

**Appendix D:
Energy Supporting Information**

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Appendix D: Energy Calculations

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Adelanto Quick n Clean Project Energy Use Summary

Summary of Energy Use During Construction

(Annually)

Construction vehicle fuel	2,342 gallons (gasoline, diesel)
Construction equipment fuel	12,754 gallons (diesel)
Total construction fuel	15,096 gallons (gasoline, diesel)
Construction office electricity	3,606 kilowatt hours

Summary of Energy Use During Operations

(Annually)

Operation vehicle fuel	28,264 gallons (gasoline, diesel)
Operation natural gas	147,166 kilo-British Thermal Units
Operation electricity	72,684 kilowatt hours

Construction Vehicle Fuel Calculations

VMT = Vehicle Miles Traveled
FE = Fuel Economy

EMFAC2017 (v1.0.2) Emissions Inventory

Region Type: County

Region: SAN BERNARDINO

Calendar Year: 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption. Note 'day' in the unit is operation day

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Population	VMT (mi/day)	Trips	Fuel_Consumption (1000 gallons/day)	Calculations	
										FE (mi/gallon)	VMT*FE
SAN BERNARDINO	2023	HHDT	Aggregated	Aggregated	GAS	7.8019201	902.9372886	156.1008	0.205857	4.386227815	3960.48865
SAN BERNARDINO	2023	HHDT	Aggregated	Aggregated	DSL	29526.785	4258567.766	345800.8	586.8395	7.256784312	30903507.75
SAN BERNARDINO	2023	LDT1	Aggregated	Aggregated	GAS	98412.435	3525890.088	446995.5	127.936	27.55979633	97172812.71
SAN BERNARDINO	2023	LDT1	Aggregated	Aggregated	DSL	46.418347	846.8439543	150.9529	0.033209	25.50034304	21594.81134
SAN BERNARDINO	2023	LDT2	Aggregated	Aggregated	GAS	301046.02	11239619.24	1399638	433.2917	25.94007495	291556565.6
SAN BERNARDINO	2023	LDT2	Aggregated	Aggregated	DSL	1831.5943	78774.08743	9012.703	2.01497	39.09442156	3079627.382
SAN BERNARDINO	2023	LHDT1	Aggregated	Aggregated	GAS	24792.49	832047.927	369371.2	78.4812	10.60187515	8821268.241
SAN BERNARDINO	2023	LHDT1	Aggregated	Aggregated	DSL	23193.366	818620.8796	291743.4	38.75247	21.12435247	17292836
SAN BERNARDINO	2023	LHDT2	Aggregated	Aggregated	GAS	4042.3089	134715.1985	60224.38	14.57984	9.239826778	1244745.099
SAN BERNARDINO	2023	LHDT2	Aggregated	Aggregated	DSL	8744.9036	309655.4536	109999.9	15.98812	19.36784827	5997359.842
SAN BERNARDINO	2023	MDV	Aggregated	Aggregated	GAS	239897.67	8627560.448	1092834	414.9208	20.7932714	179395205.9
SAN BERNARDINO	2023	MDV	Aggregated	Aggregated	DSL	5124.7791	214852.4381	24788.26	7.422684	28.94538519	6218986.581
SAN BERNARDINO	2023	MHDT	Aggregated	Aggregated	GAS	2406.1407	152847.5798	48142.06	29.32027	5.213034679	796799.7341
SAN BERNARDINO	2023	MHDT	Aggregated	Aggregated	DSL	17836.697	1242349.304	176235.4	109.0335	11.39419562	14155571

Worker
Sum of VMТ*FE (Column BI) **417944704.7**
Total VMT **16495799.07**
Weighted Average FE **25.33643281**

Vendor
Sum of VMТ*FE (Column BI) **238716136.4**
Total VMT **14941451.12**
Weighted Average FE **15.97677055**

Haul
Sum of VMТ*FE (Column BI) **30907468.24**
Total VMT **4259470.703**
Weighted Average FE **7.256175801**

