Appendix D

Air Quality/Greenhouse Gas Emissions

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Road Construction Emissions Model

Version 7.1.5.1

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.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

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.

Input Type		
Project Name	Center-Running BRT	
Construction Start Year	2020	Enter a Year between 2009 and 2025 (inclusive)
Project Type	2	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	24.00	months
Predominant Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	1.14	miles
Total Project Area	2.75	acres
Maximum Area Disturbed/Day	0.28	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	100.00	yd^3/day
Soil Exported	100.00	yd^3/day
Average Truck Capacity	20	yd^3 (assume 20 if unknown)

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 Construction Months	Program Calculated Months
Grubbing/Land Clearing		2.40
Grading/Excavation		9.60
Drainage/Utilities/Sub-Grade		8.40
Paving		3.60
Totals	0.00	24.00

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

NOTE: soil hauling emissions are included in the Grading/Excavation Construction Period Phase, therefore the Construction Period for Grading/Excavation cannot be zero if hauling is part of the project.

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

Soil Hauling Emissions	User Override of Soil Hauling Defaults	Default Values
User Input		
Miles/round trip		30
Round trips/day		10
Vehicle miles traveled/day (calculated)		300

Hauling Emissions	**ROG**	**NOx**	**CO**	**PM10**	**PM2.5**	**CO2**
Emission rate (grams/mile)	0.16	4.67	0.71	0.16	0.09	1558.59
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	0.10	3.09	0.47	0.10	0.06	1029.91
Tons per contruction period	0.01	0.33	0.05	0.01	0.01	108.76

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

Worker Commute Emissions	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		8
No. of employees: Grading/Excavation		23
No. of employees: Drainage/Utilities/Sub-Grade		16
No. of employees: Paving		13

	ROG	**NOx**	**CO**	**PM10**	**PM2.5**	**CO2**
Emission rate - Grubbing/Land Clearing (grams/mile)	0.105	0.129	1.196	0.047	0.020	441.856
Emission rate - Grading/Excavation (grams/mile)	0.105	0.129	1.196	0.047	0.020	441.856
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.101	0.120	1.122	0.047	0.020	441.814
Emission rate - Paving (grams/mile)	0.101	0.120	1.122	0.047	0.020	441.814
Emission rate - Grubbing/Land Clearing (grams/trip)	0.353	0.205	2.824	0.004	0.004	95.943
Emission rate - Grading/Excavation (grams/trip)	0.353	0.205	2.824	0.004	0.004	95.943
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.330	0.185	2.592	0.004	0.004	96.043
Emission rate - Paving (grams/trip)	0.330	0.185	2.592	0.004	0.004	96.043
Pounds per day - Grubbing/Land Clearing	0.081	0.092	0.883	0.031	0.013	295.145
Tons per const. Period - Grub/Land Clear	0.002	0.002	0.023	0.001	0.000	7.792
Pounds per day - Grading/Excavation	0.244	0.276	2.650	0.093	0.039	885.435
Tons per const. Period - Grading/Excavation	0.026	0.029	0.280	0.010	0.004	93.502
Pounds per day - Drainage/Utilities/Sub-Grade	0.168	0.185	1.792	0.067	0.028	639.429
Tons per const. Period - Drain/Util/Sub-Grade	0.016	0.017	0.166	0.006	0.003	59.083
Pounds per day - Paving	0.129	0.142	1.378	0.052	0.022	491.868
Tons per const. Period - Paving	0.005	0.006	0.055	0.002	0.001	19.478
tons per construction period	0.049	0.054	0.523	0.019	0.008	179.855

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

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust		1		40
Grading/Excavation - Exhaust		1		40
Drainage/Utilities/Subgrade		1		40

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.16	4.67	0.71	0.16	0.09	1558.59
Emission rate - Grading/Excavation (grams/mile)	0.16	4.67	0.71	0.16	0.09	1558.59
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.17	2.87	0.77	0.15	0.09	1551.98
Pounds per day - Grubbing/Land Clearing	0.01	0.41	0.06	0.01	0.01	137.32
Tons per const. Period - Grub/Land Clear	0.00	0.01	0.00	0.00	0.00	3.63
Pound per day - Grading/Excavation	0.01	0.41	0.06	0.01	0.01	137.32
Tons per const. Period - Grading/Excavation	0.00	0.04	0.01	0.00	0.00	14.50
Pound per day - Drainage/Utilities/Subgrade	0.01	0.25	0.07	0.01	0.01	136.74
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.02	0.01	0.00	0.00	12.63

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

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		0.275	2.8	0.1	0.6	0.0
Fugitive Dust - Grading/Excavation		0.275	2.8	0.3	0.6	0.1
Fugitive Dust - Drainage/Utilities/Subgrade		0.275	2.8	0.3	0.6	0.1

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	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
		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
	1	Crawler Tractors	0.59	4.47	7.29	0.27	0.25	824.47
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00	2	Excavators	0.27	2.79	2.49	0.12	0.11	572.76
		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
		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
	3	Signal Boards	0.66	3.70	3.43	0.17	0.16	472.30
		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
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		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	1.5	11.0	13.2	0.6	0.5	1869.5
	Grubbing/Land Clearing	tons per phase	0.0	0.3	0.3	0.0	0.0	49.4

