality gases	0.916	--	--

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
Union Mine Disposal Site	Operational	Project #1	1/1/2004	Electricity	(3) Ingersoll Rand microturbines rated at 70 kW each, electricity used to supplement the power used to run on-site wastewater treatment facility	0.21	0.21	0.115
RECIPROCATING ENGINE								
Badlands SLF	Operational	Project #1	2/1/2001	Electricity	--	1.1	--	0.576
Buena Vista Drive SLF	Operational	Project #2	2/2/2006	Electricity	(3) 1,060 kW spark-ignited, turbocharged, after-cooled GE Jenbacher engines total, expected minimum availability of 90%	3.18	3.18	1.54
City of Santa Cruz SLF	Operational	Project #2	11/23/2009	Electricity	(1) Caterpillar 3520 engine	1.6	1.6	--
Clover Flat Landfill	Operational	Project #1	12/31/2014	Electricity	(1) Jenbacher engine	0.75	--	0.35
Cold Canyon LF Solid Waste Disposal Site	Operational	Project #2	7/31/2013	Electricity	(1) 1.6-MW G3520 CAT engine	1.6	1.6	--
Corona Disposal Site	Operational	Project #1	3/4/1986	Electricity	--	0.6	--	--
Crazy Horse Landfill	Planned	Project #2	12/31/2018	Electricity	(2) GE Jenbacher engines	1.6	--	--
Foothill Sanitary Landfill, Inc.	Operational	Project #1	4/24/2014	Electricity	(2) GE Jenbacher engines	3.6	4.2	1.55
Forward Landfill	Operational	Project #1	2/22/2014	Electricity	(2) GE Jenbacher 2.1-MW engines	3.4	4.2	1.55

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
Frank R. Bowerman SLF	Operational	Project #2	3/29/2016	Electricity	fuel clean-up system, (7) Caterpillar CG260 internal combustion engines, and selective catalytic reduction (SCR) and oxidation catalyst units installed on each engine exhaust system to reduce NOx, CO, and VOC emissions	22.4	--	10.75
Johnson Canyon SLF	Operational	Project #1	5/12/2013	Electricity	(1) GE Jenbacher engine	1.4	1.4	0.53
	Planned	Project #1, Expansion #1	12/31/2019	Electricity	--	--	--	--
Keller Canyon LF	Operational	Project #1	8/1/2009	Electricity	(2) GE Jenbacher engines	3.8	3.8	1.63
Kiefer LF	Operational	Project #1	1/1/1999	Electricity	3 Caterpillar 3616 engines	9	--	4.752
	Operational	Project #1, Expansion #1	1/1/2006	Electricity	2 Caterpillar 3616 engines	6	--	3.2
Lopez Canyon SLF	Operational	Project #1	1/5/1999	Electricity	(2) 3616 Caterpillar engines	6	--	2.67
Mid-Valley Sanitary LF	Operational	Project #1	3/1/2003	Electricity	(2) Deutz model TBG620V16K engine-generators	2.52	--	1.58
Milliken SLF	Operational	Project #1	3/1/2003	Electricity	(2) engines	2.2	--	1.94
Monterey Peninsula SLF	Shutdown	Project #1	1/1/1983	Electricity	Original project: 2 Waukesha engine generators	1.2	--	--
	Shutdown	Project #1, Expansion #1	1/1/1994	Electricity	Expansion: (1) Caterpillar 3516	0.8	0.8	--
	Shutdown	Project #1, Expansion #2	1/1/1997	Electricity	Expansion: GE-Jenbacher 320 engine	0.987	--	--

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
	Operational	Project #1, Expansion #3	1/1/1998	Electricity	Replacement: GE-Jenbacher 320 engine replaced an original Waukesha engine.	0.987	--	--
	Operational	Project #1, Expansion #4	1/1/2002	Electricity	Replacement: GE-Jenbacher 320 engine replaced an original Waukesha engine.	1.057	--	--
	Operational	Project #1, Expansion #6	1/1/2009	Electricity	Replacement: GE-Jenbacher 420 replaced GE-Jenbacher 320	1.4	--	--
Neal Road Recycling and Waste Facility	Operational	Project #1	2/13/2013	Electricity	(1) GE Jenbacher 420 engine	1.4	1.4	0.85
North Miramar SLF	Operational	Combination Project #1, Expansion #1 (MP2)	6/14/2012	Electricity	(2) Caterpillar G3520C engines provide 51% of MCAS' base energy load, new 6.5-mile power line delivers electricity to MCAS	3.2	3.2	1.73
Orange Avenue Disposal Inc.	Operational	Project #1	11/30/2015	Electricity	containerized 2G agenitor 206 with MAN engine, optimized for efficient operation on biogas, with a complete LFG treatment system and a special hot ambient temperature package	0.22	0.22	--
Otay LF	Operational	Project #1	12/1/1986	Electricity	(1) Cooper-Superior model 16SGTA lean-burn engine-generator set with 1,850 kW capacity (2,650 hp)	1.8	1.85	--
	Operational	Project #1, Expansion #1	12/1/1991	Electricity	(1) Cooper-Superior model 16SGTA lean-burn engine-generator set with 1,850 kW capacity (2,650 hp)	1.8	1.85	--
	Operational	Project #1, Expansion #2	3/1/2007	Electricity	(2) Cooper-Superior model 16SGTA lean-burn engine-generator sets with 1,850 kW capacity (2,650 hp)	3.7	3.7	--

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
	Operational	Project #1, Expansion #3	8/1/2013	Electricity	(2) Caterpillar 3520 engines	3.2	3.2	--
Ox Mountain SLF	Operational	Project #1	4/1/2009	Electricity	(6) GE Jenbacher 1.92-MW JGS 616 GS-LL engines in all, using GE's temperature swing adsorption (TSA)	9.7	11.4	4.8
Potrero Hills SLF	Operational	Project #1	4/30/2016	Electricity	(5) Caterpillar lean-burn 3520 engines, advanced environmental controls to reduce sulfur content prior to combustion and post-combustion catalytic reduction	7	8	3.7
Prima Deshecha SLF	Operational	Project #1	6/1/1999	Electricity	(2) Caterpillar 3616 engines (3,150 kW each)	5.5	6.3	3.24
Recology Hay Road LF	Operational	Project #1	7/2/2013	Electricity	(1) Caterpillar G3520C RICE generator rated at 1.6 MWe	1.6	1.6	1.0498
Recology Ostrom Road LF	Operational	Project #1	1/9/2009	Electricity	(1) Caterpillar G3520C genset	1.6	1.6	0.9979
	Operational	Project #1, Expansion #1	9/11/2013	Electricity	(1) Caterpillar G3520C genset rated at 1.95 Mwe	1.95	1.95	1.215
Redwood SLF	Operational	Project #2	9/20/2017	Electricity	(2) CAT 3520+ models at 2 MW each; engine exhaust is treated to remove CO and NOx; LFG is pre-treated to remove particulates, moisture, sulfur and siloxanes	3.3	3.9	1.78
Sonoma County Central Disposal Site	Shutdown	Project #1	3/1/1994	Electricity	(4) CAT 3516 engines installed in 1993	3.2	3.2	1.38
	Shutdown	Project #1, Expansion #1	6/1/1996	Electricity	4 CAT 3516 engines installed in 1996	3.2	3.2	1.38
	Shutdown	Project #1, Expansion #2	3/1/2003	Electricity	2 CAT 3516 engines	1.1	1.6	0.2

