

# **APPENDIX C**

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Air Quality Modeling Results

Unit	Quantity	Unit	ROG	NOX	PM10	Unit	Distance (miles/round-trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor
	4000.0	yd3 (export)					10.0	266.7	2666.7	444.4	6.0	days
	*(assumes 10 miles to material disposal site)											
	*(assumes haul load = 15 yd3)											
lb/day	4.0		87.1	517.2	26.8	lb/yr						0.002204623
lb/day	2.0		43.2	167.7	8.6	lb/yr						
lb/day	4.0		22.1	168.3	9.1	lb/yr						
g/mile	20.0	employees	2.2	5.8	0.4	lb/yr				40.0	per employee	0.002204623
lb/VMT	0.0	trucks	-	-	-	lb/yr						
lb/VMT	4.0	trucks			753.0	lb/yr						
lb/ton							Tons/yd3 (gravel/sand)	Tons/day				
lb/ton							202.9	833.33				
lb/ton							26.3	833.33				
			154.6	859.0	1027.1	lb/yr						2000
			25.8	143.2	171.2	lb/day						
	0.0	yd3					0.0	0.0	0.0	0.0	12.0	days
	*(assumes haul load = 15 yd3)											
lb/day	2.0		87.1	517.2	26.8	lb/yr						
lb/day	2.0		44.2	155.2	8.2	lb/yr						
lb/day	1.0		12.5	56.6	3.1	lb/yr						
g/mile	20.0	employees	4.4	11.6	0.8	lb/yr				40.0	per employee	0.002204623
			148.2	740.6	38.9	lb/yr						2000
			12.3	61.7	3.2	lb/day						
	0.0	yd3					0.0	0.0	0.0	20.0	16.0	days
	*(assumes haul load = 15 yd3)											
lb/day	2.0		58.9	207.0	10.9	lb/yr						
lb/day	4.0		366.2	1658.8	91.5	lb/yr						
g/mile	2.0		1.0	12.2	0.4	lb/yr						0.002204623
g/mile	20.0	employees	5.9	15.5	1.1	lb/yr				40.0	per employee	0.002204623
lb/VMT	0.0	trucks	-	-	-	lb/yr						
lb/VMT	2.0	trucks			90.4	lb/yr						
			432.0	1893.5	194.4	lb/yr						2000
			27.0	118.3	12.1	lb/day						
	15000.0	yd3 (borrow)					10.0	1000.0	10000.0	1000.0	55.0	days
	*(assumes haul load = 15 yd3)*10 days to complete hauling											
lb/day	2.0		396.2	1537.4	79.2	lb/yr						
lb/day	2.0		399.1	2370.4	122.7	lb/yr						
lb/day	4.0		129.1	982.8	53.2	lb/yr						
lb/day	2.0		131.9	1070.3	58.2	lb/yr						
g/mile	10.0		15.4	190.3	6.0	lb/yr						0.002204623
g/mile	20.0	employees	20.4	53.4	3.9	lb/yr				40.0	per employee	0.002204623
lb/VMT	0.0	trucks	-	-	-	lb/yr						
lb/VMT	10.0	trucks			2,823.8	lb/yr						
			1092.1	6204.5	3146.9	lb/yr						2000
			19.9	112.8	57.2	lb/day						
	2600.0	yd3					20.0	173.3	3466.7	385.2	9.0	days
	*(assumes haul load = 15 yd3)											
lb/day	3.0		97.3	377.4	19.5	lb/yr						
g/mile	10.0		5.3	66.0	2.1	lb/yr						0.002204623
g/mile	20.0	employees	4.5	9.7	0.6	lb/yr				40.0	per employee	0.002204623
lb/VMT	0.0	trucks	-	-	-	lb/yr						
lb/VMT	10.0	trucks			978.9	lb/yr						
			107.1	453.0	1001.0	lb/yr						2000
			11.9	50.3	111.2	lb/day						
	0.0	yd3					0.0	0.0	0.0	0.0	4.0	days
	*(assumes haul load = 15 yd3)											
lb/day	1.0		14.4	55.9	2.9	lb/yr						
lb/day	1.0		4.8	38.9	2.1	lb/yr						
lb/day	2.0		14.7	51.7	2.7	lb/yr						
g/mile	20.0	employees	1.5	3.9	0.3	lb/yr				40.0	per employee	0.002204623
			35.4	150.4	8.0	lb/yr						2000
			8.9	37.6	2.0	lb/day						
	0.0	yd3					0.0	0.0	0.0	0.0	8.0	days
	*(assumes haul load = 15 yd3)											
lb/day	1.0		28.8	111.8	5.8	lb/yr						
lb/day	2.0		29.4	103.5	5.5	lb/yr						
lb/day	2.0		14.7	112.2	6.1	lb/yr						
lb/day	3.0		49.9	226.2	12.5	lb/yr						
lb/day	1.0		11.5	49.3	2.7	lb/yr						0.002204623
g/mile	20.0	employees	3.0	7.8	0.6	lb/yr				40.0	per employee	0.002204623
			137.4	610.7	33.0	lb/yr						2000
			17.2	76.3	4.1	lb/day						
