



## **Appendix C. Construction Emissions**

## Road Construction Emissions Model, Version 7.1.2

Emission Estimates for -> Kem Front - Year 1											
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)	
Grubbing/Land Clearing	2.1	10.4	23.2	21.0	1.0	20.0	5.0	0.9	4.2	2,279.7	
Grading/Excavation	4.2	18.9	45.1	22.2	2.2	20.0	6.2	2.0	4.2	3,935.9	
Drainage/Utilities/Sub-Grade	4.4	19.1	34.9	12.1	2.1	10.0	4.0	1.9	2.1	3,494.0	
Paving	2.0	8.0	16.8	1.0	1.0	-	0.9	0.9	-	1,519.9	
<b>Maximum (pounds/day)</b>	<b>4.4</b>	<b>19.1</b>	<b>45.1</b>	<b>22.2</b>	<b>2.2</b>	<b>20.0</b>	<b>6.2</b>	<b>2.0</b>	<b>4.2</b>	<b>3,935.9</b>	
<b>Total (tons/construction project)</b>	<b>0.4</b>	<b>1.6</b>	<b>3.1</b>	<b>1.2</b>	<b>0.2</b>	<b>1.1</b>	<b>0.4</b>	<b>0.2</b>	<b>0.2</b>	<b>304.0</b>	
Notes: Project Start Year -> 2013 Project Length (months) -> 8 Total Project Area (acres) -> 12 Maximum Area Disturbed/Day (acres) -> 2 Total Soil Imported/Exported (yd <sup>3</sup> /day)-> 0											
PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.											
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.											
Emission Estimates for -> Kem Front - Year 1											
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)	
Grubbing/Land Clearing	0.9	4.7	10.5	9.5	0.4	9.1	2.3	0.4	1.9	1,036.2	
Grading/Excavation	1.9	8.6	20.5	10.1	1.0	9.1	2.8	0.9	1.9	1,789.0	
Drainage/Utilities/Sub-Grade	2.0	8.7	15.9	5.5	1.0	4.5	1.8	0.9	0.9	1,588.2	
Paving	0.9	3.6	7.7	0.5	0.5	-	0.4	0.4	-	690.9	
<b>Maximum (kilograms/day)</b>	<b>2.0</b>	<b>8.7</b>	<b>20.5</b>	<b>10.1</b>	<b>1.0</b>	<b>9.1</b>	<b>2.8</b>	<b>0.9</b>	<b>1.9</b>	<b>1,789.0</b>	
<b>Total (megagrams/construction project)</b>	<b>0.3</b>	<b>1.5</b>	<b>2.8</b>	<b>1.1</b>	<b>0.2</b>	<b>1.0</b>	<b>0.3</b>	<b>0.2</b>	<b>0.2</b>	<b>275.8</b>	
Notes: Project Start Year -> 2013 Project Length (months) -> 8 Total Project Area (hectares) -> 5 Maximum Area Disturbed/Day (hectares) -> 1 Total Soil Imported/Exported (meters <sup>3</sup> /day)-> 0											
PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.											
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.											

**Road Construction Emissions Model**

Version 7.1.2

**Data Entry Worksheet**

Note: Required data input sections have a yellow background.  
 Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.  
 The user is required to enter information in cells C10 through C25.



**Input Type**

Project Name	Kern Front - Year 1	
Construction Start Year	2013	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	8.0	months
Predominant Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	0.2	miles
Total Project Area	12.0	acres
Maximum Area Disturbed/Day	2.0	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0.0	yd <sup>3</sup> /day
Soil Exported	0.0	yd <sup>3</sup> /day
Average Truck Capacity	20.0	yd <sup>3</sup> (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of	Program
	Construction Months	Calculated Months
Grubbing/Land Clearing	0.20	0.80
Grading/Excavation	0.60	3.20
Drainage/Utilities/Sub-Grade	7.00	2.80
Paving	0.20	1.20
<b>Totals</b>	<b>8.00</b>	<b>8.00</b>

2005	%	2006	%	2007	%
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00

Hauling emission default values can be overridden in cells C45 through C46.

<b>Soil Hauling Emissions</b>		User Override of				
User Input	Soil Hauling Defaults	Default Values				
Miles/round trip		30				
Round trips/day		0				
Vehicle miles traveled/day (calculated)						
		0				
Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
Tons per construction period	0.00	0.00	0.00	0.00	0.00	0.00

Worker commute default values can be overridden in cells C60 through C65.

