

Energy and Fuel Calculations

Summary of Energy Use during Construction	
Electricity	
Water Consumption	17,523 kWh
Temporary Power (lighting, tools)	57,254 kWh
Total	74,777 kWh
Gasoline	
On Road (Worker)	57,662 gallons
Off Road	0
Total	57,662 gallons
Diesel	
On Road (Vender and Haul)	16,134 gallons
Off Road	26,430 gallons
Total	42,564 gallons
Total Mobile	100,226 gallons

Summary of Energy Use during Operation	
Electricity	
Building	1,390,793 kWh/year
Water	95,041 kWh/year
Total	1,485,834 kWh
Natural Gas	
Total	2,648,195 cf/year
Gasoline	
Total	77,501 gallons
Diesel	
Total	19,329 gallons
Total Mobile	96,830 gallons

Calculation of Gas Usage During Construction (On-road workers)						
Phase	Trips	Days	Length (miles)	Total (miles)	MPG	Gallons
Parking Building						
Demolition	5	5				
Grading	10	2				
Construction	99	175				
Arch Coating	20	10				
Subtotal	134	192	14.7	378,202	28.0	13,507
Proposed Building						
Demolition	5	5				
Grading	10	2				
Construction	145	393				
Arch Coating	29	45				
Subtotal	189	445	14.7	1,236,344	28.0	44,155
Total						57,662
Worker Miles Per Gallon per EMFAC2017 (v.1.02) Emissions Inventory: South Coast Air Basin, Year 2021, Season Annual, Aggregate, LSA, LDT1, LDT2 vehicle categories.						

Calculation of Diesel Usage During Construction (On-road vender)						
Phase	Trips	Days	Length (miles)	Total (miles)	MPG	Gallons
Parking Building						
Construction	38	175	6.9	45,885	6.66	6,890
Proposed Building						

Construction	22	393	6.9	59,657	6.66	8,958
Total						15,848
Vender Miles Per Gallon per EMFAC2017 (v.1.02) Emissions Inventory: South Coast Air Basin, Year 2021, Season Annual, Aggregate, T7 vehicle categories.						

Calculation of Diesel Usage During Construction (On-road haul)					
Phase	Trips	Length (mi)	Total (mil)	MPG	Gallons
Parking Building					
Demolition	5				
Grading	14				
Subtotal	19	50	950	6.66	143
Proposed Building					
Demolition	5				
Grading	14				
Subtotal	19	50	950	6.66	143
Total					286
Vender Miles Per Gallon per EMFAC2017 (v.1.02) Emissions Inventory: South Coast Air Basin, Year 2021, Season Annual, Aggregate, T7 vehicle categories. Note: for on-road haul, the trips represent a total, not per day.					

Calculation of Diesel Usage During Construction (Off-road equipment)								
Phase	Equipment	Units	Hours	HP	Load Factor	Ave. Daily Factor	Days	HP-hours
Parking Building								
Demolition	Excavators	1	8	158	0.48	0.6	5	1,820
	Rubber Tired Dozers	1	8	203	0.36	0.6	5	1,754
Grading	Excavators	1	8	158	0.38	0.6	2	576
	Rubber Tired Dozers	1	8	247	0.40	0.6	2	949
	Rubber Tired Loaders	1	8	203	0.36	0.6	2	702
	Bore/Drill Rigs	1	8	221	0.50	0.6	2	1,061
Construction	Cranes	1	8	231	0.29	0.6	175	56,272
	Rough Terrain Forklifts	2	8	100	0.40	0.6	175	67,200
	Skid Steer Loaders	1	8	65	0.37	0.6	175	20,202
Arch Coatings	Air Compressors	1	8	78	0.48	0.6	10	1,797
Subtotal								152,332
Proposed Building								
Demolition	Excavators	1	8	158	0.38	0.6	5	1,441
	Rubber Tired Dozers	1	8	203	0.36	0.6	5	1,754
Grading	Bore/Drill Rigs	1	8	221	0.50	0.6	2	1,061
	Excavators	1	8	158	0.38	0.6	2	576
	Rubber Tired Dozers	1	8	247	0.40	0.6	2	949
	Rubber Tired Loaders	1	8	203	0.36	0.6	2	702
Construction	Cranes	1	8	231	0.29	0.6	393	126,370
	Rough Terrain Forklifts	2	8	100	0.40	0.6	393	150,912
	Skid Steer Loaders	1	8	65	0.37	0.6	393	45,368
	Welders	1	8	46	0.45	0.6	393	39,048
Arch Coatings	Air Compressors	1	8	78	0.48	0.6	45	8,087
Subtotal								376,267
Total								528,599
HP = horsepower gallons of diesel fuel per HP-hour= 0.05 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. 528,599 HP-hours = 26,430								

Water Usage for fugitive dust control during construction					
Phase	Days	Acres	Water Rate	Electrical Rate	Total
Grading	4 days	3.4 acres	3,020 gallons / acre	0.009727 kWh / gallon	400 kWh

kWh – kilowatt hours
 Conservatively assumes the total amount of site that would be disturbed.
 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 gallons/acre/day (Air & Waste Management Association Air Pollution Engineering Manual (1992 Edition)) and average of 26 construction days per month.
 CalEEMod Default: Each gallon of delivered potable water in Southern California is associated with 0.009727 kWh of electricity).

Construction Electricity Usage							
Equipment	Peak Power Rating	Typical Load	Average Output	Hours Per Day	Average Daily Output	Construction Days	Total
Caterpillar 40-C4.4 Generator	36 kWh	70%	25.2 kWh	4	100.8 kWh	568	57,254 kWh

Gasoline and Diesel Use - Operation				
Percent of Fleet			Fuel Consumption	
Fleet	94.4% Auto	2,170,039 miles	28.0 mpg gas	77,501 gallons
Mix	5.6% Other	128,731 miles	6.66 mpg diesel	19,329 gallons
Total			96,830 gallons	

Daily VMT = 6,298 from Overland Transportation Assessment, May 2020
 Daily x 365 days = Annual VMT = 2,298,770
 Percent fleet based on VMT from ENFAC2017.
 Fuel efficiency calculated using fuel consumption and VMT from EMFAC2017.

Electricity by Land Use - Operation	
Use	Amount (kWh/year)
Residential	810,726
Commercial	108,143
Parking Lot	6,125
Parking Structure	377,912
Warehouse	87,887
Total	1,390,793

Electricity by Water Use - Operation		
Use (gallons/day)	Use (gallons/year)	Amount (kWh/year)
23,437	8,554,505	95,041

Indoor water results in 0.0111 kWh of electricity usage per gallon from delivery, treatment, and distribution of water within Southern California (CalEEMod).

Natural Gas by Land Use - Operation		
Use	Amount (kBtu/year)	Amount (cubic feet/year)
Residential	2,195,640	2,091,084
Commercial	565,362	538,439
Parking Lot	0	0
Parking Structure	0	0
Warehouse	19,606	18,672
Total	2,780,608	2,648,195

1 kBtu = 0.95238 cubic foot.