	7000.0	yd3					20.0	466.7	9333.3	4666.7	15.0	days
	*(assumes haul load = 15 yd3)											
lb/day	2.0		33.3	150.8	8.3	lb/yr						
lb/day	2.0		14.7	112.2	6.1	lb/yr						
lb/day	3.0		162.1	638.9	32.4	lb/yr						
g/mile	2.0		14.4	177.6	5.6	lb/yr						0.002204623
g/mile	20.0	employees	31.7	257.4	14.0	lb/yr				40.0	per employee	0.002204623
lb/VMT	0.0	trucks	-	-	-	lb/yr						
lb/VMT	2.0	trucks			2,635.5	lb/yr						
			256.2	1326.9	2701.9	lb/yr						2000
			17.1	88.5	180.1	lb/day						
			1	6	4	TPY	to occur during 2008 calendar year					
							<b>Worst-case</b>					
			27	118	180	lb/day	*assumes some phases will be conducted concurrently					

Sacramento River East Levee Improvements																											
Assumes 90% of levee work is in Sutter County and 10% in Sacramento County																											
	ROG	NOX	PM10	Unit	Quantity	Unit	ROG	NOX	PM10	Unit	Distance (miles/round-trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor											
[1] Cleaning, Grubbing, Stripping, Grading (concurrent with 2,3)					0.0	yd3					0.0	0.0	4.3		4.3	18.0	days										
Mobile Sources																											
Haul Truck(s)	0.70	8.63	0.27	g/mile	4.0		0.0	0.3	0.0	lb/yr								*assumes haul load = 15 yd3									
Water Truck(s)	3.60	13.98	0.72	lb/day	1.0		64.8	251.6	13.0	lb/yr								0.002204623 lb/gram									
Scrapper(s)	3.64	15.96	0.85	lb/day	4.0		262.2	1149.5	61.2	lb/yr																	
Loader(s)	0.92	7.01	0.38	lb/day	2.0		33.2	252.4	13.7	lb/yr																	
Grader(s)	1.20	9.73	0.53	lb/day	2.0		43.2	350.3	19.0	lb/yr																	
Employee Trips	0.21	0.55	0.04	g/mile	120.0	employees	40.0	104.8	7.6	lb/yr								40.0 per employee 0.002204623 lb/gram									
Fugitive Sources																											
Travel on unpaved roads	-	-	0.90	lb/VMT	0.0	trucks	-	-	-	lb/yr																	
Travel on paved roads	-	-	0.28	lb/VMT	4.0	trucks	-	-	4.9	lb/yr																	
Material Handling											Tons/yd3 (gravel/sand)		Tons/day														
Total							443.4	2108.8	119.4	lb/yr								2000 lb/ton									
Total							24.6	117.2	6.6	lb/day																	
[2] Relocate Canal and Tree Removal (concurrent with 1,3)					0.0	yd3					0.0	0.0	4.3		4.3	24.0	days										
Mobile Sources																											
Excavator(s)	1.84	6.47	0.34	lb/day	2.0		88.3	310.4	16.4	lb/yr																	
Haul Truck(s)	0.70	8.63	0.27	g/mile	4.0		0.0	0.3	0.0	lb/yr								0.002204623 lb/gram									
Loader(s)	0.92	7.01	0.38	lb/day	2.0		44.2	336.5	18.2	lb/yr																	
Employee Trips	0.21	0.55	0.04	g/mile	120.0	employees	53.3	139.7	10.2	lb/yr								40.0 per employee 0.002204623 lb/gram									
Fugitive Sources																											
Travel on unpaved roads	-	-	0.90	lb/VMT	0.0	trucks	-	-	-	lb/yr																	
Travel on paved roads	-	-	0.28	lb/VMT	4.0	trucks	-	-	4.9	lb/yr																	
Material Handling											Tons/yd3 (gravel/sand)		Tons/day														
Total							185.9	787.0	581.9	lb/yr								2000 lb/ton									
Total							7.7	32.8	24.2	lb/day																	
[3] Excavate Stability Berm/Inspection Trench (concurrent with 1,2)				Reusable Concrete Fill	242000.0	yd3					0.1	16133.3	1613.3		67.2	24.0	days										
Mobile Sources																											
Excavator(s)	1.84	6.47	0.34	lb/day	2.0		88.3	310.4	16.4	lb/yr																	
Scrapper(s)	3.64	15.96	0.85	lb/day	2.0		174.8	766.3	40.8	lb/yr																	
