

FINAL ENVIRONMENTAL IMPACT STATEMENT

**408 PERMISSION AND 404 PERMIT TO THREE RIVERS
LEVEE IMPROVEMENT AUTHORITY**

FOR THE

**FEATHER RIVER LEVEE REPAIR PROJECT, CALIFORNIA
SEGMENT 2**

**APPENDIX I – AIR EMISSIONS CALCULATIONS FOR
SEGMENT 2**

October 2008

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**APPENDIX I – AIR EMISSIONS CALCULATIONS FOR
SEGMENT 2**

Air Quality Emissions: Direct Effects

Air Quality Emissions: Indirect Effects

October 2008

Air Quality Emissions: Direct Effects

Unmitigated 2008 Emissions						
	Worst-Case lb/day			Tons/year		
	ROG	NOX	PM10	ROG	NOX	PM10
Mobile Sources	102	528	42	11	60	5
Fugitive Sources	-	-	3586	-	-	316
TOTAL	102	528	3627	11	60	320

Mitigated 2008 Emissions						
	Worst-Case lb/day			Tons/year		
	ROG	NOX	PM10	ROG	NOX	PM10
% Reduction	5%	20%	75%	5%	20%	75%
TOTAL	96.5	422.3	906.9	10.6	47.7	80.0
FRAQMD Threshold	25	25	80			
De Minimus Threshold				50	50	100
Significant Post-Mitigation?	Y	Y	Y	N	N	N
Regional SignificanceThreshold				310	280	289
Regionally Significant?				N	N	N

Unmitigated 2009 Emissions						
	Worst-Case lb/day			Tons/year		
	ROG	NOX	PM10	ROG	NOX	PM10
Mobile Sources	102	491	35	12	61	4
Fugitive Sources	-	-	3984	-	-	263
TOTAL	102	491	4019	12	61	267

Mitigated 2009 Emissions						
	Worst-Case lb/day			Tons/year		
	ROG	NOX	PM10	ROG	NOX	PM10
% Reduction	5%	20%	75%	5%	20%	75%
TOTAL	97.3	392.8	1004.8	11.8	48.5	66.8
FRAQMD Threshold	25	25	80			
De minimus Threshold				50	50	100
Significant Post-Mitigation?	Y	Y	Y	N	N	N
Regional SignificanceThreshold				310	280	289
Regionally Significant?				N	N	N

Unmitigated 2010 Emissions						
	Worst-Case lb/day			Tons/year		
	ROG	NOX	PM10	ROG	NOX	PM10
Mobile Sources	102	438	33	7	30	2
Fugitive Sources	-	-	3984	-	-	263
TOTAL	102	438	4017	7	30	265

Mitigated 2010 Emissions						
	Worst-Case lb/day			Tons/year		
	ROG	NOX	PM10	ROG	NOX	PM10
% Reduction	5%	20%	75%	5%	20%	75%
TOTAL	96.8	350.5	1004.2	6.4	23.7	66.3
FRAQMD Threshold	25	25	80			
De minimus Threshold				50	50	100
Significant Post-Mitigation?	Y	Y	Y	N	N	N
Regional SignificanceThreshold				310	280	289
Regionally Significant?				N	N	N

Note: Because the extent of the construction activity associated with levee degrading that would occur in 2009 and 2010 respectively was not known, emissions estimated for each calendar year may be double-counted.

Feather River Levee Segment 2 Unmitigated Fugitive PM10 Emissions (Years 2008-2010)												
Activity: M=Mobilization, F=Levee Foundation, E=Levee Embankment, B=Borrow, D=Demobilization, R=Removal of Existing Levee	PM10	Unit	Quantity	Unit	PM10	Unit	Distance (miles/ round-trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor
Putting Setback Levee in Place (2008 work)			3600000	yd3 (import from borrow)			4.0	180000.0	720000.0	4090.9	176.0	days
			*(assumes 2 miles on average 1 way to/from borrow)				*(assumes haul load = 20 yd3)					
<u>Fugitive Sources</u>												
Travel on unpaved roads	0.90	lb/VMT	*(assumes 50% unpaved)		323,176.6	lb/yr						
Travel on paved roads	0.28	lb/VMT	*(assumes 50% paved)		101,655.2	lb/yr						
<u>Material Handling</u>							Tons/yd3 (gravel/sand)	Tons/day				
Truck Loading at Borrow	0.04	lb/ton			182654.6	lb/yr	1.25	25568.18				
Truck Unloading at Levee	0.005	lb/ton			23625.0	lb/yr	1.25	25568.18				
Total					631111.4	lb/yr						2000 lb/ton
Total					3585.9	lb/day						
Total					315.6	tons/year	to occur during 2008 calendar year					
<hr/>												
Degrading Existing Levee (2009 work)			3000000.0	yd3 (borrow)			4.0	150000.0	600000.0	4545.5	132.0	days
			*(assumes 2 miles on average 1 way to/from borrow)				*(assumes haul load = 20 yd3)					
<u>Fugitive Sources</u>												
Travel on unpaved roads	0.90	lb/VMT	*(assumes 50% unpaved)		269,313.8	lb/yr						
Travel on paved roads	0.28	lb/VMT	*(assumes 50% paved)		84,712.7	lb/yr						
<u>Material Handling</u>							Tons/yd3 (gravel/sand)	Tons/day				
Truck Loading at Levee	0.04	lb/ton			152212.2	lb/yr	1.25	28409.09				
Truck Unloading at Borrow	0.005	lb/ton			19687.5	lb/yr	1.25	28409.09				
Total					525926.2	lb/yr						2000 lb/ton
Total					3984.3	lb/day						
Total					263.0	tons/year	to occur during 2009 calendar year					
<hr/>												
Degrading Existing Levee (2010 work)			3000000.0	yd3 (borrow)			4.0	150000.0	600000.0	4545.5	132.0	days
			*(assumes 2 miles on average 1 way to/from borrow)				*(assumes haul load = 20 yd3)					
<u>Fugitive Sources</u>												
Travel on unpaved roads	0.90	lb/VMT	*(assumes 50% unpaved)		269,313.8	lb/yr						
Travel on paved roads	0.28	lb/VMT	*(assumes 50% paved)		84,712.7	lb/yr						
<u>Material Handling</u>							Tons/yd3 (gravel/sand)	Tons/day				
Truck Loading at Levee	0.04	lb/ton			152212.2	lb/yr	1.25	28409.09				
Truck Unloading at Borrow	0.005	lb/ton			19687.5	lb/yr	1.25	28409.09				
Total					525926.2	lb/yr						2000 lb/ton
Total					3984.3	lb/day						
Total					263.0	tons/year	to occur during 2010 calendar year					
<hr/>												
Total from FRL Project					841	Total Unmitigated Emissions (Tons)	to occur during segment 2 construction					
Total from FRL Project					3984	Worst-case lb/day	to occur during segment 2 construction					
*These calculations represent worst-case emissions from construction activities associated with the FRL												
Note: Because the extent of the construction activity associated with levee degrading that would occur in 2009 and 2010 respectively was not known, emissions estimated for each calendar year may be double-counted.												

Road Construction Emissions Model Version 5.2

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 C28.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Feather River Levee	
Construction Start Year	2008	Enter a Year between 2000 and 2010 inclusive
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	7	months
Predominate Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
On-Road Emission Factors: Enter 1, 2, 3, or 4	4	1. Emfac7lv1.1 2. Emfac7G 3. Emfac2001 4. Emfac2002 (default)
Project Length	5.7	miles
Total Project Area	232	acres
Maximum Area Disturbed/Day	3	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	18182	yd ³ /day
Soil Exported	0	yd ³ /day
Average Truck Capacity	20	yd ³ (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.

or User Override (for program calculated)

Months	% Time
0.7	10
7.0	40
2.5	35
1.1	15

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 C37 through C40.

Construction Periods	User Override of		Program Calculated		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		sum	2010 adjusted %	
	Construction Months	Months		%		%		%		%		%		%		%		%		%		%		%					
Grubbing/Land Clearing	0.00	0.70	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	0.00	0.00	0.00
Grading/Excavation	7.00	2.80	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	7.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	7
Drainage/Utilities/Sub-Grade	0.00	2.45	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	1.00	0.00	0
Paving	0.00	1.05	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	1.00	0.00	0
Totals	7.00	7.00																											

Hauling emission default values can be overridden in cells C48 through C50.