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
	Shutdown	Project #1, De-Expansion #1	1/1/2006	Electricity	--	3	--	--
	Operational	Project #1, De-Expansion #2	1/1/2018	Electricity	(2) lean-burn ICE / generator sets (Caterpillar G3516)	1.6	1.6	1
Sunnyvale LF	Operational	Project #1	1/1/1998	Electricity	LFG co-fired with WWTP digester gas; (2) 800-kW Caterpillar 3516 engine-generators combust 75% LFG/25% digester gas	1.2	1.6	0.656
Tajiguas SLF	Operational	Project #1	3/31/2000	Electricity	Caterpillar G3616 IC engine (rated at 4231 bhp) is prime mover that generates electrical energy via a Kato Model CO87-0546 electrical generator	3.1	--	1.5
Vasco Road SLF	Operational	Project #1	2/22/2014	Electricity	(2) GE Jenbacher engines	4.3	--	2.04
West Contra Costa SLF	Operational	Project #1	1/1/1985	Electricity	(3) Waukesha engines	2	--	--
	Operational	Project #1, Expansion #1	1/1/2010	Electricity	Original (3) Waukesha engines (overhauled multiple times) still in place, original generators have been rebuilt or replaced which increased capacity from 675 kW each to 700-750 kW each	0.15	--	--

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
West Miramar SLF	Operational	Project #2 (NCCF)	3/1/1999	Electricity	(4) 950-kW Caterpillar 3516 engines; most electricity is used on site, balance sold to the grid	3.3	3.8	--
	Planned	Project #2 (NCCF), Expansion #1	12/31/2019	Electricity	--	1.6	1.6	--
	Operational	Combination Project #1, Expansion #1 (MP2)	6/14/2012	Electricity	(2) Caterpillar G3520C engines provide 51% of MCAS' base energy load, new 6.5-mile power line delivers electricity to MCAS	3.2	3.2	1.73
Western Regional SLF	Operational	Project #1	7/1/2004	Electricity	2 Caterpillar engines	1.6	1.6	--
	Operational	Project #1, Expansion #1	3/1/2008	Electricity	1 additional Caterpillar engine	0.8	0.8	--
Yolo County Central LF	Operational	Project #1	3/1/1997	Electricity	(4) Caterpillar G399 at 600kW each, producing 1,500-2,000 kW with 250 kW parasitic drain	1.75	2.4	1.4
	Future Potential	Project #1, Expansion #1	--	Electricity	--	--	--	--
STEAM TURBINE								
BKK Landfill-Phases I & II	Operational	Project #2	1/1/1992	Electricity	--	6	6.8	--

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
Puente Hills LF	Shutdown	Project #3, Steam Cycle Plant	8/8/1986	Electricity	Conventional Rankine Cycle Steam power plant firing LFG in the plant's boilers to produce superheated steam which is then used to drive the steam turbine/generator to generate electric power	50	50	33.1
	Shutdown	Project #3, De-Expansion #1	1/1/2013	Electricity	Conventional Rankine Cycle Steam power plant firing LFG in the plant's boilers to produce superheated steam which is then used to drive the steam turbine/generator to generate electric power	33	--	--
	Operational	Project #3, De-Expansion #2	1/1/2016	Electricity	Conventional Rankine Cycle Steam power plant firing LFG in the plant's boilers to produce superheated steam which is then used to drive the steam turbine/generator to generate electric power	24	--	24.5
UNKNOWN								
West Central LF	Planned	--	12/1/2020	Unknown	--	2	--	1
VEHICLE FUEL								
Altamont Landfill & Resource Recovery Facility	Operational	Project #3	9/1/2009	Renewable Natural Gas (LU)**	System's multi-step process includes compression, chilling, adsorption, and membranes to remove impurities, cleaned LFG is then cooled to -260 deg F to create 13,000 gal/day LNG for garbage trucks	--	--	3.6
Bakersfield Metropolitan SLF (BENA)	Planned	Project #1	1/1/2020	Renewable Natural Gas (PI)**	60% of LFG to create RNG vehicle fuel and 40% of LFG to generate electricity at local power plant	--	--	1.87
Frank R. Bowerman SLF	Planned	Project #3	12/31/2020	Renewable Natural Gas (LU)**	LFG upgrading to vehicle fuel, transport by tube trailer to end user; 1,252 mmBtu/day output	--	--	1.728

Landfill Name	Current Project Status	Project Name	Project Start Date	Project Type Category	LFG Use Details	Actual MW Generation	Rated MW Capacity	LFG Flow to Project (mmscfd)
Monterey Peninsula SLF	Planned	Project #2	3/31/2020	Renewable Natural Gas (LU)**	--	--	--	--
Newby Island SLF Phases I, II, & III	Planned	Project #3	12/31/2019	Renewable Natural Gas (PI)**	--	--	--	--
Prima Deshecha SLF	Planned	Project #2	12/31/2022	Renewable Natural Gas (LU)**	LFG upgrading to vehicle fuel, transport by tube trailer to end user; 3,000 mmBtu/day output.	--	--	4.32
Santiago Canyon SLF	Planned	--	12/1/2020	Renewable Natural Gas (LU)**	LFG will be upgraded to be used in solid waste hauling trucks	--	--	0.345

*Source: The USEPA's Landfill Methane Outreach Program and Landfill Gas Energy Project Database dated July 2019

** Delivery Method – LU = Local Use
PI = Pipeline Injection

"—"=No Data

5.2 PRELIMINARY ALTERNATIVES SCREENING EVALUATION

A reasonable range of alternatives to the proposed Project was considered based on the types of operational and planned LFG to energy projects in California presented in **Table 53**, that consist of projects that put LFG to beneficial use, which is one of the Project objectives. The range of alternatives is as well as public input received during preparation of the previous IS/MND and public scoping for preparation of this EIR. Sections 5.3 and 5.4 introduce alternatives selected for analysis and alternatives considered and not selected for further analysis, respectively.

5.3 ALTERNATIVES SELECTED FOR ANALYSIS

Pursuant to Section 15124(b) of the CEQA Guidelines, the description of the proposed Project must contain “a clearly written statement of objectives” that would aid the lead agency in developing a reasonable range of alternatives to evaluate in the EIR, and to aid decision makers in preparing findings, and if necessary, a statement of overriding considerations. The objective of the proposed Project is to safely capture all the LFG generated by the Scholl Canyon Landfill (SCLF) as required by regulatory standards and use the captured LFG generated by the SCLF for beneficial purposes such as combusting the LFG to generate power. The following alternatives are evaluated in this EIR.

1. Alternative 1: No Project. LFG would continue to be captured and combusted by flare at SCLF. The South Coast Air Quality Management District (SCAQMD) passed new regulations in January 2019 that requires landfills that do not convert 80 percent or more of LFG to beneficial use to replace the existing LFG flares with new flares that comply with lower NO_X and VOC emissions rates. Because the No Project Alternative would involve combusting 100 percent of the LFG in flares with no beneficial reuse, Alternative 1 assumes that the existing flares would be replaced with new flares required by SCAQMD regulation within the next three to four years. Alternative 1 is discussed further in Section 5.6.1.
2. Alternative 2: Convert the LFG to Natural Gas. Alternative 2 includes converting the LFG to natural gas and delivering the natural gas to a connection with an existing SoCalGas natural gas transmission pipeline. Alternative 2 would include removing gas impurities through an LFG gas cleanup system at the SCLF to meet higher natural gas purity standards. After cleaning the LFG to meet SoCalGas standards, the natural gas would be compressed using new equipment at SCLF and delivered to SoCalGas through a new high-pressure pipeline. The existing flares would remain at SCLF and would be used as backup in the event natural gas was unable to be produced or delivered to SoCalGas due to equipment and pipeline repair or maintenance activities. Alternative 2 is discussed further in Section 5.6.2.
3. Alternative 3: Convert LFG to Liquid Natural Gas. (LNG). Alternative 3 includes converting the LFG to LNG at SCLF and utilizing the LNG as vehicle fuel at a new LNG storage and fueling facility at SCLF or transporting the LNG to a commercial user off-site via trucks. LNG is natural gas that is cooled to a temperature at which natural gas becomes a liquid. The conversion process includes a cleanup system to remove impurities from the LFG. The LFG is then cooled and liquefied via a cryogenic process to a temperature of approximately minus 260º F. The volume of the liquid is 600 times smaller than the gaseous form. The LNG would be stored at the landfill in an insulated LNG vessel. The LNG then can be used as vehicle fuel on-site or transported to a commercial user off-site via trucks. Alternative 3 would require a more extensive LFG cleanup system, additional process equipment, and LNG storage vessels at SCLF. The

existing flares would remain at SCLF and would be used as backup in the event LNG was unable to be produced due to equipment repair or maintenance activities or LNG storage capacity is reached. Alternative 3 is discussed further in Section 5.6.3.

