Appendix D

Energy Calculations

1000 Seward
Draft EIR
Appendix D
Energy Analysis Spreadsheets

- Appendix D: Energy Analysis
    - Energy Consumption Summary
    - Construction Energy Usage
        - Construction Electricity Consumption
        - Off-Road Equipment
        - On-Road Fuel Usage Rates
        - On-Road Vehicles
        - Construction Water Usage
    - Operational Energy Usage
        - Existing
        - Buildout without Project Design Features
        - Buildout with Project Design Features
        - Peak Electricity Demand Calculations
        - Total County Fuel Consumption

1000 Seward Project

Summary of Energy Use During Construction

Electricty		
Water Consumption	4,201	kWh
Temporary Power (lighting, tools)	40,824	kWh
Total:	**45,025**	kWh
Gasoline		
On Road	46,868	Gallons
Off Road	0	Gallons
Total:	**46,868**	Gallons
Diesel		
On Road	140,938	Gallons
Off Road	40,945	Gallons
Total:	**181,883**	Gallons
Total Mobile	**228,751**	

Summary of Energy Use During Operations

		Baseline (Buildout)	Buildout Without Project Features/MXD	Buildout With Project Features/MXD		Percent Reduction due to Project Features	Project Without Project Features - Baseline (Buildout)	Project (Buildout - Baseline (Buildout)
Electricity								
Electricity (building)		215,907	2,910,148	2,700,081	kWh/year	-7%	2,694,241	2,484,174
Electricity (water)		34,691	459,511	367,609	kWh/year	-20%	424,821	332,919
EV Chargers			3,011	3,011	kWh/year		3,011	3,011
	Electricity Total	**250,598**	**3,372,671**	**3,070,702**	**kWh/year**	**-9%**	**3,122,073**	**2,820,104**
Natural Gas								
Natural Gas (building)		642,485	4,047,565	4,016,987				**3,374,502**
	Natural Gas Total	**642,485**	**4,016,987**	**4,016,987**	**cu ft/year**	**0%**	**3,374,502**	**3,374,502**
Mobile								
Gasoline		22,588	253,450	151,044	Gallons/year	-40%	230,862	128,457
Diesel		3,657	41,030	24,452	Gallons/year	-40%	37,373	20,795
	Mobile Total	**26,245**	**294,480**	**175,496**	**Gallons/year**	**-40%**	**268,235**	**149,252**

Construction Electricity Usage

Caterpillar 40-C4.4 Generator[a]

Peak Power Rating - Prime (kW)	36
Typical Load	70%
Average Output (kW)	25.2
Hours per Day	2
Average Daily Output (kWh)	50.4
Building Construction Phase Duration (days)	810
Total Construction (kWh)	40,824
Total Construction (MWh)	40.8

[a]https://www.albancat.com/content/uploads/2014/06/40-C4.4-Spec-Sheet.pdf

Calculation of Diesel Usage During Cosnstruciton (Offroad Equipment):

