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Mr. Jeremy Krout
 EPD Solutions, Inc.
 2 Park Plaza Suite 1120
 Irvine, CA 92614

SUBJECT: ETHANAC AND BARNETT WAREHOUSE ENERGY TABLES

The following Energy Tables were prepared for the proposed Ethanac and Barnett Warehouse development (referred to as “Project”) which is located in the City of Menifee.

CONSTRUCTION POWER COSTS

Based on the 2022 *National Construction Estimator* (1), the typical power cost per 1,000 square feet (sf) of building construction per month is estimated to be \$2.41. The Project is proposed to consist of two industrial buildings totaling 251,912-square-feet (sf). This analysis assumes up to 25,191-sf manufacturing use (10% of the total industrial building sf) and 226,721-sf of warehouse use (90% of industrial building). Table 1 estimates the total power cost of the on-site electricity usage during the construction of the proposed Project to be approximately \$16,037.83.

TABLE 1: PROJECT CONSTRUCTION POWER COST

Land Use	Power Cost (per 1,000 SF of construction per month)	Size (1,000 SF)	Construction Duration (months)	Project Construction Power Cost
Manufacturing	\$2.41	25.191	11	\$667.82
Warehousing	\$2.41	226.721	11	\$6,010.37
Landscape	\$2.41	92.803	11	\$2,460.21
Parking	\$2.41	67.392	11	\$1,786.56
Other Asphalt Surfaces	\$2.41	192.866	11	\$5,112.88
CONSTRUCTION POWER COST				\$16,037.83

CONSTRUCTION ELECTRICITY USAGE

The SCE’s general service rate schedule were used to determine the Project’s electrical usage. As of June 1, 2022, SCE’s general service rate is \$0.13 per kilowatt hours (kWh) of electricity for industrial services (2), the total electricity usage from on-site Project construction related activities is estimated to be approximately 120,849 kWh.

TABLE 2: PROJECT CONSTRUCTION ELECTRICITY USAGE

Land Use	Cost per kWh	Project Construction Electricity Usage (kWh)
Manufacturing	\$0.13	5,032
Warehousing	\$0.13	45,289
Landscape	\$0.13	18,538
Parking	\$0.13	13,462
Other Asphalt Surfaces	\$0.13	38,527
CONSTRUCTION ELECTRICITY USAGE		120,849

CONSTRUCTION EQUIPMENT FUEL CONSUMPTION

Fuel consumption estimates are presented in Table 3. The aggregate fuel consumption rate for all equipment is estimated at 18.5 hp-hr-gal., obtained from California Air Resources Board (CARB) 2018 Emissions Factors Tables and cited fuel consumption rate factors presented in Table D-24 of the Moyer guidelines (3). For the purposes of this analysis, the calculations are based on all construction equipment being diesel-powered which is standard practice consistent with industry standards. Diesel fuel would be supplied by existing commercial fuel providers serving the City and region. As presented in Table 3, Project construction activities would consume an estimated 60,575 gallons of diesel fuel.

TABLE 3: CONSTRUCTION EQUIPMENT FUEL CONSUMPTION ESTIMATES

Construction Activity	Duration (Days)	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption
Site Preparation	10	Crawler Tractors	87	4	8	0.43	1,197	647
		Rubber Tired Dozers	367	3	8	0.40	3,523	1,904
Grading	30	Crawler Tractors	87	2	8	0.43	599	971
		Graders	148	1	8	0.41	485	787
		Excavators	36	2	8	0.38	219	355
		Scrapers	423	2	8	0.48	3,249	5,268
		Rubber Tired Dozers	367	1	8	0.40	1,174	1,904
Building Construction	200	Crawler Tractors	87	5	8	0.43	1,496	16,177
		Forklifts	82	5	8	0.20	656	7,092
		Generator Sets	14	2	8	0.74	166	1,792
		Cranes	367	2	8	0.29	1,703	18,410
		Welders	46	2	8	0.45	331	3,581
Paving	20	Pavers	81	2	8	0.42	544	588
		Paving Equipment	89	2	8	0.36	513	554
		Rollers	36	2	8	0.38	219	237
Architectural Coating	40	Air Compressors	37	1	8	0.48	142	307
CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								60,575

CONSTRUCTION WORKER FUEL ESTIMATES

For purposes of analysis, it is assumed that 50% of all worker trips are from light-duty-auto vehicles (LDA), 25% are from light-duty-trucks with a gross vehicle weight rating (GVWR) of less than 6,000 lbs. and equivalent test weight (ETW) of less than or equal to 3,750 lbs (LDT1), and 25% are from light-duty-trucks with a GVWR of less than 6,000 lbs. and ETW between 3,751 lbs. and 5,750 lbs (LDT2). Data regarding Project related construction worker trips were based on CalEEMod 2022.1 model defaults utilized within the AQIA. Vehicle fuel efficiencies for LDAs, LDT1s, and LDT2s were estimated using information generated within the 2021 version of the EMFAC developed by the CARB.

Table 4 provides an estimated annual fuel consumption resulting from the Project generated by LDAs, LDT1s, and LDT2s related to construction worker trips. Based on Table 4, it is estimated that 15,808 gallons of fuel will be consumed related to construction worker trips during full construction of the proposed Project.