4. Alternative 4: Locate Engine Generators at an Another Location. Alternative 4 includes relocating the proposed internal combustion engine generators at Grayson Power Plant. The LFG compression and cleanup system would be located at SCLF. The cleaned LFG would be transported from SCLF to Grayson Power Plant through the existing LFG pipeline. The existing flares would remain at SCLF and would be used as backup in the event LFG was unable to be periodically combusted in the engine generators at Grayson Power Plant due to equipment repair or maintenance activities. Alternative 4 is discussed further in Section 5.6.4.

5.4 ALTERNATIVES CONSIDERED AND NOT SELECTED FOR FURTHER ANALYSIS

State CEQA Guidelines Section 15126.6(c) recommends that an EIR identify alternatives which were considered for analysis but rejected as infeasible and briefly explain the reasons for their rejection. According to the State CEQA Guidelines, the following factors may be used to eliminate alternatives from detailed consideration: the alternative's failure to meet most of the basic Project Objectives, the alternative's infeasibility, or the alternative's inability to avoid significant environmental impacts. Alternatives that have been considered and rejected as infeasible are discussed below. These technology and scale-based alternatives were considered in part as the result of public input during preparation of the previous IS/MND and scoping meetings conducted for this EIR. The following alternatives were considered and not selected for further analysis:

- Generate Electricity in Microturbines
- Generate Electricity in Combustion Turbines
- Reduce Number of Internal Combustion Engines from Four to Three
- Generate Electricity with Fuel Cells
- Convert LFG to Compressed Natural Gas

5.4.1 Generate Electricity in Microturbines

This alternative would involve consuming the LFG in microturbines to generate electricity. An LFG treatment system would be required, and the existing backup flares would remain to support this alternative. Due to the size of microturbines, which inherently limits the generation capacity of each microturbine, this alternative would require the equivalent of approximately 70 microturbines to generate the same electrical output as the proposed Project. This alternative would require development of an additional approximately ½ acre of site compared to the proposed Project to accommodate the 70 microturbines. The microturbines could not be located on the active landfill due to potential surface instability and landfill settling.

The USEPA maintains LFG to energy project information through the Landfill Methane Outreach Program and Landfill Gas Energy Project Database. The most recent database dated July 29, 2019, lists eight LFG projects in operation and two additionally planned within California that generate electricity in microturbines. The largest of the ten projects has a generation output of 1.2 MW, approximately ten times smaller than what would be required to generate electricity in microturbines with the SCLF LFG as fuel (USEPA, 2019). This alternative would result in grading and development of an additional ½ acre of previously undisturbed areas adjacent to the active landfill compared to the proposed Project, therefore this alternative would result in an increase in impacts to aesthetics, biological resources, cultural resources, and land use from an increase in development of previously undisturbed land adjacent to the active landfill compared to the proposed Project.

While this alternative would meet the Project objective to put the LFG to beneficial use, it would result in a higher magnitude of environmental impacts. As noted in the Landfill Gas Energy Project Database, an LFG project generating electricity using microturbines on the scale needed to beneficially use the SCLF LFG is not in operation or currently planned in the state of California. While technically feasible, this alternative would include 70 microturbines that would substantially increase the size of the operation and maintenance activities compared to the proposed Project that utilizes four gas engines. This alternative would not avoid significant environmental impacts of the proposed Project and would substantially increase operation and maintenance activities associated with the number of many microturbines, therefore, this alternative was not considered further analysis.

5.4.2 Generate Electricity in Combustion Turbines

This alternative is similar to the proposed Project but would combust the LFG in gas turbines to generate electricity rather than in reciprocating internal combustion engines (RICE). The existing backup flares would remain to support this alternative. Gas turbines require high pressure inlet gas and the installation of high-pressure gas compressors would reduce the proposed Project's electrical output at a higher capital cost due to the increase in gas compression equipment and energy use required to compress the LFG compared to that required for RICEs associated with the proposed Project . Additionally, two turbines would be required to combust the LFG which would result in reduced flexibility and efficiency also with a higher cost. The potential environmental impacts of gas turbines would be comparable to gas engines, would result in increased operational costs, and does not prevent otherwise potentially significant impacts from occurring compared to the proposed Project, therefore this alternative was not considered for further analysis.

5.4.3 Reduce Number of Internal Combustion Engines from Four to Three

This alternative involves reducing the number of internal combustion engines from four to three. The existing backup flares would remain to support this alternative. Each of the three internal combustion engines would operate at a higher load factor than the four engines associated with the proposed Project.

Initially, the volume of available LFG would exceed the combustion capacity of only three engines, requiring some LFG to be flared. It is assumed that the existing flares would need to be replaced to meet the recent SCAQMD rule for flare emissions. The operating load factor of each engine would be reduced, and each engine decommissioned as the LFG available decreases over time. This alternative would occur at the same site as the proposed Project and is of comparable technology type and space requirements. The potential environmental impacts of removing one gas engine and flaring excess gas would be comparable to the proposed Project but would not avoid any potentially significant environmental impacts. As this alternative would not reduce or avoid significant environmental impacts and would not beneficially use the LFG to the same degree as the proposed Project, this alternative was not considered for further analysis.

5.4.4 Generate Electricity with Fuel Cells

This alternative involves consuming the LFG in fuel cells at the SCLF to generate electricity. The existing backup flares would remain to support this alternative. A fuel cell directly converts chemical energy to electrical energy without combustion. It is an electrochemical process that combines hydrogen produced from the fuel, in this case methane from the LFG, with oxygen from the air in an anode-cathode electrolyte cell configuration to produce direct current. Oxygen atoms with negative charge from the cathode are transported through a media to the fuel rich positive charged anode where the oxygen ions react with hydrogen ions to produce a current. Each anode-cathode cell consumes small amounts of methane and produces very small amounts of direct current, therefore numerous cells would be required to be combined together to consume all the available methane from the landfill. Direct current is then converted to alternating current via inverters. This chemical reaction produces electricity without producing direct emissions of air pollutants and would reduce air quality impacts when compared to the proposed Project.

There are two main drawbacks of utilizing fuel cells to make electricity from methane derived from LFG.

1. The LFG would have to be scrubbed to remove all siloxanes, silicones, sulfur, VOCs and other constituents of the LFG that would be attracted to the anode and which would poison the anode rendering the fuel cell ineffective.
2. Each cell consumes very small amount of methane and therefore numerous cells would have to be packaged together making a fuel cell package large in size and numerous packages would have to be combined together to consume all the methane available.

To prevent the LFG from poisoning the anode, the LFG cleanup system would have to be significantly more rigorous for fuel cells than for the proposed Project. The process to clean the LFG prior to use in a fuel cell would involve more equipment and would have higher energy consumption associated with processing the LFG for beneficial use compared to the proposed Project and RICEs that can combust the LFG with less pre-treatment.

Each existing commercial fuel cell module generates 300 kWh of electricity utilizing cleaned LFG is approximately 33 ft by 5 ft and 8 ft tall. It would require 40 fuel cell modules coupled together to utilize all the available LFG to generate the approximately gross 13 MW of electricity produced by the engines. Due to the high energy consumption of the fuel cell cleanup system, less electricity would be available to the City than would be generated by the engines.