Phase Name	Off Road Equipment Type	Units	Hours	HP	Load Factor	Avg. Daily Factor	Number of Days	Diesel Fuel Usage	
Demolition	Concrete/Industrial Saws	0	8	81	0.73	0.6	16	0	
Demolition	Excavators	1	8	158	0.38	0.6	16	231	
Demolition	Rubber Tired Dozers	0	8	247	0.4	0.6	16	0	
Demolition	Rubber Tired Loaders	2	8	203	0.36	0.6	16	561	
Demolition	Tractors/Loaders/Backhoes	1	8	97	0.37	0.6	16	138	
Grading	Bore/Drill Rigs	1	8	221	0.5	0.6	127	3,368	
Grading	Cranes	1	8	231	0.29	0.6	127	2,042	
Grading	Excavators	1	8	158	0.38	0.6	127	1,830	
Grading	Graders	1	8	187	0.41	0.6	127	2,337	
Grading	Plate Compactors	1	8	8	0.43	0.6	127	105	
Grading	Rubber Tired Dozers	0	8	247	0.4	0.6	127	0	
Grading	Rubber Tired Loaders	1	8	203	0.36	0.6	127	2,227	
Mat Foundation	Cranes	1	12	231	0.29	0.6	2	48	
Mat Foundation	Pumps	4	12	84	0.74	0.6	2	179	
Mat Foundation	Rubber Tired Dozers	0	8	247	0.4	0.6	2	0	
Mat Foundation	Tractors/Loaders/Backhoes	0	8	97	0.37	0.6	2	0	
Mat Foundation	Welders	2	8	46	0.45	0.6	2	20	
Building Construction	Aerial Lifts	2	8	63	0.31	0.6	363	3,403	
Building Construction	Air Compressors	2	8	78	0.48	0.6	363	6,524	
Building Construction	Cranes	0	7	231	0.29	0.6	363	0	
Building Construction	Generator Sets	0	8	84	0.74	0.6	363	0	
Building Construction	Plate Compactors	1	8	8	0.43	0.6	363	300	
Building Construction	Pumps	1	8	84	0.74	0.6	363	5,415	
Building Construction	Welders	2	8	46	0.45	0.6	363	3,607	
Paving	Cement and Mortar Mixers	1	8	9	0.56	0.6	108	131	
Paving	Pavers	0	8	130	0.42	0.6	108	0	
Paving	Paving Equipment	1	8	132	0.36	0.6	108	1,232	
Paving	Rollers	1	8	80	0.38	0.6	108	788	
Paving	Skid Steer Loaders	1	8	65	0.37	0.6	108	623	
Architectural Coating	Air Compressors	0	6	78	0.48	0.6	108	0	
						Total Diesel Usage for Construction (Offr		**40,945.3**	**gallons of diesel fuel**

gallons of diesel fuel per horsepower-hour=	0.05

Notes: Equipment assumptions are provide in the CalEEMod output files and fuel usage estimate of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

EMFAC Emissions Inventory
Region Type: Air Basin
Region: South Coast
Calendar Year: 2022
Season: Annual
Vehicle Classification: EMFAC2011 Categories

Region	Veh_Class	Fuel	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	Trips (trips/day)	Fuel_Gas (1000 gallons/day)	Fuel_DSL (1000 gallons/day)	Miles per Gallon
South Coast	LDA	GAS	Aggregate	4,040,505	154,312,636	19,063,483	5,097	0	30.3
South Coast	LDT1	GAS	Aggregate	466,456	17,402,686	2,155,710	667	0	26.1
South Coast	LDT2	GAS	Aggregate	1,395,328	52,851,239	6,550,846	2,173	0	24.3
						Construction Worker Trip (Composite LDA/LDT1/LDT2):			**27.7**
South Coast	HHDT	DSL	Aggregate	58,359	7,034,024	585,291	0	1068.8	**6.6**

Notes: Consistent with CalEEMod, a construction worker trip is assumed to be a composite of 50% LDA , 25% for LDT1, and 25% for LDT2. Used EMFAC 2011 Categories for construciton as EMFAC2011 has specific categories for vehicle class T7.

Calculation of Gasoline and Diesel Usage During Construction (Onroad Vehicles):

Phase Name	Daily Woker Trips	Daily Vendor Trips	Days	Total Worker Trips	Total Vendor Trips	Total Haul Trips	Trip Length (miles)			Total Length (miles)			Avg. Daily Factor	Gallons of Fuel	
							Worker	Vendor	Haul	Worker	Vendor	Haul	(worker and vendor)	Gasoline	Diesel
Demolition	25	25	16	400	400	0	14.7	68	20	5880	27200	0	0.6	127.2	2,479.8
Grading	75	115	127	9525	14605	0	14.7	68	20	140017.5	993140	0	0.6	3,027.9	90,542.7
Mat Foundation	100	180	2	200	360	0	14.7	13.8	20	2940	4968	0	0.6	63.6	452.9
Building Construction	350	95	363	127050	34485	0	14.7	13.8	20	1867635	475893	0	0.6	40,388.0	43,386.3
Paving	75	15	108	8100	1620	0	14.7	13.8	20	119070	22356	0	0.6	2,574.9	2,038.2
Architectural Coating	20	15	108	2160	1620	0	14.7	13.8	20	31752	22356	0	0.6	686.6	2,038.2
													Total:	**46,868.2**	**140,938.0**

Worker Miles per gallon=	27.75	gasoline
Vedor/Haul miles per gallon=	6.58	diesel

Notes: Consistent with CalEEMod worker vehicles are assumed to be gasoline and 50% LDA, 25%LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy Duty Trucks (T7).

