

Appendix B:

Air Quality Emissions Model & Construction Health Risk Results

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Urbemis\Version9a\Projects\CartanFieldConstruction.urb924

Project Name: CartanFieldConstruction

Project Location: San Mateo County

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>CO</u>	<u>SO2</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>
2014 TOTALS (tons/year unmitigated)	0.09	0.72	0.48	0.00	6.76	0.04	6.79	1.41	0.03	1.44	90.38
2015 TOTALS (tons/year unmitigated)	1.03	1.25	0.95	0.00	9.38	0.07	9.44	1.96	0.06	2.02	180.75

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</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>
2014	0.09	0.72	0.48	0.00	6.76	0.04	6.79	1.41	0.03	1.44	90.38
Mass Grading 08/04/2014-10/03/2014	0.09	0.67	0.44	0.00	6.75	0.03	6.78	1.41	0.03	1.44	83.42
Mass Grading Dust	0.00	0.00	0.00	0.00	6.75	0.00	6.75	1.41	0.00	1.41	0.00
Mass Grading Off Road Diesel	0.09	0.67	0.42	0.00	0.00	0.03	0.03	0.00	0.03	0.03	79.98
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.45
Demolition 10/06/2014-10/24/2014	0.01	0.05	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	6.96
Fugitive Dust	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.01	0.00	0.01	0.00
Demo Off Road Diesel	0.01	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94
Demo Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77
2015	1.03	1.25	0.95	0.00	9.38	0.07	9.44	1.96	0.06	2.02	180.75
Fine Grading 01/05/2015-02/27/2015	0.06	0.48	0.31	0.00	6.00	0.02	6.02	1.25	0.02	1.27	62.70
Fine Grading Dust	0.00	0.00	0.00	0.00	6.00	0.00	6.00	1.25	0.00	1.25	0.00
Fine Grading Off Road Diesel	0.06	0.47	0.29	0.00	0.00	0.02	0.02	0.00	0.02	0.02	60.15
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55
Asphalt 03/02/2015-03/20/2015	0.02	0.11	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	15.28
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.10	0.07	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	10.64
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.92
Paving Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72
Building 03/23/2015-05/22/2015	0.06	0.28	0.30	0.00	0.00	0.02	0.02	0.00	0.02	0.02	0.02	50.78
Building Off Road Diesel	0.05	0.27	0.22	0.00	0.00	0.02	0.02	0.00	0.02	0.02	0.02	36.48
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.83
Building Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.47
Fine Grading 04/27/2015-08/28/2015	0.05	0.38	0.23	0.00	3.38	0.02	3.39	0.70	0.02	0.72	0.72	50.99
Fine Grading Dust	0.00	0.00	0.00	0.00	3.38	0.00	3.38	0.70	0.00	0.70	0.70	0.00
Fine Grading Off Road Diesel	0.05	0.38	0.21	0.00	0.00	0.02	0.02	0.00	0.02	0.02	0.02	47.54
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.45
Coating 08/03/2015-08/21/2015	0.84	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Architectural Coating	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00

Phase Assumptions

Phase: Demolition 10/6/2014 - 10/24/2014 - Building Demolition

Building Volume Total (cubic feet): 9664

Building Volume Daily (cubic feet): 2240

On Road Truck Travel (VMT): 31.11

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 1/5/2015 - 2/27/2015 - Fine Grading and Site Work

Total Acres Disturbed: 15

Maximum Daily Acreage Disturbed: 15

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Fine Grading 4/27/2015 - 8/28/2015 - Site Preparation

Total Acres Disturbed: 15

Maximum Daily Acreage Disturbed: 3.75

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 4 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 4 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 4 hours per day

Phase: Mass Grading 8/4/2014 - 10/3/2014 - Pool Excavation

Total Acres Disturbed: 15

Maximum Daily Acreage Disturbed: 15

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day
1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 3/2/2015 - 3/20/2015 - Paving

Acres to be Paved: 4.89

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day
2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day
1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 3/23/2015 - 5/22/2015 - Building Construction

Off-Road Equipment:

- 1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day
- 2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
- 1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
- 1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
- 3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 8/3/2015 - 8/21/2015 - Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Users\bruce\AppData\Roaming\Urbemis\Version9a\Projects\CartanFieldConstruction.urb924