To accommodate the additional fuel cell cleanup system and the numerous fuel cell modules the size of facility footprint would be increased by an additional ½ acre compared to that needed for the proposed Project. Due to the topography and proximity of the landfill on the north side, steep drop off on the south side, and existing equipment on the west side, the additional half an acre of land would have to be on the east side where significant grading, retaining walls and topographic disturbance would be required.

To overcome the land constraint at SCLF, if the LFG could be cleaned to fuel cell requirements, one option would be to place the LFG cleanup system at SCLF and transport the cleaned gas to Grayson via the existing Scholl to Grayson pipeline. The LFG cleanup system would still require a process flare to be located near the cleanup system at SCLF to combust and destroy the unwanted constituents that are removed from the LFG; however, in this case the fuel cell modules could be placed at Grayson and the electricity generated at Grayson.

The USEPA's Landfill Methane Outreach Program and Landfill Gas Energy Project Database dated July 2019, does not list any operational LFG projects using fuel cells to generate electricity. The database does list one planned LFG project in Newport Beach that would involve a combination of generating electricity and hydrogen vehicle fuel using fuel cells. The project would include two 2.35 MW capacity fuel cells and would produce 1,270 kg/day hydrogen fuel (USEPA, 2019).

The largest obstacles to generating electricity from fuel cells with LFG are the high cost and energy requirement of the LFG cleanup system and unreliability of existing technology to effectively remove siloxanes, silicones, sulfur, VOC's and other unwanted constituents from the LFG. LFG cleanup system technology has not developed sufficiently to promote operations of fuel cells on LFG at the scale needed to consume the available LFG at the SCLF. While this alternative would achieve the proposed Project objective, it is not technically or economically feasible at the scale required and therefore was not considered for further analysis.

5.4.5 Convert LFG to Compressed Natural Gas

This alternative would consist of converting the available LFG to Compressed Natural Gas (CNG) and using the CNG as vehicle fuel. The existing backup flares would remain to support this alternative. The conversion process begins by removing water and compressing the LFG to a higher pressure required by the LFG cleanup system. This alternative would require a more extensive LFG cleanup system than currently exists to remove gas impurities such as sulfur compounds, carbon dioxide, siloxane, additional moisture, nitrogen and oxygen. Similar to the proposed Project, the LFG cleanup system would require a process flare to be located near the cleanup system to combust and destroy some of the impurities that would be removed from the LFG. The cleaned gas is then compressed a second time and either used directly to fuel vehicles in a slow fill system or is stored in high pressure vessels to fuel vehicles in a fast fill system. Removing the large quantities of oxygen, nitrogen and carbon dioxide contained in the LFG prior to converting to CNG would require more energy compared to the proposed Project.

As shown in **Table 53**, there is one operational and six planned LFG to RNG projects in California. The operational project involves converting LFG to LNG use as vehicle fuel. All six planned LFG to RNG projects are listed as vehicle fuel uses with two including pipeline conveyance of produced RNG. Based on available data from the USEPA included in **Table 53**, it is not clear if any of the vehicle use applications involve CNG as the fuel type.

This alternative has the following considerations:

- The available cleaned LFG would produce tens of thousands of gallons of CNG per day, sufficient to fuel hundreds of trucks per day. It is assumed the necessary gas cleanup system would be located at the SCLF in approximately the same area as the existing gas cleanup system.
- Due to the equipment and space requirements related to a fueling facility, the area needed to accommodate the gas cleanup and compression system as well as the fueling station would necessitate development of an additional one and one-half acres of previously undisturbed areas adjacent to the active landfill compared to the proposed Project.
- CNG would be stored in cylinders measuring 24 inches in diameter by 103 feet long, referred to as “bullets”. Bullets are commonly placed in series of three referred to as a “stack”. There would need to be 82 stacks to hold the amount of CNG produced daily. Each stack would have an approximate volume of 112.5 actual cubic feet of natural gas compressed to a pressure of approximately 4,500 psig.
- There are two options available to fuel trucks with CNG. Slow fill that would require CNG to be compressed, have the trucks park at the fueling station and fuel the trucks slowly over night; or quick fill that would require the trucks to be driven to the fueling station and more quickly be fueled from high pressure storage vessels as they would in a gas station.
- Locating the CNG vehicle fueling station at the SCLF would avoid the need to convey the CNG to an off-site location. An option would be to transport the cleaned LFG at low pressure via the existing pipeline between SCLF and Grayson Power Plant, compress the cleaned LFG to high pressure CNG requirements at Grayson Power Plant and install a truck fueling system at Grayson Power Plant.
- An additional option would be to construct a new approximately 5-mile long pipeline to transport the cleaned LFG to the City of Glendale’s only CNG fueling station located on West Cerritos Avenue, compress the cleaned LFG to high pressure CNG requirements, and utilize the existing fueling station to fuel CNG vehicles.

This alternative would not have any potential environmental impacts less than the proposed Project. It would have lower operation phase emissions of air pollutants, greenhouse gases, and noise compared to combustion of the LFG in internal combustion engines to generate electricity. However, the emissions and noise associated with hundreds of truck fueling trips per day would likely result in comparable operational emissions and noise as the proposed Project. Because the construction disturbance size and duration would be greater, emissions, noise, and traffic during construction of this alternative would be greater than those associated with the proposed Project. Additionally, more grading of previously undisturbed areas and removal of native vegetation would result and therefore this alternative would have a greater potential impact to biological resources, geology and soils, and hydrology and water quality; particularly during construction. The additional site size and grading required would have also have a greater potential for aesthetics and land use impacts. There would be an increase in energy use due to the compression of the natural gas and traffic during operation of this alternative related to vehicles fueling at the CNG fueling station whether located at SCLF or Grayson Power Plant. The handling and storage of CNG represents a greater consequence in the event of an accidental release compared to the aqueous ammonia storage associated with the proposed Project for emissions control. USEPA's ALOHA model (https://www.epa.gov/cameo/aloha-software) was used to screen the potential hazards and fire risks from a worst-case release of CNG which equates to a complete release of one stack of CNG storage vessels which equates to 112.5 actual cubic feet of stored CNG at 4,500 psi. The ALOHA input and output files are included as Appendix O (Off-site Consequence Analysis for LFG to CNG). The ALOHA screening demonstrates that flame patches associated with the flammable area of vapor cloud could extend 867 feet from the release site. Similarly, a vapor cloud explosion could shatter glass located within 735 feet of the release site. The toxic area vapor cloud could also result in adverse health effects to people located within 453 feet of the release site. These potential hazards are greater than those associated with a worst-case release of aqueous ammonia associated with the proposed Project.

Potential construction air quality, greenhouse gas emissions, biological resources, geology and soils, hydrology and water quality, noise, and traffic and transportation impacts would be greater than those of the proposed Project. Potential operation phase aesthetics, hazards and hazardous materials, land use and planning, traffic and transportation noise, energy, and wildfire impacts would be greater than those of the proposed Project. While this alternative meets the proposed Project objective of beneficial reuse of the LFG, it would not generate electricity and will not assist the City in meeting the Renewable Portfolio Standard requirements. Consequently, converting the LFG to CNG for use as vehicle fuel was not considered further as an alternative due to substantially greater potential environmental impacts and not meeting the objectives as well as the proposed Project.