Water Usage for Control of Fugitive Dust during Construction:

Phase	Days	Average Daily Acreage Distrubed	Gallons Per Year	Electricity (kWhr)
Demolition	16	1.0	48,320	470
Grading	127	1.0	383,540	3,731
Mat Foundation	2	0.0	0	0
Building Construction	363	0.0	0	0
Paving	108	0.0	0	0
Architectural Coating	108	0.0	0	0
		Total:	**431,860**	**4,201**

Water application rate=	3020	gal/acre/day
kWhr equivalent=	0.01	kWhr

Notes: 1) Gallons per year of water usage for dust control is calculated based on a minimum control efficiency of 66% (three times daily) with an application rate of 3,020 gal/acre/day (Air & Waste Management Association Air Pollution Engineering Manual (1992 Edition)) and average of 26 construction days per month.
2) CalEEMod Default: Each gallon of delivered potable water in Southern California is associated with 0.009727 kWhr of electricity).

1000 Seward (Existing Conditions)

Los Angeles-South Coast County, Annual

Trip Summary Information

Total	*Average Daily Trip Rate*			*Annual VMT*
	Weekday	*Saturday*	*Sunday*	
Total	**223.00**	**227.00**	**183.00**	**582,855**

Gasoline and Diesel Usage

	Buildout Year		Existing (Baseline) Year	
	Gasoline	*Diesel*	*Gasoline*	*Diesel*
Miles/Gallon	24.3	9.6	27.8	11.3
% Fleet Mix	94.0%	6.0%	93.0%	7.0%
Total (Gallons):	**22,588**	**3,657**	**19,477**	**3,607**

Energy by Land Use - Natural Gas

Total	*kBTU/yr*	cu ft/year
Total	**674,609**	**642,485**

Energy by Land Use - Electricity

Land Uses	*kWH/yr*
Total	215,907

Water Detail

Land Uses	*Indoor Use (Mgal)*	*Outdoor Use (Mgal)*	*Electricity Use (kWh/yr)*
Total	2.27	0.97	34,691

Notes: Indoor water results in 0.0111 kWhr of electricity usage per gallon from delivery, treatment, and distribution of water within Southern California (CalEEMod). Outdoor water results in 0.009727 kWhr of electricity usage per gallon from delivery and distribution of water within Southern California (CalEEMod).

1000 Seward Project - Buildout Operations Without Project Features/MXD
Los Angeles-South Coast County, Annual

Total	*Average Daily Trip Rate*			*Annual VMT*
	Weekday	*Saturday*	*Sunday*	
	2,639	1,964	1,499	6,539,931

Gasoline and Diesel Usage

	Gasoline	*Diesel*
Miles/Gallon	24.3	9.6
% Fleet Mix	94.0%	6.0%
Total (Gallons):	**253,450**	**41,030**

Energy by Land Use - Natural Gas

	kBTU/yr	cu ft/year
Total	4,217,836	**4,016,987**

Energy by Land Use - Electricity

Land Uses	*kWH/yr*
Total	**2,910,148**

Water Detail (Unmitigated)

Land Uses	*Indoor Use (Mgal)*	*Outdoor Use (Mgal)*	*Electricity Use (kWh/yr)*
Total	28.07	15.17	**459,511**

Notes: Indoor water results in 0.0111 kWhr of electricity usage per gallon from delivery, treatment, and distribution of water within Southern California (CalEEMod). Outdoor water results in 0.009727 kWhr of electricity usage per gallon from delivery and distribution of water within Southern California (CalEEMod).

1000 Seward Project - Buildout Operations with Project Fetures and MXD (No MMs)
Los Angeles-South Coast County, Annual

Trip Summary Information

Land Uses	*Average Daily Trip Rate*			*Mitigated*
	Weekday	*Saturday*	*Sunday*	
Total	1,542	1,148	876	3,897,494

Mitigated Gasoline and Diesel Usage

	Gasoline	*Diesel*
Miles/Gallon	24.3	9.6
% Fleet Mix	94.0%	6.0%
Total (Gallons):	**151,044**	**24,452**

Note: Fleet mix is 92.3% gasoline @ 30.6 miles/gallon and 7.7% diesel @ 12.1 miles/gallon.