Haul Truck(s)	0.70	8.63	0.27	g/mile	4.0		2.5	30.7	1.0	lb/yr								0.002204623 lb/gram									
Employee Trips	0.21	0.55	0.04	g/mile	120.0	employees	53.3	139.7	10.2	lb/yr								40.0 per employee 0.002204623 lb/gram									
Fugitive Sources																											
Travel on unpaved roads	-	-	0.90	lb/VMT	0.0	trucks	-	-	-	lb/yr																	
Travel on paved roads	-	-	0.28	lb/VMT	8.0	trucks	-	-	455.6	lb/yr																	
Material Handling											Tons/yd3 (gravel/sand)		Tons/day														
Aggregate Storage Piles	-	-	0.002	lb/ton			-	-	483.8	lb/yr		1.25	12604.17														
Total							319.0	1247.1	1007.4	lb/yr								2000 lb/ton									
Total							13.3	52.0	42.0	lb/day																	
[4] Borrow Excavation, Haul and Place Adjacent Levee Raise & Seepage Berms (concurrent with 5,6)				Random Fill	1307000.0	yd3					3.0	87133.3	261400.0		2420.4	108.0	days										
Mobile Sources																											
Water Truck(s)	3.60	13.98	0.72	lb/day	2.0		778.1	3018.9	155.6	lb/yr								*assumes haul load = 15 yd3									
Scrapper(s)	3.64	15.96	0.85	lb/day	13.0		5113.5	22414.3	1193.2	lb/yr																	
Loader(s)	0.92	7.01	0.38	lb/day	4.0		398.0	3028.7	163.9	lb/yr																	
Bulldozers	3.63	21.55	1.12	lb/day	2.0		783.6	4654.6	240.9	lb/yr																	
Other Equipment	2.08	9.43	0.52	lb/day	2.0		449.4	2035.8	112.4	lb/yr																	
Grader(s)	1.20	9.73	0.53	lb/day	2.0		258.9	2101.7	114.2	lb/yr																	
Haul Truck(s)	0.70	8.63	0.27	g/mile	28.0		1042.3	12850.1	402.0	lb/yr								0.002204623 lb/gram									
Employee Trips	0.21	0.55	0.04	g/mile	120.0	employees	240.0	628.6	45.7	lb/yr								40.0 per employee 0.002204623 lb/gram									
Fugitive Sources																											
Travel on unpaved roads	-	-	0.90	lb/VMT	30.0	trucks	-	-	202,105.1	lb/yr								*assumes that 1/3 of material hauling along unpaved haul routes									
Travel on paved roads	-	-	0.28	lb/VMT	30.0	trucks	-	-	127,144.3	lb/yr								*assumes that 2/3 of material hauling is along paved haul routes									
Material Handling											Tons/yd3 (gravel/sand)		Tons/day														
Material loading at borrow	-	-	0.04	lb/ton			-	-	76,816.4	lb/yr		1.25	17523.15														
Material unloading at levee	-	-	0.005	lb/ton			-	-	9,935.6	lb/yr		1.25	17523.15														
Bulldozing	-	-	0.41	lb/hr	12.0	hrs/day	-	-	532.28	lb/yr																	
Total							9063.8	50732.7	418961.6	lb/yr								2000 lb/ton									
Total							83.9	469.7	3879.3	lb/day																	
[5] Reconstruct Garden Hwy/Install Surface Drainage (concurrent with 4,6)					0.0	yd3					10.0	0.0	10.0		10.0	27.0	days										
Mobile Sources																											
Backhoe(s)	0.67	4.54	0.38	lb/day	2.0		36.3	245.4	20.5	lb/yr																	
Other Equipment	2.08	9.43	0.52	lb/day	1.0		56.2	254.5	14.0	lb/yr																	
Roller(s)	0.59	4.47	0.24	lb/day	1.0		15.8	120.6	6.5	lb/yr																	
Paver(s)	0.93	7.08	0.38	lb/day	2.0		50.2	382.2	20.7	lb/yr																	
Concrete Truck(s)	3.60	13.98	0.72	lb/day	1.0		97.3	377.4	19.5	lb/yr																	
Haul Truck(s)	0.70	8.63	0.27	g/mile	3.0		0.0	0.6	0.0	lb/yr								0.002204623 lb/gram									
Employee Trips	0.29	0.61	0.04	g/mile	120.0	employees	81.7	173.7	10.9	lb/yr								40.0 per employee 0.002204623 lb/gram									
Fugitive Sources																											