Adelanto Quick n Clean Project Construction Assumptions

On-site Construction

Source: AQ/GHG Appendix, CalEEMod Output

Adelanto Quick n Clean - San Bernardino-Mojave Desert County, Annual

Date: 8/8/2023 3:07 PM

Construction Schedule	Phase Type	Start Date	End Date	Num Days	
				Week	Num Days
Site Preparation		6/1/2023	6/14/2023	5	10
Grading		6/15/2023	7/14/2023	5	22
Building Construction		7/15/2023	10/27/2023	5	75
Paving		10/28/2023	11/28/2023	5	22
Architectural Coating		11/29/2023	12/28/2023	5	22

Trips and VMT	Phase Name	Trips per Day		Total Trips		Trips per Phase			VMT per Phase			Fuel Consumption (gallons)						
		Worker Trip	Vendor Trip	Worker Trip	Vendor Trip	Worker Trip	Vendor Trip	Hauling Trip	Worker	Vendor	Hauling	Worker	Vendor	Hauling				
		Number	Number	Length	Length	Number	Number	Number	Trips	Trips	Trips	Trips	Trips	Trips				
Site Preparation		8	0	0	10.8	7.3	20	HDT_Mix	10	80	0	0	864	0	0	34.10	0.00	0.00
Grading		10	0	0	10.8	7.3	20	HDT_Mix	22	220	0	0	2,376	0	0	93.78	0.00	0.00
Building Construction		44	17	0	10.8	7.3	20	HDT_Mix	75	3,300	1,275	0	35,640	9,308	0	1,406.67	582.56	0.00
Paving		15	0	0	10.8	7.3	20	HDT_Mix	22	330	0	0	3,564	0	0	140.67	0.00	0.00
Architectural Coating		9	0	0	10.8	7.3	20	HDT_Mix	22	198	0	0	2,138	0	0	84.40	0.00	0.00

On-site Total Construction VMT (miles)
53,890

On-Site Total Fuel Consumption (gallons)
2,342

Construction Equipment Fuel Calculation

On-site

Source: AQ/GHG Appendix, CalEEMod Output

Adelanto Quick n Clean - San Bernardino-Mojave Desert County, Annual

Date: 8/8/2022 3:07 PM

Construction Schedule	Phase Name	Start Date	End Date	Num Days	
				Week	Num Days
	Site Preparation	6/1/2023	6/14/2023	5	10
	Grading	6/15/2023	7/14/2023	5	22
	Building Construction	7/15/2023	10/27/2023	5	75
	Paving	10/28/2023	11/28/2023	5	22
	Architectural Coating	11/29/2023	12/28/2023	5	22

Construction Equipment	Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load		HP Hours	Diesel Fuel Usage
						Factor	Number of Days		
	Site Preparation	Graders	1	8	187	0.41	10	6,133.60	306.68
	Site Preparation	Scrapers	1	8	367	0.48	10	14,092.80	704.64
	Site Preparation	Tractors/Loaders/Backhoes	1	7	97	0.37	10	2,512.30	125.62
	Grading	Graders	1	8	187	0.41	22	13,493.92	674.70
	Grading	Rubber Tired Dozers	1	8	247	0.4	22	17,388.80	869.44
	Grading	Tractors/Loaders/Backhoes	2	7	97	0.37	22	11,054.12	552.71
	Building Construction	Cranes	1	8	231	0.29	75	40,194.00	2,009.70
	Building Construction	Forklifts	2	7	89	0.2	75	18,690.00	934.50
	Building Construction	Generator Sets	1	8	84	0.74	75	37,296.00	1,864.80
	Building Construction	Tractors/Loaders/Backhoes	1	6	97	0.37	75	16,150.50	807.53
	Building Construction	Welders	3	8	46	0.45	75	37,260.00	1,863.00
	Paving	Cement and Mortar Mixers	1	8	9	0.56	22	887.04	44.35
	Paving	Pavers	1	8	130	0.42	22	9,609.60	480.48
	Paving	Paving Equipment	1	8	132	0.36	22	8,363.52	418.18
	Paving	Rollers	2	8	80	0.38	22	10,700.80	535.04
	Paving	Tractors/Loaders/Backhoes	1	8	97	0.37	22	6,316.64	315.83
	Architectural Coating	Air Compressors	1	6	78	0.48	22	4,942.08	247.10
Construction Equipment Fuel Consumption									12,754.29 gallons