<b>Worker Commute Emissions</b>		User Override of Worker				
	Commute Default Values	Default Values				
Miles/ one-way trip		20				
One-way trips/day		2				
No. of employees: Grubbing/Land Clearing		3				
No. of employees: Grading/Excavation		6				
No. of employees: Drainage/Utilities/Sub-Grade	7.00	6				
No. of employees: Paving		4				
	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Grading/Excavation (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Paving (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Grubbing/Land Clearing (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Grading/Excavation (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Paving (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Pounds per day - Grubbing/Land Clearing	0.072	0.087	0.810	0.013	0.005	119.684
Tons per const. Period - Grub/Land Clear	0.000	0.000	0.002	0.000	0.000	0.263
Pounds per day - Grading/Excavation	0.072	0.087	0.810	0.013	0.005	119.684
Tons per const. Period - Grading/Excavation	0.000	0.001	0.005	0.000	0.000	0.790
Pounds per day - Drainage/Utilities/Sub-Grade	0.072	0.087	0.810	0.013	0.005	119.684
Tons per const. Period - Drain/Util/Sub-Grade	0.006	0.007	0.062	0.001	0.000	9.216
Pounds per day - Paving	0.094	0.087	0.810	0.013	0.005	168.502
Tons per const. Period - Paving	0.000	0.000	0.002	0.000	0.000	0.371
tons per construction period	0.006	0.008	0.071	0.001	0.000	10.640

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values			
	Default # Water Trucks	Number of Water Trucks	Miles Traveled/Day	Miles Traveled/Day			
Grubbing/Land Clearing - Exhaust	2.00	1	20.00	40			
Grading/Excavation - Exhaust	2.00	1	20.00	40			
Drainage/Utilities/Subgrade	1.00	1	20.00	40			
	<b>ROG</b>	<b>NOx</b>	<b>CO</b>	<b>PM10</b>	<b>PM2.5</b>	<b>CO2</b>	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84	
Emission rate - Grading/Excavation (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.40	11.32	1.78	0.35	0.26	1716.84	
Pounds per day - Grubbing/Land Clearing	0.04	1.00	0.16	0.03	0.02	151.26	
Tons per const. Period - Grub/Land Clear	0.00	0.01	0.00	0.00	0.00	1.00	
Pound per day - Grading/Excavation	0.04	1.00	0.16	0.03	0.02	151.26	
Tons per const. Period - Grading/Excavation	0.00	0.01	0.00	0.00	0.00	1.00	
Pound per day - Drainage/Utilities/Subgrade	0.02	0.50	0.08	0.02	0.01	75.63	
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.04	0.01	0.00	0.00	5.82	

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max	Default	PM10	PM10	PM2.5	PM2.5
	Acreage Disturbed/Day	Maximum Acreage/Day	pounds/day	tons/per period	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing		2	20.0	0.0	4.2	0.0
Fugitive Dust - Grading/Excavation		2	20.0	0.7	4.2	0.1
Fugitive Dust - Drainage/Utilities/Subgrade	1.00	2	10.0	0.3	2.1	0.1

## Off-Road Equipment Emissions

Grubbing/Land Clearing	Default	Type	ROG	CO	NOx	PM10	PM2.5	CO2
	Number of Vehicles		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
Override of Default Number of Vehicles	Program-estimate							
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
1.00	1	Scrapers	1.60	7.26	20.03	0.81	0.75	1609.94
	0	Signal Boards	0.20	0.60	0.59	0.05	0.05	62.97
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.15	1.57	1.45	0.07	0.06	335.80
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	1.9	9.4	22.1	0.9	0.9	2008.7
	Grubbing/Land Clearing	tons per phase	0.0	0.0	0.0	0.0	0.0	4.4

Grading/Excavation	Default		ROG	CO	NOx	PM10	PM2.5	CO2
	Number of Vehicles	Type						
Override of Default Number of Vehicles	Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	1	Excavators	0.49	2.79	5.57	0.28	0.26	572.73
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
	1	Graders	1.13	3.49	11.12	0.62	0.57	672.89
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
	0	Other Construction Equipment	0.16	0.72	1.68	0.09	0.08	130.83
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
	1.00	Rollers	0.41	1.51	3.59	0.27	0.25	279.78
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
	1	Scrapers	1.60	7.26	20.03	0.81	0.75	1609.94
	0	Signal Boards	0.20	0.60	0.59	0.05	0.05	62.97
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
	1.00	Tractors/Loaders/Backhoes	0.15	1.57	1.45	0.07	0.06	335.80
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	4.1	17.9	44.0	2.2	2.0	3664.9
	Grading	tons per phase	0.0	0.1	0.3	0.0	0.0	24.2