Grading/Excavation	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
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
	1	Crawler Tractors	0.59	4.47	7.29	0.27	0.25	824.47
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00	3	Excavators	0.27	2.79	2.49	0.12	0.11	572.76
		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	2	Graders	0.75	3.46	6.96	0.39	0.36	666.39
		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
	2	Rollers	0.43	3.02	4.13	0.26	0.24	558.94
		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
	1	Rubber Tired Loaders	0.39	3.11	4.36	0.14	0.13	662.32
1.00	2	Scrapers	1.03	7.25	11.63	0.45	0.42	1607.79
	3	Signal Boards	0.66	3.70	3.43	0.17	0.16	472.30
		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
2.00	4	Tractors/Loaders/Backhoes	0.44	3.13	4.23	0.27	0.25	669.38
		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	4.5	30.9	44.5	2.1	1.9	6034.3
	Grading	tons per phase	0.5	3.3	4.7	0.2	0.2	637.2

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	Air Compressors	0.41	3.28	2.83	0.18	0.16	507.95
		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
	1	Generator Sets	0.29	2.88	2.55	0.14	0.13	487.07
	1	Graders	0.67	3.46	6.09	0.34	0.31	667.07
		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
	1	Pumps	0.25	2.38	2.10	0.12	0.11	396.14
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
	1	Rough Terrain Forklifts	0.13	2.03	1.63	0.06	0.06	372.90
		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	Scrapers	0.96	7.26	10.59	0.41	0.38	1608.77
	3	Signal Boards	0.59	3.64	3.33	0.15	0.14	472.30
		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
	3	Tractors/Loaders/Backhoes	0.59	4.70	5.71	0.34	0.31	1004.52
		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
	Drainage	pounds per day	3.9	29.9	35.1	1.7	1.6	5551.2
	Drainage	tons per phase	0.4	2.8	3.2	0.2	0.1	512.9

Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
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
		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
	1	Pavers	0.25	2.84	2.48	0.12	0.11	481.81
	1	Paving Equipment	0.20	2.69	1.89	0.09	0.09	426.15
		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
	2	Rollers	0.39	3.02	3.82	0.23	0.21	558.99
		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
	3	Signal Boards	0.59	3.64	3.33	0.15	0.14	472.30
		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
	3	Tractors/Loaders/Backhoes	0.59	4.70	5.71	0.34	0.31	1004.52
		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	16.9	17.2	0.9	0.9	2943.8
	Paving	tons per phase	0.1	0.7	0.7	0.0	0.0	116.6
Total Emissions all Phases (tons per construction period) =>			1.0	7.0	9.0	0.4	0.4	1316.1

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 7.1.5.1

Emission Estimates for -> Center-Running BRT 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	1.6	11.9	13.7	3.4	0.6	2.8	1.1	0.5	0.6	2,302.0
Grading/Excavation	4.9	34.1	48.3	5.0	2.3	2.8	2.6	2.0	0.6	8,087.0
Drainage/Utilities/Sub-Grade	4.1	31.7	35.5	4.6	1.8	2.8	2.2	1.6	0.6	6,327.3
Paving	2.2	18.3	17.4	1.0	1.0	-	0.9	0.9	-	3,435.6
Maximum (pounds/day)	4.9	34.1	48.3	5.0	2.3	2.8	2.6	2.0	0.6	8,087.0
Total (tons/construction project)	1.0	7.6	9.4	1.1	0.5	0.6	0.5	0.4	0.1	1,635.5

Notes:

Project Start Year ->	2020
Project Length (months) ->	24
Total Project Area (acres) ->	3
Maximum Area Disturbed/Day (acres) ->	0
Total Soil Imported/Exported (yd^3/day)->	200

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 -> Center-Running BRT 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	0.7	5.4	6.2	1.5	0.3	1.3	0.5	0.2	0.3	1,046.4
Grading/Excavation	2.2	15.5	22.0	2.3	1.0	1.3	1.2	0.9	0.3	3,675.9
Drainage/Utilities/Sub-Grade	1.9	14.4	16.1	2.1	0.8	1.3	1.0	0.7	0.3	2,876.1
Paving	1.0	8.3	7.9	0.4	0.4	-	0.4	0.4	-	1,561.7
Maximum (kilograms/day)	2.2	15.5	22.0	2.3	1.0	1.3	1.2	0.9	0.3	3,675.9
Total (megagrams/construction project)	0.9	6.9	8.6	1.0	0.4	0.6	0.5	0.4	0.1	1,483.4

Notes:

Project Start Year ->	2020
Project Length (months) ->	24
Total Project Area (hectares) ->	1
Maximum Area Disturbed/Day (hectares) ->	0
Total Soil Imported/Exported ($meters^3$/day)->	153

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 sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model

Version 7.1.5.1

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.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

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.

Input Type

Project Name	Lincoln Bridge & Roadway Widening	
Construction Start Year	2018	Enter a Year between 2009 and 2025 (inclusive)
Project Type	3	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	24.00	months
Predominant Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	0.40	miles
Total Project Area	1.50	acres
Maximum Area Disturbed/Day	1.00	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	500.00	yd^3/day
Soil Exported	500.00	yd^3/day
Average Truck Capacity	20	yd^3 (assume 20 if unknown)

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 Construction Months	Program Calculated Months
Grubbing/Land Clearing		2.40
Grading/Excavation		9.60
Drainage/Utilities/Sub-Grade		8.40
Paving		3.60
Totals	0.00	24.00

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

NOTE: soil hauling emissions are included in the Grading/Excavation Construction Period Phase, therefore the Construction Period for Grading/Excavation cannot be zero if hauling is part of the project.