Project Name: CartanFieldConstruction

Project Location: San Mateo County

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>CO</u>	<u>SO2</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>
2014 TOTALS (lbs/day unmitigated)	3.90	29.92	19.61	0.00	300.01	1.49	301.50	62.65	1.37	64.02	3,707.72
2015 TOTALS (lbs/day unmitigated)	112.50	23.75	18.69	0.01	300.01	1.17	301.16	62.65	1.08	63.72	3,390.11

Calculation:

Average Daily Amounts

	9.76	17.17 #	12.41	0.00	140.29 #	0.89	141.19 #	29.30	0.82	30.12	2,357.66
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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</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>
Time Slice 8/4/2014-10/3/2014 Active Days: 45	<u>3.90</u>	<u>29.92</u>	<u>19.61</u>	0.00	<u>300.01</u>	<u>1.49</u>	<u>301.50</u>	<u>62.65</u>	<u>1.37</u>	<u>64.02</u>	<u>3,707.72</u>
Mass Grading 08/04/2014-10/03/2014	3.90	29.92	19.61	0.00	300.01	1.49	301.50	62.65	1.37	64.02	3,707.72
Mass Grading Dust	0.00	0.00	0.00	0.00	300.00	0.00	300.00	62.65	0.00	62.65	0.00
Mass Grading Off Road Diesel	3.86	29.86	18.45	0.00	0.00	1.48	1.48	0.00	1.37	1.37	3,554.57
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.03	0.06	1.16	0.00	0.01	0.00	0.01	0.00	0.00	0.01	153.16
Time Slice 10/6/2014-10/24/2014 Active Days: 15	0.90	6.51	5.28	<u>0.00</u>	0.95	0.41	1.36	0.20	0.38	0.58	927.66
Demolition 10/06/2014-10/24/2014	0.90	6.51	5.28	0.00	0.95	0.41	1.36	0.20	0.38	0.58	927.66
Fugitive Dust	0.00	0.00	0.00	0.00	0.94	0.00	0.94	0.20	0.00	0.20	0.00
Demo Off Road Diesel	0.84	5.95	4.33	0.00	0.00	0.39	0.39	0.00	0.36	0.36	700.30
Demo On Road Diesel	0.04	0.52	0.18	0.00	0.00	0.02	0.02	0.00	0.02	0.02	125.25
Demo Worker Trips	0.02	0.04	0.77	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.11
Time Slice 1/5/2015-2/27/2015 Active Days: 40	3.11	<u>23.75</u>	15.64	0.00	<u>300.01</u>	1.16	<u>301.16</u>	<u>62.65</u>	1.07	<u>63.72</u>	3,135.14
Fine Grading 01/05/2015-02/27/2015	3.11	23.75	15.64	0.00	300.01	1.16	301.16	62.65	1.07	63.72	3,135.14

