APPENDIX E – ENERGY MODEL RUN OUTPUTS

Appendix B - Energy Calculations

Construction-Related Petroleum Fuels

The off-road construction equipment fuel usage was calculated through use of the off-road equipment assumptions utilized in the CalEEMod model run provided in Appendix A and the fuel usage calculations provided in the 2017 Off-road Diesel Emission Factors spreadsheet, prepared by CARB (https://ww3.arb.ca.gov/msei/ordiesel.htm). The Spreadsheet provides the following formula to calculate fuel usage from off-road equipment:

Fuel Used = Load Factor x Horsepower x Total Operational Hours x BSFC / Unit Conversion

Where:

Load Factor - Obtained from CalEEMod default values

Horsepower – Obtained from CalEEMod default values

Total Operational Hours – Calculated by multiplying CalEEMod default daily hours by the estimated number of working days for each phase of construction

BSFC – Brake Specific Fuel Consumption (pounds per horsepower-hour) – If less than 100 Horsepower = 0.408, if greater than 100 Horsepower = 0.367

Unit Conversion – Converts pounds to gallons = 7.109

The Following Table shows the off-road construction equipment fuel calculations based on the above formula, which shows that the off-road equipment utilized during construction of the proposed project would consume 34,833 gallons of fuel.

Off-Road Construction Equipment Modeled in CalEEMod and Fuel Used

Equipment Type	Equipment Quantity	Horse-Power	Load Factor	Operating Hours Per Day	Total Operational Hours[1]	Fuel Used (gallons)
Site Preparation						
Grader	1	187	0.41	8	80	317
Scraper	1	367	0.48	8	80	728
Tractors/Loaders/Backhoes	1	97	0.37	7	70	144
Grading						
Grader	1	187	0.41	8	320	1,267
Rubber Tired Dozer	1	247	0.4	8	320	1,632
Tractors/Loaders/Backhoes	2	97	0.37	7	560	1,153
Building Construction						
Crane	1	231	0.29	8	1,760	6,087
Forklifts	2	89	0.2	7	3,080	3,146
Generator Set	1	84	0.74	8	1,760	6,279

Equipment Type	Equipment Quantity	Horse-Power	Load Factor	Operating Hours Per Day	Total Operational Hours[1]	Fuel Used (gallons)
Tractors/Loaders/Backhoes	1	97	0.37	6	1,320	2,719
Welders	3	46	0.45	8	5,280	6,273
Paving						
Cement and Mortar Mixers	1	9	0.56	8	400	116
Paver	1	130	0.42	8	400	1,127
Paving Equipment	1	132	0.36	8	400	981
Rollers	2	80	0.38	8	800	1,396
Tractors/Loaders/Backhoes	1	97	0.37	8	400	824
Architectural Coatings						
Air Compressor	1	78	0.48	6	300	645
Total Off-Road Equipment Fuel used during Construction of the Proposed Project (gallons)						**34,833**

Notes:

[1] Based on 10 days for Site Preparation, 40 days for Grading , 220 days for Building Construction, 50 days for Paving, and 50 days for Architectural Coatings.

Source: CalEEMod Version 2020.4.0, CARB, 2018.

The on-road construction-related vehicle trips fuel usage was calculated through use of the default construction vehicle trip assumptions from the CalEEMod model run. The calculated total construction miles were then divided by the fleet average for Ventura County miles per gallon rates for the year 2023 that were calculated through use of the EMFAC2017 model (https://www.arb.ca.gov/emfac/2017/) and the EMFAC2017 model printouts are attached. The following Table shows the on-road construction vehicle trips modeled in CalEEMod and the fuel usage calculations, which shows that the on-road construction-related vehicle trips would consume 7,972 gallons of fuel for the proposed Project.

On-Road Construction Vehicle Trips Modeled in CalEEMod and Fuel Used

Vehicle Trip Types	Daily Trips	Trip Length (miles)	Total per Day (miles)	Total per Phase (miles)	Fleet Average Miles per Gallon	Fuel Used (gallons)
Site Preparation						
Worker Trips	8	10.8	86	864	27.6	31
Grading						
Worker Trips	10	10.8	108	4,320	27.6	157
Haul Trips	3.7	20	74	2,940	9.4	313
Building Construction						
Worker Trips	57	10.8	616	135,432	27.6	4,913
Vendor Trips	12	7.3	88	19,272	9.4	2,050
Paving						
Worker Trips	15	10.8	162	8,100	27.6	294
Architectural Coatings						

Vehicle Trip Types	Daily Trips	Trip Length (miles)	Total per Day (miles)	Total per Phase (miles)	Fleet Average Miles per Gallon	Fuel Used (gallons)
Worker Trips	11	10.8	119	5,940	27.6	215
Total On-Road Vehicle Fuel used during Construction of the Proposed Project (gallons)						**7,972**

Notes:

[1] Based on 10 days for Site Preparation, 40 days for Grading , 220 days for Building Construction, 50 days for Paving, and 50 days for Architectural Coatings..