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

Soil Hauling Emissions

User Input	User Override of Soil Hauling Defaults	Default Values
Miles/round trip		30
Round trips/day		50
Vehicle miles traveled/day (calculated)		1500

Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	0.15	6.66	0.67	0.16	0.09	1624.61
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	0.49	22.01	2.22	0.52	0.29	5367.67
Tons per contruction period	0.05	2.32	0.23	0.05	0.03	566.83

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

Worker Commute Emissions

	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		5
No. of employees: Grading/Excavation		28
No. of employees: Drainage/Utilities/Sub-Grade		18
No. of employees: Paving		8

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.120	0.154	1.399	0.047	0.020	443.880
Emission rate - Grading/Excavation (grams/mile)	0.120	0.154	1.399	0.047	0.020	443.880
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.112	0.140	1.291	0.047	0.020	441.739
Emission rate - Paving (grams/mile)	0.112	0.140	1.291	0.047	0.020	441.739
Emission rate - Grubbing/Land Clearing (grams/trip)	0.415	0.255	3.410	0.004	0.003	95.711
Emission rate - Grading/Excavation (grams/trip)	0.415	0.255	3.410	0.004	0.003	95.711
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.382	0.228	3.101	0.004	0.003	95.822
Emission rate - Paving (grams/trip)	0.382	0.228	3.101	0.004	0.003	95.822
Pounds per day - Grubbing/Land Clearing	0.062	0.074	0.691	0.021	0.009	197.650
Tons per const. Period - Grub/Land Clear	0.002	0.002	0.018	0.001	0.000	5.218
Pounds per day - Grading/Excavation	0.342	0.405	3.802	0.114	0.048	1087.075
Tons per const. Period - Grading/Excavation	0.036	0.043	0.401	0.012	0.005	114.795
Pounds per day - Drainage/Utilities/Sub-Grade	0.202	0.234	2.230	0.072	0.031	688.483
Tons per const. Period - Drain/Util/Sub-Grade	0.019	0.022	0.206	0.007	0.003	63.616
Pounds per day - Paving	0.087	0.100	0.956	0.031	0.013	295.064
Tons per const. Period - Paving	0.003	0.004	0.038	0.001	0.001	11.685
tons per construction period	0.060	0.070	0.664	0.020	0.009	195.313

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

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust		1		40
Grading/Excavation - Exhaust		1		40
Drainage/Utilities/Subgrade		1		40

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.15	6.66	0.67	0.16	0.09	1624.61
Emission rate - Grading/Excavation (grams/mile)	0.15	6.66	0.67	0.16	0.09	1624.61
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.15	5.88	0.69	0.16	0.09	1596.49
Pounds per day - Grubbing/Land Clearing	0.01	0.59	0.06	0.01	0.01	143.14
Tons per const. Period - Grub/Land Clear	0.00	0.02	0.00	0.00	0.00	3.78
Pound per day - Grading/Excavation	0.01	0.59	0.06	0.01	0.01	143.14
Tons per const. Period - Grading/Excavation	0.00	0.06	0.01	0.00	0.00	15.12
Pound per day - Drainage/Utilities/Subgrade	0.01	0.52	0.06	0.01	0.01	140.66
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.05	0.01	0.00	0.00	13.00

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

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		1	10.0	0.3	2.1	0.1
Fugitive Dust - Grading/Excavation		1	10.0	1.1	2.1	0.2
Fugitive Dust - Drainage/Utilities/Subgrade		1	10.0	0.9	2.1	0.2

Off-Road Equipment Emissions

Grubbing/Land Clearing	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
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
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
	1	Crawler Tractors	0.53	3.63	6.76	0.26	0.24	670.26
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	2	Excavators	0.51	4.53	5.20	0.25	0.23	930.76
		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
		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
2.00	1	Signal Boards	0.46	2.10	1.99	0.12	0.11	255.83
		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
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		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	1.5	10.3	14.0	0.6	0.6	1856.8
	Grubbing/Land Clearing	tons per phase	0.0	0.3	0.4	0.0	0.0	49.0

Grading/Excavation	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
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
	1	Cranes	0.47	2.44	5.39	0.23	0.21	488.93
1.00	2	Crawler Tractors	0.53	3.63	6.76	0.26	0.24	670.26
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
2.00	4	Excavators	0.51	4.53	5.20	0.25	0.23	930.76
		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	2	Graders	0.71	2.81	6.75	0.38	0.35	542.25
		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
2.00	3	Rollers	0.44	2.45	4.02	0.28	0.25	454.07
		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
1.00	3	Rubber Tired Loaders	0.36	2.53	4.27	0.14	0.13	538.28
1.00	4	Scrapers	0.96	5.90	11.41	0.45	0.41	1306.96
2.00	1	Signal Boards	0.46	2.10	1.99	0.12	0.11	255.83
		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
	2	Tractors/Loaders/Backhoes	0.45	2.55	4.29	0.30	0.28	544.42
		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	4.9	28.9	50.1	2.4	2.2	5731.7
	Grading	tons per phase	0.5	3.1	5.3	0.3	0.2	605.3

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	Air Compressors	0.43	2.75	2.92	0.21	0.20	412.71
		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
	1	Generator Sets	0.31	2.39	2.60	0.16	0.15	395.74
	2	Graders	1.30	5.62	12.30	0.69	0.63	1083.72
		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	0.03	0.17	0.20	0.01	0.01	27.99
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
	1	Pumps	0.27	1.98	2.14	0.14	0.13	321.86
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
	1	Rough Terrain Forklifts	0.12	1.65	1.52	0.07	0.06	302.78
		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
2.00	4	Scrapers	1.79	11.79	20.76	0.81	0.75	2613.00
2.00	1	Signal Boards	0.40	2.04	1.92	0.11	0.10	255.83
		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
	2	Tractors/Loaders/Backhoes	0.40	2.55	3.82	0.25	0.23	544.03
		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
	Drainage	pounds per day	5.1	30.9	48.2	2.5	2.3	5957.7
	Drainage	tons per phase	0.5	2.9	4.5	0.2	0.2	550.5

Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
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
		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
	1	Pavers	0.23	2.31	2.43	0.12	0.11	391.75
	1	Paving Equipment	0.18	2.19	1.79	0.09	0.08	346.33
		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
2.00	1	Rollers	0.38	2.45	3.62	0.24	0.22	454.09
		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
2.00	1	Signal Boards	0.40	2.04	1.92	0.11	0.10	255.83
		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
	2	Tractors/Loaders/Backhoes	0.40	2.55	3.82	0.25	0.23	544.03
		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	1.6	11.5	13.6	0.8	0.7	1992.0
	Paving	tons per phase	0.1	0.5	0.5	0.0	0.0	78.9
Total Emissions all Phases (tons per construction period) =>			1.1	6.6	10.6	0.5	0.5	1283.7

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	6.50	8
Air Compressors		106	6.50	8
Bore/Drill Rigs		206	6.50	8
Cement and Mortar Mixers		10	6.50	8
Concrete/Industrial Saws		64	6.50	8
Cranes		226	6.50	8
Crawler Tractors		208	6.50	8
Crushing/Proc. Equipment		142	6.50	8
Excavators		163	6.50	8
Forklifts		89	6.50	8
Generator Sets		66	6.50	8
Graders		175	6.50	8
Off-Highway Tractors		123	6.50	8
Off-Highway Trucks		400	6.50	8
Other Construction Equipment		172	6.50	8
Other General Industrial Equipment		88	6.50	8
Other Material Handling Equipment		167	6.50	8
Pavers		126	6.50	8
Paving Equipment		131	6.50	8
Plate Compactors		8	6.50	8
Pressure Washers		26	6.50	8
Pumps		53	6.50	8
Rollers		81	6.50	8
Rough Terrain Forklifts		100	6.50	8
Rubber Tired Dozers		255	6.50	8
Rubber Tired Loaders		200	6.50	8
Scrapers		362	6.50	8
Signal Boards		20	6.50	8
Skid Steer Loaders		65	6.50	8
Surfacing Equipment		254	6.50	8
Sweepers/Scrubbers		64	6.50	8
Tractors/Loaders/Backhoes		98	6.50	8
Trenchers		81	6.50	8
Welders		45	6.50	8

END OF DATA ENTRY SHEET

Road Construction Emissions Model, Version 7.1.5.1

Emission Estimates for -> Lincoln Bridge & Roadway Widening 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	1.6	11.0	14.6	10.7	0.7	10.0	2.7	0.6	2.1	2,197.6
Grading/Excavation	5.7	35.0	73.1	13.1	3.1	10.0	4.7	2.6	2.1	12,329.6
Drainage/Utilities/Sub-Grade	5.3	33.2	48.9	12.5	2.5	10.0	4.4	2.3	2.1	6,786.8
Paving	1.7	12.5	13.7	0.8	0.8	-	0.8	0.8	-	2,287.1
Maximum (pounds/day)	5.7	35.0	73.1	13.1	3.1	10.0	4.7	2.6	2.1	12,329.6
Total (tons/construction project)	1.2	7.6	13.2	2.9	0.6	2.2	1.0	0.5	0.5	2,077.7

Notes:

Project Start Year ->	2018
Project Length (months) ->	24
Total Project Area (acres) ->	2
Maximum Area Disturbed/Day (acres) ->	1
Total Soil Imported/Exported (yd^3/day)->	1000

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 -> Lincoln Bridge & Roadway Widening 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	0.7	5.0	6.6	4.8	0.3	4.5	1.2	0.3	0.9	998.9
Grading/Excavation	2.6	15.9	33.2	5.9	1.4	4.5	2.1	1.2	0.9	5,604.4
Drainage/Utilities/Sub-Grade	2.4	15.1	22.2	5.7	1.2	4.5	2.0	1.0	0.9	3,084.9
Paving	0.8	5.7	6.2	0.4	0.4	-	0.3	0.3	-	1,039.6
Maximum (kilograms/day)	2.6	15.9	33.2	5.9	1.4	4.5	2.1	1.2	0.9	5,604.4
Total (megagrams/construction project)	1.1	6.9	11.9	2.6	0.6	2.0	0.9	0.5	0.4	1,884.5

Notes:

Project Start Year ->	2018
Project Length (months) ->	24
Total Project Area (hectares) ->	1
Maximum Area Disturbed/Day (hectares) ->	0
Total Soil Imported/Exported (meters^3/day)->	765

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 sume of exhaust and fugitive dust emissions shown in columns K and L.

Coastal Transportation Corridor Specific Plan &
West Los Angeles Transportation Improvement and Mitigation Specific Plan Amendment Project EIR
Criteria Pollutants Emissions Summary

	Maximum Daily Construction Emissions (lb/day)					
	CO	**ROG**	**NOx**	**PM10**	**PM2.5**	**SOx**
Typical Construction Total	9	2	17	3	2	0
Construction Equipment Exhaust	8	2	16	1	1	0
Onsite Fugitive Dust	0	0	0	2	1	0
Offsite Vehicles	2	0	1	0	0	0
Maximum Daily Construction Emissions	9	2	17	3	2	0
SCAQMD Thresholds	550	75	100	150	55	150
Exceeding Thresholds?	NO	NO	NO	NO	NO	NO

	Maximum Daily Onsite Construction Emissions (lb/day)					
	CO	**ROG**	**NOx**	**PM10**	**PM2.5**	**SOx**
Typical Construction Total	8	2	16	3	2	0
Maximum Daily Construction Emissions	8	2	16	3	2	0
LST Thresholds	562	N/A	103	4	3	N/A
Exceeding Thresholds?	NO	NO	NO	NO	NO	NO

Assumptions used in the emissions calculations:

1. Calculated emissions include dust control by watering 3 times a day.
2. Construction phases do not overlap.
3. Localized Significance Thresholds (LSTs) from published 1-acre LSTs for sites 25 meters from the receptor in Northwest Coastal Los Angeles County Source-Receptor Area.