Soil Hauling Emissions

User Input	Soil Hauling Defaults	Default Values
Miles/round trip	4	30
Round trips/day	909	
Vehicle miles traveled/day (calculated)		3636.4

4
909.1

Hauling Emissions	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.75	8.63	7.25	0.27
Pounds per day	6.0	69.1	58.1	2.2
Tons per construction period	0.46	5.32	4.47	0.17

Worker commute default values can be overridden in cells C62 through C67.

Worker Commute Emissions

User Override of Worker	Commute Default Values	Default Values
Miles/ one-way trip	10	20
One-way trips/day		
No. of employees: Grubbing/Land Clearing	0	17
No. of employees: Grading/Excavation	70	19
No. of employees: Drainage/Utilities/Sub-Grade	0	19
No. of employees: Paving	0	19

10
2
0
70
0
0

	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.30	0.55	6.25	0.04
Emission rate (grams/trip)	1.62	0.72	16.13	0.02
Pounds per day - Grubbing/Land Clearing	0.0	0.0	0.0	0.0
Tons per const. Period - Grub/Land Clear	0.0	0.0	0.0	0.0
Pounds per day - Grading/Excavation	1.9	2.1	29.2	0.1
Tons per const. Period - Grading/Excavation	0.1	0.2	2.2	0.0
Pounds per day - Drainage/Utilities/Sub-Grade	0.0	0.0	0.0	0.0
Tons per const. Period - Drain/Util/Sub-Grade	0.0	0.0	0.0	0.0
Pounds per day - Paving	0.0	0.0	0.0	0.0
Tons per const. Period - Paving	0.0	0.0	0.0	0.0
tons per construction period	0.1	0.2	2.2	0.0

80

Water truck default values can be overridden in cells C87 through C89 and E87 through E89.

Water Truck Emissions

	Number of Water Trucks	Program Estimate of Number of Water Trucks	User Override of Water Truck Miles Traveled	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust	0	1		40
Grading/Excavation - Exhaust	2	1		40
Drainage/Utilities/Subgrade	0	1		40

0
80
0

	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.75	8.63	7.25	0.27
Pounds per day - Grubbing/Land Clearing	0.0	0.0	0.0	0.0
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.1	1.5	1.3	0.0
Tons per const. Period - Grading/Excavation	0.01	0.12	0.10	0.00
Pound per day - Drainage/Utilities/Subgrade	0.0	0.0	0.0	0.0
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C104 and C105.

Fugitive PM10 Dust	User Override of Max	Default	pounds/day	tons/period
	Acres/day	Maximum Acres/Day		
Fugitive Dust - Grubbing/Land Clearing	0	3	0.0	0.0
Fugitive Dust - Grading/Excavation		3	15.0	1.2
Fugitive Dust - Drainage/Utilities/Subgrade	0	3	0.0	0.0

0
3
0

Off road equipment default number of vehicles can be overridden in cells B115 through B224.

Off-Road Equipment Emissions						
Grubbing/Land Clearing		Default	ROG	CO	NOx	PM10
Override of Default	Number of Vehicles	Type	pounds/day	pounds/day	pounds/day	pounds/day
	Program-estimate					
		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
		Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
0	1	Dozer	0.00	0.00	0.00	0.00
		Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
		Grader	0.00	0.00	0.00	0.00
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
0	1	Scraper	0.00	0.00	0.00	0.00
0	11	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		max pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0
Grading/Excavation		Default	ROG	CO	NOx	PM10
Override of Default	Number of Vehicles	Type	pounds/day	pounds/day	pounds/day	pounds/day
	Program-estimate					
		Backhoes	0.00	0.00	0.00	0.00
1		Bore/Drill Rigs	2.87	7.47	5.75	0.43
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
		Compactor	0.00	0.00	0.00	0.00
1	0	Cranes	1.44	6.59	6.16	0.34
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
6		Dozer	21.77	103.21	129.30	6.69
6	1	Excavator	11.04	38.02	38.81	2.05
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
4	1	Grader	4.79	22.56	38.92	2.12
1	1	Loaders, Rubber Tired	0.92	4.50	7.01	0.38
1		Off-Highway Trucks	3.60	13.62	13.98	0.72
4	0	Other Construction Equip.	8.32	41.28	37.70	2.08
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
4		Rollers	2.35	11.48	17.87	0.97
10	1	Scraper	36.42	166.32	159.65	8.50
0	11	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		max pounds per day	93.5	415.1	455.1	24.3
		tons per period	10.3	45.7	50.1	2.7
Drainage/Utilities/Subgrade		Default	ROG	CO	NOx	PM10
Override of Default	Number of Vehicles	Type	pounds/day	pounds/day	pounds/day	pounds/day
	Program-estimate					
		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
0	1	Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
		Dozer	0.00	0.00	0.00	0.00
		Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
0	1	Grader	0.00	0.00	0.00	0.00
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
0	1	Scraper	0.00	0.00	0.00	0.00
0	11	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
0	1	Trenchers	0.00	0.00	0.00	0.00
		max pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0

Paving	Number of Vehicles		ROG	CO	NOx	PM10	
	Override of Default Number of Vehicles	Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day
			Backhoes	0.00	0.00	0.00	0.00
			Bore/Drill Rigs	0.00	0.00	0.00	0.00
			Concrete/Industrial Saws	0.00	0.00	0.00	0.00
			Compactor	0.00	0.00	0.00	0.00
			Cranes	0.00	0.00	0.00	0.00
			Crawler Tractors	0.00	0.00	0.00	0.00
			Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
			Dozer	0.00	0.00	0.00	0.00
			Excavator	0.00	0.00	0.00	0.00
			Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
			Graders	0.00	0.00	0.00	0.00
			Loaders, Rubber Tired	0.00	0.00	0.00	0.00
			Off-Highway Trucks	0.00	0.00	0.00	0.00
			Other Construction Equip.	0.00	0.00	0.00	0.00
	0	1	Pavers	0.00	0.00	0.00	0.00
	0	1	Paving Equipment	0.00	0.00	0.00	0.00
	0	2	Rollers	0.00	0.00	0.00	0.00
	0		Scrapper	0.00	0.00	0.00	0.00
	0	11	Signal Boards	0.00	0.00	0.00	0.00
			Skid Steer Loaders	0.00	0.00	0.00	0.00
			Surfacing Equipment	0.00	0.00	0.00	0.00
			Tractors	0.00	0.00	0.00	0.00
			Trenchers	0.00	0.00	0.00	0.00
			pounds per day	0.0	0.0	0.0	0.0
			tons per period	0.0	0.0	0.0	0.0
Total Emissions (tons per construction period)				10.3	45.7	50.1	2.7

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Equipment default values for horsepower, load factor, and hours/day can be overridden in cells C235 through C256, E235 through E256, and G235 through G256.

Equipment	Default Values		Default Values		Default Values	
	Horsepower	Load Factor	Horsepower	Load Factor	Hours/day	Class
Bore/Drill Rigs	218	0.75			8	4
Concrete/Industrial Saws	84	0.73			8	2
Cranes	190	0.43			8	4
Crawler Tractors	143	0.575			8	3
Crushing/Proc. Equipment	154	0.78			8	3
Excavators	180	0.58			8	4
Graders	174	0.575			8	3
Off-Highway Tractors	255	0.41			8	4
Off-Highway Trucks	417	0.49			8	5
Other Construction Equipment	190	0.62			8	4
Pavers	132	0.59			8	3
Paving Equipment	111	0.53			8	3
Rollers	114	0.43			8	3
Rough Terrain Forklifts	94	0.475			8	2
Rubber Tired Dozers	352	0.59			8	5
Rubber Tired Loaders	165	0.465			8	3
Scrapers	313	0.66			8	5
Signal Boards	25	0.82			8	1
Skid Steer Loaders	62	0.515			8	2
Surfacing Equipment	437	0.49			8	5
Tractors/Loaders/Backhoes	79	0.465			8	2
Trenchers	82	0.695			8	2

Default load factors from SCAQMD CEQA Handbook, 1993.

Default horsepower values from Appendix B, California Air Resources Board's Offroad Model (see also Appendix B of this spreadsheet).

Signal board horsepower based on: U.S. EPA, 1998. Final Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines (EPA420-R-98-016).