Travel on unpaved roads	-	-	0.90	lb/VMT	0.0	trucks	-	-	-	lb/yr																	
Travel on paved roads	-	-	0.28	lb/VMT	3.0	trucks	-	-	8.5	lb/yr																	
Total							337.6	1554.3	81.1	lb/yr								2000 lb/ton									
Total							12.5	57.6	3.0	lb/day																	
[6] Construct Relief Wells/Berm/Drainage Canal (concurrent with 4,5)					0.0	yd3					0.0	0.0	0.0		0.0	13.0	days										
Mobile Sources																											
Off-Highway Truck(s)	3.60	13.98	0.72	lb/day	4.0		187.3	726.8	37.5	lb/yr								*assumes haul load = 15 yd3									
Excavator(s)	1.84	6.47	0.34	lb/day	1.0		23.9	84.1	4.4	lb/yr																	
Drill Rig(s)	2.87	5.75	0.43	lb/day	2.0		74.7	149.4	11.2	lb/yr																	
Other Equipment	2.08	9.43	0.52	lb/day	1.0		27.0	122.5	6.8	lb/yr																	
Employee Trips	0.21	0.55	0.04	g/mile	120.0	employees	28.9	75.7	5.5	lb/yr								40.0 per employee 0.002204623 lb/gram									
Fugitive Sources																											
Travel on unpaved roads	-	-	0.90	lb/VMT	2.0	trucks	-	-	-	lb/yr																	
Travel on paved roads	-	-	0.28	lb/VMT	0.0	trucks	-	-	-	lb/yr																	
Total							341.9	1158.5	65.4	lb/yr								2000 lb/ton									
Total							26.3	89.1	5.0	lb/day																	
[7] Site Restoration/Demobilization					0.0	yd3					0.1	0.0	0.0		0.0	26.0	days										
Mobile Sources																											
Off-Highway Truck(s)	3.60	13.98	0.72	lb/day	4.0		374.6	1453.6	74.9	lb/yr								*assumes haul load = 15 yd3									
Haul Truck(s)	0.70	8.63	0.27	g/mile	2.0		0.0	0.0	0.0	lb/yr								0.002204623 lb/gram									
Employee Trips	1.20	9.73	0.53	g/mile	120.0	employees	329.8	2677.1	145.5	lb/yr								40.0 per employee 0.002204623 lb/gram									
Fugitive Sources																											
Travel on unpaved roads	-	-	0.90	lb/VMT	0.0	trucks	-	-	-	lb/yr																	
Travel on paved roads	-	-	0.28	lb/VMT	0.0	trucks	-	-	-	lb/yr																	
Total							704.4	4130.7	220.4	lb/yr								2000 lb/ton									
Total							27.1	158.9	8.5	lb/day																	
<b>Total from East Levee Project</b>							<b>5.7</b>	<b>30.9</b>	<b>210.5</b>	<b>TPY</b>	to occur during 2008 calendar year																

NCC South Levee Phase 2 Improvements - Cutoff Wall and Levee Raise																
All work would occur in Sutter County																
	ROG	NOX	PM10	Unit	Quantity	Unit	ROG	NOX	PM10	Unit	Distance (miles/round-trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor
<b>[1] Clearing, Grubbing, Stripping</b>					13500.0	yd3 (export)					10.0	900.0	9000.0	450.0	20.0	days
*(assumes 10 miles to material disposal site)																
*(assumes haul load = 15 yd3)																
Mobile Sources																
Haul Truck(s)	0.70	8.63	0.27	gmile	12.0		166.7	2054.8	64.3							0.002204623
Water Truck(s)	3.60	13.98	0.72	lb/day	1.0		72.0	279.5	14.4							
Scraper(s)	3.64	15.96	0.85	lb/day	3.0		218.5	957.9	51.0							
Loader(s)	0.92	7.01	0.38	lb/day	1.0		18.4	140.2	7.6							
Employee Trips	0.21	0.55	0.04	gmile	50.0	employees	18.5	48.5	3.5					40.0	per employee	0.002204623
Fugitive Sources																
Travel on unpaved roads	-	-	0.90	lb/VMT	0.0	trucks	-	-	-							
Travel on paved roads	-	-	0.28	lb/VMT	12.0	trucks	-	-	-		2,541.4					
Material Handling																
Truck Loading at Levee	-	-	0.04	lb/ton							685.0	1.25	843.75			
Truck Unloading at Off-site Disposal	-	-	0.005	lb/ton							88.6	1.25	843.75			
