Appendix E.1
Construction Emissions

ESA

Valero Crude By Rail Project
Construction Emissions

Summary of Construction-Related Emissions

Sources	Average Daily Emissions (lb/day)						
	ROG	CO	NOx	SOx	PM10	PM2.5	CO2e
Equipment Exhaust	6.96	26.60	49.67	0.06	2.56	2.35	5977
Onsite Vehicle Exhaust	0.18	1.63	0.79	0.00	3.57	0.38	297
Offsite Vehicle Exhaust	0.91	8.47	1.43	0.01	0.53	0.17	1307
Fugitive Emissions	0.11	---	---	---	2.63	1.38	---
Total Emissions	**8.17**	**36.7**	**51.9**	**0.08**	**9.28**	**4.29**	**7581**
CEQA Threshold	**54**	**---**	**54**	**---**	**82**	**54**	**---**
Threshold Exceeded (Y/N)	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Sources	Average Annual Emissions (tpy)						
	ROG	CO	NOx	SOx	PM10	PM2.5	CO2e
Equipment Exhaust	0.61	2.33	4.35	0.01	0.22	0.21	523
Onsite Vehicle Exhaust	0.02	0.14	0.07	0.00	0.31	0.03	26
Offsite Vehicle Exhaust	0.08	0.74	0.13	0.00	0.05	0.02	114
Fugitive Emissions	0.01	---	---	---	0.23	0.12	---
Total Emissions	**0.71**	**3.21**	**4.54**	**0.01**	**0.81**	**0.38**	**663**

Civil Work Fugitive PM Emission Factors

Soil handling

Emission Factor [lb/cu. yd] = k x 0.0032 x (mean wind speed [mi/hr] / 5)$^{1.3}$ / (moisture [%] / 2)$^{1.4}$ x (number drops per ton) x (density [ton/cu. yd])
Reference: AP-42, Equation (1), Section 13.2.4, November 2006

Table 1a Soil Handling Reference Data		
Parameter	**Value**	**Basis**
Particle Size Multiplier for PM10 (k)	0.35	AP-42 Chapter 13.2.4
Particle Size Multiplier for PM2.5 (k)	0.053	AP-42 Chapter 13.2.4
Mean Wind Speed (mph)	5	Default, CalEEMod User Manual Appendix D, Table 1.1
Moisture (%)	12	Default, CalEEMod User Manual Appendix A
Number Drops	4	Assumed
Soil Density (ton/cu. yd)	1.264	Default, CalEEMod User Manual Appendix A

Table 1b Soil Handling Emission Factors		
PM10 Emission Factor (Uncontrolled)	4.61E-04	lb/cu. yd
PM2.5 Emission Factor (Uncontrolled)	6.98E-05	lb/cu. yd
Mitigation Efficiency	0%	
Controlled PM10 Emission Factor	4.61E-04	lb/cu. yd
Controlled PM2.5 Emission Factor	6.98E-05	lb/cu. yd

Bulldozing

Emission Factor [lb/hr] = k x C x (silt content [%])^{A} / (moisture)^{B}
Reference: AP-42, Table 11.9-1, October 1998

Table 4-E Bulldozing Reference Data			
Parameter	**PM10**	**PM2.5**	**Basis**
Scaling Factor (k)	0.75	0.105	AP-42, Section 11.9, Table 11.9-1, July 1998
Coefficient (C)	1	5.7	AP-42, Section 11.9, Table 11.9-1, July 1998
Exponent A	1.5	1.2	AP-42, Section 11.9, Table 11.9-1, July 1998
Exponent B	1.4	1.3	AP-42, Section 11.9, Table 11.9-1, July 1998
Silt Content (%)	6.9	6.9	AP-42, Section 11.9, Table 11.9-3, July 1998 for overburden
Moisture (%)	7.9	7.9	AP-42, Section 11.9, Table 11.9-3, July 1998, for overburden

Table 4-F Bulldozing Emission Factors			
	PM10	**PM2.5**	**Units**
Uncontrolled Emission Factor	0.753	0.414	lb/hr
Mitigation Efficiency	0%	0%	%
Controlled Emission Factor	0.753	0.414	lb/hr

Grading

Emission Factor [lb/VMT] = k x A x (mean vehicle speed [mi/hr])^{B}
Reference: AP-42, Section 11.9, Table 11.9-1, July 1998