0

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END OF DATA ENTRY SHEET

Horsepower	Load Factor	Hours/Day	Columns (LxMxN)	Horsepower Class
218	0.75	8.0	1306.0	4
84	0.73	8.0	489.0	2
190	0.43	8.0	655.1	4
143	0.575	8.0	659.6	3
154	0.78	8.0	963.0	3
180	0.58	8.0	835.5	4
174	0.575	8.0	800.3	3
255	0.41	8.0	836.6	4
417	0.49	8.0	1635.4	5
190	0.62	8.0	944.6	4
132	0.59	8.0	620.9	3
111	0.53	8.0	470.4	3
114	0.43	8.0	391.9	3
94	0.475	8.0	358.1	2
352	0.59	8.0	1663.7	5
165	0.465	8.0	615.1	3
313	0.66	8.0	1653.5	5
25	0.82	8.0	164.0	1
62	0.515	8.0	255.4	2
437	0.49	8.0	1712.9	5
79	0.465	8.0	295.7	2
82	0.695	8.0	455.6	2

Road Construction Emissions Model, Version 5.2

Emission Estimates for -> Feather River Levee					Exhaust	Fugitive Dust
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	102	504	528	42	27	15
Drainage/Utilities/Sub-Grade	0	0	2	0	0	0
Paving	0	0	0	0	0	0
Maximum (pounds/day)	102	504	528	42	27	15
Total (tons/construction project)	11.16	53.49	59.67	4.58	2.93	1.65

<-tons

Notes: Project Start Year -> 2008
 Project Length (months) -> 10
 Total Project Area (acres) -> 232
 Maximum Area Disturbed/Day (acres) -> 3
 Total Soil Imported/Exported (yd³/day)-> 18182

PM10 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.

Emission Estimates for -> Feather River Levee					Exhaust	Fugitive Dust
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	46	229	240	19	12	7
Drainage/Utilities/Sub-Grade	0	0	1	0	0	0
Paving	0	0	0	0	0	0
Maximum (kilograms/day)	46	229	240	19	12	7
Total (megagrams/construction project)	10.12	48.52	54.12	4.15	2.66	1.50

<-megagrams

Notes: Project Start Year -> 2008
 Project Length (months) -> 10
 Total Project Area (hectares) -> 94
 Maximum Area Disturbed/Day (hectares) -> 1
 Total Soil Imported/Exported (meters³/day)-> 13901

PM10 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.

Road Construction Emissions Model

Version 5.2



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 C28.

Input Type		
Project Name	Feather River Levee	
Construction Start Year	2009	Enter a Year between 2000 and 2010 inclusive
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	11	months
Predominate Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
On-Road Emission Factors: Enter 1, 2, 3, or 4	4	1. Emfac7v1.1 4. Emfac2002 (default) 2. Emfac7G 3. Emfac2001
Project Length	6.2	miles
Total Project Area	128	acres
Maximum Area Disturbed/Day	2	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0	yd ³ /day
Soil Exported	22727	yd ³ /day
Average Truck Capacity	20	yd ³ (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.

or User Override (for program calculated)

Months	% Time
1.1	10
11.0	40
3.9	35
1.7	15

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 C37 through C40.

Construction Periods	User Override of Construction Months	Program Calculated Months	2000		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		sum		
			%	adjusted %	%	adjusted %	%	adjusted %	%	adjusted %	%	adjusted %	%	adjusted %	%	adjusted %	%	adjusted %	%	adjusted %							
Grubbing/Land Clearing	0.00	1.10	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	
Grading/Excavation	11.00	4.40	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	11.00	1.00	0.00	0.00	1.00	11	
Drainage/Utilities/Sub-Grade	0.00	3.85	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	
Paving	0.00	1.65	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	
Totals	11.00	11.00																								0.00	0

Hauling emission default values can be overridden in cells C48 through C50.

User Input	User Override of Soil Hauling Defaults		Default Values
	Miles/round trip	Round trips/day	
Miles/round trip	4	30	
Round trips/day		1136	
Vehicle miles traveled/day (calculated)			4545.4

Hauling Emissions	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.70	7.99	6.67	0.26
Pounds per day	7.0	80.0	66.8	2.6
Tons per construction period	0.85	9.68	8.08	0.31

4
1136.35
4

Worker commute default values can be overridden in cells C62 through C67.

User Override of Worker	User Override of Worker Commute Default Values		Default Values
	Miles/ one-way trip	One-way trips/day	
Miles/ one-way trip	10	20	
One-way trips/day		2	
No. of employees: Grubbing/Land Clearing	0	18	
No. of employees: Grading/Excavation	70	21	
No. of employees: Drainage/Utilities/Sub-Grade	0	21	
No. of employees: Paving	0	19	

	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.27	0.49	5.66	0.04
Emission rate (grams/trip)	1.49	0.67	14.88	0.02
Pounds per day - Grubbing/Land Clearing	0.0	0.0	0.0	0.0
Tons per const. Period - Grub/Land Clear	0.0	0.0	0.0	0.0
Pounds per day - Grading/Excavation	1.7	1.9	26.6	0.1
Tons per const. Period - Grading/Excavation	0.2	0.2	3.2	0.0
Pounds per day - Drainage/Utilities/Sub-Grade	0.0	0.0	0.0	0.0
Tons per const. Period - Drain/Util/Sub-Grade	0.0	0.0	0.0	0.0
Pounds per day - Paving	0.0	0.0	0.0	0.0
Tons per const. Period - Paving	0.0	0.0	0.0	0.0
tons per construction period	0.2	0.2	3.2	0.0

10
2
0
70
0
0
80

Water truck default values can be overridden in cells C87 through C89 and E87 through E89.

Water Truck Emissions	Number of Water Trucks	Program Estimate of	User Override of Water	Default Values
		Number of Water Trucks	Truck Miles Traveled	Miles Traveled/Day
Grubbing/Land Clearing - Exhaust	0	1		40
Grading/Excavation - Exhaust	2	1		40
Drainage/Utilities/Subgrade	0	1		40

	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.70	7.99	6.67	0.26
Pounds per day - Grubbing/Land Clearing	0.0	0.0	0.0	0.0
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.1	1.4	1.2	0.0
Tons per const. Period - Grading/Excavation	0.01	0.17	0.14	0.01
Pound per day - Drainage/Utilities/Subgrade	0.0	0.0	0.0	0.0
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00

0
80
0

Fugitive dust default values can be overridden in cells C104 and C105.

Fugitive PM10 Dust	User Override of Max	Default	pounds/day	tons/per period
	Acreage/Day	Maximum Acreage/Day		
Fugitive Dust - Grubbing/Land Clearing	0	2	0.0	0.0
Fugitive Dust - Grading/Excavation		2	10.0	1.2
Fugitive Dust - Drainage/Utilities/Subgrade	0	2	0.0	0.0

0
3
0

Off road equipment default number of vehicles can be overridden in cells B115 through B224.