Energy by Land Use - Natural Gas (Mitigated)

	kBTU/yr	cu ft/year
Land Uses	4,217,836	4,016,987
Total	4,217,836	**4,016,987**

Energy by Land Use - Electricity (Mitigated)

Land Uses	*kWH/yr*
Total	**2,700,081**

Note: Reduction in electricity usage reflects implementation of CalGreen and GHG-PDF-1 (Exceed baseline requirements for lighting by 25%). Reduction in natural gas usage reflects implementation of GHG-PDF-2 (Reduction in natural gas fireplaces).

Water Detail (Unmitigated)

Land Uses	*Indoor Use (Mgal)*	*Outdoor Use (Mgal)*	*Electricity Use (kWh/yr)*
Total	22.46	12.14	367,609

Notes: Indoor water results in 0.0111 kWhr of electricity usage per gallon from delivery, treatment, and distribution of water within Southern California (CalEEMod). Outdoor water results in 0.009727 kWhr ofelectricity usage per gallon from delivery and distribution of water within Southern California (CalEEMod). The City of Los Angeles Green Building Code (Chapter IX, Article 9, of the LAMC) requires newly constructed non-residential and high-rise residential buildings to reduce indoor water use by at least 20 percent by: (1) using water saving fixtures or flow restrictions; and/or (2) demonstrating a 20 percent reduction in baseline water

Peak Electricity Demand Calculations

Electrical Load Factor Equation

$$f_{Load} = \frac{\text{Average load}}{\text{Maximum load in given time period}}$$

Load Factor (%)[1] **52%**

Project Electricity Demand (Operational)

Annual Demand	Baseline (Existing)	Project
Building (MWh)	216	2,700
Water (MWh)	35	368
Total (MWh)	251	3,071
Average Daily Demand		
Building (kWh)	592	7,397
Water (kWh)	95	1,007
Total (kWh)	687	8,413
Average Load		
Building (kW)	25	308
Water (kW)	4	42
Total (kW)	29	351

Peak Load Calculation

Peak Load (kW)[2]	51	635
Systemwide Peak Load (MW)		5,854
Percent of Peak		0.011%

[1] 2017 Report: System Efficiency of California's Electric Grid. California Public Utilities Co 2017. Page 11, Figure 6. Visual estimate.

[2] Peak Load is conservatively calculated without any reductions from removal of existing uses.

EMFAC Emission inventories for County

EMFAC2014 (v1.0.7) Emissions Inventory
Region Type: County
Region: Los Angeles
Calendar Year: **2022** (Construction Start Year)
Season: Annual
Vehicle Classification: EMFAC2011 Categories

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Fuel_Gasoline (1000 gallons/day)	Fuel_DSL (1000 gallons/day)
Los Angeles	2022	HHDT	Aggregatec	Aggregatec	DSL	0.00	1068.80
Los Angeles	2022	HHDT	Aggregatec	Aggregatec	GAS	1.43	0.00
Los Angeles	2022	LDA	Aggregatec	Aggregatec	DSL	0.00	29.72
Los Angeles	2022	LDA	Aggregatec	Aggregatec	GAS	5096.55	0.00
Los Angeles	2022	LDT1	Aggregatec	Aggregatec	DSL	0.00	0.31
Los Angeles	2022	LDT1	Aggregatec	Aggregatec	GAS	666.55	0.00
Los Angeles	2022	LDT2	Aggregatec	Aggregatec	DSL	0.00	11.04
Los Angeles	2022	LDT2	Aggregatec	Aggregatec	GAS	2173.39	0.00
Los Angeles	2022	LHDT1	Aggregatec	Aggregatec	DSL	0.00	130.18
Los Angeles	2022	LHDT1	Aggregatec	Aggregatec	GAS	374.46	0.00
Los Angeles	2022	LHDT2	Aggregatec	Aggregatec	DSL	0.00	56.19
Los Angeles	2022	LHDT2	Aggregatec	Aggregatec	GAS	69.95	0.00
Los Angeles	2022	MCY	Aggregatec	Aggregatec	GAS	36.08	0.00
Los Angeles	2022	MDV	Aggregatec	Aggregatec	DSL	0.00	29.43
Los Angeles	2022	MDV	Aggregatec	Aggregatec	GAS	1672.53	0.00
Los Angeles	2022	MH	Aggregatec	Aggregatec	DSL	0.00	6.09
Los Angeles	2022	MH	Aggregatec	Aggregatec	GAS	38.64	0.00
Los Angeles	2022	MHDT	Aggregatec	Aggregatec	DSL	0.00	404.31
Los Angeles	2022	MHDT	Aggregatec	Aggregatec	GAS	160.71	0.00
Los Angeles	2022	OBUS	Aggregatec	Aggregatec	DSL	0.00	28.63
Los Angeles	2022	OBUS	Aggregatec	Aggregatec	GAS	33.56	0.00
Los Angeles	2022	SBUS	Aggregatec	Aggregatec	DSL	0.00	16.06
Los Angeles	2022	SBUS	Aggregatec	Aggregatec	GAS	6.19	0.00
Los Angeles	2022	UBUS	Aggregatec	Aggregatec	DSL	0.00	0.81
Los Angeles	2022	UBUS	Aggregatec	Aggregatec	GAS	7.94	0.00
						3,773,361,064	650,271,759
					Fuel Usage for Project Construction	140,938	40,945
					Percentage of County for Construction	0.0037%	0.006%