Table 4-E Grading Reference Data			
Parameter	**PM10**	**PM2.5**	**Basis**
Scaling Factor (k)	0.6	0.031	AP-42, Section 11.9, Table 11.9-1, July 1998
Particle Size Multiplier (A)	0.051	0.04	AP-42, Section 11.9, Table 11.9-1, July 1998
Exponent B	2	2.5	AP-42, Section 11.9, Table 11.9-1, July 1998
Mean vehicle Speed (mph)	7.1	7.1	AP-42, Section 11.9, Table 11.9-3, July 1998
Blade Width (ft)	12	12	Default, CalEEMod User Manual Appendix A

Table 4-F Grading Emission Factors			
Emission Factor	**PM10**	**PM2.5**	**Unit**
Uncontrolled Emission Factor	1.061	0.115	lb/acre
Mitigation Efficiency	0%	0%	
ControlledEmission Factor	1.061	0.115	lb/acre

Notes:

The above equations are used in CalEEMod model to estimate fugitive emissions from demolition of structures.

Fugitive VOC Emission Factors

Architectural Coating VOC Emission Factor			
Parameter	**Value**	**Unit**	**Basis**
Paint VOC Content	250	g/l	BAAQMD Architectural Coating Regulation Requirement
Coating Coverage	180	sq.ft/gal	Default, CalEEMod User Manual Appendix A
Fugitive VOC Emission Factor	0.012	lb/sq.ft	Default, CalEEMod User Manual Appendix A

Asphalt Paving VOC Emissions Factor			
Parameter	**Value**	**Unit**	**Basis**
Fugitive VOC Emission Factor	2.620	lb/acre	Basis: Default, CalEEMod User Manual Appendix A

Equipment and Vehicle Emission Factors (2013)

Equipment	Engine Rating (HP)	OFFROAD Category	Emission Factors (lb/hr)[1]							Fuel Consumption
			ROG	CO	NOx	SOx	PM10	PM2.5[2]	CO2e	gal/hr
Track Hoes (225)	300	Crawler Tractors	0.17018	0.63617	1.49875	0.00170	0.05813	0.05348	173.85033	11.77614
Bulldozer (D-5)	90	Crawler Tractors	0.08657	0.32517	0.51455	0.00052	0.04534	0.04171	44.21753	3.01908
Front End loader (644)	200	Rubber Tired Loaders	0.08425	0.24664	0.81170	0.00112	0.02791	0.02568	99.88438	6.75126
Air Compressor (185)	50	Air Compressors	0.06041	0.16870	0.14804	0.00019	0.01452	0.01336	15.02281	1.03664
Wheel Compactor (small)	60	Other Construction Equipment	0.06734	0.35324	0.47029	0.00063	0.03797	0.03493	54.25431	3.69356
50 Ton Hydraulic Crane	173	Cranes	0.06905	0.32272	0.52007	0.00061	0.02980	0.02742	53.91338	3.66769
25 Ton Hydraulic Crane	130	Cranes	0.06905	0.32272	0.52007	0.00061	0.02980	0.02742	53.91338	3.66769
120 Ton Crawler Crane	600	Cranes	0.17567	0.59574	1.64500	0.00204	0.05921	0.05447	203.19050	13.74438
Welding Machine (300)	30	Welders	0.06424	0.18246	0.16897	0.00022	0.01581	0.01455	17.49801	1.20501
Man Lift (40')	30	Aerial Lifts	0.03874	0.11649	0.12262	0.00017	0.01025	0.00943	13.20215	0.90544
Concrete Pumper (trailer mt.)	30	Pumps	0.06900	0.20670	0.21528	0.00030	0.01815	0.01670	23.11445	1.58573
Forklift - Telehandler TL1255	130	Forklifts	0.03794	0.22116	0.28300	0.00042	0.01628	0.01498	37.59458	2.55555
Bobcat - S770	50	Skid Steer Loaders	0.03461	0.15146	0.15254	0.00022	0.01051	0.00967	17.14806	1.17367
Excavator - 345BL/C	300	Excavators	0.11613	0.35283	0.98828	0.00154	0.03455	0.03179	156.68225	10.58421
Loader - 950G/H	200	Rubber Tired Loaders	0.08425	0.24664	0.81170	0.00112	0.02791	0.02568	99.88438	6.75126
Light Plant - 4,000 Watt Diesel	20	Light	0.06652	0.20859	0.23229	0.00033	0.01833	0.01686	25.30906	1.73303
Scraper - 613C	300	Scrapers	0.21329	0.81078	1.89360	0.00211	0.07357	0.06769	215.56795	14.60463
Off Road Truck - 730 CAT	300	Off-Highway Trucks	0.14523	0.42585	1.19594	0.00179	0.04241	0.03902	182.57509	12.33639
Dozer - D6N LGP	120	Crawler Tractors	0.08657	0.32517	0.51455	0.00052	0.04534	0.04171	44.21753	3.01908
Dozer - D5HXL W/RIPPERS	110	Crawler Tractors	0.08657	0.32517	0.51455	0.00052	0.04534	0.04171	44.21753	3.01908
Blade - 140H/M with GPS	170	Graders	0.09821	0.49170	0.74935	0.00093	0.04227	0.03889	83.13893	5.65398
Loader - John Deere 210 - 4/1 Bucket	90	Rubber Tired Loaders	0.06498	0.27793	0.40270	0.00046	0.03515	0.03234	39.55974	2.69776
Roller - (Dirt) 84" SD	90	Rollers	0.06601	0.27198	0.41860	0.00046	0.03572	0.03286	39.61205	2.70081
Paver - CAT AP800	150	Pavers	0.11898	0.52104	0.92177	0.00097	0.05148	0.04736	86.09952	5.85923
Excavator - 320CL	250	Excavators	0.08317	0.23706	0.76051	0.00120	0.02492	0.02293	106.37955	7.18656
Excavator - Compaction Wheel	0	Excavators	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Compactor - 32" Walk Behind	15	Other Construction Equipment	0.00788	0.04131	0.04932	0.00011	0.00191	0.00176	6.78076	0.46124
Paver - Lee boy Paver	60	Pavers	0.09286	0.33851	0.55942	0.00054	0.04880	0.04490	46.49592	3.17456
Roller - (AC) 42"/47"	60	Rollers	0.06601	0.27198	0.41860	0.00046	0.03572	0.03286	39.61205	2.70081
Loader - 966G/H	200	Rubber Tired Loaders	0.08425	0.24664	0.81170	0.00112	0.02791	0.02568	99.88438	6.75126
Track - Hydraulic Tie Jig	0	Other Construction Equipment	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Track - Low Railer	120	Other Construction Equipment	0.06734	0.35324	0.47029	0.00063	0.03797	0.03493	54.25431	3.69356
Track - Production Tamper	200	Other Construction Equipment	0.09720	0.35038	1.01664	0.00167	0.03288	0.03025	170.37094	11.50093
Track - Regulator	150	Other Construction Equipment	0.06261	0.39312	0.53628	0.00080	0.02811	0.02586	71.42018	4.85059
Loader - Backhoe - 420D	90	Tractors/Loaders/Backhoes	0.04648	0.23621	0.30559	0.00041	0.02564	0.02359	34.71473	2.36493