Off-Road Equipment Emissions							
Grubbing/Land Clearing		Default	ROG	CO	NOx	PM10	
Override of Default Number of Vehicles	Number of Vehicles Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day	
		Backhoes	0.00	0.00	0.00	0.00	
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	
		Compactor	0.00	0.00	0.00	0.00	
		Cranes	0.00	0.00	0.00	0.00	
		Crawler Tractors	0.00	0.00	0.00	0.00	
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	
0	1	Dozer	0.00	0.00	0.00	0.00	
		Excavator	0.00	0.00	0.00	0.00	
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00	
		Grader	0.00	0.00	0.00	0.00	
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00	
		Off-Highway Trucks	0.00	0.00	0.00	0.00	
		Other Construction Equip.	0.00	0.00	0.00	0.00	
		Pavers	0.00	0.00	0.00	0.00	
		Paving Equipment	0.00	0.00	0.00	0.00	
		Rollers	0.00	0.00	0.00	0.00	
0	1	Scraper	0.00	0.00	0.00	0.00	
0	12	Signal Boards	0.00	0.00	0.00	0.00	
		Skid Steer Loaders	0.00	0.00	0.00	0.00	
		Surfacing Equipment	0.00	0.00	0.00	0.00	
		Tractors	0.00	0.00	0.00	0.00	
		Trenchers	0.00	0.00	0.00	0.00	
		pounds per day	0.0	0.0	0.0	0.0	
		tons per period	0.0	0.0	0.0	0.0	
Grading/Excavation		Number of Vehicles	ROG	CO	NOx	PM10	
Override of Default Number of Vehicles	Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day	
		Backhoes	0.00	0.00	0.00	0.00	
1		Bore/Drill Rigs	2.87	7.47	5.75	0.43	
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	
		Compactor	0.00	0.00	0.00	0.00	
1	0	Cranes	1.44	5.64	5.37	0.30	
		Crawler Tractors	0.00	0.00	0.00	0.00	
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	
6		Dozer	21.84	101.37	116.20	6.13	
6	1	Excavator	11.04	28.71	31.08	1.66	
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00	
4	1	Grader	4.79	23.27	36.17	2.00	
1	1	Loaders, Rubber Tired	0.92	4.67	6.35	0.35	
1		Off-Highway Trucks	3.60	11.49	12.21	0.63	
4	0	Other Construction Equip.	8.32	36.37	33.62	1.87	
		Pavers	0.00	0.00	0.00	0.00	
		Paving Equipment	0.00	0.00	0.00	0.00	
4		Rollers	2.35	11.91	16.19	0.90	
10	1	Scraper	36.42	148.42	144.77	7.74	
0	12	Signal Boards	0.00	0.00	0.00	0.00	
		Skid Steer Loaders	0.00	0.00	0.00	0.00	
		Surfacing Equipment	0.00	0.00	0.00	0.00	
		Tractors	0.00	0.00	0.00	0.00	
		Trenchers	0.00	0.00	0.00	0.00	
		max pounds per day	93.6	379.3	407.7	22.0	
		tons per period	11.3	45.9	49.3	2.7	
Drainage/Utilities/Subgrade		Number of Vehicles	ROG	CO	NOx	PM10	
Override of Default Number of Vehicles	Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day	
		Backhoes	0.00	0.00	0.00	0.00	
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	
0	1	Compactor	0.00	0.00	0.00	0.00	
		Cranes	0.00	0.00	0.00	0.00	
		Crawler Tractors	0.00	0.00	0.00	0.00	
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	
		Dozer	0.00	0.00	0.00	0.00	
		Excavator	0.00	0.00	0.00	0.00	
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00	
0	1	Grader	0.00	0.00	0.00	0.00	
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00	
		Off-Highway Trucks	0.00	0.00	0.00	0.00	
		Other Construction Equip.	0.00	0.00	0.00	0.00	
		Pavers	0.00	0.00	0.00	0.00	
		Paving Equipment	0.00	0.00	0.00	0.00	
		Rollers	0.00	0.00	0.00	0.00	
0	1	Scraper	0.00	0.00	0.00	0.00	
0	12	Signal Boards	0.00	0.00	0.00	0.00	
		Skid Steer Loaders	0.00	0.00	0.00	0.00	
		Surfacing Equipment	0.00	0.00	0.00	0.00	
		Tractors	0.00	0.00	0.00	0.00	
0	1	Trenchers	0.00	0.00	0.00	0.00	
		max pounds per day	0.0	0.0	0.0	0.0	
		tons per period	0.0	0.0	0.0	0.0	

Paving	Number of Vehicles		ROG	CO	NOx	PM10	
	Override of Default Number of Vehicles	Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day
			Backhoes	0.00	0.00	0.00	0.00
			Bore/Drill Rigs	0.00	0.00	0.00	0.00
			Concrete/Industrial Saws	0.00	0.00	0.00	0.00
			Compactor	0.00	0.00	0.00	0.00
			Cranes	0.00	0.00	0.00	0.00
			Crawler Tractors	0.00	0.00	0.00	0.00
			Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
			Dozer	0.00	0.00	0.00	0.00
			Excavator	0.00	0.00	0.00	0.00
			Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
			Grader	0.00	0.00	0.00	0.00
			Loaders, Rubber Tired	0.00	0.00	0.00	0.00
			Off-Highway Trucks	0.00	0.00	0.00	0.00
			Other Construction Equip.	0.00	0.00	0.00	0.00
	0	1	Pavers	0.00	0.00	0.00	0.00
	0	1	Paving Equipment	0.00	0.00	0.00	0.00
	0	1	Rollers	0.00	0.00	0.00	0.00
			Scraper	0.00	0.00	0.00	0.00
	0	12	Signal Boards	0.00	0.00	0.00	0.00
			Skid Steer Loaders	0.00	0.00	0.00	0.00
			Surfacing Equipment	0.00	0.00	0.00	0.00
			Tractors	0.00	0.00	0.00	0.00
			Trenchers	0.00	0.00	0.00	0.00
			pounds per day	0.0	0.0	0.0	0.0
			tons per period	0.0	0.0	0.0	0.0
Total Emissions (tons per construction period)				11.3	45.9	49.3	2.7

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Equipment default values for horsepower, load factor, and hours/day can be overridden in cells C235 through C256, E235 through E256, and G235 through G256.

Equipment	Default Values		Default Values		Default Values	
	Horsepower	Load Factor	Hours/day			
Bore/Drill Rigs	218	0.75	8			
Concrete/Industrial Saws	84	0.73	8			
Cranes	190	0.43	8			
Crawler Tractors	143	0.575	8			
Crushing/Proc. Equipment	154	0.78	8			
Excavators	180	0.58	8			
Graders	174	0.575	8			
Off-Highway Tractors	255	0.41	8			
Off-Highway Trucks	417	0.49	8			
Other Construction Equipment	190	0.62	8			
Pavers	132	0.59	8			
Paving Equipment	111	0.53	8			
Rollers	114	0.43	8			
Rough Terrain Forklifts	94	0.475	8			
Rubber Tired Dozers	352	0.59	8			
Rubber Tired Loaders	165	0.465	8			
Scrapers	313	0.66	8			
Signal Boards	25	0.82	8			
Skid Steer Loaders	62	0.515	8			
Surfacing Equipment	437	0.49	8			
Tractors/Loaders/Backhoes	79	0.465	8			
Trenchers	82	0.695	8			

Default load factors from SCAQMD CEQA Handbook, 1993.

Default horsepower values from Appendix B, California Air Resources Board's Offroad Model (see also Appendix B of this spreadsheet).

Signal board horsepower based on: U.S. EPA, 1998. Final Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines (EPA420-R-98-016).

0

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END OF DATA ENTRY SHEET

Horsepower	Load Factor	Hours/Day	Columns (LxMxN)	Horsepower	Class
218	0.75	8.0	1306.0		4
84	0.73	8.0	489.0		2
190	0.43	8.0	655.1		4
143	0.575	8.0	659.6		3
154	0.78	8.0	963.0		3
180	0.58	8.0	835.5		4
174	0.575	8.0	800.3		3
255	0.41	8.0	836.6		4
417	0.49	8.0	1635.4		5
190	0.62	8.0	944.6		4
132	0.59	8.0	620.9		3
111	0.53	8.0	470.4		3
114	0.43	8.0	391.9		3
94	0.475	8.0	358.1		2
352	0.59	8.0	1663.7		5
165	0.465	8.0	615.1		3
313	0.66	8.0	1653.5		5
25	0.82	8.0	164.0		1
62	0.515	8.0	255.4		2
437	0.49	8.0	1712.9		5
79	0.465	8.0	295.7		2
82	0.695	8.0	455.6		2

Road Construction Emissions Model, Version 5.2

Emission Estimates for -> Feather River Levee					Exhaust	Fugitive Dust
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	102	474	491	35	25	10
Drainage/Utilities/Sub-Grade	0	0	1	0	0	0
Paving	0	0	0	0	0	0
Maximum (pounds/day)	102	474	491	35	25	10
Total (tons/construction project)	12.38	55.81	60.64	4.20	2.99	1.21

<-tons

Notes: Project Start Year -> 2009
 Project Length (months) -> 11
 Total Project Area (acres) -> 128
 Maximum Area Disturbed/Day (acres) -> 2
 Total Soil Imported/Exported (yd³/day)-> 22727

PM10 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.

Emission Estimates for -> Feather River Levee					Exhaust	Fugitive Dust
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	47	215	223	16	11	5
Drainage/Utilities/Sub-Grade	0	0	1	0	0	0
Paving	0	0	0	0	0	0
Maximum (kilograms/day)	47	215	223	16	11	5
Total (megagrams/construction project)	11.23	50.62	55.00	3.81	2.72	1.10

<-megagrams

Notes: Project Start Year -> 2009
 Project Length (months) -> 11
 Total Project Area (hectares) -> 52
 Maximum Area Disturbed/Day (hectares) -> 1
 Total Soil Imported/Exported (meters³/day)-> 17375

PM10 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.

Road Construction Emissions Model

Version 5.2



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 C28.