<b>Total</b>							<b>494.2</b>	<b>3480.9</b>	<b>3455.7</b>							2000
<b>Total</b>							<b>24.7</b>	<b>174.0</b>	<b>172.8</b>							
<b>[2.4] Levee Degrading &amp; Compaction (lags [1] by 14 days)</b>																
Mobile Sources					0.0	yd3					0.0	0.0	0.0	0.0	50.0	days
*(assumes haul load = 15 yd3)																
Bulldozer(s)	3.63	21.55	1.12	lb/day	3.0		544.2	3232.4	167.3							
Water Truck(s)	3.60	13.98	0.72	lb/day	2.0		360.2	1397.6	72.0							
Scraper(s)	3.64	15.96	0.85	lb/day	2.0		364.2	1596.5	85.0							
Roller(s)	0.59	4.47	0.24	lb/day	2.0		58.7	446.7	24.2							
Loader(s)	0.92	7.01	0.38	lb/day	1.0		46.1	350.5	19.0							
Employee Trips	0.21	0.55	0.04	gmile	50.0	employees	46.3	121.3	8.8					40.0	per employee	0.002204623
Fugitive Sources																
Travel on unpaved roads	-	-	0.90	lb/VMT	0.0	trucks	-	-	-							
Travel on paved roads	-	-	0.28	lb/VMT	0.0	trucks	-	-	-							
Material Handling																
Bulldozing	-	-	0.41	lb/hr	10.0	hrs/day					205.35					
<b>Total</b>							<b>1419.7</b>	<b>7145.0</b>	<b>581.6</b>							2000
<b>Total</b>							<b>28.4</b>	<b>142.9</b>	<b>11.6</b>							
<b>[3.5] Cutoff Wall Construction &amp; Borrow Site Excavation (lags [2] by 14 days)</b>																
Mobile Sources					44500.0	yd3 (borrow)					10.0	2966.7	29666.7	370.8	80.0	days
*(assumes RD 1001 borrow site)																
*(assumes haul load = 15 yd3)																
Excavator(s)	1.84	6.47	0.34	lb/day	3.0		441.7	1552.2	82.0							
Water Truck(s)	3.60	13.98	0.72	lb/day	1.0		288.2	1116.1	57.6							
Other Equipment	2.08	9.43	0.52	lb/day	8.0		1331.6	6032.1	332.9							
Loader(s)	0.92	7.01	0.38	lb/day	3.0		221.1	1682.6	91.0							
Haul Truck(s)	0.70	8.63	0.27	gmile	8.0		45.8	564.4	17.7							0.002204623
Pick-up Truck(s)	0.21	0.55	0.04	gmile	3.0		0.1	0.3	0.0							0.002204623
Employee Trips	0.21	0.55	0.04	gmile	50.0	employees	74.1	194.0	14.1					40.0	per employee	0.002204623
Fugitive Sources																
Travel on unpaved roads	-	-	0.90	lb/VMT	0.0	trucks	-	-	-							
Travel on paved roads	-	-	0.28	lb/VMT	8.0	trucks	-	-	-		8,377.1					
Material Handling																
Truck Loading at Borrow	-	-	0.04	lb/ton							2257.8	1.25	695.31			
Truck Unloading at Levee	-	-	0.005	lb/ton							292.0	1.25	695.31			
<b>Total</b>							<b>2402.5</b>	<b>11143.8</b>	<b>11522.4</b>							2000
<b>Total</b>							<b>30.0</b>	<b>139.3</b>	<b>144.0</b>							
<b>[6] Demobilization/Cleanup</b>																
Mobile Sources					0.0	yd3					0.0	0.0	0.0	0.0	14.0	days
*(assumes haul load = 15 yd3)																
Water Truck(s)	3.60	13.98	0.72	lb/day	3.0		151.3	587.0	30.3							
Haul Truck(s)	0.70	8.63	0.27	gmile	2.0		0.2	2.7	0.1							0.002204623
Employee Trips	0.21	0.55	0.04	gmile	50.0	employees	13.0	34.0	2.5					40.0	per employee	0.002204623
Fugitive Sources																
Travel on unpaved roads	-	-	0.90	lb/VMT	2.0	trucks	-	-	-		128.2					
Travel on paved roads	-	-	0.28	lb/VMT	0.0	trucks	-	-	-							
<b>Total</b>							<b>164.5</b>	<b>623.7</b>	<b>161.0</b>							2000
<b>Total</b>							<b>11.7</b>	<b>44.5</b>	<b>11.5</b>							
<b>Levee Raise &amp; Borrow Site Excavation</b>																
Mobile Sources					58000.0	yd3					10.0	38666.7	386666.7	4549.0	85.0	days
*(assumes haul load = 15 yd3)																
Water Truck(s)	3.60	13.98	0.72	lb/day	4.0		1224.7	4752.0	244.9							