Vehicles	Fuel	EMFAC Category[3]	Emission Factors (lb/mi)[4]							Fuel Consumption
			ROG	CO	NOx	SOx	PM10	PM2.5	CO2e[5]	gal/mi
Onsite 1/2 Ton Pick-up Truck	GAS	LDT2	0.00062	0.00652	0.00079	0.00001	0.01614	0.00165	1.03463	0.05676
Onsite Dump Truck (Tandum)	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.01689	0.00227	3.97538	0.18054
Onsite Shuttle Truck	GAS	LDT1	0.00126	0.01162	0.00105	0.00001	0.01614	0.00165	0.87092	0.04853
Onsite Concrete Trucks (8 yd)	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.01689	0.00227	3.97538	0.18054
Onsite Truck - Foreman/Superintendent/PM	GAS	LDT2	0.00062	0.00652	0.00079	0.00001	0.01614	0.00165	1.03463	0.05676
Onsite Truck - Crew w/Small Tools	GAS	LDT2	0.00062	0.00652	0.00079	0.00001	0.01614	0.00165	1.03463	0.05676
Onsite Truck - Water	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.01689	0.00227	3.97538	0.18054
Onsite Asphalt Delivery	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.01689	0.00227	3.97538	0.18054
Offsite Concrete Trucks (8 yd)	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.00106	0.00072	3.97538	0.18054
Offsite 18 Wheeler (Deliveries)	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.00106	0.00072	3.97538	0.18054
Offsite Asphalt Delivery	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.00106	0.00072	3.97538	0.18054
Offsite Construction Worker Commute Vehicles	GAS	LDA	0.00054	0.00516	0.00045	0.00001	0.00031	0.00009	0.73759	0.04180