Coastal Transportation Corridor Specific Plan & West Los Angeles Transportation Improvement and Miti

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	1.00	Acre	1.00	43,560.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2015
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Construction Phase - Bridge construction and other roadway improvements modeled

Grading - Default disturbed acre

Off-road Equipment - compressor, cement mixer, paver, loader

Off-road Equipment - drill, saw, crane

Trips and VMT - 16 worker trips per day, 26 haul trips total

Construction Off-road Equipment Mitigation - Watering is required by SCAQMD Rule 403 and is not mitigation.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	100.00	10.00
tblConstructionPhase	NumDays	2.00	10.00
tblConstructionPhase	PhaseEndDate	12/25/2015	12/26/2015
tblConstructionPhase	PhaseEndDate	12/11/2015	12/12/2015
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs

tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblTripsAndVMT	HaulingTripNumber	0.00	26.00
tblTripsAndVMT	HaulingTripNumber	0.00	26.00
tblTripsAndVMT	WorkerTripNumber	8.00	16.00
tblTripsAndVMT	WorkerTripNumber	18.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	1.973	9.7341	10.7971	0.0249	2.1407	0.9864	2.8285	1.0448	0.9385	1.8031	0	2,506.56	2,506.56	0.5284	0	2,517.66
Total	**1.973**	**9.7341**	**10.7971**	**0.0249**	**2.1407**	**0.9864**	**2.8285**	**1.0448**	**0.9385**	**1.8031**	**0**	**2,506.56**	**2,506.56**	**0.5284**	**0**	**2,517.66**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	11/29/2015	12/12/2015	5	10	
2	Building Construction	Building Construction	12/13/2015	12/26/2015	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Air Compressors	1	8	78	0.48
Grading	Cement and Mortar Mixers	1	8	9	0.56
Grading	Pavers	1	8	125	0.42
Building Construction	Cranes	1	8	226	0.29
Grading	Rubber Tired Loaders	1	8	199	0.36
Building Construction	Bore/Drill Rigs	1	8	205	0.5
Building Construction	Concrete/Industrial Saws	1	8	81	0.73

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	3	16	0	26	14.7	6.9	20	LD_Mix	HDT_Mix	HHDT
Building Construction	7	16	0	26	14.7	6.9	20	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Grading - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.9166	0	1.7925	0.985	0	0.9716			0			0
Off-Road	1.5642	15.6862	7.5763	0.0153		0.7965	0.7965		0.7576	0.7576	0	1,540.58	1,540.58	0.3869		1,548.70
Total	**1.5642**	**15.6862**	**7.5763**	**0.0153**	**1.9166**	**0.7965**	**2.589**	**0.985**	**0.7576**	**1.7291**	**0**	**1,540.58**	**1,540.58**	**0.3869**		**1,548.70**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.052	0.825	0.5624	1.94E-03	0.0453	0.0136	0.0589	0.0124	0.0125	0.0249		197.8838	197.8838	1.61E-03		197.9176
Vendor	0	0	0	0	0	0	0	0	0	0		0	0	0		0
Worker	0.0789	0.0992	1.2234	2.33E-03	0.1788	1.79E-03	0.1806	0.0474	1.64E-03	0.0491		203.4274	203.4274	0.0116		203.6712
Total	**0.1309**	**0.9242**	**1.7858**	**4.27E-03**	**0.2241**	**0.0154**	**0.2395**	**0.0598**	**0.0142**	**0.074**		**401.3113**	**401.3113**	**0.0132**		**401.5889**

Coastal Transportation Corridor Specific Plan & West Los Angeles Transportation Improvement and Miti

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	1.00	Acre	1.00	43,560.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2015
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Construction Phase - Bridge construction and other roadway improvements modeled

Grading - Default disturbed acre

Off-road Equipment - compressor, cement mixer, paver, loader

Off-road Equipment - drill, saw, crane

Trips and VMT - 16 worker trips per day, 26 haul trips total

Construction Off-road Equipment Mitigation - Watering is required by SCAQMD Rule 403 and is not mitigation.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	100.00	10.00
tblConstructionPhase	NumDays	2.00	10.00
tblConstructionPhase	PhaseEndDate	12/25/2015	12/26/2015
tblConstructionPhase	PhaseEndDate	12/11/2015	12/12/2015
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs

tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblTripsAndVMT	HaulingTripNumber	0.00	26.00
tblTripsAndVMT	HaulingTripNumber	0.00	26.00
tblTripsAndVMT	WorkerTripNumber	8.00	16.00
tblTripsAndVMT	WorkerTripNumber	18.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	1.9796	9.774	10.8086	0.0248	2.1407	0.9865	2.8285	1.0448	0.9386	1.8032	0	2,494.69	2,494.69	0.5284	0	2,505.79
Total	**1.9796**	**9.774**	**10.8086**	**0.0248**	**2.1407**	**0.9865**	**2.8285**	**1.0448**	**0.9386**	**1.8032**	**0**	**2,494.69**	**2,494.69**	**0.5284**	**0**	**2,505.79**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	11/29/2015	12/12/2015	5	10	
2	Building Construction	Building Construction	12/13/2015	12/26/2015	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Air Compressors	1	8	78	0.48
Grading	Cement and Mortar Mixers	1	8	9	0.56
Grading	Pavers	1	8	125	0.42
Building Construction	Cranes	1	8	226	0.29
Grading	Rubber Tired Loaders	1	8	199	0.36
Building Construction	Bore/Drill Rigs	1	8	205	0.5
Building Construction	Concrete/Industrial Saws	1	8	81	0.73