Bulldozer(s)	3.63	21.55	1.12	lb/day	2.0		616.8	3663.4	189.6							
Roller(s)	0.59	4.47	0.24	lb/day	4.0		199.6	1518.8	82.2							
Excavator(s)	1.84	6.47	0.34	lb/day	5.0		782.2	2748.8	145.3							
Haul Truck(s)	0.70	8.63	0.27	gmile	30.0		596.7	7356.7	230.2							0.002204623
Employee Trips	0.21	0.61	0.04	gmile	65.0	employees	139.3	296.2	18.5					40.0	per employee	0.002204623
Fugitive Sources																
Travel on unpaved roads	-	-	0.90	lb/VMT	0.0	trucks	-	-	-							
Travel on paved roads	-	-	0.28	lb/VMT	30.0	trucks	-	-	-		109,185.2					
Material Handling																
Truck Loading at Borrow	-	-	0.04	lb/ton							29427.7	1.25	8529.41			
Truck Unloading at Levee	-	-	0.005	lb/ton							3906.3	1.25	8529.41			
<b>Total</b>							<b>3559.3</b>	<b>20335.9</b>	<b>143329.8</b>							2000
<b>Total</b>							<b>41.9</b>	<b>239.2</b>	<b>1686.2</b>							
<b>Finishing Grading</b>																
Mobile Sources					0.0	yd3					0.0	0.0	0.0	0.0	10.0	days
*(assumes haul load = 15 yd3)																
Water Truck(s)	3.60	13.98	0.72	lb/day	2.0		72.0	279.5	14.4							
Grader(s)	1.20	9.73	0.53	lb/day	2.0		24.0	194.6	10.6							
Employee Trips	0.21	0.55	0.04	gmile	55.0	employees	10.2	26.7	1.9					40.0	per employee	0.002204623
Fugitive Sources																
Travel on unpaved roads	-	-	0.90	lb/VMT	2.0	trucks	-	-	-							
Travel on paved roads	-	-	0.28	lb/VMT	0.0	trucks	-	-	-							
<b>Total</b>							<b>106.2</b>	<b>500.8</b>	<b>26.9</b>							2000
<b>Total</b>							<b>10.6</b>	<b>50.1</b>	<b>2.7</b>							
<b>Operating Road Construction</b>																
Mobile Sources					5000.0	yd3					0.1	333.3	333.3	3.3	10.0	days
*(assumes haul load = 15 yd3)																
Compactor(s)	2.08	9.43	0.52	lb/day	2.0		41.6	188.5	10.4							
Grader(s)	0.67	4.54	0.38	lb/day	2.0		6.7	45.4	3.8							
Haul Truck(s)	0.70	8.63	0.27	gmile	5.0		0.1	0.6	0.0							0.002204623
Employee Trips	1.20	9.73	0.53	gmile	55.0	employees	58.1	471.9	25.6					40.0	per employee	0.002204623
Fugitive Sources																
Travel on unpaved roads	-	-	0.90	lb/VMT	2.0	trucks	-	-	-		29.9					
Travel on paved roads	-	-	0.28	lb/VMT	0.0	trucks	-	-	-		9.4					
Material Handling																
Truck Loading of salvage material	-	-	0.04	lb/ton							253.7	1.25	625.00			
Truck Unloading at road installation	-	-	0.005	lb/ton							32.8	1.25	625.00			
<b>Total</b>							<b>106.5</b>	<b>706.5</b>	<b>365.7</b>							2000
<b>Total</b>							<b>10.7</b>	<b>70.7</b>	<b>36.6</b>							

**Unmitigated 2008 Emissions**

Sutter County	Worst-Case lb/day			Tons/year			Sacramento County	Worst-Case lb/day			Tons/year		
	ROG	NOX	PM10	ROG	NOX	PM10		ROG	NOX	PM10	ROG	NOX	PM10
NCC	58	317	184	4	22	80	East Levee	12	62	389	1	3	21
East Levee	110	555	3499	5	28	189	Elkhorn Canal	27	118	180	1	6	4
<b>TOTAL</b>	<b>168.9</b>	<b>871.7</b>	<b>3683.0</b>	<b>9.3</b>	<b>49.7</b>	<b>269.2</b>	<b>TOTAL</b>	<b>39.3</b>	<b>180.0</b>	<b>568.9</b>	<b>1.8</b>	<b>9.2</b>	<b>25.1</b>

**Mitigated 2008 Emissions**

Sutter County	Worst-Case lb/day			Tons/year			Sacramento County	Worst-Case lb/day			Tons/year		
	ROG	NOX	PM10	ROG	NOX	PM10		ROG	NOX	PM10	ROG	NOX	PM10
% Reduction	5%	20%	75%	5%	20%	75%	% Reduction	5%	20%	75%	5%	20%	75%
<b>TOTAL</b>	<b>160.4</b>	<b>697.4</b>	<b>920.7</b>	<b>8.8</b>	<b>39.8</b>	<b>67.3</b>	<b>TOTAL</b>	<b>37.3</b>	<b>144.0</b>	<b>142.2</b>	<b>1.7</b>	<b>7.4</b>	<b>6.3</b>
