

# Appendix E

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Energy Calculations

# 3001 El Camino Real Housing Project

Last Updated: 11/7/2022

Compression-Ignition Engine Brake-Specific Fuel Consumption (BSFC) Factors [1]:

HP: 0 to 100	0.0588	HP: Greater than 100	0.0529
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*Values above are expressed in gallons per horsepower-hour/BSFC.*

CONSTRUCTION EQUIPMENT						
Construction Equipment	#	Hours per		Load Factor	Construction Phase	Fuel Used (gallons)
		Day	Horsepower			
Rubber Tired Dozers	1	8	247	0.4	Demolition Phase	1,462
Tractors/Loaders/Backhoes	3	8	97	0.37	Demolition Phase	1,772
Concrete/Industrial Saws	1	8	81	0.73	Demolition Phase	973
Graders	1	8	187	0.41	Site Preparation Phase	3,242
Tractors/Loaders/Backhoes	1	8	97	0.37	Site Preparation Phase	1,687
Rubber Tired Dozers	1	7	247	0.4	Site Preparation Phase	3,656
Graders	1	8	187	0.41	Grading Phase	1,297
Rubber Tired Dozers	1	8	247	0.4	Grading Phase	1,671
Tractors/Loaders/Backhoes	2	7	97	0.37	Grading Phase	1,181
Cranes	1	6	231	0.29	Building Construction Phase	8,498
Forklifts	1	6	89	0.2	Building Construction Phase	2,510
Generator Sets	1	8	84	0.74	Building Construction Phase	11,689
Tractors/Loaders/Backhoes	1	6	97	0.37	Building Construction Phase	5,062
Welders	3	8	46	0.45	Building Construction Phase	11,678
Air Compressors	1	8	78	0.48	Architectural Coating Phase	704
Pavers	1	6	130	0.42	Paving Phase	364
Paving Equipment	1	8	132	0.36	Paving Phase	422
Tractors/Loaders/Backhoes	1	8	97	0.37	Paving Phase	354
Rollers	1	7	80	0.38	Paving Phase	263
Cement and Mortar Mixers	1	6	9	0.56	Paving Phase	37
<b>Total Fuel Used</b>						<b>58,522</b>
						<b>(Gallons)</b>

Construction Phase	Days of Operation
Demolition Phase	35
Site Preparation Phase	100
Grading Phase	40
Building Construction Phase	400
Paving Phase	21
Architectural Coating Phase	40
Total Days	636

WORKER TRIPS				
Constuction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Demolition Phase	25.3	13	10.8	194.23
Site Preparation Phase	25.3	8	10.8	341.50
Grading Phase	25.3	10	10.8	170.75
Building Construction Phase	25.3	116	10.8	19807.11
Paving Phase	25.3	15	10.8	134.47
Architectural Coating Phase	25.3	23	10.8	392.73
<b>Total</b>				<b>21,040.79</b>

### HAULING AND VENDOR TRIPS

Trip Class	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
<b>HAULING TRIPS</b>				
Demolition Phase	7.6	35	20.0	92.11
Site Preparation Phase	7.6	225	20.0	592.11
Grading Phase	7.6	0	20.0	0.00
Building Construction Phase	7.6	0	20.0	0.00
Paving Phase	7.6	0	20.0	0.00
Architectural Coating Phase	7.6	0	20.0	0.00
<b>Total</b>				<b>684.21</b>
<b>VENDOR TRIPS</b>				
Demolition Phase	7.6	0	7.3	0.00
Site Preparation Phase	7.6	0	7.3	0.00
Grading Phase	7.6	0	7.3	0.00
Building Construction Phase	7.6	23	7.3	8836.84
Paving Phase	7.6	0	7.3	0.00
Architectural Coating Phase	7.6	0	7.3	0.00
<b>Total</b>				<b>8,836.84</b>
<b>Total Gasoline Consumption (gallons)</b>				<b>21,041</b>
<b>Total Diesel Consumption (gallons)</b>				<b>68,043</b>

**Sources:**

[1] United States Environmental Protection Agency. 2021. *Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES3.0.2*. September. Available at: <https://www.epa.gov/system/files/documents/2021-08/420r21021.pdf>.

[2] United States Department of Transportation, Bureau of Transportation Statistics. 2021. *National Transportation Statistics*. Available at: <https://www.bts.gov/topics/national-transportation-statistics>.

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**Populate one of the following tables (Leave the other blank):**

<b>Annual VMT</b>	<b>OR</b>	<b>Daily Vehicle Trips</b>
Annual VMT: 1,003,162		Daily Vehicle Trips: 621
		Average Trip Distance:

Fleet Class	Fleet Mix	Fuel Economy (MPG) [1]	
Light Duty Auto (LDA)	0.574685	Passenger Vehicles	25.3
Light Duty Truck 1 (LDT1)	0.056097	Light-Med Duty Trucks	18.2
Light Duty Truck 2 (LDT2)	0.185093	Heavy Trucks/Other	7.6
Medium Duty Vehicle (MDV)	0.115164	Motorcycles	44
Light Heavy Duty 1 (LHD1)	0.020188		
Light Heavy Duty 2 (LHD2)	0.005209		
Medium Heavy Duty (MHD)	0.008091		
Heavy Heavy Duty (HHD)	0.006312		
Other Bus (OBUS)	0.000884		
Urban Bus (UBUS)	0.000364		
Motorcycle (MCY)	0.024358		
School Bus (SBUS)	0.000887		
Motorhome (MH)	0.002668		

Fleet Mix					
Vehicle Type	Percent	Fuel Type	Annual VMT: VMT	Vehicle Trips: VMT	Fuel Consumption (Gallons)
Passenger Vehicles	57.47%	<i>Gasoline</i>	576,502	0.00	22,787
Light-Medium Duty Trucks	35.64%	<i>Gasoline</i>	357,481	0.00	19,642
Heavy Trucks/Other	4.46%	<i>Diesel</i>	44,744	0.00	5,887
Motorcycle	2.44%	<i>Gasoline</i>	24,435	0.00	555

<b>Total Gasoline Consumption (gallons)</b>	<b>42,984</b>
<b>Total Diesel Consumption (gallons)</b>	<b>5,887</b>

**Sources:**

[1] United States Department of Transportation, Bureau of Transportation Statistics. 2021. National Transportation Statistics. Available at: <https://www.bts.gov/topics/national-transportation-statistics>.