EMFAC Emission inventories for County

EMFAC2014 (v1.0.7) Emissions Inventory
Region Type: County
Region: Los Angeles
Calendar Year: **2025** (Operational Start Year)
Season: Annual
Vehicle Classification: EMFAC2011 Categories

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Fuel_Gasoline (1000 gallons/day)	Fuel_DSL (1000 gallons/day)
Los Angeles	2025	HHDT	Aggregatec	Aggregatec	DSL	0.00	1030.97
Los Angeles	2025	HHDT	Aggregatec	Aggregatec	GAS	1.45	0.00
Los Angeles	2025	LDA	Aggregatec	Aggregatec	DSL	0.00	30.79
Los Angeles	2025	LDA	Aggregatec	Aggregatec	GAS	4654.49	0.00
Los Angeles	2025	LDT1	Aggregatec	Aggregatec	DSL	0.00	0.24
Los Angeles	2025	LDT1	Aggregatec	Aggregatec	GAS	650.83	0.00
Los Angeles	2025	LDT2	Aggregatec	Aggregatec	DSL	0.00	12.08
Los Angeles	2025	LDT2	Aggregatec	Aggregatec	GAS	2001.79	0.00
Los Angeles	2025	LHDT1	Aggregatec	Aggregatec	DSL	0.00	142.00
Los Angeles	2025	LHDT1	Aggregatec	Aggregatec	GAS	351.35	0.00
Los Angeles	2025	LHDT2	Aggregatec	Aggregatec	DSL	0.00	61.53
Los Angeles	2025	LHDT2	Aggregatec	Aggregatec	GAS	67.40	0.00
Los Angeles	2025	MCY	Aggregatec	Aggregatec	GAS	38.25	0.00
Los Angeles	2025	MDV	Aggregatec	Aggregatec	DSL	0.00	32.04
Los Angeles	2025	MDV	Aggregatec	Aggregatec	GAS	1517.42	0.00
Los Angeles	2025	MH	Aggregatec	Aggregatec	DSL	0.00	6.46
Los Angeles	2025	MH	Aggregatec	Aggregatec	GAS	36.85	0.00
Los Angeles	2025	MHDT	Aggregatec	Aggregatec	DSL	0.00	401.74
Los Angeles	2025	MHDT	Aggregatec	Aggregatec	GAS	156.13	0.00
Los Angeles	2025	OBUS	Aggregatec	Aggregatec	DSL	0.00	28.85
Los Angeles	2025	OBUS	Aggregatec	Aggregatec	GAS	30.17	0.00
Los Angeles	2025	SBUS	Aggregatec	Aggregatec	DSL	0.00	15.80
Los Angeles	2025	SBUS	Aggregatec	Aggregatec	GAS	7.06	0.00
Los Angeles	2025	UBUS	Aggregatec	Aggregatec	DSL	0.00	0.59
Los Angeles	2025	UBUS	Aggregatec	Aggregatec	GAS	7.09	0.00
						3,474,906,889	643,523,976
					Net Fuel Usage for Project Operation	128,457	20,795
					Percentage of County for Operation	0.0037%	0.0032%