Threshold	25	25	80	25	25	-		-	85	-	25	25	100
Significant?	Y	Y	Y	N	Y	-		-	Y	Y*	N	N	N

\*PM10 emissions would likely result in or substantially contribute to a violation of the (

Equipment Type	Emission Rates for Year 2008			Unit	Assumptions: Emission factors from the Road Construction Emissions Model, Version 5.2 (SMAQMD 2006) for 2008 which assume equipment operates 8hrs/day
	ROG	NOX	PM10		
Employee Light-Duty Trucks	0.21	0.55	0.04	g/mile	
Haul Trucks	0.70	8.63	0.27	g/mile	
Backhoes	0.67	4.54	0.38	lb/day	
Bore/Drill Rigs	2.87	5.75	0.43	lb/day	
Concrete/Industrial Saws	1.11	7.51	0.63	lb/day	
Cranes	1.44	6.16	0.34	lb/day	
Crawler Tractors	1.08	10.22	0.54	lb/day	
Crushing/Proc. Equipment	1.59	14.91	0.79	lb/day	
Doser	3.63	21.55	1.12	lb/day	
Excavator	1.84	6.47	0.34	lb/day	
Forklifts, Rough Terrain	0.78	4.59	0.35	lb/day	
Grader	1.20	9.73	0.53	lb/day	
Loaders, Rubber Tired	0.92	7.01	0.38	lb/day	
Off-Highway Trucks	3.60	13.98	0.72	lb/day	
Other Construction Equip.	2.08	9.43	0.52	lb/day	
Pavers	0.93	7.08	0.38	lb/day	
Paving Equipment	0.78	7.28	0.39	lb/day	
Rollers	0.59	4.47	0.24	lb/day	
Scraper	3.64	15.96	0.85	lb/day	
Signal Boards	0.65	2.37	0.22	lb/day	
Skid Steer Loaders	0.56	2.91	0.17	lb/day	
Surfacing Equipment	3.74	22.19	1.15	lb/day	
Tractors	0.67	4.54	0.38	lb/day	
Trenchers	0.59	5.69	0.41	lb/day	
Water Trucks	0.65	7.23	0.24	g/mile	
Fugitive Dust			10	lb/acre/day	
<b>Travel on Unpaved Haul Roads (Heavy Duty Trucks):</b>					
$E(\text{lbs/VMT}) = (k)(s/12)^a (W/3)^b$ *AP-42 12/03, 13.2.2.4 eq 1a					
Where:					
$k = \text{Particle Size Multiplier}$ : 1.5 *AP-42 12/03 Table 13.2.2.2; PM10 emissions; industrial roads					
$s = \text{Silt Content}$ : 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					
$W = \text{Vehicle Weight}$ : 11.375 [(2+1.25 T/cy)*15 cy truck capacity] + 2)/2 (average weight of loaded and unloaded haul truck; assumed empty truck weighs 2 tons)					
$E(\text{ext}) = E[(365-P)/365]$ *AP-42 12/03 12.2.2.4 eq 2					
Where:					
$P = \text{# of days/yr with } >= 0.01 \text{ in. precip}$ : 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)					
$E(\text{ext})$ : 0.90 lbs/VMT					
<b>Travel on Paved Haul Roads (Heavy Duty Trucks):</b>					
$E(\text{lbs/VMT}) = (k)(s/2)^a (W/3)^b (1.5 - C)$ *AP-42 12/03, 13.2.1.4 eq 1					
Where:					
$k = \text{Particle Size Multiplier (lb/VMT)}$ : 0.016 *AP-42 12/03 Table 13.2.1.1; PM10 emissions; industrial roads					
$s = \text{road surface silt loading (g/m}^2)$ : 8.2 *AP-42 12/03 Table 13.2.1.4; quarry roads					
$W = \text{Vehicle Weight}$ : 11.375 [(2+1.25 T/cy)*15 cy truck capacity] + 2)/2 (average weight of loaded and unloaded haul truck; assumed empty truck weighs 2 tons)					
$C = \text{exhaust, break, tire wear (lb/VMT)}$ : 0.00047 *AP-42 12/03 Table 13.2.1.2; PM10 emissions					
$E(\text{ext}) = E[(1-(P/4N))]$ *AP-42 12/03 13.2.1 eq 2					
Where:					
$P = \text{# of days/yr with } >= 0.01 \text{ in. precip}$ : 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)					
$N = \text{number of days in averaging period}$ : 365					
$E(\text{ext})$ : 0.28 lbs/VMT					
<b>Fugitive Dust Source Emissions</b>					
<b>(lb/acre/day)</b>					
<b>Disturbance Area</b> : 60.71					
Assumptions: SMAQMD emission factor of 60.71 lbs/acre/day (SMAQMD 1994).					
<b>Aggregate Storage Piles</b>					
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).					