1. Load Factor Correction of 0.67 applied to emissions estimated using OFFROAD2007 emission factors - http://www.arb.ca.gov/regact/2010/offroadlsi10/offroadappd.pdf

OFFROAD2007 Load Factor Correction	0.67

2. PM2.5 Fraction of PM10

	Value	Source
Gasoline Exhaust	0.756	from Appendix A, Final–Methodology to Calculate Particulate Matter (PM) 2.5
Diesel Exhaust	0.920	and PM 2.5 Significance Thresholds, SCAQMD, October 2006

3. Vehicle emission factors were compiled by running the California Air Resources Board's EMFAC2011 Emissions Model with EMFAC2007 vehicle categories and dividing calculated daily emissions by daily vehicle-miles-traveled.

4. All vehicle emission factors account for the emissions from start, running and idling exhaust. In addition, the VOC emission factors take into account diurnal, hot soak, running and resting emissions, and PM10 and

5. N_2O and CH_4 factors from 2013 Climate Registry Default Emission Factors, Released: January 2, 2013. http://www.theclimateregistry.org/downloads/2013/01/2013-Climate-Registry-Default-Emissions-Factors.pdf

Parameters	Onsite Unpaved Road Dust Emission Factor	
	PM10	PM2.5
Particle Size Multiplier (k) - lb/VMT	1.5	0.15
Silt Content (%)	0.03	0.03
Mean Vehicle Weight (W) - tons	20	20
Emission Factor	1.60E-02	1.60E-03

AP-42, Section 13.2.2, November 2006

Parameters	Offsite Paved Road Dust Emission Factor	
	PM10	PM2.5
Particle Size Multiplier (k) - lb/VMT	0.0022	0.00054
Silt Loading (sL) - g/m^2	0.03	0.03
Average Fleet Weight (W) - tons	2.2	2.2
Emission Factor	2.02E-04	4.96E-05

AP-42, Section 13.2.1, January 2011

Fugitive Emissions Activity Rate Estimate

Activity	Value	Unit	Reference
Soil handled	23132	cu. yd Cut	per Sue G's email - 3/27/2013
	711	cu. yd Fill	per Sue G's email - 3/27/2013
Soil hauled	23843	cu. yd	
Truck Capacity	20	cu. yd	URBEMIS/CalEEMOD Default
Asphalt paving	3.9	Acres	per Sue G's email - 3/27/2013
Grading (Acres)	3.9	Acres	per Sue G's email - 3/27/2013
Architectural Coating	800.0	sq. ft	

Disturbed Area Estimate	Value	Unit	Reference
Approximate Distance from Loading rack to Facility Boundary	0.96	miles	Google Earth
	5069	feet	
Approximate Width of Distrubed Area	111	feet	from CBR project drawings
Approximate Area Disturbed/Graded	13	Acres	

Fugitive Emissions

Fugitive Activity Rate		
Source	**Activity Rate Unit**	**Total for Project**
Soil Handling	cu. yd	23,843
Bulldozing/Scraping	hr	578
Grading	Acres	13
Architectural Coating	sq. ft	800
Asphalt Paving	Acres	3.9

Fugitive PM10 Emissions				
Source	**Emisison Factor (lb/Unit)**	**Total Emissions (lb)**	**Average Annual Emissions (tpy)**	**Average Daily Emissions (lb/day)**
Soil Handling	4.61E-04	11	0.005	0.06
Bulldozing	7.53E-01	435	0.218	2.49
Grading	1.06E+00	14	0.007	0.08
Total		**460**	**0.23**	**2.63**

Fugitive PM2.5 Emissions				
Source	**Emisison Factor (lb/Unit)**	**Total Emissions (lb)**	**Average Annual Emissions (tpy)**	**Average Daily Emissions (lb/day)**
Soil Handling	6.98E-05	2	0.001	0.01
Bulldozing	4.14E-01	239	0.120	1.37
Grading	1.15E-01	1	0.001	0.01
Total		**242**	**0.12**	**1.38**

Fugitive VOC Emissions				
Source	**Emisison Factor (lb/Unit)**	**Total Emissions (lb)**	**Average Annual Emissions (tpy)**	**Average Daily Emissions (lb/day)**
Architectural Coating	1.16E-02	9	0.005	0.05
Asphalt Paving	2.62E+00	10	0.005	0.06
Total		**19**	**0.01**	**0.11**