Input Type		
Project Name	Feather River Levee	
Construction Start Year	2010	Enter a Year between 2000 and 2010 inclusive
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	6	months
Predominate Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
On-Road Emission Factors: Enter 1, 2, 3, or 4	4	1. Emfac7v1.1 4. Emfac2002 (default) 2. Emfac7G 3. Emfac2001
Project Length	6.2	miles
Total Project Area	128	acres
Maximum Area Disturbed/Day	2	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0	yd ³ /day
Soil Exported	22727	yd ³ /day
Average Truck Capacity	20	yd ³ (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.

or User Override (for program calculated)

Months	% Time
0.6	10
6.0	40
2.1	35
0.9	15

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 C37 through C40.

Construction Periods	User Override of		Program Calculated																						2010		sum			
	Construction Months	Months	2000	%	2001	%	2002	%	2003	%	2004	%	2005	%	2006	%	2007	%	2008	%	2009	%	2010	% adjusted %						
Grubbing/Land Clearing	0.00	0.60	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	1.00	0.00	0	
Grading/Excavation	6.00	2.40	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	6.00	1.00	1.00	1.00	1.00	6	
Drainage/Utilities/Sub-Grade	0.00	2.10	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	1.00	0.00	0	
Paving	0.00	0.90	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	1.00	0.00	0	
Totals	6.00	6.00																												

Hauling emission default values can be overridden in cells C48 through C50.

Soil Hauling Emissions				
User Input		User Override of		
	Soil Hauling Defaults	Default Values		
Miles/round trip	4	30		
Round trips/day		1136		
Vehicle miles traveled/day (calculated)			4545.4	
				1136.35
				4
Hauling Emissions	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.65	7.23	6.11	0.24
Pounds per day	6.5	72.4	61.2	2.4
Tons per construction period	0.43	4.78	4.04	0.16

Worker commute default values can be overridden in cells C62 through C67.

Worker Commute Emissions				
User Override of Worker		Default Values		
	Commute Default Values			
Miles/ one-way trip	10	20		
One-way trips/day		2		
No. of employees: Grubbing/Land Clearing	0	18		
No. of employees: Grading/Excavation	70	21		
No. of employees: Drainage/Utilities/Sub-Grade	0	21		
No. of employees: Paving	0	19		
				10
				2
				0
				70
				0
				0
				80
	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.24	0.44	5.10	0.04
Emission rate (grams/trip)	1.37	0.62	13.67	0.02
Pounds per day - Grubbing/Land Clearing	0.0	0.0	0.0	0.0
Tons per const. Period - Grub/Land Clear	0.0	0.0	0.0	0.0
Pounds per day - Grading/Excavation	1.6	1.7	24.2	0.1
Tons per const. Period - Grading/Excavation	0.1	0.1	1.6	0.0
Pounds per day - Drainage/Utilities/Sub-Grade	0.0	0.0	0.0	0.0
Tons per const. Period - Drain/Util/Sub-Grade	0.0	0.0	0.0	0.0
Pounds per day - Paving	0.0	0.0	0.0	0.0
Tons per const. Period - Paving	0.0	0.0	0.0	0.0
tons per construction period	0.1	0.1	1.6	0.0

Water truck default values can be overridden in cells C87 through C89 and E87 through E89.

Water Truck Emissions				
	Number of Water Trucks	Program Estimate of	User Override of Water	Default Values
		Number of Water Trucks	Truck Miles Traveled	Miles Traveled/Day
Grubbing/Land Clearing - Exhaust	0	1		40
Grading/Excavation - Exhaust	2	1		40
Drainage/Utilities/Subgrade	0	1		40
				0
				80
				0
	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.65	7.23	6.11	0.24
Pounds per day - Grubbing/Land Clearing	0.0	0.0	0.0	0.0
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.1	1.3	1.1	0.0
Tons per const. Period - Grading/Excavation	0.01	0.08	0.07	0.00
Pound per day - Drainage/Utilities/Subgrade	0.0	0.0	0.0	0.0
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C104 and C105.

Fugitive PM10 Dust	User Override of Max	Default		
	Acreage/Day	Maximum Acreage/Day	pounds/day	tons/period
Fugitive Dust - Grubbing/Land Clearing	0	2	0.0	0.0
Fugitive Dust - Grading/Excavation	2	2	10.0	0.7
Fugitive Dust - Drainage/Utilities/Subgrade	0	2	0.0	0.0

0
3
0

Off road equipment default number of vehicles can be overridden in cells B115 through B224.

Off-Road Equipment Emissions						
Grubbing/Land Clearing		Default	ROG	CO	NOx	PM10
Override of Default Number of Vehicles	Number of Vehicles Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day
		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
		Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
0	1	Dozer	0.00	0.00	0.00	0.00
		Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
		Grader	0.00	0.00	0.00	0.00
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
0	1	Scraper	0.00	0.00	0.00	0.00
0	12	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
pounds per day			0.0	0.0	0.0	0.0
tons per period			0.0	0.0	0.0	0.0
Grading/Excavation		Default	ROG	CO	NOx	PM10
Override of Default Number of Vehicles	Number of Vehicles Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day
		Backhoes	0.00	0.00	0.00	0.00
1		Bore/Drill Rigs	2.87	7.47	5.75	0.43
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
		Compactor	0.00	0.00	0.00	0.00
1	0	Cranes	1.44	3.75	4.10	0.22
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
6		Dozer	21.91	99.54	103.11	5.57
6	1	Excavator	11.04	28.71	28.08	1.66
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
4	1	Grader	4.79	23.97	33.42	1.89
1	1	Loaders, Rubber Tired	0.92	5.01	5.17	0.30
1		Off-Highway Trucks	3.60	9.37	10.45	0.54
4	0	Other Construction Equip.	8.32	31.46	29.54	1.66
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
4		Rollers	2.35	12.78	13.17	0.76
10	1	Scraper	36.42	130.51	129.90	6.98
0	12	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
max pounds per day			93.7	352.6	362.7	20.0
tons per period			6.2	23.3	23.9	1.3
Drainage/Utilities/Subgrade		Default	ROG	CO	NOx	PM10
Override of Default Number of Vehicles	Number of Vehicles Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day
		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
0	1	Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
		Dozer	0.00	0.00	0.00	0.00
		Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
0	1	Grader	0.00	0.00	0.00	0.00
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
0	1	Scraper	0.00	0.00	0.00	0.00
0	12	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
0	1	Trenchers	0.00	0.00	0.00	0.00
max pounds per day			0.0	0.0	0.0	0.0
tons per period			0.0	0.0	0.0	0.0

Paving	Number of Vehicles		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day
	Override of Default Number of Vehicles	Program-estimate Type				
		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
		Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
		Dozer	0.00	0.00	0.00	0.00
		Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
		Grader	0.00	0.00	0.00	0.00
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
	0	1 Pavers	0.00	0.00	0.00	0.00
	0	1 Paving Equipment	0.00	0.00	0.00	0.00
	0	1 Rollers	0.00	0.00	0.00	0.00
		Scraper	0.00	0.00	0.00	0.00
	0	12 Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0
Total Emissions (tons per construction period)			6.2	23.3	23.9	1.3

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Equipment default values for horsepower, load factor, and hours/day can be overridden in cells C235 through C256, E235 through E256, and G235 through G256.

Equipment	Default Values		Default Values		Default Values	
	Horsepower		Load Factor		Hours/day	
Bore/Drill Rigs	218		0.75		8	
Concrete/Industrial Saws	84		0.73		8	
Cranes	190		0.43		8	
Crawler Tractors	143		0.575		8	
Crushing/Proc. Equipment	154		0.78		8	
Excavators	180		0.58		8	
Graders	174		0.575		8	
Off-Highway Tractors	255		0.41		8	
Off-Highway Trucks	417		0.49		8	
Other Construction Equipment	190		0.62		8	
Pavers	132		0.59		8	
Paving Equipment	111		0.53		8	
Rollers	114		0.43		8	
Rough Terrain Forklifts	94		0.475		8	
Rubber Tired Dozers	352		0.59		8	
Rubber Tired Loaders	165		0.465		8	
Scrapers	313		0.66		8	
Signal Boards	25		0.82		8	
Skid Steer Loaders	62		0.515		8	
Surfacing Equipment	437		0.49		8	
Tractors/Loaders/Backhoes	79		0.465		8	
Trenchers	82		0.695		8	

Default load factors from SCAQMD CEQA Handbook, 1993.

Default horsepower values from Appendix B, California Air Resources Board's Offroad Model (see also Appendix B of this spreadsheet).