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles <i>Program-estimate</i>	ROG	CO	NOx	PM10	PM2.5	CO2	
		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Air Compressors	0.87	3.50	5.33	0.48	0.44	507.95
1.00		Bore/Drill Rigs	0.46	3.82	7.32	0.23	0.21	950.55
1.00		Cement and Mortar Mixers	0.07	0.35	0.43	0.02	0.02	57.88
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Cranes	0.82	3.01	9.37	0.43	0.40	601.80
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Forklifts	0.28	0.90	2.29	0.19	0.18	165.47
0.00		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	1	Plate Compactors	0.04	0.21	0.25	0.01	0.01	34.45
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.20	0.60	0.59	0.05	0.05	62.97
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.15	1.57	1.45	0.07	0.06	335.80
	1	Trenchers	0.64	2.10	5.33	0.42	0.38	377.08
1.00		Welders	0.75	2.14	1.99	0.19	0.17	204.74
	Drainage	pounds per day	4.3	18.2	34.3	2.1	1.9	3298.7
	Drainage	tons per phase	0.3	1.4	2.6	0.2	0.1	254.0



Paving	Default		ROG	CO	NOx	PM10	PM2.5	CO2
	Number of Vehicles	Type						
Override of Default Number of Vehicles	Program-estimate		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Graders	1.13	3.49	11.12	0.62	0.57	672.89
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
	1	Rollers	0.41	1.51	3.59	0.27	0.25	279.78
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.20	0.60	0.59	0.05	0.05	62.97
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.15	1.57	1.45	0.07	0.06	335.80
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	1.9	7.2	16.8	1.0	0.9	1351.4
	Paving	tons per phase	0.0	0.0	0.0	0.0	0.0	3.0
<b>Total Emissions all Phases (tons per construction period) =&gt;</b>			<b>0.4</b>	<b>1.6</b>	<b>3.0</b>	<b>0.2</b>	<b>0.2</b>	<b>285.6</b>

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment	Default Values	
	Horsepower	Hours/day
Aerial Lifts	63	8
Air Compressors	106	8
Bore/Drill Rigs	206	8
Cement and Mortar Mixers	10	8
Concrete/Industrial Saws	64	8
Cranes	226	8
Crawler Tractors	208	8
Crushing/Proc. Equipment	142	8
Excavators	163	8
Forklifts	89	8
Generator Sets	66	8
Graders	175	8
Off-Highway Tractors	123	8
Off-Highway Trucks	400	8
Other Construction Equipment	172	8
Other General Industrial Equipment	88	8
Other Material Handling Equipment	167	8
Pavers	126	8
Paving Equipment	131	8
Plate Compactors	8	8
Pressure Washers	26	8
Pumps	53	8
Rollers	81	8
Rough Terrain Forklifts	100	8
Rubber Tired Dozers	255	8
Rubber Tired Loaders	200	8
Scrapers	362	8
Signal Boards	20	8
Skid Steer Loaders	65	8
Surfacing Equipment	254	8
Sweepers/Scrubbers	64	8
Tractors/Loaders/Backhoes	98	8
Trenchers	81	8
Welders	45	8

0

END OF DATA ENTRY SHEET

**Road Construction Emissions Model**

Version 7.1.2

**Data Entry Worksheet**

Note: Required data input sections have a yellow background.  
 Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.  
 The user is required to enter information in cells C10 through C25.



**Input Type**

Project Name	Kern Front - Year 2	
Construction Start Year	2014	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	12.0	months
Predominant Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	0.2	miles
Total Project Area	12.0	acres
Maximum Area Disturbed/Day	2.0	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0.0	yd <sup>3</sup> /day
Soil Exported	0.0	yd <sup>3</sup> /day
Average Truck Capacity	20.0	yd <sup>3</sup> (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of	Program
	Construction Months	Calculated Months
Grubbing/Land Clearing	0.50	1.20
Grading/Excavation	1.00	4.80
Drainage/Utilities/Sub-Grade	10.00	4.20
Paving	0.50	1.80
<b>Totals</b>	<b>12.00</b>	<b>12.00</b>

2005	%	2006	%	2007	%
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00

Hauling emission default values can be overridden in cells C45 through C46.

<b>Soil Hauling Emissions</b>		User Override of					
User Input	Soil Hauling Defaults	Default Values					
Miles/round trip		30					
Round trips/day		0					
Vehicle miles traveled/day (calculated)			0				
Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate (grams/mile)	0.28	10.43	1.26	0.25	0.18	1713.35	
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	
Pounds per day	0.0	0.0	0.0	0.0	0.0	0.0	
Tons per construction period	0.00	0.00	0.00	0.00	0.00	0.00	

Worker commute default values can be overridden in cells C60 through C65.