Fine Grading Dust	0.00	0.00	0.00	0.00	300.00	0.00	300.00	62.65	0.00	62.65	0.00
Fine Grading Off Road Diesel	3.09	23.71	14.74	0.00	0.00	1.16	1.16	0.00	1.06	1.06	3,007.48
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.05	0.90	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.67
Time Slice 3/2/2015-3/20/2015 Active Days: 15	3.20	15.19	11.94	0.01	0.02	<u>1.17</u>	1.19	0.01	<u>1.08</u>	1.08	2,037.33
Asphalt 03/02/2015-03/20/2015	3.20	15.19	11.94	0.01	0.02	1.17	1.19	0.01	1.08	1.08	2,037.33
Paving Off-Gas	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.20	13.65	9.82	0.00	0.00	1.11	1.11	0.00	1.02	1.02	1,418.44
Paving On Road Diesel	0.11	1.45	0.51	0.00	0.01	0.05	0.06	0.00	0.05	0.05	389.08
Paving Worker Trips	0.05	0.08	1.61	0.00	0.01	0.01	0.02	0.00	0.00	0.01	229.80
Time Slice 3/23/2015-4/24/2015 Active Days: 25	2.53	12.56	13.52	0.01	0.03	0.79	0.82	0.01	0.72	0.73	2,257.03
Building 03/23/2015-05/22/2015	2.53	12.56	13.52	0.01	0.03	0.79	0.82	0.01	0.72	0.73	2,257.03
Building Off Road Diesel	2.40	12.04	9.62	0.00	0.00	0.76	0.76	0.00	0.70	0.70	1,621.20
Building Vendor Trips	0.03	0.34	0.32	0.00	0.00	0.01	0.02	0.00	0.01	0.01	125.99
Building Worker Trips	0.10	0.19	3.58	0.00	0.02	0.01	0.04	0.01	0.01	0.02	509.85
Time Slice 4/27/2015-5/22/2015 Active Days: 20	3.62	21.03	<u>18.69</u>	<u>0.01</u>	75.03	1.16	76.19	15.67	1.06	16.74	<u>3,390.11</u>
Building 03/23/2015-05/22/2015	2.53	12.56	13.52	0.01	0.03	0.79	0.82	0.01	0.72	0.73	2,257.03
Building Off Road Diesel	2.40	12.04	9.62	0.00	0.00	0.76	0.76	0.00	0.70	0.70	1,621.20
Building Vendor Trips	0.03	0.34	0.32	0.00	0.00	0.01	0.02	0.00	0.01	0.01	125.99
Building Worker Trips	0.10	0.19	3.58	0.00	0.02	0.01	0.04	0.01	0.01	0.02	509.85
Fine Grading 04/27/2015-08/28/2015	1.09	8.47	5.17	0.00	75.00	0.37	75.37	15.66	0.34	16.00	1,133.07
Fine Grading Dust	0.00	0.00	0.00	0.00	75.00	0.00	75.00	15.66	0.00	15.66	0.00
Fine Grading Off Road Diesel	1.07	8.44	4.63	0.00	0.00	0.37	0.37	0.00	0.34	0.34	1,056.47
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.54	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.60
Time Slice 5/25/2015-7/31/2015 Active Days: 50	1.09	8.47	5.17	0.00	75.00	0.37	75.37	15.66	0.34	16.00	1,133.07
Fine Grading 04/27/2015-08/28/2015	1.09	8.47	5.17	0.00	75.00	0.37	75.37	15.66	0.34	16.00	1,133.07
Fine Grading Dust	0.00	0.00	0.00	0.00	75.00	0.00	75.00	15.66	0.00	15.66	0.00
Fine Grading Off Road Diesel	1.07	8.44	4.63	0.00	0.00	0.37	0.37	0.00	0.34	0.34	1,056.47
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.54	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.60
Time Slice 8/3/2015-8/21/2015 Active Days: 15	<u>112.50</u>	8.51	6.10	0.00	75.01	0.37	75.38	15.67	0.34	16.01	1,265.84
Coating 08/03/2015-08/21/2015	111.42	0.05	0.93	0.00	0.01	0.00	0.01	0.00	0.00	0.01	132.77

Architectural Coating	111.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.03	0.05	0.93	0.00	0.01	0.00	0.01	0.00	0.00	0.01	132.77
Fine Grading 04/27/2015-08/28/2015	1.09	8.47	5.17	0.00	75.00	0.37	75.37	15.66	0.34	16.00	1,133.07
Fine Grading Dust	0.00	0.00	0.00	0.00	75.00	0.00	75.00	15.66	0.00	15.66	0.00
Fine Grading Off Road Diesel	1.07	8.44	4.63	0.00	0.00	0.37	0.37	0.00	0.34	0.34	1,056.47
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.54	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.60
Time Slice 8/24/2015-8/28/2015 Active Days: 5	1.09	8.47	5.17	0.00	75.00	0.37	75.37	15.66	0.34	16.00	1,133.07
Fine Grading 04/27/2015-08/28/2015	1.09	8.47	5.17	0.00	75.00	0.37	75.37	15.66	0.34	16.00	1,133.07
Fine Grading Dust	0.00	0.00	0.00	0.00	75.00	0.00	75.00	15.66	0.00	15.66	0.00
Fine Grading Off Road Diesel	1.07	8.44	4.63	0.00	0.00	0.37	0.37	0.00	0.34	0.34	1,056.47
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.54	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.60