Signal board horsepower based on: U.S. EPA, 1998. Final Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines (EPA420-R-98-016).

0

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END OF DATA ENTRY SHEET

Horsepower	Load Factor	Hours/Day	Columns (LxMxN)	Horsepower	Class
218	0.75	8.0	1306.0		4
84	0.73	8.0	489.0		2
190	0.43	8.0	655.1		4
143	0.575	8.0	659.6		3
154	0.78	8.0	963.0		3
180	0.58	8.0	835.5		4
174	0.575	8.0	800.3		3
255	0.41	8.0	836.6		4
417	0.49	8.0	1635.4		5
190	0.62	8.0	944.6		4
132	0.59	8.0	620.9		3
111	0.53	8.0	470.4		3
114	0.43	8.0	391.9		3
94	0.475	8.0	358.1		2
352	0.59	8.0	1663.7		5
165	0.465	8.0	615.1		3
313	0.66	8.0	1653.5		5
25	0.82	8.0	164.0		1
62	0.515	8.0	255.4		2
437	0.49	8.0	1712.9		5
79	0.465	8.0	295.7		2
82	0.695	8.0	455.6		2

Road Construction Emissions Model, Version 5.2

Emission Estimates for -> Feather River Levee					Exhaust	Fugitive Dust	
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	
Grubbing/Land Clearing	0	0	0	0	0	0	
Grading/Excavation	102	439	438	33	23	10	
Drainage/Utilities/Sub-Grade	0	0	1	0	0	0	
Paving	0	0	0	0	0	0	
Maximum (pounds/day)	102	439	438	33	23	10	
Total (tons/construction project)	6.72	28.16	29.57	2.15	1.49	0.66	<-tons
Notes:	Project Start Year ->	2010					
	Project Length (months) ->	6					
	Total Project Area (acres) ->	128					
	Maximum Area Disturbed/Day (acres) ->	2					
	Total Soil Imported/Exported (yd ³ /day)->	22727					

PM10 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.

Emission Estimates for -> Feather River Levee					Exhaust	Fugitive Dust	
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	
Grubbing/Land Clearing	0	0	0	0	0	0	
Grading/Excavation	46	200	199	15	10	5	
Drainage/Utilities/Sub-Grade	0	0	1	0	0	0	
Paving	0	0	0	0	0	0	
Maximum (kilograms/day)	46	200	199	15	10	5	
Total (megagrams/construction project)	6.09	25.54	26.82	1.95	1.35	0.60	<-megagrams
Notes:	Project Start Year ->	2010					
	Project Length (months) ->	6					
	Total Project Area (hectares) ->	52					
	Maximum Area Disturbed/Day (hectares) ->	1					
	Total Soil Imported/Exported (meters ³ /day)->	17375					

PM10 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.

Travel on Unpaved Haul Roads (Heavy Duty Trucks):		
$E(\text{lbs}/\text{VMT})=(k)(s/12)^a (W/3)^b$	*AP-42 12/03, 13.2.2-4 eq 1a	
Where:	PM10	
k =Particle Size Multiplier:	1.5	*AP-42 12/03 Table 13.2.2-2; PM10 emissions; industrial roads
s =Silt Content:	4.3	*AP-42 12/03 Table 13.2.2-1, service road
empirical constants		
a	0.9	*AP-42 12/03 Table 13.2.2-2; PM10 emissions; industrial roads
b	0.45	*AP-42 12/03 Table 13.2.2-2; PM10 emissions; industrial roads
W =Vehicle Weight:	11.375	$((2+1.25 \text{ T/cy} \cdot 15 \text{ cy truck capacity}) + 2)/2$ (average weight of loaded and unloaded haul truck; assumed empty truck weighs 2 tons)
	1.08	lbs/VMT
$E(\text{ext})=E[(365-P)/365]$	*AP-42 12/03 13.2.2-4 eq 2	
Where:		
P =# days/yr with ≥ 0.01 in. precip	63	*AP-42 12/03 Figure 13.2.2-1 for Sacramento Co/NOAA Technical Memorandum NWS WR-272; CLIMATE OF SACRAMENTO, CALIFORNIA (June 2005)
	0.90	lbs/VMT
Travel on Paved Haul Roads (Heavy Duty Trucks):		
$E(\text{lbs}/\text{VMT})=(k)(sL/2)^{0.65} (W/3)^{1.5} - C$	*AP-42 12/03, 13.2.1-4 eq 1	
Where:	PM10	
k =Particle Size Multiplier (lb/VMT)	0.016	*AP-42 12/03 Table 13.2.1-1; PM10 emissions; industrial roads
sL =road surface silt loading (g/m ²)	8.2	*AP-42 12/03 Table 13.2.1-4; quarry roads
W =Vehicle Weight:	11.375	$((2+1.25 \text{ T/cy} \cdot 15 \text{ cy truck capacity}) + 2)/2$ (average weight of loaded and unloaded haul truck; assumed empty truck weighs 2 tons)
C =exhaust, break, tire wear (lb/VMT)	0.00047	*AP-42 12/03 Table 13.2.1-2; PM10 emissions
	0.30	lbs/VMT
$E(\text{ext})=E[1-(P/4N)]$	*AP-42 12/03 13.2.1 eq 2	
Where:		
P =# days/yr with ≥ 0.01 in. precip	63	*AP-42 12/03 Figure 13.2.2-1 for Sacramento Co/NOAA Technical Memorandum NWS WR-272; CLIMATE OF SACRAMENTO, CALIFORNIA (June 2005)
N =number of days in averaging period	365	
	0.28	lbs/VMT
Fugitive Dust Source Emissions		
	(lb/acre/day)	
Disturbance Area	60.71	
Assumptions: SMAQMD emission factor of 60.71 lbs/acre/day (SMAQMD 1994).		
Aggregate Storage Piles		
Emissions result from several distinct processes within the stockpiling cycle: 1. loading in of materials through batch or drop operations, 2. equipment traffic in storage area, 3. wind erosion of piles, 4. loadout of material through batch or drop operations (AP-42 12/03, chapt. 13.2.4).		
$E(\text{lb}/\text{ton})=(k)(0.0032)(U/5)^{1.3} (M/2)^{1.4}$	*AP-42 12/03, 13.2.4-3 eq 1	
Where:	PM10	
k =Particle Size Multiplier:	0.35	*AP-42 12/03 13.2.4-3; PM10 emissions
U =mean wind speed (mph)	8	*NOAA Western Regional Climate Center, Sacramento International Airport ASOS station, CA RAWS data from 1996-2006 (http://www.wrcc.dri.edu/htmlfiles/westwind.final.html#CALIFORNIA)
M =moisture content (%):	2.4	*AP-42 7/98 Table 11.9-3, haul truck
	0.002	lbs/ton
Batch Loading at Borrow Area		
$E(\text{TSP}<15 \text{ um})=(.119/(M^{0.9}))$	*AP-42 7/98, Table 11.9-1	
Where:	PM10	
M =moisture content (%):	2.4	*AP-42 7/98 Table 11.9-3, haul truck
	0.05	lb/ton
$E(\text{TSP}<10 \text{ um})=(E(\text{TSP}<15 \text{ um}) \cdot S)$	*AP-42 7/98, Table 11.9-1	
S =scaling factor	0.75	*AP-42 7/98 Table 11.9-3, haul truck
	0.04	lb/ton
Truck Unloading		
$E(\text{TSP}<15 \text{ um})$	PM10	
Where:	0.007	lb/ton *AP-42 7/98 Table 11.9-4, end dump truck unloading (batch drop)
$E(\text{TSP}<10 \text{ um})=(E(\text{TSP}<15 \text{ um}) \cdot S)$	*AP-42 7/98, Table 11.9-1	
S =scaling factor	0.75	*AP-42 7/98 Table 11.9-1, haul truck
	0.005	lb/ton
Bulldozing		
$E(\text{TSP}<15 \text{ um})=(18.6(s)^{1.5})/(M^{1.4})$	*AP-42 7/98, Table 11.9-1	
Where:		
M =moisture content (%):	7.9	*AP-42 7/98 Table 11.9-3, bulldozer
s =silt content (%)	6.9	*AP-42 7/98 Table 11.9-3, bulldozer
	18.67	lb/hr
$E(\text{TSP}<10 \text{ um})=(E(\text{TSP}<15 \text{ um}) \cdot S)$	*AP-42 7/98, Table 11.9-1	
S =scaling factor	0.75	*AP-42 7/98 Table 11.9-1, bulldozer
	14.00	lb/hr
Scraper Unloading		
$E(\text{TSP}<15 \text{ um})$	PM10	
	0.04	lb/ton *AP-42 7/98 Table 11.9-4, scraper unloading
$E(\text{TSP}<10 \text{ um})=(E(\text{TSP}<15 \text{ um}) \cdot S)$	*AP-42 7/98, Table 11.9-1	
S =scaling factor	0.75	*AP-42 7/98 Table 11.9-1, bulldozer/haul truck
	0.03	lb/ton