Notes:

Equipment assumptions are provided in the CalEEMod output files.

Fuel usage estimate of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

South Coast Air Quality Management District. 1993. Air Quality Handbook, Table A9-3E.

Website: <http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook>.

Construction Office Electricity Calculation

Energy Appendix: CalEEMod Typical Construction Trailer

Typical Construction Trailer - San Bernardino-Mojave Desert County, Annual

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5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	6854.4	1.6603	0.0000	0.0000	1.6603
Total		1.6603	0.0000	0.0000	1.6603

kWh/yr = kilowatt hours per year

Energy by Land Use - Electricity

Annual

6,854 kWh/yr

Total Over Construction

3,606 kWh

Total Construction Schedule

Start

1/3/2022

End

7/14/2022

Total Calendar Days

192

Years

0.53

Proposed Operation Fuel Calculation

VMT = Vehicle Miles Traveled
 FE = Fuel Economy

EMFAC2017 (v1.0.2) Emissions Inventory

Region Type: County

Region: SAN BERNARDINO

Calendar Year: 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption. Note 'day' in the unit is operation day.

Given

Calculations

Region	CalYr	VehClass	MdYr	Speed	Fuel	Population	VMT	Fuel Consumption	FE	VMT*FE
SAN BERNARDINO	2023	HHDT	Aggregated	Aggregated	GAS	7.80192009	902.937289	0.205857362	4.386228	3960.48865
SAN BERNARDINO	2023	HHDT	Aggregated	Aggregated	DSL	29526.785	4258567.77	586.8395122	7.256784	30903507.75
SAN BERNARDINO	2023	LDA	Aggregated	Aggregated	GAS	929038.608	38321202.2	1182.746641	32.40018	1241613788
SAN BERNARDINO	2023	LDA	Aggregated	Aggregated	DSL	8375.71875	365072.838	6.947796481	52.54513	19182798.04
SAN BERNARDINO	2023	LDT1	Aggregated	Aggregated	GAS	98412.4348	3525890.09	127.9359994	27.5598	97172812.71
SAN BERNARDINO	2023	LDT1	Aggregated	Aggregated	DSL	46.418347	846.843954	0.03320912	25.50034	21594.81134
SAN BERNARDINO	2023	LDT2	Aggregated	Aggregated	GAS	301046.015	11239619.2	433.2917028	25.94007	291556565.6
SAN BERNARDINO	2023	LDT2	Aggregated	Aggregated	DSL	1831.59431	78774.0874	2.014970021	39.09442	3079627.382
SAN BERNARDINO	2023	LHDT1	Aggregated	Aggregated	GAS	24792.4902	832047.927	78.48120406	10.60188	8821268.241
SAN BERNARDINO	2023	LHDT1	Aggregated	Aggregated	DSL	23193.3663	818620.88	38.75247209	21.12435	17292836
SAN BERNARDINO	2023	LHDT2	Aggregated	Aggregated	GAS	4042.30892	134715.199	14.57984027	9.239827	1244745.099
SAN BERNARDINO	2023	LHDT2	Aggregated	Aggregated	DSL	8744.90361	309655.454	15.98811852	19.36785	5997359.842
SAN BERNARDINO	2023	MCY	Aggregated	Aggregated	GAS	44961.9067	426067.416	11.09147319	38.41396	16366937.01
SAN BERNARDINO	2023	MDV	Aggregated	Aggregated	GAS	239897.666	8627560.45	414.920783	20.79327	179395205.9
SAN BERNARDINO	2023	MDV	Aggregated	Aggregated	DSL	5124.77915	214852.438	7.422683673	28.94539	6218986.581
SAN BERNARDINO	2023	MH	Aggregated	Aggregated	GAS	6488.29	53980.4497	10.59023097	5.097193	275148.7633
SAN BERNARDINO	2023	MH	Aggregated	Aggregated	DSL	2522.55098	21236.1107	1.969070509	10.78484	229028.0604
SAN BERNARDINO	2023	MHDT	Aggregated	Aggregated	GAS	2406.14073	152847.58	29.32026914	5.213035	796799.7341
SAN BERNARDINO	2023	MHDT	Aggregated	Aggregated	DSL	17836.6974	1242349.3	109.0335242	11.3942	14155571
SAN BERNARDINO	2023	OBUS	Aggregated	Aggregated	GAS	688.006385	35951.4865	7.00154678	5.134792	184603.406
SAN BERNARDINO	2023	OBUS	Aggregated	Aggregated	DSL	306.179665	23296.3299	2.651894142	8.784789	204653.3368
SAN BERNARDINO	2023	SBUS	Aggregated	Aggregated	GAS	297.755664	14188.3211	1.517811384	9.347882	132630.7455
SAN BERNARDINO	2023	SBUS	Aggregated	Aggregated	DSL	1397.22801	44391.5402	5.707593428	7.777628	345260.8995
SAN BERNARDINO	2023	UBUS	Aggregated	Aggregated	GAS	158.935402	17958.3892	2.526212337	7.10882	127662.9596
SAN BERNARDINO	2023	UBUS	Aggregated	Aggregated	DSL	4.05630514	346.216855	0.049907266	6.937203	2401.776734

