

**Paine Field Terminal Construction Exhaust Emissions**

9/25/2009 13:26

Summary	CO	NOx	VOC	SO2	PM10/2.5	CO2
Building	1.02	2.02	0.16	0.05	0.15	211.38
Employees	0.37	0.02	0.01	0.00	0.00	24.46
Materials	0.12	0.39	0.02	0.00	0.02	80.08
Fugitive	na	na	na	na	2.4	na
<b>Total</b>	<b>1.51</b>	<b>2.42</b>	<b>0.19</b>	<b>0.05</b>	<b>2.57</b>	<b>315.92</b>

All equipment noted as Diesel unless specified

Project	Equipment	Hp	LF	Tot Hrs	Emission Factors Grams/Hp-Hr					
					CO	NOx	VOC	SO2	PM10	CO2
Connect utilities	Trencher	27	75%	40	7.9147	6.9905	1.9882	0.1462	1.2736	679.7966
	Dumpers/Tenders	300	59%	40	7.9147	6.9905	1.9882	0.1462	1.2736	679.7966
	Concrete/Industrial Saws	60	73%	40	3.5365	4.9397	0.5187	0.1270	0.5733	590.4580
	Other Construction Equipment	200	55%	120	2.5853	5.3091	0.3810	0.1154	0.3741	536.6888
	Cement & Mortar Mixers	100	56%	16	3.0575	6.6080	0.7316	0.1211	0.5436	563.0491
	Generator - gas	50	45%	60	3.4497	10.9906	0.2253	0.2644	0.4992	1,093.9982
Connect Module	Crane	300	43%	36	4.8218	0.3226	0.1145	0.2463	0.2463	532.3728
	Forklift	150	60%	108	1.8531	4.4252	0.2973	0.1159	0.2969	538.9234
	Generator - gas	50	45%	80	3.4497	10.9906	0.2253	0.2644	0.4992	1,093.9982
	Other Construction Equipment	200	55%	120	2.5853	5.3091	0.3810	0.1154	0.3741	536.6888
Interior Finishing	Rubber Tire Loaders	200	55%	540	1.9870	4.7588	0.3335	0.1160	0.3260	539.0312
	Other Construction Equipment	200	55%	2,160	2.5853	5.3091	0.3810	0.1154	0.3741	536.6888

Source: Emission factors- EPA's NONROAD2008 for Snohomish County Washington

1 gram = 0.00220462262 pounds  
 1 gram = 1.10231131 x 10<sup>-6</sup> short tons  
 1 gram = 0.00000110231131

**Worker Commute Emissions**

	Number of Workers	Days	Trips	Rdtrp Miles Traveled	Miles Traveled
<b>Worker Commute</b>	20	90	1,800	25	45,000

Based on EDMS 5.1 - LDGT at 40 MPH (2005 vehicle)

Vehicle Emission Factors (GR/Mile)							
Calendar Year	Avg. Speed *	VOC	NOx	CO	PM10	SOx	CO2
Emission factor	40	0.217	0.313	7.503	0.025	0.009	na

<b>Worker Comute Emissions</b>						
	VOC	NOx	CO	PM10	SOx	CO2
LBS	21	31	744	2	1	48,910
TONS	0.01	0.02	0.37	0.00	0.00	24.46

CO2 estimated at: 45,000/18mpg=gallons 2,500\*19.564 lbs CO2/gallon

**Material Delivery**

	Days	Trips/day	Rdtrp Miles Traveled	Total Miles
Base material	5	3	30	450
Concrete	10	3	30	900
Modular Units	1	63	30	1,890
Finishing	60	15	30	27,000
Miscell	90	10	30	27,000
				57,240

2 vehicles per unit - 21 units

Based on EDMS 5.1 - Class 8b HDDV (Vehicle age 2005)

Vehicle Emission Factors (GR/Mile)							
Calendar Year	Avg. Speed *	VOC	NOx	CO	PM10	Sox	CO2
Emission factor	45	0.296	6.127	1.828	0.254	0.043	na

<b>Material Delivery</b>						
	VOC	NOx	CO	PM10	Sox	CO2
LBS	37	773	231	32	5	160,158
TONS	0.02	0.39	0.12	0.02	0.00	80.08

CO2 estimated at: 57,240miles/8mpg=gallons 7155 diesel\*22.384 lbs CO2/gallon

**Fugitive Dust Evaluation**

Assumes that no more than 25 acres of land will be disturbed during any one month period.

	Acres of Construction	Months	Emission Factor	Units	% PM <sub>10</sub>	Emissions w/o Control (tons)	% Control (water)	Emissions W/ Control (tons)
Earth Moving	4	1	1.2	tons/acre-month	100%	4.8	50%	2.4

Calculation: 1.2 tons per acre-month \* acres\*months=tsp; PM10=TSP\*%PM10

Source: AP-42 Supplement 5

**Paine Field Terminal Construction Exhaust Emissions**

Emission Grams						
CO	NOx	VOC	SO2	PM10/2.5	CO2	
6,411	5,662	1,610	118	1,032	550,635	
56,036	49,493	14,076	1,035	9,017	4,812,960	
6,196	8,654	909	223	1,004	1,034,482	
34,126	70,080	5,030	1,524	4,938	7,084,292	
2,739	5,921	656	109	487	504,492	
4,657	14,837	304	357	674	1,476,898	
-	-	-	-	-	-	
22,392	1,498	532	1,144	1,144	2,472,339	
18,012	43,013	2,890	1,127	2,885	5,238,336	
6,209	19,783	405	476	899	1,969,197	
34,126	70,080	5,030	1,524	4,938	7,084,292	
-	-	-	-	-	-	
118,027	282,674	19,812	6,887	19,362	32,018,451	
614,267	1,261,432	90,536	27,430	88,883	127,517,251	
-	-	-	-	-	-	
-	-	-	-	-	-	
-	-	-	-	-	-	
923,200	1,833,127	141,791	41,953	135,263	191,763,624	Tot Grams
2,035	4,041	313	92	298	422,766	Tot Lbs
1.02	2.02	0.16	0.05	0.15	211.38	Total tons