Phase Assumptions

Phase: Demolition 10/6/2014 - 10/24/2014 - Building Demolition

Building Volume Total (cubic feet): 9664

Building Volume Daily (cubic feet): 2240

On Road Truck Travel (VMT): 31.11

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 1/5/2015 - 2/27/2015 - Fine Grading and Site Work

Total Acres Disturbed: 15

Maximum Daily Acreage Disturbed: 15

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Fine Grading 4/27/2015 - 8/28/2015 - Site Preparation

Total Acres Disturbed: 15

Maximum Daily Acreage Disturbed: 3.75

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 4 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 4 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 4 hours per day

Phase: Mass Grading 8/4/2014 - 10/3/2014 - Pool Excavation

Total Acres Disturbed: 15

Maximum Daily Acreage Disturbed: 15

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 3/2/2015 - 3/20/2015 - Paving

Acres to be Paved: 4.89

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 3/23/2015 - 5/22/2015 - Building Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 8/3/2015 - 8/21/2015 - Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

**Construction-Period Health Risk Assessment
Calculations for Diesel Particulate Matter (DPM) Cancer Risk,
DPM Non-Cancer Hazard and PM 2.5 Exposure**

Atherton Cartan Field Upgrade Project

CANCER RISK:

1. URBEMIS Output

Specifics of construction phases were entered into URBEMIS. Default assumptions regarding construction equipment were used.

Total PM10 exhaust emissions from URBEMIS were divided by the total construction period in years ($0.04 + 0.07 / 1.08$ years = 0.102 average yearly short tons) as the average yearly emissions rate.

2. Screen3

The average yearly emissions rate was converted to micro-grams/second/square meter (using a conversion factor of 1 short ton per year = 0.0287 g/s) then dividing by the project area (654,966 sq ft = 60,848 m²). This emission rate, calculated at 4.8120E-08 g/s/m² was entered into Screen3 with these other parameters:

- Source type: area
- Urban dispersion coefficient
- Source release height: 3 meters
- Simple terrain – flat
- Automated distances
- Full meteorology

This resulted in a maximum 1-hour concentration of 1.846 ug/m³, which would occur at a distance of 177 meters from the site.

3. Scaling to Annual

GLC = (X1-hour) (Scalar)

Where GLC is the annual average ground level concentration.

The maximum 1-hour concentration from the Screen3 output was then multiplied by the BAAQMD recommended hourly to annual Scalar of 0.1 for the following:

GLC = (1.846 ug/m³) (0.1)

Ground Level Concentration = 0.1846 ug/m³

4. Calculate Risk

This GLC was used as the concentration in air (“C air”) for calculation of inhalation dose as follows:

$$\text{Inhalation Dose} = (C \text{ air} * \text{DBR} * A * \text{EF} * \text{ED} * 1 \times 10^{-6}) / \text{AT}$$

DBR = daily breathing rate = 302

A = inhalation absorption rate for DPM = 1

EF = Exposure frequency = 250 days/yr (assuming 5 days a week for 50 weeks for a year)

ED = Exposure duration = 1.08 years (full construction period of 13 months)

AT = Averaging time = 25,550 (for a 70 year cancer risk)

$$\text{Inhalation Dose} = (0.1846) (302) (1) (250) (1.08) (10^{-6}) / 25550$$

$$\text{Inhalation Dose} = 5.8913\text{E-}07$$

And from there calculated the Inhalation Cancer Risk:

Inhalation Cancer Potency factor (for DPM) = 1.1

Inhalation Cancer Risk per million = (Inhalation Dose)*Inhalation Cancer Potency factor*10⁶

$$\text{Inhalation Cancer Risk per million} = (5.8913\text{E-}07) * 1.1 * 10^6$$

Inhalation Cancer Risk per million (adult) = 0.648 - compared to Threshold of 10.000

Because an infant could be exposed during the construction period, an age sensitivity factor of 10 is used.

Inhalation Cancer Risk * ASF = risk adjusted for age sensitivity

$$0.648 * 10 = 6.48$$

Inhalation Cancer Risk per million (infant) = 6.48 compared to Threshold of 10.00

FOR CHRONIC NON-HAZARD:

Hazard Quotient = C air/REL

REL = DPM inhalation non-cancer chronic (long-term) reference exposure level = 5 ug/m³

$$\text{Hazard Quotient} = 0.1846 / 5.0$$

Hazard Quotient = 0.037 compared to Threshold of 1.000

FOR PM2.5

Total PM2.5 exhaust emissions from URBEMIS were divided by the total construction period in years ($0.03 + 0.06 / 1.08$ years = 0.083 average yearly short tons) as the average yearly emissions rate.

