APPENDIX C: ENERGY TABLES

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

SUBJECT: NORTH PARAMOUNT GATEWAY SPECIFIC PLAN ENERGY TABLES

The following Energy Tables were prepared for the proposed North Paramount Gateway Specific Plan development (referred to as "Project") which is located in the City of Paramount.

CONSTRUCTION POWER COSTS

Based on the *2022 National Construction Estimator* (1), the typical power cost per 1,000 square feet of building construction per month is estimated to be $2.41. Table 1 estimates the total power cost of the on-site electricity usage during the construction of the proposed Project to be approximately $5,863,521.14.

TABLE 1: PROJECT CONSTRUCTION POWER COST

Area	Power Cost (per 1,000 SF)	Size (1,000 SF)	Construction Duration (months)	Project Construction Power Cost
Multifamily Housing (Mid Rise)	$2.41	6,751.000	211	$3,432,951.01
Retail	$2.41	152.000	211	$77,293.52
Office	$2.41	39.000	211	$19,831.89
Other Asphalt Surfaces	$2.41	4,588.788	211	$2,333,444.72
			CONSTRUCTION POWER COST	***$5,863,521.14***

CONSTRUCTION ELECTRICITY USAGE

The SCE's general service rate schedule were used to determine the Project's electrical usage. As of January 1, 2022, SCE's general service rate is $0.13 per kilowatt hours (kWh) of electricity for commercial uses, $0.17 per kWh of electricity of residential uses, and $0.13 per kWh of electricity for street and area lighting (2), the total electricity usage from on-site Project construction related activities is estimated to be approximately 38,822,522 kWh.

TABLE 2: PROJECT CONSTRUCTION ELECTRICITY USAGE

Area	**Project Construction Electricity Usage** (kWh)
Multifamily Housing (Mid Rise)	20,369,970
Retail	586,802
Office	150,561
Other Asphalt Surfaces	17,715,189
CONSTRUCTION ELECTRICITY USAGE	***38,822,522***

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 1,055,286 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
Demolition	300	Concrete/Industrial Saws	81	1	8	0.73	473	7,671
		Excavators	158	3	8	0.38	1,441	23,367
		Rubber Tired Dozers	247	2	8	0.40	1,581	25,635
Site Preparation	180	Crawler Tractors	212	4	8	0.43	2,917	28,383
		Rubber Tired Dozers	247	3	8	0.40	2,371	23,071
Grading	465	Crawler Tractors	212	2	8	0.43	1,459	36,661
		Excavators	158	2	8	0.38	961	24,146
		Graders	187	1	8	0.41	613	15,417
		Rubber Tired Dozers	247	1	8	0.40	790	19,867
		Scrapers	367	2	8	0.48	2,819	70,845
Building Construction	3000	Cranes	231	2	8	0.29	1,072	173,812
		Forklifts	89	5	8	0.20	712	115,459
		Generator Sets	84	2	8	0.74	995	161,280
		Tractors/Loaders/Backhoes	97	5	8	0.37	1,436	232,800
		Welders	46	2	8	0.45	331	53,708
Paving	330	Pavers	130	2	8	0.42	874	15,583
		Paving Equipment	132	2	8	0.36	760	13,562
		Rollers	80	2	8	0.38	486	8,676
Architectural Coating	330	Air Compressors	78	1	8	0.48	300	5,343
CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)								***1,055,286***

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 2020.4.0 model defaults utilized within the AQIA. Vehicle fuel efficiencies for LDAs, LDT1s, and LDT2s were estimated using information generated within the 2017 version of the EMFAC developed by the CARB[1].

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 11,395,605 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)

Area	**Duration** (Days)	**Worker Trips/Day**	**Trip Length** (miles)	**VMT**	**Estimated Fuel Consumption** (gallons)
LDA					
Demolition	300	8	14.7	35,280	1,161
Site Preparation	180	9	14.7	23,814	784
Grading	465	10	14.7	68,355	2,249
Building Construction	3,000	3,425	14.7	151,042,500	4,969,606
Paving	330	8	14.7	38,808	1,277
Architectural Coating	330	685	14.7	3,322,935	109,331
LDT1					
Demolition	300	4	14.7	17,640	690
Site Preparation	180	5	14.7	13,230	518
Grading	465	5	14.7	34,178	1,338
Building Construction	3,000	1,713	14.7	75,543,300	2,956,670
Paving	330	4	14.7	19,404	759
Architectural Coating	330	343	14.7	1,663,893	65,123

[1] As a conservative measure, the estimated fuel consumption was based on fuel efficiencies for the 2023 year.

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

Area	**Duration** (Days)	**Worker Trips/Day**	**Trip Length** (miles)	**VMT**	**Estimated Fuel Consumption** (gallons)
LDT2					
Demolition	300	4	14.7	17,640	750
Site Preparation	180	5	14.7	13,230	562
Grading	465	5	14.7	34,178	1,453
Building Construction	3,000	1,713	14.7	75,543,300	3,211,767
Paving	330	4	14.7	19,404	825
Architectural Coating	330	343	14.7	1,663,893	70,741
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION					***11,395,605***

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 2020.4.0 defaults utilized within the within the AQIA. Vehicle fuel efficiencies for MHDTs and HHDTs were estimated using information generated within EMFAC2017[2].

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 4,079,273 gallons.

TABLE 5: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES

Area	**Duration** (Days)	**Vendor Trips/Day**	**Trip Length** (miles)	**VMT**	**Average Vehicle Fuel Economy** (mpg)
MHDT					
Building Construction	3,000	753	6.9	15,587,100	1,678,393
HHDT (Vendor)					
University Village	3,000	753	6.9	15,587,100	2,400,880
TOTAL CONSTRUCTION VENDOR FUEL CONSUMPTION					***4,079,273***

[2] As a conservative measure, the estimated fuel consumption was based on fuel efficiencies for the 2023 year.

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

Area	Annual VMT	Estimated Annual Fuel Consumption (gallons)
LDA	65,547,684	2,156,653
LDT1	8,234,440	322,286
LDT2	24,761,401	1,052,745
MDV	15,703,281	819,677
LHDT1	3,017,063	222,567
LHDT2	932,745	66,700
MHDT	1,811,274	195,035
HHDT	1,149,934	177,124
OBUS	135,104	23,394
UBUS	90,309	19,540
MCY	3,048,228	79,319
SBUS	92,791	11,843
MH	374,226	64,977
TOTAL FUEL CONSUMPTION	***124,898,481***	***5,211,859***

FACILITY ENERGY DEMANDS

Project building operations and Project site maintenance activities would result in the consumption of natural gas and electricity. Natural gas would be supplied to the Project by Southern California Gas (SoCalGas) and electricity would be supplied to the Project by SCE. Annual natural gas and electricity demands of the Project are summarized in Table 7.

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

Area	Natural Gas Demand (kBTU/year)	Electricity Demand (kWh/year)
Multifamily Housing (Mid Rise)	88,212,510	25,986,980
Retail	247,760	1,986,640
Office	402,090	487,500
Other Asphalt Surfaces	0	0
TOTAL PROJECT ENERGY DEMAND	***88,862,360***	***28,461,120***

REFERENCES

1. **Pray, Richard.** *2022 National Construction Estimator.* Carlsbad : Craftsman Book Company, 2022.
2. **Southern California Edison.** Regulatory Information - Rates Pricing. [Online] https://www.sce.com/regulatory/tariff-books/rates-pricing-choices.
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.