<b>Worker Commute Emissions</b>		User Override of Worker					
	Commute Default Values	Default Values					
Miles/ one-way trip		20					
One-way trips/day		2					
No. of employees: Grubbing/Land Clearing		3					
No. of employees: Grading/Excavation		6					
No. of employees: Drainage/Utilities/Sub-Grade	7.00	6					
No. of employees: Paving		4					
	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.182	0.249	2.208	0.047	0.020	443.370	
Emission rate - Grading/Excavation (grams/mile)	0.182	0.249	2.208	0.047	0.020	443.370	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.182	0.249	2.208	0.047	0.020	443.370	
Emission rate - Paving (grams/mile)	0.182	0.249	2.208	0.047	0.020	443.370	
Emission rate - Grubbing/Land Clearing (grams/trip)	0.616	0.407	5.187	0.004	0.003	95.481	
Emission rate - Grading/Excavation (grams/trip)	0.616	0.407	5.187	0.004	0.003	95.481	
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.616	0.407	5.187	0.004	0.003	95.481	
Emission rate - Paving (grams/trip)	0.616	0.407	5.187	0.004	0.003	95.481	
Pounds per day - Grubbing/Land Clearing	0.064	0.077	0.721	0.013	0.005	119.714	
Tons per const. Period - Grub/Land Clear	0.000	0.000	0.004	0.000	0.000	0.658	
Pounds per day - Grading/Excavation	0.064	0.077	0.721	0.013	0.005	119.714	
Tons per const. Period - Grading/Excavation	0.001	0.001	0.008	0.000	0.000	1.317	
Pounds per day - Drainage/Utilities/Sub-Grade	0.064	0.077	0.721	0.013	0.005	119.714	
Tons per const. Period - Drain/Util/Sub-Grade	0.007	0.008	0.079	0.001	0.001	13.169	
Pounds per day - Paving	0.084	0.077	0.721	0.013	0.005	168.543	
Tons per const. Period - Paving	0.000	0.000	0.004	0.000	0.000	0.927	
tons per construction period	0.009	0.010	0.095	0.002	0.001	16.071	

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values			
	Default # Water Trucks	Number of Water Trucks	Miles Traveled/Day	Miles Traveled/Day			
Grubbing/Land Clearing - Exhaust	2.00	1	20.00	40			
Grading/Excavation - Exhaust	2.00	1	20.00	40			
Drainage/Utilities/Subgrade	1.00	1	20.00	40			
	<b>ROG</b>	<b>NOx</b>	<b>CO</b>	<b>PM10</b>	<b>PM2.5</b>	<b>CO2</b>	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.28	10.43	1.26	0.25	0.18	1713.35	
Emission rate - Grading/Excavation (grams/mile)	0.28	10.43	1.26	0.25	0.18	1713.35	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.28	10.43	1.26	0.25	0.18	1713.35	
Pounds per day - Grubbing/Land Clearing	0.03	0.92	0.11	0.02	0.02	150.96	
Tons per const. Period - Grub/Land Clear	0.00	0.01	0.00	0.00	0.00	1.66	
Pound per day - Grading/Excavation	0.03	0.92	0.11	0.02	0.02	150.96	
Tons per const. Period - Grading/Excavation	0.00	0.01	0.00	0.00	0.00	1.66	
Pound per day - Drainage/Utilities/Subgrade	0.01	0.46	0.06	0.01	0.01	75.48	
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.05	0.01	0.00	0.00	8.30	

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max	Default	PM10	PM10	PM2.5	PM2.5
	Acreage Disturbed/Day	Maximum Acreage/Day	pounds/day	tons/per period	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing		2	20.0	0.1	4.2	0.0
Fugitive Dust - Grading/Excavation		2	20.0	1.1	4.2	0.2
Fugitive Dust - Drainage/Utilities/Subgrade	1.00	2	10.0	0.5	2.1	0.1