Equipment and Vehicle Activity Rate Data

Construction Duration	25	weeks	June 13 - Dec 31
Number of working days	7	workdays per week	
Number of hours/shirt	10	hours/shift	
Number of shifts/day	2	shifts/day	

Offroad Equipment	Engine Rating (HP)	OFFROAD Category	Fuel	Total Equipment-Hours over Project Duration
			GAS/DSL	
Track Hoes (225)	300	Crawler Tractors	DSL	700
Bulldozer (D-5)	90	Crawler Tractors	DSL	100
Front End loader (644)	200	Rubber Tired Loaders	DSL	800
Air Compressor (185)	50	Air Compressors	DSL	400
Wheel Compactor (small)	60	Other Construction Equipment	DSL	200
50 Ton Hydraulic Crane	173	Cranes	DSL	1000
25 Ton Hydraulic Crane	130	Cranes	DSL	2200
120 Ton Crawler Crane	600	Cranes	DSL	700
Welding Machine (300)	30	Welders	DSL	1100
Man Lift (40')	30	Aerial Lifts	DSL	1000
Concrete Pumper (trailer mt.)	30	Pumps	DSL	50
Forklift - Telehandler TL1255	130	Forklifts	DSL	1608
Bobcat - S770	50	Skid Steer Loaders	DSL	834
Excavator - 345BL/C	300	Excavators	DSL	528
Loader - 950G/H	200	Rubber Tired Loaders	DSL	580
Light Plant - 4,000 Watt Diesel	20	Light	DSL	1400
Scraper - 613C	300	Scrapers	DSL	186
Off Road Truck - 730 CAT	300	Off-Highway Trucks	DSL	386
Dozer - D6N LGP	120	Crawler Tractors	DSL	212
Dozer - D5HXL W/RIPPERS	110	Crawler Tractors	DSL	80
Blade - 140H/M with GPS	170	Graders	DSL	368
Loader - John Deere 210 - 4/1 Bucket	90	Rubber Tired Loaders	DSL	528
Roller - (Dirt) 84" SD	90	Rollers	DSL	488
Paver - CAT AP800	150	Pavers	DSL	200
Excavator - 320CL	250	Excavators	DSL	110
Compactor - 32" Walk Behind	15	Other Construction Equipment	DSL	80
Paver - Lee boy Paver	60	Pavers	DSL	40
Roller - (AC) 42"/47"	60	Rollers	DSL	136
Loader - 966G/H	200	Rubber Tired Loaders	DSL	210
Track - Low Railer	120	Other Construction Equipment	DSL	302
Track - Production Tamper	200	Other Construction Equipment	DSL	302
Track - Regulator	150	Other Construction Equipment	DSL	302
Loader - Backhoe - 420D	90	Tractors/Loaders/Backhoes	DSL	370

Onroad Vehicles	EMFAC (on road vehicle) Category	Fuel: GAS / DSL	Total Equipment-Hours over Project Duration	Estimated speed (MPH)
1/2 Ton Pick-up Truck	LDT2	GAS		5
Dump Truck (Tandum)	T7	DSL	Based on Quantity of Dirt Hauled and Truck Capacity	
Shuttle Truck	LHD1	DSL	1600	5
Concrete Trucks (8 yd)	T7	DSL	Based on Quantity of Concrete Hauled and Truck Capacity	
Truck - Foreman/Superintendent/PM	LDT2	GAS	1824	5
Truck - Crew w/Small Tools	LDT2	GAS	2650	5
Truck - Water	T7	DSL	320	5
Asphalt Delivery	T7	DSL	Based on Quantity of Asphalt Hauled and Truck Capacity	
18 Wheeler (Deliveries)	T7	DSL	180	5
Construction Worker Commute Vehicles	LDA	GAS	Based on man-hours for project	

Concrete Requirement

Manholes, compr. relocation, sub/transformer fndn, fire monitor, custody transfer containment foundation, pipe supports	376	cu. Yd
Tank containment wall footings	420	cu. Yd
Pump pit, etc.	250	cu. Yd
Total Concrete Requirement	1046	cu. Yd
Concrete Truck Capacity	8	cu. Yd
Concrete Supplier - Syar Industries at 885 Lake Herman Rd, Vallejo, CA 94591		
One-way Offsite Concrete Truck Trip Length	4.1	miles

Total Asphalt Requirement	4375	tons
Asphalt Truck Capacity	25	ton/truck
Asphalt Supplier - County Quarry		
One-way Offsite Asphalt Truck Trip Length	8	miles