5.5 ANALYSIS FORMAT

In accordance with State CEQA Guidelines Section 15126.6(d), each alternative is evaluated in sufficient detail to determine whether the overall environmental impacts would be less than, similar to, or greater than the corresponding impacts of the proposed Project. Furthermore, each alternative is evaluated to determine whether the proposed Project objectives, identified in Chapter 2.0, Project Description would be substantially attained by the alternative. The evaluation of each of the alternatives follows the process described below:

- A description of the alternative.
- The net environmental impacts of the alternative for each environmental issue area analyzed in the EIR are described. Where applicable, the evaluation is divided between temporary impacts that would occur during the alternative's construction phase and impacts that would occur during the alternative's operational phase.
- Potential environmental impacts of the alternative and the proposed Project are compared for each environmental topic area. Where the impact of the alternative would be clearly less than the impact of the proposed Project, the comparative impact is said to be "less." Where the alternative's net impact would clearly be more than the proposed Project, the comparative impact is said to be "greater." Where the impacts of the alternative and Project would be roughly equivalent, the comparative impact is said to be "similar."
- The comparative analysis of the impacts is followed by a general discussion of the extent to which the underlying purpose and Project Objective are attained by the alternative.

At the end of the section, a relative comparison of the alternative's impacts and consistency with Project Objectives is provided. Pursuant to CEQA Guidelines Section 15126.6(e)(2) an "Environmentally Superior Alternative" is also identified.

5.6 ALTERNATIVES ANALYSIS

5.6.1 Alternative 1: No Project

5.6.1.1 Description of the Alternative

Under the No Project Alternative (Alternative 1), the naturally occurring LFG would continue to be flared at the SCLF. The SCAQMD passed new regulations in January 2019 that requires landfills that do not convert 80 percent or more of LFG to beneficial use to replace the existing LFG flares with new flares that comply with more lower NO_X and VOC emissions rates. Alternative 1, which would flare 100 percent of the LFG, therefore assumes that the LFG would be combusted in the existing flares until replacement flares would be installed and not be beneficially used. Alternative 1 includes construction activities associated with replacing the existing flares. Under the SCAQMD rule, an application to replace the flares would need to be submitted to SCAQMD within 12 months after the flares combust greater than 20 percent of the available LFG for two consecutive calendar years. The replacement flares would also need to be installed within 18 months of receiving the SCAQMD permit. It is therefore assumed that the existing flares would be replaced within the next three to four years under Alternative 1.

5.6.1.2 Environmental Impacts

The following are the potential environmental impacts that would result from Alternative 1.

<u>Potential Environmental Impacts Less than Those of the Proposed Project</u>

Due to the decreased construction activity, reduced disturbance size and reduced construction duration, emissions, noise, and traffic during construction of Alternative 1 would be less than those associated with the proposed Project, even if the flares are replaced. Alternative 1 would avoid grading previously undisturbed areas and removal of native vegetation and would therefore have less of a potential impact to biological resources, geology and soils, and hydrology and water quality; particularly during construction. Operation phase air emissions of Alternative 1 would be less than those of the proposed Project because the flares emit lower concentrations of air pollutants than the RICEs associated with the proposed Project. In addition, the LFG in flares would be expected to have lower noise levels than combustion for power generation associated with the proposed Project. Replacing the flares would have a similar aesthetic impact as existing conditions and less than the proposed Project that would include grading of previously undisturbed areas and installation of engine exhaust stacks with an approximate 40-foot elevation profile, likely higher than a 30 foot elevation profile for replacement flares. Alternative 1 would not require issuance of a land use permit and would also avoid risks associated with an accidental release of aqueous ammonia used for emissions control for the proposed internal combustion engines. Potential construction air quality, greenhouse gas emissions, biological resources, geology and soils, hydrology and water quality, noise, and traffic and transportation impacts and operation phase aesthetics, air quality, hazards and hazardous materials, land use, and noise impacts of Alternative 1 would be less than those of the proposed Project.

Potential Environmental Impacts Similar to Those of the Proposed Project:

Under Alternative 1, impacts associated with the LFG collection and flare system would remain. Both Alternative 1 and the proposed Project would have to comply with applicable fire code requirements such as emergency access, fire prevention/suppression equipment, and brush clearance/fuel control. Alternative 1 would include flares as the primary combustion source of wildfire risk whereas the proposed Project's primary combustion source would be internal combustion engines in enclosures equipped with an inert gas fire suppression system. Neither Alternative 1 nor the proposed Project would occur on lands zoned or used for agriculture, residential, mineral resource development, or with known cultural resources sensitivities. While the site is zoned Special Recreation, it is within the SCLF and is not used for recreation. Demand for public services and utility access/use between Alternative 1 and the proposed Project are comparable. Alternative 1 would have similar impacts as the proposed Project with respect to agriculture and forestry resources, cultural resources, mineral resources, population and housing, public services, recreation, tribal cultural resources, utilities and service systems, and wildfire.

Potential Environmental Impacts Greater than Those of the Proposed Project:

Alternative 1 would not utilize the naturally occurring LFG as a renewable electricity resource to assist in meeting Renewable Portfolio Standard requirements. Flaring the LFG would not provide any energy benefit and would waste a designated renewable energy source. Alternative 1 would not be as consistent with state and local plans for renewable energy or energy efficiency. Therefore, Alternative 1 would have greater indirect greenhouse gas emissions/climate change and energy impacts compared to the proposed Project because other potentially non-renewable energy sources would make up the amount of renewable energy available from the Project but not generated.

5.6.1.3 Objectives Consistency Evaluation

The naturally occurring LFG would be captured it would not be put to beneficial use and therefore, Alternative 1 would not meet the proposed Project objectives.

5.6.1.4 Summary

The City is required to generate a portion of its electricity from renewable resources. In addition to not meeting the proposed Project objective of beneficial use of the LFG, Alternative 1 would prevent using the naturally occurring LFG as an additional renewable electricity source to help meet State-mandated Renewable Portfolio Standard requirements. Recent SCAQMD regulatory action that requires lower flare emissions limits when less than 80 percent of LFG is used for beneficial purposes would result in replacement of the existing flares under Alternative 1.

Potential construction air quality, greenhouse gas emissions, biological resources, geology and soils, hydrology and water quality, noise, and traffic and transportation impacts and operation phase aesthetics, air quality, hazards and hazardous materials, land use, and noise impacts of Alternative 1 would be less than those of the proposed Project. However, long-term greenhouse gas emissions and energy impacts of the Alternative 1 would be greater than those of the proposed Project.

5.6.2 Alternative 2: Convert Landfill Gas to Natural Gas

5.6.2.1 Description of the Alternative

Alternative 2 includes converting the LFG to natural gas at SCLF. The existing backup flares would remain to support this alternative. It is presumed a high-pressure pipeline would be constructed and operated to deliver the natural gas to a connection with an existing SoCalGas natural gas transmission pipeline. A gas compressor system would have to be installed at SCLF to deliver the cleaned LFG to the SoCalGas transmission system. Alternative 2 would have a similar site size at SCLF compared to the proposed Project.

SoCalGas can accept this renewable natural gas (RNG) provided that the RNG meets California Public Utilities Commission (CPUC) approved SoCalGas Rule 30 terms and conditions. **Table 54** below summarizes some of these requirements in comparison to the existing LFG at SCLF.

Table 54 CPUC Renewable Natural Gas Specification Compared to Scholl Canyon LFG

Specification	CPUC Standard for RNG	Existing Scholl Canyon LFG*
Heating value	Between 990 and 1,150 Btu/scf	350 Btu/scf
Carbon dioxide content	Less than 3%	30%
Oxygen content	No greater than .2%	5.2%
Nitrogen content	No greater than 4%	26.5%

*Source: AtmAA Inc., 2018

There are additional unwanted components in the LFG, such as sulfur compounds, silicones, siloxanes, and non-methane organic compounds that would have to be removed and additional specifications met before the SoCalGas would accept the LFG. The LFG cleanup system would require a process flare to be located near the cleanup system to combust and destroy the unwanted constituents that are removed from the LFG.