Conformity: Regionally Significant Thresholds Calculations

2006 Estimated Annual Average Emissions

YUBA COUNTY

ROG	CO	NOX	PM10
8.48	44.32	7.67	7.92
3095.20	16176.8	2799.55	2890.80
309.52	1617.68	279.96	289.08

ton/day

tpy

10% of total

http://www.arb.ca.gov/app/emsmv/emssumcat_query.php?F_DIV=-4&F_DD=Y&F_YR=2006&F_SEASON=A&SP=2007&F_AREA=CO&F_CO=58

Air Quality Emissions: Indirect Effects

FRLRP Air Quality Emissions, Indirect Effects: Growth-Inducing and Cumulative Assumptions and Emissions Calculations Summary

Growth Inducing: Inundation Area

Assumptions:

Operational Year 2030
 242 acres constructed/year over 20 year buildout period (first year of construction 2009)
 Residential 12176 du 4059 ac
 Commercial 639 ac
 Industrial 0 ac

		students/s			
Educational	schools	ac/school	chool	total ac	total students
Elementary	5	10	700	50	3500
Middle	1.5	20	800	30	1200
High	1.5	40	1000	60	1500

<u>Emissions Summary:</u>		ROG		NOX		PM10		PM2.5		CO2	
	Analysis Year	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy
Construction	2009	5,457	59	600	42	1,238	15	276	4	130,804	9,768
Operation at buildout	2030	2,420	441	1,671	343	6,674	1,218	1,262	230	4,414,474	773,747
	Mobile Sources	1,447	272	1,394	293	6,672	1,218	1,260	230	4,077,008	712,206
	Area Sources	972	168	277	50	2	0	2	0	337,466	61,541
Total (Construction + Operation	2009-2030	7,876	500	2,271	385	7,912	1,233	1,537	234	4,545,278	783,515

Cumulative: Project Area (Includes Inundation Area)

Assumptions:

Operational Year 2030
 418 acres constructed/year over 20 year buildout period (first year of construction 2009)
 Residential 23322 du 7774 ac
 Commercial 983 ac
 Industrial 205 ac

		students/s			
Educational	schools	ac/school	chool	total ac	total students
Elementary	14	10	700	140	9800
Middle	3.6	20	800	72	2880
High	4.6	40	1000	184	4600

<u>Emissions Summary:</u>		ROG		NOX		PM10		PM2.5		CO2	
	Analysis Year	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy
Construction	2009	9,419	102	982	70	2,135	26	473	7	223,167	16,692
Operation at buildout	2030	4,294	778	2,804	575	11,084	2,022	2,096	382	7,370,534	1,292,148
	Mobile Sources	2,439	456	2,315	487	11,080	2,022	2,092	382	6,773,209	1,183,224
	Area Sources	1,855	321	490	88	4	0	4	0	597,325.83	108,924
Total (Construction + Operation	2009-2030	13,713	880	3,786	645	13,219	2,049	2,569	390	7,593,702	1,308,840

Difference: (Cumulative - Growth Inducing)

(Emissions that would occur without the project)

Assumptions:

Operational Year 2030
 176 acres constructed/year over 20 year buildout period (first year of construction 2009)
 Residential 11146 du 3715 ac
 Commercial 344 ac
 Industrial 205 ac

		students/s			
Educational	schools	ac/school	chool	total ac	total students
Elementary	9	10	700	90	6300
Middle	2.1	20	800	42	1680
High	3.1	40	1000	124	3100

<u>Emissions Summary:</u>		ROG		NOX		PM10		PM2.5		CO2	
	Analysis Year	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy
Construction	2009	3,963	43	382	28	897	11	197	3	92,363	6,924
Operation at buildout	2030	1,874	337	1,133	232	4,409	805	834	152	2,956,061	518,401
	Mobile Sources	992	184	920	194	4,408	804	832	152	2,696,201	471,018
	Area Sources	882	153	213	38	2	0	2	0	259,860	47,383
Total (Construction + Operation	2009-2030	5,837	380	1,515	260	5,306	816	1,031	155	3,048,424	525,325

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Documents and Settings\phillipsh\Application Data\Urbemis\Version9a\Projects\FRLIP Growth Inducing Construction.urb924

Project Name: FRLIP Growth Inducement Construction

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2009 TOTALS (lbs/day unmitigated)	5,456.68	599.78	1,214.84	23.47	1,238.31	254.38	21.40	275.78	130,804.49

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\phillipsh\Application Data\Urbemis\Version9a\Projects\FRLIP Growth Inducing Construction.urb924

Project Name: FRLIP Growth Inducement Construction

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2009 TOTALS (tons/year unmitigated)	59.15	41.52	13.70	1.56	15.26	2.92	1.42	4.34	9,767.90

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Documents and Settings\phillipsh\Application Data\Urbemis\Version9a\Projects\FRLIP Growth Inducing.urb924

Project Name: FRLIP Induced Growth

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	972.25	276.97	1.96	1.95	337,465.91

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	1,447.49	1,394.44	6,672.18	1,259.62	4,077,007.81

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	2,419.74	1,671.41	6,674.14	1,261.57	4,414,473.72

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	PM10	PM2.5	CO2
Natural Gas	20.36	270.74	0.50	0.50	336,579.13
Hearth - No Summer Emissions					
Landscape	98.85	6.23	1.46	1.45	886.78
Consumer Products	595.69				
Architectural Coatings	257.35				
TOTALS (lbs/day, unmitigated)	972.25	276.97	1.96	1.95	337,465.91

Area Source Changes to Defaults

Percentage of residences with wood stoves changed from 35% to 0%

Percentage of residences with wood fireplaces changed from 10% to 0%

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	PM10	PM25	CO2
Single family housing	389.27	355.06	1,708.61	322.95	1,050,328.19
Elementary school	26.30	12.59	60.22	11.37	36,792.54
Junior high school	10.06	5.42	25.93	4.90	15,841.57
High school	11.88	6.50	31.05	5.86	18,935.86
Strip mall	771.17	793.19	3,783.00	713.70	2,303,942.96
General office building	238.81	221.68	1,063.37	200.84	651,166.69
TOTALS (lbs/day, unmitigated)	1,447.49	1,394.44	6,672.18	1,259.62	4,077,007.81

Operational Settings:

- Does not include correction for passby trips
- Does not include double counting adjustment for internal trips
- Analysis Year: 2030 Temperature (F): 85 Season: Summer
- Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	4,058.67	9.57	dwelling units	12,176.00	116,524.32	996,247.96
Elementary school		1.29	students	3,500.00	4,515.00	35,126.70
Junior high school		1.62	students	1,200.00	1,944.00	15,124.32
High school		1.71	students	1,400.00	2,394.00	18,110.61
Strip mall		42.94	1000 sq ft	6,951.63	298,502.98	2,206,832.49
General office building		11.01	1000 sq ft	6,951.63	76,537.45	620,144.66
					500,417.75	3,891,586.74

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.9	0.0	100.0	0.0
Light Truck < 3750 lbs	19.1	0.0	99.0	1.0
Light Truck 3751-5750 lbs	19.7	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	80.0	20.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.6	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	0.0	91.7	8.3

Travel Conditions

	Residential				Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer	
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4	
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6	
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0	
% of Trips - Residential	32.9	18.0	49.1				
% of Trips - Commercial (by land use)							
Elementary school				20.0	10.0		70.0
Junior high school				20.0	10.0		70.0
High school				10.0	5.0		85.0
Strip mall				2.0	1.0		97.0
General office building				35.0	17.5		47.5

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\phillipsh\Application Data\Urbemis\Version9a\Projects\FRLIP Growth Inducing.urb924

Project Name: FRLIP Induced Growth

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	168.39	50.00	0.22	0.22	61,540.95

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	272.11	293.31	1,217.67	229.87	712,205.67