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	3	16	0	26	14.7	6.9	20	LD_Mix	HDT_Mix	HHDT
Building Construction	7	16	0	26	14.7	6.9	20	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Grading - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.9166	0	1.7925	0.985	0	0.9716			0			0
Off-Road	1.5642	15.6862	7.5763	0.0153		0.7965	0.7965		0.7576	0.7576	0	1,540.58	1,540.58	0.3869		1,548.70
Total	**1.5642**	**15.6862**	**7.5763**	**0.0153**	**1.9166**	**0.7965**	**2.589**	**0.985**	**0.7576**	**1.7291**	**0**	**1,540.58**	**1,540.58**	**0.3869**		**1,548.70**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0553	0.854	0.6446	1.94E-03	0.0453	0.0137	0.0589	0.0124	0.0126	0.025		197.4206	197.4206	1.63E-03		197.4548
Vendor	0	0	0	0	0	0	0	0	0	0		0	0	0		0
Worker	0.0822	0.11	1.1527	2.20E-03	0.1788	1.79E-03	0.1806	0.0474	1.64E-03	0.0491		192.0172	192.0172	0.0116		192.261
Total	**0.1375**	**0.964**	**1.7973**	**4.14E-03**	**0.2241**	**0.0154**	**0.2396**	**0.0598**	**0.0142**	**0.074**		**389.4378**	**389.4378**	**0.0132**		**389.7158**

Coastal Transportation Corridor Specific Plan &
West Los Angeles Transportation Improvement and Mitigation Specific Plan
Amendment Project EIR
Los Angeles County (South Coast Air Basin portion) Project Incremental Emissions

2014 Existing Emissions, lbs/day					
CO	**ROG**	**NOX**	**SOX**	**PM10**	**PM2_5**
44,616	**5,160**	**11,468**	**85**	**2,531**	**705**

2035 Emissions Without Project, lbs/day					
CO	**ROG**	**NOX**	**SOX**	**PM10**	**PM2_5**
12,369	**1,627**	**4,801**	**56**	**2,543**	**586**

2035 Emissions With Project, lbs/day					
CO	**ROG**	**NOX**	**SOX**	**PM10**	**PM2_5**
12,147	**1,591**	**4,918**	**55**	**2,459**	**567**

Significance Determination: 2035 With Project minus 2014 Existing					
CO	**ROG**	**NOX**	**SOX**	**PM10**	**PM2_5**
2035 Emissions With Project, lbs/day					
12,147	**1,591**	**4,918**	**55**	**2,459**	**567**
2014 Existing Emissions, lbs/day					
44,616	**5,160**	**11,468**	**85**	**2,531**	**705**
2035 With Project Incremental Emissions, lbs/day					
-32,468	**-3,568**	**-6,550**	**-30**	**-72**	**-138**
SCAQMD Signficance Thresholds for Operations, lbs/day					
550	55	55	150	150	55
2035 With Project Incremental Emissions Exceeds Threshold?					
NO	**NO**	**NO**	**NO**	**NO**	**NO**

For Disclosure: 2035 With Project minus 2035 Without Project, lbs/day					
-222	-36	**118**	-1	-84	-19

Coastal Transportation Corridor Specific Plan &
West Los Angeles Transportation Improvement and Mitigation Specific Plan Amendment Project EIR
Traffic Data

Westside Study Area Daily VMT By Speed Bin						
Speed	**2014**		**2035 No Project**		**2035 Plus Project**	
5	58,230	1%	66,238	1%	85,295	1%
10	593,908	11%	658,074	11%	741,352	12%
15	1,528,036	27%	1,585,164	26%	1,506,935	25%
20	1,486,858	26%	1,639,537	26%	1,514,297	25%
25	823,120	15%	933,529	15%	869,071	15%
30	434,912	8%	481,913	8%	473,887	8%
35	168,231	3%	183,503	3%	169,585	3%
40	137,748	2%	116,362	2%	101,478	2%
45	257,242	5%	292,714	5%	288,404	5%
50	76,657	1%	148,838	2%	143,791	2%
55	68,110	1%	68,348	1%	69,683	1%
60	16,736	0%	16,257	0%	18,498	0%
Total	***5,649,787***	***100%***	***6,190,478***	***100%***	***5,982,275***	***100%***
VMT Weighted Avg Speed	***22.0***		***22.2***		***22.0***	

Source: VMT_SPEED_BIN_AQ_5.12.15.xlsx

Coastal Transportation Corridor Specific Plan &
West Los Angeles Transportation Improvement and Mitigation Specific Plan
Amendment Project EIR
Los Angeles County (South Coast Air Basin portion) Vehicle Emission Rates