$E(\text{lb/ton}) = (k)(0.0032)(U/5)^{1.3} / (M/2)^{1.4}$ *AP-42 12/03, 13.2.4 eq 1					
Where:					
$k = \text{Particle Size Multiplier}$ : 0.35 *AP-42 12/03 13.2.4-3; PM10 emissions					
$U = \text{mean wind speed (mph)}$ : 8 *NOAA Western Regional Climate Center, Sacramento International Airport ASOS station, CA RAWS data from 1996-2006 ( <a href="http://www.wrcc.dri.edu/htmlfiles/westwind.html">http://www.wrcc.dri.edu/htmlfiles/westwind.html</a> CALIFORNIA)					
$M = \text{moisture content (\%)}$ : 2.4 *AP-42 7/98 Table 11.9-3, haul truck					
$E(\text{ext})$ : 0.002 lbs/ton					
<b>Batch Loading at Borrow Area</b>					
$E(\text{TSP} < 15 \text{ } \mu\text{m}) = (119)(M/0.9)$ *AP-42 7/98, Table 11.9-1					
Where:					
$M = \text{moisture content (\%)}$ : 2.4 *AP-42 7/98 Table 11.9-3, haul truck					
$E(\text{ext})$ : 0.05 lb/ton					
$E(\text{TSP} < 10 \text{ } \mu\text{m}) = E(\text{TSP} < 15 \text{ } \mu\text{m}) \cdot S$ *AP-42 7/98, Table 11.9-1					
$S = \text{scaling factor}$ : 0.75 *AP-42 7/98 Table 11.9-3, haul truck					
$E(\text{ext})$ : 0.04 lb/ton					
<b>Truck Unloading</b>					
$E(\text{TSP} < 15 \text{ } \mu\text{m})$ : 0.007 lb/ton *AP-42 7/98 Table 11.9-4, end dump truck unloading batch drop					
Where:					
$E(\text{TSP} < 10 \text{ } \mu\text{m}) = E(\text{TSP} < 15 \text{ } \mu\text{m}) \cdot S$ *AP-42 7/98, Table 11.9-1					
$S = \text{scaling factor}$ : 0.75 *AP-42 7/98 Table 11.9-1, haul truck					
$E(\text{ext})$ : 0.005 lb/ton					
<b>Bulldozing</b>					
$E(\text{TSP} < 15 \text{ } \mu\text{m}) = (18.6)(s/1.5)(M/1.4)$ *AP-42 7/98, Table 11.9-1					
Where:					
$M = \text{moisture content (\%)}$ : 7.9 *AP-42 7/98 Table 11.9-3, bulldozer					
$s = \text{silt content (\%)}$ : 6.9 *AP-42 7/98 Table 11.9-3, bulldozer					
$E(\text{ext})$ : 18.67 lb/hr					
$E(\text{TSP} < 10 \text{ } \mu\text{m}) = E(\text{TSP} < 15 \text{ } \mu\text{m}) \cdot S$ *AP-42 7/98, Table 11.9-1					
$S = \text{scaling factor}$ : 0.75 *AP-42 7/98 Table 11.9-1, bulldozer					
$E(\text{ext})$ : 14.00 lb/hr					
<b>Scraper Unloading</b>					
$E(\text{TSP} < 15 \text{ } \mu\text{m})$ : 0.04 lb/ton *AP-42 7/98 Table 11.9-4, scraper unloading					
Where:					
$E(\text{TSP} < 10 \text{ } \mu\text{m}) = E(\text{TSP} < 15 \text{ } \mu\text{m}) \cdot S$ *AP-42 7/98, Table 11.9-1					
$S = \text{scaling factor}$ : 0.75 *AP-42 7/98 Table 11.9-1, bulldozer/haul truck					
$E(\text{ext})$ : 0.03 lb/ton					

**TIPS FOR USE:**

1. For both residential and non-residential acreage entries EXCLUDE ONLY undisturbed (not graded) Open Space
2. Append this calculation sheet to the environmental document.
3. Unmitigated NOx (lbs/day) and duration (days) should be consistent with URBEMIS results.

<b>Construction Emissions Mitigation Fee Calculation</b>						
<b>PART 1: PROJECT INFORMATION</b>						
Project Name:	SAFCA - 2008 NLIP Emissions within SMAQMD's Jurisdiction					
Control/Application #:						
Single Family Dwelling Units:		<i>Note: Enter information only in blue bordered cells</i>				
Multi Family Dwelling Units:				Total Residential Acreage:		
Non-residential Square Feet:				Total Non-residential Acreage:		
<b>PART 2: EMISSIONS INFORMATION</b>						
Year	Activity Phase	NOx (lbs/day) unmitigated	NOx (lbs/day) mitigated*	NOx over threshold (lbs/day)	duration (days)	Total significant NOx (lbs)
2008	East Levee/Elkhorn Canal	179.99	143.99	58.99	108	6370.80
	<i>Total project Nox over threshold (lbs)</i>		6370.80			
	<i>Total project Nox over threshold (tons)</i>		3.19			
<b>PART 3: MITIGATION FEE RESULTS</b>						
<b>TOTAL MITIGATION FEE (\$14,300/TON)**</b>		<b>\$45,551</b>				
>>> Fee is to be paid to the SMAQMD prior to any ground disturbance either in total or on a by acre basis.						
Mitigation Fee (\$/acre)				\$45,551.00		
<p style="font-size: small;">* Assumes a construction mitigation plan which achieves a 20% reduction in NOx from on-site, off-road equipment.  ** Or the \$/ton of NOx cost-effectiveness value in effect at the time the fee is collected.</p>						