If the LFG could be cleaned to comply with SoCalGas Rule 30, it would have to be conveyed via a high-pressure pipeline to a SoCalGas transmission pipeline where it would mix with the natural gas within the SoCalGas pipeline. There are no SoCalGas transmission pipelines near the landfill, therefore Alternative 2 assumes converting the LFG to natural gas at SCLF and transporting the cleaned gas via the existing pipeline between SCLF and Grayson Power Plant. Under this scenario, a gas compression system would be installed at Grayson to compress the natural gas to transmission line pressure of approximately 500 psig. The natural gas would then be conveyed through a new approximately 1/3-mile-long high-pressure pipeline in and around San Fernando Road towards the 134 freeway to an interconnection with a SoCalGas transmission line.

As shown in **Table 53**, there is one operational and six planned LFG to renewable natural gas projects in California. The operational project involves converting LFG to LNG for use as vehicle fuel. All six planned LFG to RNG projects are listed as vehicle fuel uses with two including pipeline conveyance of produced RNG.

5.6.2.2 Environmental Impacts

Following are the potential environmental impacts that would result from Alternative 2.

Potential Environmental Impacts Less than Those of the Proposed Project

Alternative 2 would have a similar site size at SCLF but would have a lower elevation profile (30 feet) compared to the proposed Project (40 feet). Converting LFG to natural gas would have lower operation phase direct emissions of air pollutants and greenhouse gases and noise compared to combustion of the LFG in internal combustion engines to generate electricity. Alternative 2 would reduce operation phase combustion sources of wildfire risk. Potential long-term aesthetics, air quality, greenhouse gas emissions, noise, and wildfire impacts of Alternative 2 would be less than those of the proposed Project.

Potential Environmental Impacts Similar to Those of the Proposed Project

Alternative 2 would result in similar disturbances to the same previously undisturbed areas compared to the proposed Project. Neither Alternative 2 nor the proposed Project would occur on lands zoned or used for agriculture, residential, mineral resource development, or with known cultural resources sensitivities. While the site is zoned Special Recreation, it is within the SCLF and is not used for recreation. Demand for public services and utility access/use between Alternative 2 and the proposed Project are comparable. Alternative 2 would have similar impacts as the proposed Project to agriculture and forestry resources, biological resources, cultural resources, mineral resources, population and housing, public services, recreation, tribal cultural resources, and utilities and service systems.

Potential Environmental Impacts Greater than Those of the Proposed Project

It is expected that construction activities at SCLF associated with the Alternative 2 would be similar to those of the proposed Project. However, because Alternative 2 would require a new natural gas pipeline installed in the public right of way of an urbanized area to connect the Grayson Power Plant to a SoCalGas transmission pipeline near Highway 134, it is expected construction air quality, greenhouse gas emissions, geology and soils, hydrology and water quality, land use and planning, noise, and traffic and transportation impacts of Alternative 2 would be greater than those of the proposed Project. Cleaning the LFG to standards that SoCalGas can accept into their transmission system, as well as conveying it to the point of connection with the SoCal Gas pipeline, would require more compression energy and have higher energy related impacts than that of the proposed Project. Alternative 2 includes a risk of upset and release of natural gas from conveying it through pipelines in urbanized areas to Grayson Power Plant and a connection with a SoCalGas transmission pipeline. Alternative 2 would have greater hazards and hazardous materials impacts related to continuing to operate the existing SCLF to Grayson Power Plant LFG pipeline and a new high-pressure natural gas pipeline in an urban area compared to the proposed Project that would abandon in place the existing SCLF to Grayson Power Plant LFG pipeline.

5.6.2.3 Objectives Consistency Evaluation

The naturally occurring LFG would be put to beneficial use and therefore Alternative 2 would meet the proposed Project objective.

5.6.2.4 Summary

Although technically feasible, and it has been done under certain test conditions, removing the unwanted components of the LFG, especially the large quantity of CO_2, O_2, and N_2 required to comply with the Rule 30 specifications would be a significant, energy consuming, and expensive challenge because it would require more equipment and processing of the LFG compared to combusting it in RICEs

The City is required to generate a portion of its electricity from renewable resources. While Alternative 2 may be eligible for Low Carbon Fuel Standard credits, this alternative would prevent the City from using the naturally occurring LFG as an additional renewable electricity source to help meet and exceed State-mandated Renewable Portfolio Standard requirements. Additionally, Alternative 2 would not allow the City to decommission the existing pipeline between SCLF and Grayson Power Plant and would require the construction of a new ½ mile long pipeline to convey the gas to existing SoCalGas infrastructure.

Construction air quality, greenhouse gas emissions, geology and soils, hydrology and water quality, land use and planning, noise, and traffic and transportation impacts of Alternative 2 would be greater than those of the proposed Project. Potential long-term aesthetics, air quality, greenhouse gas emissions, hazards and hazardous materials, noise, and wildfire impacts of Alternative 2 would be less than those of the proposed Project.

5.6.3 Alternative 3: Convert Landfill Gas to Liquid Natural Gas

5.6.3.1 Description of the Alternative

Alternative 3 would convert LFG to LNG; which is natural gas in its liquid phase. The existing backup flares would remain to support this alternative. The conversion process begins by removing water and compressing the LFG to a higher pressure required by the LFG cleanup system. Alternative 3 would require a more extensive LFG cleanup system than currently exists to remove gas impurities such as sulfur compounds, carbon dioxide, siloxane, additional moisture nitrogen and oxygen. Similar to the proposed Project, the LFG cleanup system would require a process flare to be located near the cleanup system to combust and destroy some of the impurities that would be removed from the LFG. The cleaned LFG is then cooled and liquefied via a cryogenic process to a temperature of approximately minus 260ºF. The LNG would be stored at the landfill in an insulated LNG vessel. The LNG then can be used as vehicle fuel on-site or transported to a commercial user off-site via trucks. Alternative 3 is technically feasible; however, removing the large quantities of oxygen, nitrogen and carbon dioxide entrained in the LFG plus liquefying the gas is more energy consuming and involves more equipment related to the extensive gas cleanup system required compared to the proposed Project. As shown in **Table 53**, there is one operational LFG to LNG project in California that uses the produced LNG to fuel garbage trucks.

Alternative 3 has the following considerations:

- The gas treatment, liquification, storage, and vehicle fueling facilities would include equipment that would require approximately one acre of additional site development compared to the proposed Project.
- Would either require vehicles to travel to the site to be fueled or require that LNG be transported off-site for commercial use using trucks. Alternative 3 would produce 32,000 gallons of LNG per day.
- A filling station would create additional infrastructure consisting of LNG pumps that would circulate the LNG through cryogenic loading arms and back to the storage tank. Additional vehicle trips to/from the Project site would be required. Also, vehicles would need to be converted to use LNG or new vehicles purchased.
- The LNG would need to be stored in an approximately 70,000-gallon vessel which would be 12.5 feet diameter by 103 feet long. Stored LNG has an increased safety risk. If a leak occurs in the LNG system, the liquid LNG would vaporize, expand at a volume 600 times that of the liquid and could create an explosive mixture with the atmosphere over a wide area.
- Alternative 3 would allow Glendale Water and Power (GWP) to decommission the existing SCLF pipeline to the Grayson Power Plant.
- The City does not currently have any vehicles fueled by LNG. In order to utilize the produced LNG as vehicle fuel, Alternative 3 would require the City to sell the LNG or introduce hundreds of LNG-fueled vehicles to the City's fleet to consume the available LNG.
- There would be no credit to Glendale's attainment of the California Renewable Portfolio Standard as the LFG would not be used to generate electricity.
- The Pipeline and Hazardous Materials Safety Administration (PHMSA) is the primary Federal Administration responsible for ensuring that pipelines are safe, reliable, and environmentally sound. The rules governing pipeline safety are included in Title 49 of the Code of Federal Regulations (CFR). Part 193 specifically addresses safety standards for LNG facilities. The existing pipeline between Scholl Canyon and Grayson was designed to convey LFG at ambient temperature at low pressure. The pipeline does not meet the design and safety standards promulgated in Part 193 for conveying cryogenic LNG under high pressure and could not be used to convey LNG produced at the SCLF to Grayson. A new pipeline would need to be constructed in order to convey LNG to Grayson to a new vehicle fueling station.