## Off-Road Equipment Emissions

Grubbing/Land Clearing	Default		Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
	Number of Vehicles	Program-estimate							
Override of Default Number of Vehicles									
			Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
			Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
			Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
			Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
			Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
			Cranes	0.00	0.00	0.00	0.00	0.00	0.00
			Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
			Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
			Excavators	0.00	0.00	0.00	0.00	0.00	0.00
			Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
			Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
			Graders	0.00	0.00	0.00	0.00	0.00	0.00
			Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
			Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
			Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
			Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
			Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
			Pavers	0.00	0.00	0.00	0.00	0.00	0.00
			Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
			Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
			Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
			Pumps	0.00	0.00	0.00	0.00	0.00	0.00
			Rollers	0.00	0.00	0.00	0.00	0.00	0.00
			Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00		1	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
			Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
1.00		1	Scrapers	1.54	7.26	19.16	0.77	0.71	1609.63
		0	Signal Boards	0.18	0.58	0.57	0.05	0.04	62.97
			Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
			Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
			Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tractors/Loaders/Backhoes	0.14	1.57	1.34	0.05	0.05	336.13
			Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
			Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing		pounds per day	1.9	9.4	21.1	0.9	0.8	2008.7
	Grubbing/Land Clearing		tons per phase	0.0	0.1	0.1	0.0	0.0	11.0

Grading/Excavation	Default		ROG	CO	NOx	PM10	PM2.5	CO2
	Number of Vehicles	Type						
Override of Default Number of Vehicles	Program-estimate		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	1	Excavators	0.45	2.79	5.10	0.25	0.23	572.77
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
	1	Graders	1.12	3.49	10.95	0.61	0.57	672.31
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
	0	Other Construction Equipment	0.15	0.72	1.60	0.08	0.08	130.87
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
	1.00	Rollers	0.39	1.51	3.40	0.25	0.23	279.56
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
	1	Scrapers	1.54	7.26	19.16	0.77	0.71	1609.63
	0	Signal Boards	0.18	0.58	0.57	0.05	0.04	62.97
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
	1.00	Tractors/Loaders/Backhoes	0.14	1.57	1.34	0.05	0.05	336.13
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	4.0	17.9	42.1	2.1	1.9	3664.2
	Grading	tons per phase	0.0	0.2	0.5	0.0	0.0	40.3

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles Program-estimate	ROG	CO	NOx	PM10	PM2.5	CO2	
		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Air Compressors	0.80	3.47	5.00	0.44	0.41	507.95
1.00		Bore/Drill Rigs	0.41	3.80	6.42	0.19	0.18	945.25
1.00		Cement and Mortar Mixers	0.07	0.35	0.43	0.02	0.02	57.88
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Cranes	0.79	3.00	9.03	0.41	0.38	601.76
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Forklifts	0.26	0.90	2.17	0.18	0.17	165.47
0.00		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	1	Plate Compactors	0.04	0.21	0.25	0.01	0.01	34.45
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.18	0.58	0.57	0.05	0.04	62.97
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.14	1.57	1.34	0.05	0.05	336.13
	1	Trenchers	0.61	2.10	5.16	0.40	0.37	377.07
1.00		Welders	0.68	2.06	1.91	0.17	0.16	204.74
	Drainage	pounds per day	4.0	18.1	32.3	1.9	1.8	3293.7
	Drainage	tons per phase	0.4	2.0	3.6	0.2	0.2	362.3



Paving	Default		ROG	CO	NOx	PM10	PM2.5	CO2	
	Override of Default Number of Vehicles	Number of Vehicles <i>Program-estimate</i>							Type
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00	
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00	
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	
	1.00	Graders	1.12	3.49	10.95	0.61	0.57	672.31	
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00	
	1	Rollers	0.39	1.51	3.40	0.25	0.23	279.56	
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	
	0	Signal Boards	0.18	0.58	0.57	0.05	0.04	62.97	
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	
	1.00	Tractors/Loaders/Backhoes	0.14	1.57	1.34	0.05	0.05	336.13	
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	
		Welders	0.00	0.00	0.00	0.00	0.00	0.00	
		Paving	pounds per day	1.8	7.2	16.3	1.0	0.9	1351.0
		Paving	tons per phase	0.0	0.0	0.1	0.0	0.0	7.4
<b>Total Emissions all Phases (tons per construction period) =&gt;</b>				0.5	2.3	4.2	0.2	0.2	421.1

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment	Default Values Horsepower	Default Values Hours/day
Aerial Lifts	63	8
Air Compressors	106	8
Bore/Drill Rigs	206	8
Cement and Mortar Mixers	10	8
Concrete/Industrial Saws	64	8
Cranes	226	8
Crawler Tractors	208	8
Crushing/Proc. Equipment	142	8
Excavators	163	8
Forklifts	89	8
Generator Sets	66	8
Graders	175	8
Off-Highway Tractors	123	8
Off-Highway Trucks	400	8
Other Construction Equipment	172	8
Other General Industrial Equipment	88	8
Other Material Handling Equipment	167	8
Pavers	126	8
Paving Equipment	131	8
Plate Compactors	8	8
Pressure Washers	26	8
Pumps	53	8
Rollers	81	8
Rough Terrain Forklifts	100	8
Rubber Tired Dozers	255	8
Rubber Tired Loaders	200	8
Scrapers	362	8
Signal Boards	20	8
Skid Steer Loaders	65	8
Surfacing Equipment	254	8
Sweepers/Scrubbers	64	8
Tractors/Loaders/Backhoes	98	8
Trenchers	81	8
Welders	45	8