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	440.50	343.31	1,217.89	230.09	773,746.62

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	PM10	PM2.5	CO2
Natural Gas	3.72	49.41	0.09	0.09	61,425.69
Hearth	0.09	0.03	0.00	0.00	35.45
Landscape	8.90	0.56	0.13	0.13	79.81
Consumer Products	108.71				
Architectural Coatings	46.97				
TOTALS (tons/year, unmitigated)	168.39	50.00	0.22	0.22	61,540.95

Area Source Changes to Defaults

Percentage of residences with wood stoves changed from 35% to 0%

Percentage of residences with wood fireplaces changed from 10% to 0%

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	PM10	PM25	CO2
Single family housing	71.99	74.73	311.82	58.94	183,531.73
Elementary school	4.06	2.65	10.99	2.07	6,427.17
Junior high school	1.60	1.14	4.73	0.89	2,767.31
High school	1.89	1.37	5.67	1.07	3,307.58
Strip mall	148.32	166.78	690.40	130.25	402,409.15
General office building	44.25	46.64	194.06	36.65	113,762.73
TOTALS (tons/year, unmitigated)	272.11	293.31	1,217.67	229.87	712,205.67

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	4,058.67	9.57	dwelling units	12,176.00	116,524.32	996,247.96
Elementary school		1.29	students	3,500.00	4,515.00	35,126.70
Junior high school		1.62	students	1,200.00	1,944.00	15,124.32
High school		1.71	students	1,400.00	2,394.00	18,110.61
Strip mall		42.94	1000 sq ft	6,951.63	298,502.98	2,206,832.49
General office building		11.01	1000 sq ft	6,951.63	76,537.45	620,144.66
					500,417.75	3,891,586.74

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.9	0.0	100.0	0.0
Light Truck < 3750 lbs	19.1	0.0	99.0	1.0
Light Truck 3751-5750 lbs	19.7	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	80.0	20.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.6	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	0.0	91.7	8.3

Travel Conditions

	Residential				Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer	
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4	
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6	
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0	
% of Trips - Residential	32.9	18.0	49.1				
% of Trips - Commercial (by land use)							
Elementary school				20.0	10.0		70.0
Junior high school				20.0	10.0		70.0
High school				10.0	5.0		85.0
Strip mall				2.0	1.0		97.0
General office building				35.0	17.5		47.5

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Documents and Settings\phillipsh\Application Data\Urbemis\Version9a\Projects\FRLIP Cumulative Construction.urb924

Project Name: FRLIP Cumulative Construction

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2009 TOTALS (lbs/day unmitigated)	9,419.48	981.85	2,098.36	36.96	2,135.32	439.39	473.07	223,167.41

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\phillipsh\Application Data\Urbemis\Version9a\Projects\FRLIP Cumulative Construction.urb924

Project Name: FRLIP Cumulative Construction

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2009 TOTALS (tons/year unmitigated)	101.84	69.73	23.66	2.56	26.22	5.04	7.36	16,691.96

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Documents and Settings\phillipsh\Application Data\Urbemis\Version9a\Projects\FRLIP Cumulative.urb924

Project Name: FRLIP Cumulative

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	1,854.64	489.57	3.68	3.64	597,325.83

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	2,439.05	2,314.66	11,079.89	2,091.89	6,773,208.52

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	4,293.69	2,804.23	11,083.57	2,095.53	7,370,534.35

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	PM10	PM2.5	CO2
Natural Gas	36.04	477.71	0.89	0.88	595,637.33
Hearth - No Summer Emissions					
Landscape	188.90	11.86	2.79	2.76	1,688.50
Consumer Products	1,140.98				
Architectural Coatings	488.72				
TOTALS (lbs/day, unmitigated)	1,854.64	489.57	3.68	3.64	597,325.83

Area Source Changes to Defaults

Percentage of residences with wood stoves changed from 35% to 0%

Percentage of residences with wood fireplaces changed from 10% to 0%

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Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	PM10	PM25	CO2
Single family housing	745.62	680.09	3,272.68	618.57	2,011,806.35
Elementary school	73.65	35.24	168.63	31.83	103,019.12
Junior high school	23.47	12.64	60.50	11.42	36,963.67
High school	39.03	21.36	102.01	19.25	62,217.84
Strip mall	1,165.20	1,198.48	5,715.95	1,078.37	3,481,160.83
General office building	360.83	334.94	1,606.70	303.46	983,885.45
General light industry	31.25	31.91	153.42	28.99	94,155.26
TOTALS (lbs/day, unmitigated)	2,439.05	2,314.66	11,079.89	2,091.89	6,773,208.52

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	7,774.00	9.57	dwelling units	23,322.00	223,191.53	1,908,220.68
Elementary school		1.29	students	9,800.00	12,642.00	98,354.76
Junior high school		1.62	students	2,800.00	4,536.00	35,290.08
High school		1.71	students	4,600.00	7,866.00	59,506.29

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Strip mall		42.94	1000 sq ft	10,503.62	451,025.43	3,334,430.99
General office building		11.01	1000 sq ft	10,503.62	115,644.86	937,012.47
General light industry		51.80	acres	205.00	10,619.00	89,465.07
					825,524.82	6,462,280.34

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.9	0.0	100.0	0.0
Light Truck < 3750 lbs	19.1	0.0	99.0	1.0
Light Truck 3751-5750 lbs	19.7	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	80.0	20.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.6	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	0.0	91.7	8.3

Travel Conditions

	Residential				Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer	
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4	
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6	
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0	
% of Trips - Residential	32.9	18.0	49.1				
% of Trips - Commercial (by land use)							
Elementary school				20.0	10.0	70.0	
Junior high school				20.0	10.0	70.0	
High school				10.0	5.0	85.0	
Strip mall				2.0	1.0	97.0	
General office building				35.0	17.5	47.5	
General light industry				50.0	25.0	25.0	

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\phillipsh\Application Data\Urbemis\Version9a\Projects\FRLIP Cumulative.urb924

Project Name: FRLIP Cumulative

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	321.32	88.30	0.41	0.41	108,923.69

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	456.18	486.90	2,022.07	381.76	1,183,224.05

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	777.50	575.20	2,022.48	382.17	1,292,147.74

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	PM10	PM2.5	CO2
Natural Gas	6.58	87.18	0.16	0.16	108,703.81
Hearth	0.32	0.05	0.00	0.00	67.91
Landscape	17.00	1.07	0.25	0.25	151.97
Consumer Products	208.23				
Architectural Coatings	89.19				
TOTALS (tons/year, unmitigated)	321.32	88.30	0.41	0.41	108,923.69

Area Source Changes to Defaults

Percentage of residences with wood stoves changed from 35% to 0%

Percentage of residences with wood fireplaces changed from 10% to 0%

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	PM10	PM25	CO2
Single family housing	137.89	143.15	597.26	112.89	351,538.02
Elementary school	11.38	7.41	30.77	5.81	17,996.07
Junior high school	3.72	2.66	11.04	2.08	6,457.06
High school	6.22	4.49	18.62	3.51	10,867.76
Strip mall	224.11	251.99	1,043.16	196.80	608,023.28
General office building	66.87	70.48	293.22	55.38	171,890.70
General light industry	5.99	6.72	28.00	5.29	16,451.16
TOTALS (tons/year, unmitigated)	456.18	486.90	2,022.07	381.76	1,183,224.05

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	7,774.00	9.57	dwelling units	23,322.00	223,191.53	1,908,220.68
Elementary school		1.29	students	9,800.00	12,642.00	98,354.76
Junior high school		1.62	students	2,800.00	4,536.00	35,290.08
High school		1.71	students	4,600.00	7,866.00	59,506.29

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Strip mall		42.94	1000 sq ft	10,503.62	451,025.43	3,334,430.99
General office building		11.01	1000 sq ft	10,503.62	115,644.86	937,012.47
General light industry		51.80	acres	205.00	10,619.00	89,465.07
					825,524.82	6,462,280.34

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.9	0.0	100.0	0.0
Light Truck < 3750 lbs	19.1	0.0	99.0	1.0
Light Truck 3751-5750 lbs	19.7	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	80.0	20.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.6	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	0.0	91.7	8.3

	<u>Travel Conditions</u>					
	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
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Elementary school				20.0	10.0	70.0
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High school				10.0	5.0	85.0
Strip mall				2.0	1.0	97.0
General office building				35.0	17.5	47.5
General light industry				50.0	25.0	25.0