

CONSTRUCTION ACTIVITIES ENERGY USE

Table A: Construction Off-Road Equipment

Phase	Off-road Equipment Type	Amount	Usage Hour/Day	Total Usage Days	Total Equipment Usage Hours
Site Prep	Rubber Tired Dozers	3	8	10	240
	Tractors/Loaders/Backhoes	4	8	10	320
Grading	Excavators	2	8	35	560
	Graders	1	8	35	280
	Rubber Tired Dozers	1	8	35	280
	Scrapers	2	8	35	560
	Tractors/Loaders/Backhoes	2	8	35	560
Paving	Pavers	2	8	20	320
	Paving Equipment	2	8	20	320
	Rollers	2	8	20	320

Source: Air Quality and GHG Impact Analysis (Grand Terrace Trailer Storage, August 2019)

Table B: Off-Road Construction Equipment Diesel Fuel Usage

Phase	Off-road Equipment Type	Horsepower ¹	Load Factor ¹	Total Equipment Usage Hours	Horsepower-Hour ²	Fuel Usage (gallons) ³
Site Prep	Rubber Tired Dozers	247	0.4	240	23,712	1,214
	Tractors/Loaders/Backhoes	97	0.37	320	11,485	588
Total Diesel Fuel Use- Infrastructure (gallons)						1,802
Grading	Excavators	158	0.38	560	33,622	1,721
	Graders	187	0.41	280	21,468	1,099
	Rubber Tired Dozers	247	0.40	280	27,664	1,416
	Scrapers	367	0.48	560	98,650	5,051
	Tractors/Loaders/Backhoes	97	0.37	560	76,042	3,893
Total Diesel Fuel Use- Grading (gallons)						13,180
Paving	Pavers	130	0.42	320	17,472	895
	Paving Equipment	132	0.36	320	15,206	779
	Rollers	80	0.38	320	9,728	498
Total Diesel Fuel Use- Paving (gallons)						2,172
Total Diesel Fuel Usage (gallons)						17,154

Source: Air Quality and GHG Impact Analysis (Grand Terrace Trailer Storage, August 2019)

¹ Load factor and horsepower are CalEEMod defaults for the equipment type and were obtained from the Air Quality Impact Analysis

² HP-Hour is the basis for the fuel calculation. HP-Hour is calculated using the following formula: HP-Hour = Total Hours x LF x HP

³ Off-road mobile source fuel usage is calculated using a fuel usage rate of 0.0512 gallons of diesel per horsepower (HP)-hour. This is calculated based on diesel.

Table C: Construction Truck and Construction Worker Vehicle Fuel Efficiency

Vehicle Type	Vehicle Class	EMFAC2017 Outputs ²		Diesel Fuel Efficiency ³ (miles/gallon)
		Diesel Fuel Consumption (1,000 gallons/day)	VMT (miles/day)	
Construction Truck	MHDT	727.46	7,535,147.50	10.36
	HHDT	1,774.20	11,545,819.98	6.51
Construction Worker Vehicle	LDA	46.12	2,185,238.84	47.38
	LDT1	0.43	9,520.38	22.14
	LDT2	15.84	548,393.87	34.62

Source: EMFAC2017 (CARB 2019) and *Air Quality and GHG Impact Analysis* (Grand Terrace Trailer Storage, August 2019)

Notes:

¹ For construction trucks assumes 50 percent HHDT and 50 percent MHDT vehicles, consistent with assumptions in CalEEMod for hauling trucks. For construction worker vehicles assumes 50 percent LDA, 25 percent LDT1, and 25 percent LDT2 vehicles, consistent with assumptions in CalEEMod for worker vehicles.

² EMFAC2017 was run for South Coast Air Basin for the construction year 2021. Data was aggregated over all vehicle model years and speed bins.

³ The fuel efficiency was calculated by dividing the VMT (miles/day) by the fuel consumption (gallons/day).

HHDT = Heavy Heavy Duty Trucks

MHDT = Medium Heavy Duty Trucks

VMT = vehicle miles traveled

Table D: Construction Truck Fuel Use

Phase	Trip Type	Total Round Trips	Trip Length (miles)	Total Vehicle Miles Traveled (VMT per year)	Diesel Fuel Efficiency (miles/gallon)	Fuel Usage (gallons/year)
Gasoline Vehicles						
Site Prep	Truck	0	20.00	0	8.44	0
Grading	Truck	2,016	20.00	40,320	8.44	4,777
Paving	Truck	0	20.00	0	8.44	0
Total Diesel Fuel Usage						4,777

Source: EMFAC2017 (CARB 2019) and *Air Quality and GHG Impact Analysis* (Grand Terrace Trailer Storage, August 2019)

Notes:

¹ Assumes 50 percent HHDT and 50 percent MHDT vehicles, consistent with assumptions in CalEEMod for hauling trucks.

² EMFAC2017 was run for South Coast Air Basin for the construction years 2020-2021. Data was aggregated over all vehicle model years and speed bins.

³ The fuel efficiency was calculated by dividing the VMT (miles/day) by the fuel consumption (gallons/day).

The fuel efficiency was calculated by dividing the VMT (miles/year) by the fuel consumption efficiency (miles/gallons).

VMT = vehicle miles traveled

Table E: Construction Worker Vehicle Gasoline Fuel Use

Phase	Total One-Way Trips/Day	Total Days	Trip Length (miles)	Total Vehicle Miles Traveled (VMT/ year)	Gasoline Fuel Efficiency (miles/gallon)	Fuel Usage (gallons/year)
Site Prep	18	10	14.70	5,292	22.0	241
Grading	15	35	14.70	15,435	22.0	702
Paving	15	20	14.70	8,820	22.0	400
Total Gasoline Fuel Usage						1,343

Sources: EMFAC2017 (CARB 2019) and *Air Quality and GHG Impact Analysis* (Grand Terrace Trailer Storage, August 2019)
 Fuel efficiency is based on fuel consumption and VMT data from EMFAC2017 for South Coast Air Basin and total VMT.
 The fuel efficiency was calculated by dividing the VMT (miles/year) by the fuel consumption efficiency (miles/gallons).