0

END OF DATA ENTRY SHEET

## Road Construction Emissions Model, Version 7.1.2

Emission Estimates for -> Kern Front - Year 3												
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)		
Grubbing/Land Clearing	2.1	10.1	23.6	21.1	1.1	20.0	5.2	1.0	4.2	2,277.6		
Grading/Excavation	4.2	18.6	44.3	22.3	2.3	20.0	6.3	2.1	4.2	3,932.8		
Drainage/Utilities/Sub-Grade	4.1	18.6	33.7	12.1	2.1	10.0	4.0	1.9	2.1	3,487.1		
Paving	2.1	7.8	18.3	1.2	1.2	-	1.1	1.1	-	1,519.5		
<b>Maximum (pounds/day)</b>	<b>4.2</b>	<b>18.6</b>	<b>44.3</b>	<b>22.3</b>	<b>2.3</b>	<b>20.0</b>	<b>6.3</b>	<b>2.1</b>	<b>4.2</b>	<b>3,932.8</b>		
<b>Total (tons/construction project)</b>	<b>0.5</b>	<b>2.4</b>	<b>4.4</b>	<b>1.9</b>	<b>0.3</b>	<b>1.6</b>	<b>0.6</b>	<b>0.2</b>	<b>0.3</b>	<b>448.5</b>		
Notes: Project Start Year -> 2015												
Project Length (months) -> 12												
Total Project Area (acres) -> 12												
Maximum Area Disturbed/Day (acres) -> 2												
Total Soil Imported/Exported (yd <sup>3</sup> /day)-> 0												
PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.												
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.												
Emission Estimates for -> Kern Front - Year 3												
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)		
Grubbing/Land Clearing	1.0	4.6	10.7	9.6	0.5	9.1	2.3	0.5	1.9	1,035.3		
Grading/Excavation	1.9	8.5	20.1	10.1	1.0	9.1	2.8	1.0	1.9	1,787.6		
Drainage/Utilities/Sub-Grade	1.9	8.5	15.3	5.5	0.9	4.5	1.8	0.9	0.9	1,585.1		
Paving	1.0	3.5	8.3	0.5	0.5	-	0.5	0.5	-	690.7		
<b>Maximum (kilograms/day)</b>	<b>1.9</b>	<b>8.5</b>	<b>20.1</b>	<b>10.1</b>	<b>1.0</b>	<b>9.1</b>	<b>2.8</b>	<b>1.0</b>	<b>1.9</b>	<b>1,787.6</b>		
<b>Total (megagrams/construction project)</b>	<b>0.5</b>	<b>2.1</b>	<b>4.0</b>	<b>1.7</b>	<b>0.2</b>	<b>1.5</b>	<b>0.5</b>	<b>0.2</b>	<b>0.3</b>	<b>406.8</b>		
Notes: Project Start Year -> 2015												
Project Length (months) -> 12												
Total Project Area (hectares) -> 5												
Maximum Area Disturbed/Day (hectares) -> 1												
Total Soil Imported/Exported (meters <sup>3</sup> /day)-> 0												
PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.												
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.												

**Road Construction Emissions Model**

Version 7.1.2

**Data Entry Worksheet**

Note: Required data input sections have a yellow background.  
 Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.  
 The user is required to enter information in cells C10 through C25.



**Input Type**

Project Name	Kern Front - Year 3	
Construction Start Year	2015	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	12.0	months
Predominant Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	0.2	miles
Total Project Area	12.0	acres
Maximum Area Disturbed/Day	2.0	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0.0	yd <sup>3</sup> /day
Soil Exported	0.0	yd <sup>3</sup> /day
Average Truck Capacity	20.0	yd <sup>3</sup> (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of	Program
	Construction Months	Calculated Months
Grubbing/Land Clearing	0.50	1.20
Grading/Excavation	1.00	4.80
Drainage/Utilities/Sub-Grade	10.00	4.20
Paving	0.50	1.80
<b>Totals</b>	<b>12.00</b>	<b>12.00</b>

2005	%	2006	%	2007	%
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00

Hauling emission default values can be overridden in cells C45 through C46.