TABLE 4: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES (1 OF 2)

Year	Construction Activity	Duration (Days)	Worker Trips/Day	Trip Length (miles)	VMT	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
2023	LDA						
	Site Preparation	10	9	18.5	1,665	30.60	54
	Grading	30	10	18.5	5,550	30.60	181
	Building Construction	44	53	18.5	43,142	30.60	1,410
	LDT1						
	Site Preparation	10	5	18.5	925	24.15	38
	Grading	30	5	18.5	2,775	24.15	115
	Building Construction	44	27	18.5	21,978	24.15	910
	LDT2						
	Site Preparation	10	5	18.5	925	23.88	39
	Grading	30	5	18.5	2,775	23.88	116
	Building Construction	44	27	18.5	21,978	23.88	920
2024	LDA						
	Building Construction	156	53	18.5	152,958	31.51	4,855
	Paving	20	8	18.5	2,960	31.51	94
	Architectural Coating	40	11	18.5	8,140	31.51	258

TABLE 4: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES (2 OF 2)

Year	Construction Activity	Duration (Days)	Worker Trips/Day	Trip Length (miles)	VMT	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
2024	LDT1						
	Building Construction	156	27	18.5	77,922	24.62	3,165
	Paving	20	4	18.5	1,480	24.62	60
	Architectural Coating	40	6	18.5	4,440	24.62	180
	LDT2						
	Building Construction	156	27	18.5	77,922	24.57	3,171
	Paving	20	4	18.5	1,480	24.57	60
	Architectural Coating	40	6	18.5	4,440	24.57	181
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION							15,808

CONSTRUCTION VENDOR FUEL ESTIMATES

It is assumed that 50% of all vendor trips are from Medium-Heavy-Duty-Trucks (MHDT) and 50% are from Heavy-Heavy-Duty Trucks (HHDT). These assumptions are consistent with the CalEEMod 2022.1 defaults utilized within the within the AQIA. Vehicle fuel efficiencies for MHDTs and HHDTs were estimated using information generated within EMFAC2021.

Table 5 shows the estimated fuel economy of MHDTs and HHDTs accessing the Project site. Based on Table 5, fuel consumption from construction trips will total approximately 10,073 gallons.

TABLE 5: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES (1 OF 2)

Year	Construction Activity	Duration (Days)	Vendor Trips/Day	Trip Length (miles)	VMT	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
2023	MHD						
	Site Preparation	10	1	10.2	102	8.40	12
	Grading	30	3	10.2	918	8.40	109
	Building Construction	44	17	10.2	7,630	8.40	908
	HHD (Vendor)						
	Site Preparation	10	1	10.2	102	6.04	17
	Grading	30	3	10.2	918	6.04	152
	Building Construction	44	17	10.2	7,630	6.04	1,263

TABLE 5: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES (2 OF 2)

Year	Construction Activity	Duration (Days)	Vendor Trips/Day	Trip Length (miles)	VMT	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
2024	MHD						
	Building Construction	156	17	10.2	27,050	8.47	3,192
	HHD (Vendor)						
	Building Construction	156	17	10.2	27,050	6.12	4,419
TOTAL CONSTRUCTION VENDOR FUEL CONSUMPTION							10,073

TRANSPORTATION ENERGY DEMANDS

Energy that would be consumed by Project-generated traffic is a function of total VMT and estimated vehicle fuel economies of vehicles accessing the Project site. Table 6 presents the estimated annual fuel consumption from project-generated traffic.

TABLE 6: PROJECT-GENERATED TRAFFIC ANNUAL FUEL CONSUMPTION

Vehicle Type	Average Vehicle Fuel Economy (mpg)	Annual VMT	Estimated Annual Fuel Consumption (gallons)
LDA	30.60	816,324	26,675
LDT1	24.15	66,173	2,740
LDT2	23.88	324,568	13,591
MDV	15.29	223,991	14,652
MCY	15.29	32,940	2,155
LHD1	15.81	129,158	8,168
LHD2	15.29	36,441	2,384
MHD	8.40	209,204	24,904
HHD	6.04	634,721	105,042
TOTAL (ALL VEHICLES)		2,473,518	200,310

MDV = Medium Duty Trucks; LHDT1 = Light-Duty Trucks (Vehicles under the LHDT1 category have a GVWR of 8,501 to 10,000 lbs.); LHDT2 = Light-Duty Trucks (Vehicles under the LHDT2 category have a GVWR of 10,001 to 14,000 lbs.); OBUS = Other Buses; UBUS = Urban Buses
 MCY = Motorcycle; SBUS = School Bus; MH = Motorhome

FACILITY ENERGY DEMANDS

Project building operations and Project site maintenance activities would result in the consumption of electricity. Electricity would be supplied to the Project by SCE. Annual electricity demands of the Project are summarized in Table 7.

Based on information provided by the Project Applicant, the Project would not use natural gas. As such,

natural gas consumption has not been analyzed in this study

TABLE 7: PROJECT ANNUAL OPERATIONAL NATURAL GAS AND ELECTRICITY DEMAND SUMMARY

Land Use	Natural Gas Demand (kBTU/year)	Electricity Demand (kWh/year)
Manufacturing	0	621,990
Warehousing	0	860,235
Landscape	0	0
Parking	0	59,146
Other Asphalt Surfaces	0	0
TOTAL PROJECT ENERGY DEMAND	0	1,541,371

REFERENCES

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3. **California Air Resources Board.** *Methods to Find the Cost-Effectiveness of Funding Air Quality Projects For Evaluating Motor Vehicle Registration Fee Projects And Congestion Mitigation and Air Quality Improvement (CMAQ) Projects, Emission Factor Tables.* 2018.