	All-Inclusive* 2014 Emission Factors, g/mile						
Speed, mph	**CO**	**ROG**	**NOX**	**SOX**	**PM10**	**PM2_5**	**CO2eq**
5	5.63380	0.78250	2.63019	0.01473	0.09886	0.05922	1563.42996
10	4.65866	0.58588	1.55117	0.01073	0.08291	0.04677	1122.89813
15	3.92091	0.45577	0.92490	0.00798	0.07139	0.03753	818.68458
20	3.73189	0.40516	1.08579	0.00649	0.08520	0.04446	683.28355
25	3.07794	0.34440	0.49005	0.00525	0.05534	0.02616	528.37997
30	2.85352	0.32500	0.49013	0.00462	0.05490	0.02561	464.80973
35	2.68482	0.31466	0.56580	0.00432	0.05667	0.02659	437.77501
40	2.57048	0.30951	0.63661	0.00420	0.05884	0.02798	426.78593
45	2.48218	0.30577	0.69043	0.00418	0.06063	0.02928	424.78032
50	2.41086	0.30350	0.69295	0.00415	0.06126	0.02988	421.20141
55	2.34571	0.30155	0.79217	0.00441	0.06384	0.03176	448.11142
60	2.32161	0.30469	0.93729	0.00473	0.06768	0.03484	480.93840
65	2.47204	0.32354	1.22916	0.00540	0.07843	0.04299	550.71306
70	2.46411	0.32752	1.85162	0.00627	0.09537	0.05560	645.27349

Source: CDM Smith 2015.

a. All-inclusive emission factors were developed from EMFAC2014 Default total daily emissions and VMT for Los Angeles County (South Coast portion).
b. These factors include all fuels included in EMFAC2014 (diesel, gasoline, and electic).
c. These factors include all vehicle technologies in EMFAC2014, based on the EMFAC2007 vehicle technology categories.
d. These factors include almost all vehicle emission processes,* including:
running, starting and idling engine exhaust; running, resting diurnal, and hot soak losses; tire wear; and brake wear.

*These factors do not include paved road dust which is calculated separately.

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Los Angeles County (South Coast Air Basin portion) Vehicle Emission Rates

	All-Inclusive* 2035 Emission Factors, g/mile						
Speed, mph	**CO**	**ROG**	**NOX**	**SOX**	**PM10**	**PM2_5**	**CO2eq**
5	1.91278	0.22787	2.03446	0.00894	0.06269	0.02874	976.56330
10	1.49314	0.17126	1.08022	0.00656	0.05902	0.02608	715.26484
15	0.98895	0.13255	0.43631	0.00480	0.05470	0.02354	496.44943
20	0.87099	0.11342	0.22921	0.00381	0.05728	0.02429	399.45412
25	0.74014	0.10196	0.11880	0.00309	0.04957	0.02066	312.84444
30	0.68527	0.09605	0.10745	0.00279	0.04983	0.02061	282.95935
35	0.64954	0.09228	0.11270	0.00269	0.05118	0.02108	277.32852
40	0.61233	0.08950	0.12237	0.00275	0.05265	0.02162	284.03176
45	0.57886	0.08751	0.12252	0.00277	0.05316	0.02179	287.02894
50	0.54843	0.08609	0.12219	0.00285	0.05393	0.02210	293.31338
55	0.51065	0.08371	0.14988	0.00331	0.05679	0.02326	340.12720
60	0.48539	0.08289	0.15653	0.00350	0.05780	0.02370	360.82962
65	0.47836	0.08383	0.16380	0.00374	0.05925	0.02441	384.99364
70	0.49103	0.08380	0.24806	0.00480	0.06905	0.02860	498.02997

Source: CDM Smith 2015.

a. All-inclusive emission factors were developed from EMFAC2014 Default total daily emissions and VMT for Los Angeles County (South Coast portion).
b. These factors include all fuels included in EMFAC2014 (diesel, gasoline, and electic).
c. These factors include all vehicle technologies in EMFAC2014, based on the EMFAC2007 vehicle technology categories.
d. These factors include almost all vehicle emission processes,* including:
running, starting and idling engine exhaust; running, resting diurnal, and hot soak losses; tire wear; and brake wear.

*These factors do not include paved road dust which is calculated separately.

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Paved Road Dust

$$E_{ext} = \left[k(sL)^{0.91} \times (W)^{1.02}\right](1 - P/4N)$$ (AP-42 Section 13.2.1)

Where:

Eext = annual or other long-term average emission factor in the same units as k,
k = particle size multiplier for particle size range and units of interest (see below),
sL = road surface silt loading (grams per square meter) (g/m2),
W = average weight (tons) of the vehicles traveling the road,
P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period, and
N = number of days in the averaging period (e.g., 365 for annual, 91 for seasonal, 30 for monthly).

Constants

CARB PM Size Fractions k

Compound	Fraction of PM	Fraction of PM10
PM10	0.4572	1
PM2.5	0.0686	0.15

Profile No. 471 (Paved Road Dust 1997 and After)

Road silt loading	0.022		(CalEEMod default)
Average vehicle weight	4.13	tons	(CalEEMod default)
Number precipitation days >0.01 inches	33	days	(CalEEMod defaut, AP-42 Figure 13.2.1-2)

Paved Road Dust Emission Factors (g/VMT)

	PM10	PM25
Daily	0.132	0.020
Annual	0.129	0.019

Sources:

- California Air Pollution Control Officers Association. 2013. California Emissions Estimator Model User's Guide Version 2013.2.2. Updated September.
- CARB. 2014. PM10 Size Fraction: CARB Speciation Profiles. August 20. Available at: http://www.arb.ca.gov/ei/speciate/speciate.htm#specprof. Accessed 6/26/15.
- USEPA. 2011. Compilation of Air Pollutant Emission Factors (AP-42). Fifth Edition, Volume I. Chapter 13.2.1 Paved Roads. January.