5.6.3.2 Environmental Impacts

The following are the potential environmental impacts that would result from Alternative 3.

Potential Environmental Impacts Less than Those of the Proposed Project:

Alternative 3 would have lower operation phase emissions of air pollutants and greenhouse gases compared to combustion of the LFG in internal combustion engines to generate electricity. Potential long-term air quality and greenhouse gas emissions impacts of Alternative 3 would be less than those of the proposed Project.

Potential Environmental Impacts Similar to Those of the Proposed Project:

Neither Alternative 3 nor the proposed Project would occur on lands zoned or used for agriculture, residential, mineral resource development, or with known cultural resources sensitivities. While the site is zoned Special Recreation, it is within the SCLF and is not used for recreation. Demand for public services and utility access/use between Alternative 3 and the proposed Project are comparable. Alternative 3 and the proposed Project would include construction and operation noise at the same site, which would result in comparable noise levels at the nearest sensitive receptors which are located more than 2,200 feet away. Alternative 3 would have similar impacts as the proposed Project to agriculture and forestry resources, cultural resources, mineral resources, noise, population and housing, public services, recreation, tribal cultural resources, and utilities and service systems.

Potential Environmental Impacts Greater than those of the proposed Project:

The construction disturbance size is one acre greater than that needed for the proposed Project, therefore emissions, noise, and traffic during construction of Alternative 3 would be greater than those associated with the proposed Project. Alternative 3 would include more grading of previously undisturbed areas and removal of native vegetation and would have a greater potential impact to biological resources, geology and soils, and hydrology and water quality; particularly during construction. The additional site size and grading required would have a greater potential for aesthetics and land use impacts as there would be an increase in development of previously undisturbed areas compared to the proposed Project. Converting LFG to LNG and operating an LNG fuel station would require more energy resulting in higher energy related impacts than that of the proposed Project. There would be an increase in traffic during operation of this alternative related to vehicles fueling at the LNG station or transportation of LNG to an off-site location.

The handling and storage of up to 70,000 gallons of LNG represents a greater consequence in the event of an accidental release compared to the aqueous ammonia storage associated with the proposed Project for emissions control. Cameo's Areal Locations of Hazardous Atmospheres (ALOHA) model (https://www.epa.gov/cameo/aloha-software) was used to screen the potential hazards and fire risks from a worst-case release of LNG which equates to a complete release of 70,000 gallons of stored LNG. The ALOHA input and output files are included as Appendix N (Off-site Consequence Analysis for LFG to LNG). As the LNG is released, it transforms from a liquid phase to a gas phase and expands in volume by 600 times. This rapid expansion can create what is referred to as a boiling liquid expanding vapor explosion. The ALOHA screening demonstrates that flame patches associated with the flammable area of vapor cloud could extend 1.2 miles from the release site. Similarly, a vapor cloud explosion could shatter glass located within one mile of the release site. The toxic area vapor cloud could also result in adverse health effects to people located within 0.69 miles of the release site. The potential hazards and wildfire impact of Alternative 3 are greater than those associated with the proposed Project.

Potential construction air quality, greenhouse gas emissions, biological resources, geology and soils, hydrology and water quality, noise, and traffic and transportation impacts of Alternative 3 would be greater than those of the proposed Project. Potential operation phase aesthetics, energy, hazards and hazardous materials, land use and planning, traffic and transportation, and wildfire impacts of Alternative 3 would be greater than those of the proposed Project.

5.6.3.3 Objectives Consistency Evaluation

The naturally occurring LFG would be put to beneficial use and therefore, Alternative 3 would meet the proposed Project objective.

5.6.3.4 Summary

The City is required to generate a portion of its electricity from renewable resources. Converting LFG to LNG would prevent using the renewable LFG to generate electricity and therefore, the City would not receive credit towards meeting the mandated requirements of generating electricity from renewable sources. Alternative 3 would allow the City to decommission the existing pipeline between SCLF and Grayson Power Plant.

Potential long-term air quality and greenhouse gas emissions impacts of Alternative 3 would be less than those of the proposed Project. Potential construction air quality, greenhouse gas emissions, biological resources, geology and soils, hydrology and water quality, noise, and traffic and transportation impacts of Alternative 3 would be greater than those of the proposed Project. Potential operation phase aesthetics, energy, hazards and hazardous materials, land use and planning, traffic and transportation, and wildfire impacts of Alternative 3 would be greater than those of the proposed Project.

5.6.4 Alternative 4: Locate Engine Generators at Another Location

5.6.4.1 Description of the Alternative

Alternative 4 includes relocating the proposed internal combustion engine generators to an alternate location such as Grayson Power Plant or other City owned location within the City. The LFG compression and cleanup system, including the process flare, would be located at the landfill. The existing flares would remain at SCLF and would be used as backup in the event LFG was unable to be periodically combusted in the engine generators due to equipment repair or maintenance activities. Because at least 80 percent of the LFG is expected to be combusted in engine generators under this alternative, the existing flares would not be subject to SCAQMD regulations requiring their replacement with cleaner burning flares. The cleaned LFG would be transported by the existing pipeline to Grayson Power Plant. The four engine generators, jacket water coolers, aqueous ammonia storage (NOx and CO emissions control) and generation electrical equipment would be located at Grayson.

This alternative requires the installation and operation of new electrical generation equipment to combust the LFG at Grayson Power Plant because the existing electrical generation equipment at Grayson Power Plant is either not designed to combust LFG or can no longer combust LFG as a result of SCAQMD regulations. The potential environmental impacts of constructing new infrastructure including a new conveyance pipeline to a different site would result in substantially greater impacts than which would occur from siting the engine generators at Grayson Power Plant. As such, other site locations are not considered further in this alternatives evaluation.

Alternative 4 has the following considerations:

- The existing LFG pipeline with its required maintenance would remain in service.
- Grayson has the necessary space and required infrastructure to support operation of the engine generators.
- Siting the engine generators at Grayson would require that Glendale purchase additional emission offset credits since the SCAQMD would not make credits available from the Priority Reserve. The Priority Reserve was established by the SCAQMD to provide emissions credits for specific priority sources including small electrical generating facilities. The additional cost would be $20 to $25 million.
- At Grayson Power Plant, the nearest sensitive receptor and dwelling is located approximately 300 feet from power plant whereas the nearest sensitive receptor to the proposed Project is located more than 2,200 feet away.

5.6.4.2 Environmental Impacts

Following are the potential environmental impacts that would result from Alternative 4.

Potential Environmental Impacts Less than Those of the Proposed Project

Alternative 4 would require less land at the SCLF and therefore would avoid grading previously undisturbed areas and removal of native vegetation. Alternative 4 would therefore have less of a potential impact to biological resources, geology and soils, and hydrology and water quality; particularly during construction. The LFG would be combusted at Grayson Power Plant which is an existing developed power generation facility located in an area of lower wildfire hazard severity area then the SCLF and surrounding area. Alternative 4 would reduce development on lands zoned as Open Space and would occur in an area of generally lower aesthetic sensitivity compared to the proposed Project that would include an incremental increase in development in proximity to a ridgeline. Potential aesthetics, land use, and wildfire impacts of Alternative 4 would be less compared to the proposed Project.