Source: CalEEMod Version 2020.4.0, CARB, 2018.

Operations-Related Petroleum Fuels

The on-road operations-related vehicle trips fuel usage was calculated through use of the total annual vehicle miles traveled assumptions from the CalEEMod model run provided in Appendix A, which found that operation of the proposed project would generate 728,900 vehicle miles traveled per year. The calculated total operational miles were then divided by the Ventura County fleet average rate of 27.6 miles per gallon, which was calculated through use of the EMFAC2017 model for year 2023. The EMFAC2017 model printouts are attached to this Appendix. Based on the above calculation methodology, the operation of the proposed Project would consume 26,440 gallons of petroleum fuels per year.

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: County
Region: VENTURA
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	Calendar Y	Vehicle Cat	Model Yea	Speed	Fuel	Population	VMT	Trips	Fuel Consumption
VENTURA	2023	HHDT	Aggregate	Aggregate	GAS	1.584942	213.73213	31.71152	0.0467988
VENTURA	2023	LDA	Aggregate	Aggregate	GAS	291891	11389118	1372309	346.27487
VENTURA	2023	LDT1	Aggregate	Aggregate	GAS	32016.85	1160417.4	145081.3	41.858074
VENTURA	2023	LDT2	Aggregate	Aggregate	GAS	94375.81	3558570.1	437475.2	137.07261
VENTURA	2023	LHDT1	Aggregate	Aggregate	GAS	7709.39	276213.66	114858.4	25.841707
VENTURA	2023	LHDT2	Aggregate	Aggregate	GAS	1384.262	48905.246	20623.44	5.264898
VENTURA	2023	MCY	Aggregate	Aggregate	GAS	16218.89	80979.401	32437.78	2.2482873
VENTURA	2023	MDV	Aggregate	Aggregate	GAS	72044.43	2428532.4	327382.3	116.43824
VENTURA	2023	MH	Aggregate	Aggregate	GAS	2962.397	25120.172	296.3582	4.9266156
VENTURA	2023	MHDT	Aggregate	Aggregate	GAS	731.8971	37757.685	14643.8	7.1568797
VENTURA	2023	OBUS	Aggregate	Aggregate	GAS	238.7227	8995.1471	4776.363	1.7473959
VENTURA	2023	SBUS	Aggregate	Aggregate	GAS	71.82497	2854.4575	287.2999	0.3063043
VENTURA	2023	UBUS	Aggregate	Aggregate	GAS	59.38871	4428.2148	237.5548	0.8189129

vehicle miles per day (All Categories)	19022106	690	1,000 gall per day
		690,002	gallons per day
Fleet Avg Miles per gallon	27.6		

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: County
Region: VENTURA
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	Calendar Y	Vehicle Cat	Model Yea	Speed	Fuel	Population	VMT	Trips	Fuel Consumption
VENTURA	2023	HHDT	Aggregate	Aggregate	DSL	3189.254	346461.5	31284.61	48.25642
VENTURA	2023	LDA	Aggregate	Aggregate	DSL	3485.115	135978.9	16275.22	2.709975
VENTURA	2023	LDT1	Aggregate	Aggregate	DSL	24.24519	419.4451	78.03768	0.017157
VENTURA	2023	LDT2	Aggregate	Aggregate	DSL	673.5368	28721.98	3261.94	0.778107
VENTURA	2023	LHDT1	Aggregate	Aggregate	DSL	7767.324	291844.6	97703.17	13.78099
VENTURA	2023	LHDT2	Aggregate	Aggregate	DSL	2819.574	107185.9	35466.7	5.558593
VENTURA	2023	MDV	Aggregate	Aggregate	DSL	1701.253	67577.39	8180.928	2.409239
VENTURA	2023	MH	Aggregate	Aggregate	DSL	1090.161	9548.531	109.0161	0.905546
VENTURA	2023	MHDT	Aggregate	Aggregate	DSL	5608.331	359036.9	57227.45	31.54999
VENTURA	2023	OBUS	Aggregate	Aggregate	DSL	143.201	8919.232	1273.734	0.912332
VENTURA	2023	SBUS	Aggregate	Aggregate	DSL	286.7253	8901.391	3308.77	1.209614
VENTURA	2023	UBUS	Aggregate	Aggregate	DSL	33.42634	2717.962	133.7053	0.451184

Diesel Truck (HHDT, MDV, MHDT) vehicle miles per day	773,076	82	1,000 gall per day
		82,216	gallons per day
Diesel Truck Fleet Avg Miles per gallon	9.4		