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Los Angeles County (South Coast Air Basin portion) Non-Pavley CO2e Emission Factors

	Non-Pavely CO2e Emission Factors, g/mile			EMFAC2011 CO2eq (Non-Pavley) Light Duty Vehicle EF (g/mi)
Speed	LDA	LDT1	LDT2	LDA+LDT1+LDT2
5	1,116.01	1,296.18	1,518.58	1,231.76
10	832.23	966.12	1,131.71	918.33
15	644.33	747.68	875.72	710.84
20	517.85	600.65	703.42	571.19
25	432.08	500.94	586.57	476.47
30	373.71	433.10	507.06	412.03
35	335.06	388.17	454.39	369.34
40	312.65	362.06	423.78	344.58
45	302.04	349.66	409.24	332.84
50	301.97	349.52	409.04	332.73
55	310.64	359.60	420.79	342.29
60	329.90	382.02	446.98	363.54
65	365.49	423.31	495.25	402.78
70	391.12	452.85	529.71	430.94

Source: CDM Smith 2015.
All-inclusive emission factors includes engine running, startup and idling.

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Los Angeles County (South Coast Air Basin portion) Vehicle Emissions

	2014 Emissions, lbs/day						MT/year
Speed	**CO**	**ROG**	**NOX**	**SOX**	**PM10**	**PM2_5**	**CO2eq**
5	723	100	338	2	30	10	33,229
10	6,100	767	2,031	14	281	87	243,418
15	13,209	1,535	3,116	27	684	193	456,608
20	12,233	1,328	3,559	21	711	211	370,820
25	5,585	625	889	10	340	83	158,746
30	2,736	312	470	4	179	44	73,785
35	996	117	210	2	70	17	26,881
40	781	94	193	1	58	15	21,458
45	1,408	173	392	2	109	28	39,884
50	407	51	117	1	33	8	11,785
55	352	45	119	1	29	8	11,140
60	86	11	35	0	7	2	2,938
Totals	**44,616**	**5,160**	**11,468**	**85**	**2,531**	**705**	**1,450,692**

Source: CDM Smith 2015.

PM10 and PM2.5 emissions include paved road dust.

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Los Angeles County (South Coast Air Basin portion) Vehicle Emissions

	2035 Emissions Without Project, lbs/day						MT/year
Speed	**CO**	**ROG**	**NOX**	**SOX**	**PM10**	**PM2_5**	**CO2eq**
5	279	33	297	1	28	7	23,610
10	2,166	248	1,567	10	277	67	171,805
15	3,456	463	1,525	17	652	151	287,238
20	3,148	410	828	14	683	159	239,046
25	1,523	210	245	6	373	83	106,598
30	728	102	114	3	193	43	49,772
35	263	37	46	1	74	17	18,575
40	157	23	31	1	47	11	12,063
45	374	56	79	2	119	27	30,666
50	180	28	40	1	61	14	15,935
55	77	13	23	0	28	6	8,485
60	17	3	6	0	7	2	2,141
Totals	**12,369**	**1,627**	**4,801**	**56**	**2,543**	**586**	**965,934**

Source: CDM Smith 2015.

PM10 and PM2.5 emissions include paved road dust.

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Los Angeles County (South Coast Air Basin portion) Vehicle Emissions

	2035 Emissions With Project, lbs/day						MT/year
Speed	**CO**	**ROG**	**NOX**	**SOX**	**PM10**	**PM2_5**	**CO2eq**
5	360	43	383	2	37	9	30,403
10	2,440	280	1,766	11	312	75	193,546
15	3,286	440	1,450	16	620	144	273,063
20	2,908	379	765	13	631	147	220,786
25	1,418	195	228	6	347	77	99,238
30	716	100	112	3	190	42	48,943
35	243	34	42	1	68	15	17,166
40	137	20	27	1	41	9	10,520
45	368	56	78	2	118	26	30,215
50	174	27	39	1	59	13	15,394
55	78	13	23	1	29	7	8,651
60	20	3	6	0	8	2	2,436
Totals	**12,147**	**1,591**	**4,918**	**55**	**2,459**	**567**	**950,361**

Source: CDM Smith 2015.

PM10 and PM2.5 emissions include paved road dust.

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Los Angeles County (South Coast Air Basin portion) Vehicle Emissions

	NON-PAVLEY	
	CO2eq 2035 Light Duty Vehicles (LDV) Only (lbs/day)	
Speed	**Without Project**	**With Project**
5	142,101	182,985
10	1,052,535	1,185,731
15	1,962,514	1,865,662
20	1,631,034	1,506,444
25	774,695	721,204
30	345,830	340,071
35	118,043	109,090
40	69,833	60,901
45	169,682	167,184
50	86,252	83,327
55	40,746	41,541
60	10,293	11,712
Totals	**6,403,559**	**6,275,850**

Source: CDM Smith 2015.
Assumes 79% of VMT are LDVs.

GHG Emission Factors

Fuel type	CO2 (kg/gal)	CH4 [1] kg/gal	N2O [1] kg/gal	CO2e (kg/gal)	CO2 to CO2e Factor
Diesel	10.20648	5.76E-04	2.56E-04	10.29717	**1.009**
Gasoline	8.7775	5.04E-04	2.24E-04	8.856852	**1.009**

1. CH4 and N2O emission factors are for Non-Highway Vehicles (construction & mining).

100-yr GWP [2]:	1	25	298

2. The perturbation lifetime for methane is 12 years. The GWP for methane includes indirect effects from enhancements of ozone and stratospheric water vapour.

Source: *2015 Climate Registry Default Emission Factors* , April 2015.
http://www.theclimateregistry.org/wp-content/uploads/2015/04/2015-TCR-Default-EF-April-2015-FINAL.pdf
Table 13.1, US Default CO2 Emission Factors for Transport Fuels
Table 13.7, US Default CH4 and N2O Emission Factors for Non-Highway Vehicles

Source: *IPCC Fourth Assessment Report: Climate Change 2007* .
https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html
Table 2.14. Lifetimes, radiative efficiencies and direct (except for CH4) GWPs relative to CO2.