	Annual VMT (miles)	Fuel Consumption	
Total VMT	773,032	28,264	gallons per year

Vehicles	
Sum of VMT*FE	1935325754
Total VMT	70760941.48
Weighted Average FE	27.35019792 miles/gallon

Operation Natural Gas Use

Source: AQ/GHG Appendix, CalEEMod Output

Adelanto Quick n Clean - San Bernardino-Mojave Desert County, Annual

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kBTU/yr = kilo-British Thermal Units/year
 CF = cubic feet

Natural Gas Use

Automobile Care Center	147166
City Park	0
Parking Lot	0

Total **147,166 kBTU/yr**

	Natural Gas Use
Land Use	kBTU/yr
Automobile Care Center	147166
City Park	0
Parking Lot	0
Total	

Operation Electricity Use

Source: AQ/GHG Appendix, CalEEMod Output

Adelanto Quick n Clean - San Bernardino-Mojave Desert County, Annual

Date: 8/8/2022 3:07 PM

Project Electricity Use

kWh/yr = kilowatt hours per year

Land Use	Electricity Use (kWh/yr)
Automobile Care Center	45155.8
City Park	0
Parking Lot	27528.5

Total **72,684 kWh/yr**

	Electricity Use
Land Use	kWh/yr
Automobile Care Center	45155.8
City Park	0
Parking Lot	27528.5
Total	

Typical Construction Trailer - San Bernardino-Mojave Desert County, Annual

**Typical Construction Trailer
San Bernardino-Mojave Desert County, Annual**

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	0.72	1000sqft	0.02	720.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.6	Precipitation Freq (Days)	32
Climate Zone	10			Operational Year	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MW hr)	534	CH4 Intensity (lb/MW hr)	0	N2O Intensity (lb/MW hr)	0

5.3 Energy by Land Use - Electricity

Unmitigated

Land Use	Electricity Use kWh/yr	Total CO2 MT/yr	CH4 MT/yr	N2O MT/yr	CO2e MT/yr
General Office Building	6854.4	1.6603	0.0000	0.0000	1.6603
Total		1.6603	0.0000	0.0000	1.6603

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