The average yearly emissions rate was converted to micro-grams/second/square meter (using a conversion factor of 1 short ton per year = 0.0287 g/s) then dividing by the project area as above. This emission rate, calculated at $3.937E-08$ g/s/m² was entered into Screen3 with the same parameters as for PM10 above and scaled to an annual average.

Annual Average PM2.5 concentration of 0.151 ug/m³ compared to the threshold of 0.300 ug/m³

03/29/13

11:57:08

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

C:\Users\bruce\Documents\Lakes\Screen View\CartanFieldPM10.scr

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = AREA
EMISSION RATE (G/(S-M**2)) = 0.481200E-07
SOURCE HEIGHT (M) = 3.0000
LENGTH OF LARGER SIDE (M) = 270.0000
LENGTH OF SMALLER SIDE (M) = 229.0000
RECEPTOR HEIGHT (M) = 3.0000
URBAN/RURAL OPTION = URBAN

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS
ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = 0.000 M**4/S**3; MOM. FLUX = 0.000 M**4/S**
2.

*** FULL METEOROLOGY ***

*** SCREEN AUTOMATED DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR
FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
1.	1.470	5	1.0	1.0	10000.0	3.00	39.
100.	1.708	5	1.0	1.0	10000.0	3.00	38.
200.	1.100	5	1.0	1.0	10000.0	3.00	40.
300.	0.6465	5	1.0	1.0	10000.0	3.00	39.
400.	0.4622	5	1.0	1.0	10000.0	3.00	37.
500.	0.3596	5	1.0	1.0	10000.0	3.00	35.
600.	0.2929	5	1.0	1.0	10000.0	3.00	33.
700.	0.2456	5	1.0	1.0	10000.0	3.00	30.
800.	0.2102	5	1.0	1.0	10000.0	3.00	26.
900.	0.1827	5	1.0	1.0	10000.0	3.00	21.
1000.	0.1608	5	1.0	1.0	10000.0	3.00	16.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

177. 1.846 5 1.0 1.0 10000.0 3.00 40.

*** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
----- SIMPLE TERRAIN	----- 1.846	----- 177.	----- 0.

** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

03/29/13

11:59:56

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

C:\Users\bruce\Documents\Lakes\Screen View\CartanPM25.scr

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = AREA
EMISSION RATE (G/(S-M**2)) = 0.393710E-07
SOURCE HEIGHT (M) = 3.0000
LENGTH OF LARGER SIDE (M) = 270.0000
LENGTH OF SMALLER SIDE (M) = 229.0000
RECEPTOR HEIGHT (M) = 3.0000
URBAN/RURAL OPTION = URBAN

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS
ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = 0.000 M**4/S**3; MOM. FLUX = 0.000 M**4/S**
2.

*** FULL METEOROLOGY ***

*** SCREEN AUTOMATED DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR
FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
1.	1.203	5	1.0	1.0	10000.0	3.00	39.
100.	1.397	5	1.0	1.0	10000.0	3.00	38.
200.	0.9001	5	1.0	1.0	10000.0	3.00	40.
300.	0.5290	5	1.0	1.0	10000.0	3.00	39.
400.	0.3781	5	1.0	1.0	10000.0	3.00	37.
500.	0.2942	5	1.0	1.0	10000.0	3.00	35.
600.	0.2397	5	1.0	1.0	10000.0	3.00	33.
700.	0.2009	5	1.0	1.0	10000.0	3.00	30.
800.	0.1720	5	1.0	1.0	10000.0	3.00	26.
900.	0.1495	5	1.0	1.0	10000.0	3.00	21.
1000.	0.1316	5	1.0	1.0	10000.0	3.00	16.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

177. 1.510 5 1.0 1.0 10000.0 3.00 40.

*** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
----- SIMPLE TERRAIN	----- 1.510	----- 177.	----- 0.

** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