<b>Soil Hauling Emissions</b>		User Override of					
User Input	Soil Hauling Defaults	Default Values					
Miles/round trip		30					
Round trips/day		0					
Vehicle miles traveled/day (calculated)			0				
Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate (grams/mile)	0.25	9.41	1.09	0.22	0.15	1694.67	
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	
Pounds per day	0.0	0.0	0.0	0.0	0.0	0.0	
Tons per construction period	0.00	0.00	0.00	0.00	0.00	0.00	

Worker commute default values can be overridden in cells C60 through C65.

<b>Worker Commute Emissions</b>		User Override of Worker					
	Commute Default Values	Default Values					
Miles/ one-way trip		20					
One-way trips/day		2					
No. of employees: Grubbing/Land Clearing		3					
No. of employees: Grading/Excavation		6					
No. of employees: Drainage/Utilities/Sub-Grade	7.00	6					
No. of employees: Paving		4					
	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.164	0.219	1.956	0.047	0.020	443.518	
Emission rate - Grading/Excavation (grams/mile)	0.164	0.219	1.956	0.047	0.020	443.518	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.164	0.219	1.956	0.047	0.020	443.518	
Emission rate - Paving (grams/mile)	0.164	0.219	1.956	0.047	0.020	443.518	
Emission rate - Grubbing/Land Clearing (grams/trip)	0.558	0.363	4.666	0.004	0.003	95.528	
Emission rate - Grading/Excavation (grams/trip)	0.558	0.363	4.666	0.004	0.003	95.528	
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.558	0.363	4.666	0.004	0.003	95.528	
Emission rate - Paving (grams/trip)	0.558	0.363	4.666	0.004	0.003	95.528	
Pounds per day - Grubbing/Land Clearing	0.058	0.068	0.640	0.013	0.005	119.754	
Tons per const. Period - Grub/Land Clear	0.000	0.000	0.004	0.000	0.000	0.659	
Pounds per day - Grading/Excavation	0.058	0.068	0.640	0.013	0.005	119.754	
Tons per const. Period - Grading/Excavation	0.001	0.001	0.007	0.000	0.000	1.317	
Pounds per day - Drainage/Utilities/Sub-Grade	0.058	0.068	0.640	0.013	0.005	119.754	
Tons per const. Period - Drain/Util/Sub-Grade	0.006	0.007	0.070	0.001	0.001	13.173	
Pounds per day - Paving	0.076	0.068	0.640	0.013	0.005	168.600	
Tons per const. Period - Paving	0.000	0.000	0.004	0.000	0.000	0.927	
tons per construction period	0.008	0.009	0.085	0.002	0.001	16.076	

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values			
	Default # Water Trucks	Number of Water Trucks	Miles Traveled/Day	Miles Traveled/Day			
Grubbing/Land Clearing - Exhaust	2.00	1	20.00	40			
Grading/Excavation - Exhaust	2.00	1	20.00	40			
Drainage/Utilities/Subgrade	1.00	1	20.00	40			
	<b>ROG</b>	<b>NOx</b>	<b>CO</b>	<b>PM10</b>	<b>PM2.5</b>	<b>CO2</b>	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.25	9.41	1.09	0.22	0.15	1694.67	
Emission rate - Grading/Excavation (grams/mile)	0.25	9.41	1.09	0.22	0.15	1694.67	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.25	9.41	1.09	0.22	0.15	1694.67	
Pounds per day - Grubbing/Land Clearing	0.02	0.83	0.10	0.02	0.01	149.31	
Tons per const. Period - Grub/Land Clear	0.00	0.01	0.00	0.00	0.00	1.64	
Pound per day - Grading/Excavation	0.02	0.83	0.10	0.02	0.01	149.31	
Tons per const. Period - Grading/Excavation	0.00	0.01	0.00	0.00	0.00	1.64	
Pound per day - Drainage/Utilities/Subgrade	0.01	0.41	0.05	0.01	0.01	74.66	
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.05	0.01	0.00	0.00	8.21	

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max	Default	PM10	PM10	PM2.5	PM2.5
	Acreage Disturbed/Day	Maximum Acreage/Day	pounds/day	tons/per period	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing		2	20.0	0.1	4.2	0.0
Fugitive Dust - Grading/Excavation		2	20.0	1.1	4.2	0.2
Fugitive Dust - Drainage/Utilities/Subgrade	1.00	2	10.0	0.5	2.1	0.1

