

Appendix D

Energy Use Calculations

Vincent Place Residential Project Construction Energy Demand

Last Updated: 12/18/2020

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	2	8	247	0.4	Demolition Phase	1,671.19
Excavators	3	8	158	0.38	Site Preparation Phase	1,523.35
Concrete/Industrial Saws	1	8	81	0.73	Demolition Phase	555.96
Tractors/Loaders/Backhoes	4	8	97	0.37	Site Preparation Phase	674.90
Rubber Tired Dozers	3	8	247	0.4	Site Preparation Phase	1,253.39
Graders	1	8	187	0.41	Grading Phase	4,798.40
Excavators	1	8	158	0.38	Grading Phase	3,757.61
Rubber Tired Dozers	1	8	247	0.4	Grading Phase	6,183.40
Tractors/Loaders/Backhoes	3	8	97	0.37	Grading Phase	7,491.34
Cranes	1	7	231	0.29	Building Construction Phase	15,516.77
Forklifts	3	8	89	0.2	Building Construction Phase	15,715.15
Generator Sets	1	8	84	0.74	Building Construction Phase	18,293.14
Tractors/Loaders/Backhoes	3	7	97	0.37	Building Construction Phase	27,725.54
Welders	1	8	46	0.45	Building Construction Phase	6,091.83
Air Compressors	1	6	78	0.48	Architectural Coating Phase	3,471.81
Pavers	2	8	130	0.42	Paving Phase	12,144.71
Paving Equipment	2	8	132	0.36	Paving Phase	10,569.90
Rollers	2	8	80	0.38	Paving Phase	7,517.31
Total Fuel Used						144,955.70
						(Gallons)

Construction Phase	Days of Construction
Demolition Phase	20
Site Preparation Phase	10
Grading Phase	148
Building Construction Phase	626
Paving Phase	263
Architectural Coating Phase	263
Total Days	1330

WORKER TRIPS

Constuction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Demolition Phase	24.4	15	14.7	180.74
Site Preparation Phase	24.4	18	14.7	108.44
Grading Phase	24.4	15	14.7	1337.46
Building Construction Phase	24.4	69	14.7	26022.61
Paving Phase	24.4	15	14.7	2376.70
Architectural Coating Phase	24.4	14	14.7	2218.25
Total				32,244.21

HAULING AND VENDOR TRIPS

Trip Class	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
HAULING TRIPS				
Demolition Phase	7.5	223	20.0	594.67
Site Preparation Phase	7.5	0	20.0	0.00
Grading Phase	7.5	862	20.0	2298.67
Building Construction Phase	7.5	0	20.0	0.00
Paving Phase	7.5	0	20.0	0.00
Architectural Coating Phase	7.5	0	20.0	0.00
Total				2,893.33
VENDOR TRIPS				
Demolition Phase	7.5	0	6.9	0.00
Site Preparation Phase	7.5	0	6.9	0.00
Grading Phase	7.5	0	6.9	0.00
Building Construction Phase	7.5	13	6.9	7486.96
Paving Phase	7.5	0	6.9	0.00
Architectural Coating Phase	7.5	0	6.9	0.00
Total				7,486.96

Total Gasoline Consumption (gallons)	32,244.21
Total Diesel Consumption (gallons)	155,335.99

Sources:

[1] United States Environmental Protection Agency. 2018. *Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES2014b* . July 2018. Available at: <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100UXEN.pdf>.

[2] United States Department of Transportation, Bureau of Transportation Statistics. 2019. *National Transportation Statistics 2019* . Available at: <https://www.bts.gov/topics/national-transportation-statistics>.

Vincent Place Residential Project Existing Uses Transportation Energy Demand

Last Updated: 12/18/2020

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

Annual VMT	OR	Daily Vehicle Trips
Annual VMT: 3,891,665		Daily Vehicle Trips: Average Trip Distance:

Fleet Class	Fleet Mix	Fuel Economy (MPG) [1]	
Light Duty Auto (LDA)	0.554129	Passenger Vehicles	24.4
Light Duty Truck 1 (LDT1)	0.042164	Light-Med Duty Trucks	17.9
Light Duty Truck 2 (LDT2)	0.205182	Heavy Trucks/Other	7.5
Medium Duty Vehicle (MDV)	0.113554	Motorcycles	44
Light Heavy Duty 1 (LHD1)	0.013848		
Light Heavy Duty 2 (LHD2)	0.005806		
Medium Heavy Duty (MHD)	0.021992		
Heavy Heavy Duty (HHD)	0.033191		
Other Bus (OBUS)	0.00214		
Urban Bus (UBUS)	0.001609		
Motorcycle (MCY)	0.004858		
School Bus (SBUS)	0.000715		
Motorhome (MH)	0.000811		

Fleet Mix

Vehicle Type	Percent	Fuel Type	Annual VMT:		Fuel Consumption
			VMT	Vehicle Trips: VMT	(Gallons)
Passenger Vehicles	55.41%	<i>Gasoline</i>	2156484	2156484.43	176761.02
Light-Medium Duty Trucks	36.09%	<i>Gasoline</i>	1404502	1404501.90	156927.59
Heavy Trucks/Other	8.01%	<i>Diesel</i>	311769	311769.07	83138.42
Motorcycle	0.49%	<i>Gasoline</i>	18906	18905.71	859.35

Total Gasoline Consumption (gallons)	334547.96
Total Diesel Consumption (gallons)	83138.42

Sources:

[1] United States Department of Transportation, Bureau of Transportation Statistics. 2019. National Transportation Statistics 2019. Available at: <https://www.bts.gov/topics/national-transportation-statistics>.

Vincent Place Residential Project Proposed Uses Transportation Energy Demand

Last Updated: 12/18/2020

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

Annual VMT	OR	Daily Vehicle Trips
Annual VMT: 2,957,004		Daily Vehicle Trips: Average Trip Distance:

Fleet Class	Fleet Mix	Fuel Economy (MPG) [1]	
Light Duty Auto (LDA)	0.554129	Passenger Vehicles	24.4
Light Duty Truck 1 (LDT1)	0.042164	Light-Med Duty Trucks	17.9
Light Duty Truck 2 (LDT2)	0.205182	Heavy Trucks/Other	7.5
Medium Duty Vehicle (MDV)	0.113554	Motorcycles	44
Light Heavy Duty 1 (LHD1)	0.013848		
Light Heavy Duty 2 (LHD2)	0.005806		
Medium Heavy Duty (MHD)	0.021992		
Heavy Heavy Duty (HHD)	0.033191		
Other Bus (OBUS)	0.00214		
Urban Bus (UBUS)	0.001609		
Motorcycle (MCY)	0.004858		
School Bus (SBUS)	0.000715		
Motorhome (MH)	0.000811		

Fleet Mix

Vehicle Type	Percent	Fuel Type	Annual VMT: VMT	Vehicle Trips: VMT	Fuel Consumption (Gallons)
Passenger Vehicles	55.41%	<i>Gasoline</i>	1638562	1638561.67	134308.33
Light-Medium Duty Trucks	36.09%	<i>Gasoline</i>	1067183	1067182.74	119238.30
Heavy Trucks/Other	8.01%	<i>Diesel</i>	236892	236891.50	63171.07
Motorcycle	0.49%	<i>Gasoline</i>	14365	14365.13	652.96

Total Gasoline Consumption (gallons)	254199.59
Total Diesel Consumption (gallons)	63171.07

Sources:

[1] United States Department of Transportation, Bureau of Transportation Statistics. 2019. National Transportation Statistics 2019. Available at: <https://www.bts.gov/topics/national-transportation-statistics>.