

Appendix E

Energy Consumption Calculations

Seaside Fire Station No. 2 Project

Last Updated: 6/23/2023

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		Load Factor	Construction Phase	Fuel Used (gallons)
		Hours per Day	Horsepower			
Rubber Tired Dozers	3	8	367	0.4	Site Preparation Phase	8,194
Tractors/Loaders/Backhoes	4	8	84	0.37	Site Preparation Phase	2,572
Rubber Tired Dozers	3	8	367	0.4	Site Preparation Phase	8,194
Tractors/Loaders/Backhoes	4	8	84	0.37	Site Preparation Phase	2,572
Graders	1	8	148	0.41	Grading Phase	5,004
Excavators	1	8	36	0.38	Grading Phase	1,254
Rubber Tired Dozers	1	8	367	0.4	Grading Phase	12,105
Tractors/Loaders/Backhoes	3	8	84	0.37	Grading Phase	8,548
Cranes	1	7	367	0.29	Building Construction Phase	7,719
Forklifts	3	8	82	0.2	Building Construction Phase	4,533
Generator Sets	1	8	14	0.74	Building Construction Phase	955
Tractors/Loaders/Backhoes	3	7	84	0.37	Building Construction Phase	7,517
Welders	1	8	46	0.45	Building Construction Phase	1,907
Air Compressors	1	6	37	0.48	Architectural Coating Phase	883
Pavers	1	8	81	0.42	Paving Phase	1,056
Cement and Mortar Mixers	2	6	10	0.56	Building Construction Phase	261
Paving Equipment	2	6	89	0.36	Paving Phase	1,491
Rollers	2	6	36	0.38	Paving Phase	637
Tractors/Loaders/Backhoes	1	8	84	0.37	Paving Phase	964
Total Fuel Used						76,365
						(Gallons)

Construction Phase	Days of Operation
Site Preparation Phase	44
Grading Phase	195
Building Construction Phase	196
Paving Phase	66
Architectural Coating Phase	141
Total Days	642

WORKER TRIPS

Constuction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Site Preparation Phase	25.0	35	9.47	583.35
Grading Phase	25.0	15	9.47	1107.99
Building Construction Phase	25.0	5	9.47	363.80
Paving Phase	25.0	20	9.47	500.02
Architectural Coating Phase	25.0	1	9.47	52.34
Total				2,607.50

HAULING AND VENDOR TRIPS

Trip Class	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
HAULING TRIPS				
Site Preparation Phase	7.5	0	0.0	0.00
Grading Phase	7.5	1	7.0	0.90
Building Construction Phase	7.5	0	0.0	0.00
Paving Phase	7.5	0	0.0	0.00
Architectural Coating Phase	7.5	0	0.0	0.00
Total				0.90
VENDOR TRIPS				
Site Preparation Phase	7.5	0	0.0	0.00
Grading Phase	7.5	0	0.0	0.00
Building Construction Phase	7.5	3	6.0	395.54
Paving Phase	7.5	0	0.0	0.00
Architectural Coating Phase	7.5	0	0.0	0.00
Total				395.54

Total Gasoline Consumption (gallons)	2,608
Total Diesel Consumption (gallons)	76,761

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):

Annual VMT	OR	Daily Vehicle Trips
Annual VMT: 109,977		Daily Vehicle Trips: Average Trip Distance:

Fleet Class	Fleet Mix	Fuel Economy (MPG) [1]	
Light Duty Auto (LDA)	0.457410	Passenger Vehicles	25.0
Light Duty Truck 1 (LDT1)	0.045455	Light-Med Duty Trucks	17.9
Light Duty Truck 2 (LDT2)	0.222765	Heavy Trucks/Other	7.5
Medium Duty Vehicle (MDV)	0.180223	Motorcycles	44
Light Heavy Duty 1 (LHD1)	0.036471		
Light Heavy Duty 2 (LHD2)	0.008907		
Medium Heavy Duty (MHD)	0.011976		
Heavy Heavy Duty (HHD)	0.007589		
Other Bus (OBUS)	0.000919		
Urban Bus (UBUS)	0.000523		
Motorcycle (MCY)	0.021594		
School Bus (SBUS)	0.003012		
Motorhome (MH)	0.003155		

Fleet Mix

Vehicle Type	Percent	Fuel Type	Annual VMT: VMT	Vehicle Trips: VMT	Fuel Consumption (Gallons)
Passenger Vehicles	45.74%	Gasoline	50,305	0.00	2,012
Light-Medium Duty Trucks	44.84%	Gasoline	49,319	0.00	2,755
Heavy Trucks/Other	7.26%	Diesel	7,979	0.00	1,064
Motorcycle	2.16%	Gasoline	2,375	0.00	54

Total Gasoline Consumption (gallons)	4,821
Total Diesel Consumption (gallons)	1,064

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>.