## Off-Road Equipment Emissions

Grubbing/Land Clearing		Default	ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	Number of Vehicles	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
	<i>Program-estimate</i>							
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
1.00	1	Scrapers	1.52	7.26	18.70	0.76	0.70	1609.12
	0	Signal Boards	0.16	0.56	0.55	0.04	0.04	62.97
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.38	1.58	3.45	0.27	0.25	336.39
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	2.1	9.4	22.7	1.1	1.0	2008.5
	Grubbing/Land Clearing	tons per phase	0.0	0.1	0.1	0.0	0.0	11.0

Grading/Excavation	Default		ROG	CO	NOx	PM10	PM2.5	CO2
	Number of Vehicles	Type						
Override of Default Number of Vehicles	Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	1	Excavators	0.44	2.79	4.90	0.24	0.22	572.80
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
	1	Graders	1.11	3.49	10.87	0.61	0.56	671.98
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
	0	Other Construction Equipment	0.15	0.72	1.57	0.08	0.08	130.87
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
	1.00	Rollers	0.38	1.51	3.34	0.25	0.23	279.55
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
	1	Scrapers	1.52	7.26	18.70	0.76	0.70	1609.12
	0	Signal Boards	0.16	0.56	0.55	0.04	0.04	62.97
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
	1.00	Tractors/Loaders/Backhoes	0.38	1.58	3.45	0.27	0.25	336.39
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	4.1	17.9	43.4	2.3	2.1	3663.7
	Grading	tons per phase	0.0	0.2	0.5	0.0	0.0	40.3



Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles Program-estimate							
		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day	
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Air Compressors	0.73	3.43	4.63	0.40	0.37	507.95
1.00		Bore/Drill Rigs	0.41	3.79	6.06	0.18	0.17	944.07
1.00		Cement and Mortar Mixers	0.07	0.35	0.42	0.02	0.02	57.88
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Cranes	0.77	3.01	8.75	0.40	0.37	601.78
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Forklifts	0.25	0.90	2.09	0.18	0.16	165.47
0.00		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	1	Plate Compactors	0.04	0.21	0.25	0.01	0.01	34.45
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.16	0.56	0.55	0.04	0.04	62.97
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.38	1.58	3.45	0.27	0.25	336.39
	1	Trenchers	0.61	2.10	5.13	0.40	0.37	377.01
1.00		Welders	0.61	2.00	1.84	0.15	0.14	204.74
	Drainage	pounds per day	4.0	17.9	33.2	2.1	1.9	3292.7
	Drainage	tons per phase	0.4	2.0	3.7	0.2	0.2	362.2

Paving	Default		ROG	CO	NOx	PM10	PM2.5	CO2	
	Override of Default Number of Vehicles	Number of Vehicles <i>Program-estimate</i>							Type
			pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00	
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00	
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	
	1.00	Graders	1.11	3.49	10.87	0.61	0.56	671.98	
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00	
	1	Rollers	0.38	1.51	3.34	0.25	0.23	279.55	
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	
	0	Signal Boards	0.16	0.56	0.55	0.04	0.04	62.97	
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	
	1.00	Tractors/Loaders/Backhoes	0.38	1.58	3.45	0.27	0.25	336.39	
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	
		Welders	0.00	0.00	0.00	0.00	0.00	0.00	
		Paving	pounds per day	2.0	7.1	18.2	1.2	1.1	1350.9
		Paving	tons per phase	0.0	0.0	0.1	0.0	0.0	7.4
<b>Total Emissions all Phases (tons per construction period) =&gt;</b>				0.5	2.3	4.4	0.3	0.2	421.0

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment	Default Values	
	Horsepower	Hours/day
Aerial Lifts	63	8
Air Compressors	106	8
Bore/Drill Rigs	206	8
Cement and Mortar Mixers	10	8
Concrete/Industrial Saws	64	8
Cranes	226	8
Crawler Tractors	208	8
Crushing/Proc. Equipment	142	8
Excavators	163	8
Forklifts	89	8
Generator Sets	66	8
Graders	175	8
Off-Highway Tractors	123	8
Off-Highway Trucks	400	8
Other Construction Equipment	172	8
Other General Industrial Equipment	88	8
Other Material Handling Equipment	167	8
Pavers	126	8
Paving Equipment	131	8
Plate Compactors	8	8
Pressure Washers	26	8
Pumps	53	8
Rollers	81	8
Rough Terrain Forklifts	100	8
Rubber Tired Dozers	255	8
Rubber Tired Loaders	200	8
Scrapers	362	8
Signal Boards	20	8
Skid Steer Loaders	65	8
Surfacing Equipment	254	8
Sweepers/Scrubbers	64	8
Tractors/Loaders/Backhoes	98	8
Trenchers	81	8
Welders	45	8