Potential Environmental Impacts Similar to Those of the Proposed Project

Alternative 4 involves similar activities and equipment as the proposed Project but places the engine generators at a different site location. Neither would occur on lands zoned or used for agriculture, mineral resource development, or with known cultural resources sensitivities. While the site is zoned Special Recreation, it is within the SCLF and is not used for recreation. While the geologic conditions vary between the two sites, both Alternative 4 and the proposed Project would be designed in accordance with applicable building code requirements that take into account site-specific geologic conditions, seismic safety design, and settlement considerations. Alternative 4 and the proposed Project would incorporate similar construction stormwater best management practices and stormwater/industrial drainage facilities/requirements during operation. Demand for public services, traffic volumes, and utility access/use between Alternative 4 and the proposed Project are comparable. Alternative 4 would have similar impacts as the proposed Project to agriculture and forestry resources, cultural resources, geology and soils, hydrology and water quality, mineral resources, population and housing, public services, recreation, transportation and traffic, tribal cultural resources, and utilities and service systems.

Potential Environmental Impacts Greater than Those of the Proposed Project

Potential hazards associated with a release during operation of the LFG pipeline would be greater with Alternative 4 compared to decommissioning the pipeline with the proposed Project. Emissions of criteria air pollutants and toxic air contaminants as well as noise from the engine generators would occur in closer proximity to sensitive and residential receptors and would have higher potential health risk and noise impacts compared to the proposed Project. Additionally, there would be an increase in indirect greenhouse gas emissions from energy used to convey the LFG to Grayson Power Plant compared to combusting the LFG at SCLF due to the additional energy required to transport the LFG to another location. Alternative 4 would have greater air quality, energy, greenhouse gases, hazardous and hazardous materials, and noise impacts than the proposed Project.

5.6.4.3 Objectives Consistency Evaluation

The naturally occurring LFG would be put to beneficial use and therefore Alternative 4 would meet the proposed Project objective.

5.6.4.4 Summary

Alternative 4 would generate electricity that meets Renewable Portfolio Standard eligibility and would assist the City in meeting those requirements. Alternative 4 would not allow the City to decommission the existing pipeline between SCLF and Grayson Power Plant. Relocating the engine generators from SCLF would also preclude the City from obtaining Priority Reserve credits from the SCAQMD which would result in a 20 to $25 million cost increase compared to the proposed Project. The Priority Reserve was established by SCAQMD to provide credits for specific priority sources, of which they have indicated would apply to power generation using LFG at the SCLF.

Alternative 4 would have less of a potential impact to biological resources, geology and soils, and hydrology and water quality during construction. Potential aesthetics, land use, and wildfire impacts of resulting from Alternative 4 would also be less compared to the proposed Project. Alternative 4 would have greater air quality, energy, greenhouse gases, hazardous and hazardous materials, and noise impacts than the proposed Project and these impacts would be in closer proximity to residential uses.

5.6.5 Comparison of Alternatives

A comparison of the alternatives carried forward for analysis relative to the proposed Project with respect to the alternative’s ability to meet the proposed Project objectives and relative environmental impacts is summarized in **Table 55**.

Table 55 Comparison of Alternatives

		Alternative 1 No Project	Alternative 2 Convert Landfill Gas to Natural Gas	Alternative 3 Convert Landfill Gas to Liquid Natural Gas	Alternative 4 Locate Engine Generators at an Another Location
Ability to Meet Project Objective					
Would the alternative provide beneficial use of naturally occurring LFG?		No	Yes	Yes	Yes
Environmental Factor	**Project Impacts**	**Comparison of Potential Environmental Impacts to Project**			
Aesthetics	Less than Significant Impact	Less	Less	Greater	Less
Agriculture & Forestry Resources	No Impact	Similar	Similar	Similar	Similar
Air Quality	Less than Significant Impact	Less	Less	Less	Greater
Biological Resources	Less than Significant Impact with Mitigation	Less	Similar	Greater	Less
Cultural Resources	No Impact	Similar	Similar	Similar	Similar
Energy	Less than Significant Impact	Greater	Greater	Greater	Greater
Geology & Soils	Less than Significant Impact	Less	Greater	Greater	Similar
Greenhouse Gas Emissions	Less than Significant Impact	Greater	Less	Less	Greater
Hazards & Hazardous Materials	Less than Significant Impact	Less	Greater	Greater	Greater
Hydrology & Water Quality	Less than Significant Impact	Less	Greater	Greater	Similar
Land Use and Planning	Less than Significant Impact	Less	Greater	Greater	Less
Mineral Resources	No Impact	Similar	Similar	Similar	Similar
Noise	Less than Significant Impact	Less	Less	Similar	Greater
Population & Housing	No Impact	Similar	Similar	Similar	Similar
Public Services	No Impact	Similar	Similar	Similar	Similar
Recreation	No Impact	Similar	Similar	Similar	Similar
Transportation and Traffic	Less than Significant Impact	Less	Greater	Similar	Similar
Tribal Cultural Resources	Less than Significant Impact	Similar	Similar	Similar	Similar

		Alternative 1 No Project	Alternative 2 Convert Landfill Gas to Natural Gas	Alternative 3 Convert Landfill Gas to Liquid Natural Gas	Alternative 4 Locate Engine Generators at an Another Location
Utilities and Service Systems	Less than Significant Impact	Similar	Similar	Similar	Similar
Wildfire	Less than Significant Impact with Mitigation	Similar	Less	Greater	Less

5.6.6 Identification of the Environmentally Superior Alternative

CEQA requires that an EIR identify the environmentally superior alternative(s) of a project other than the proposed project or the "no project" alternative (CEQA Guidelines Section 15126.6 (e)(2)) if the no project alternative is the environmental superior. As stated at the beginning of this chapter, the purpose of this alternatives analysis is to consider a reasonable range of alternatives that could feasibly attain the basic project objective and avoid or substantially lessen significant project impacts.

The No Project Alternative would not satisfactorily meet the proposed Project objective.

As shown above in **Table 55**, the proposed Project, prior to incorporating mitigation, has the potential to significantly impact biological resources and wildfire. Of the alternatives considered in this evaluation, Alternative 4 is the only alternative that would reduce or avoid the potentially significant environmental effects of the proposed Project in the areas of biological resources and wildfire. However, placing the engine generators at Grayson Power Plant and significantly closer to sensitive and residential receptors would increase health risks and noise levels compared to the proposed Project. Additionally, an increase in energy use, indirect greenhouse gas emissions, and risk of upset/hazards from continued use of the SCLF to Grayson Power Plant pipeline would result compared to the proposed Project.

Alternative 2 would have incrementally less impacts to five environmental factors and incrementally greater impacts to six environmental factors compared to the proposed Project. Alternative 3 would have incrementally greater impacts to eight environmental factors and incrementally less impacts to two environmental factors when compared to the proposed Project. Alternative 4 would have incrementally greater impacts to five environmental factors and incrementally less impacts to four environmental factors when compared to the proposed Project.

As a result of this analysis, Alternative 2 is the environmentally superior alternative because it would reduce more proposed Project impacts when compared to the other alternatives. These include reductions in impacts to aesthetics, air quality, noise, greenhouse gas emissions and wildfire risk. Alternative 2 impacts on biological resources is similar to the proposed Project. Alternative 2 decreases more impacts compared to the proposed Project and also when compared to the other alternatives. Alternative 4 would have greater impacts on greenhouse gas emissions, air quality and noise in closer proximity to residential uses and sensitive receptors when compared to the proposed Project and to

Alternative 2. Alternative 2 would incrementally increase impacts on energy, hydrology and water quality, land use planning, geology and soils, and traffic compared to the proposed Project. However, these incremental increases in impacts compared to the proposed Project are in impact categories that have already been determined to be “less than significant”. The incremental increase in these impacts from Alternative 2 are not significant and unavoidable and are capable of being mitigated to below a level of significance. Further, and similar to the proposed Project, Alternative 2’s impacts would not occur in close proximity to residential uses when compared to Alternative 4. For these reasons, Alternative 2 is the environmentally superior alternative.