Construction Worker Trips		
OSBL Manhours	37500	man-hours/project
ISBL Manhours	76300	man-hours/project @ 16 wks, 10 hrs/day, 7 day/wk
Work hours/day	10	
Total Project Worker Trips	11380	

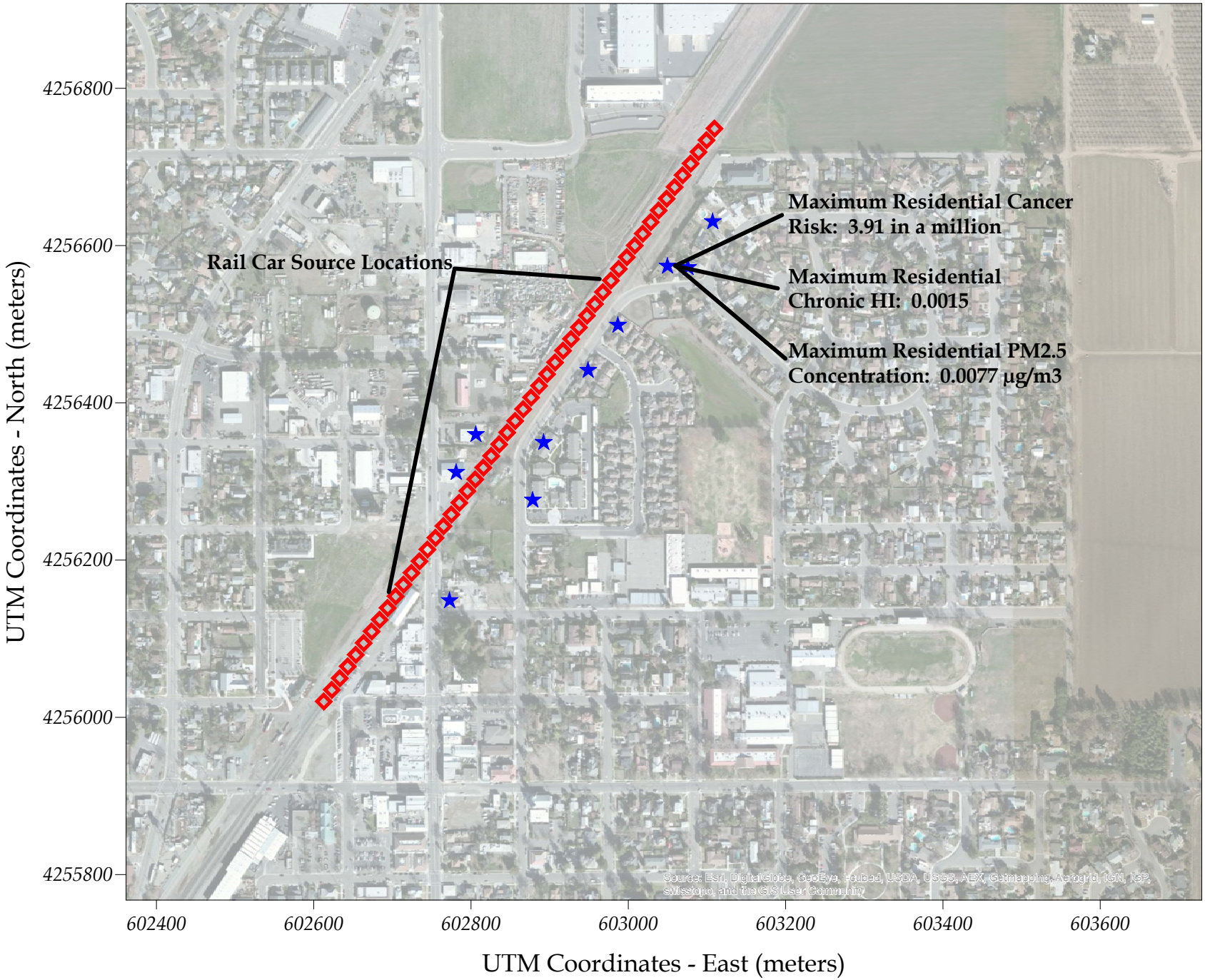
URBEMIS Material Delivery Truck Default Trip Length (	7.3	miles/one-way
Worker Commute Trip Distance (H-W)	12.4	miles/one-way
Onsite Truck Trip Length	2	miles (Assumed)

Equipment and Vehicle Exhaust Emissions

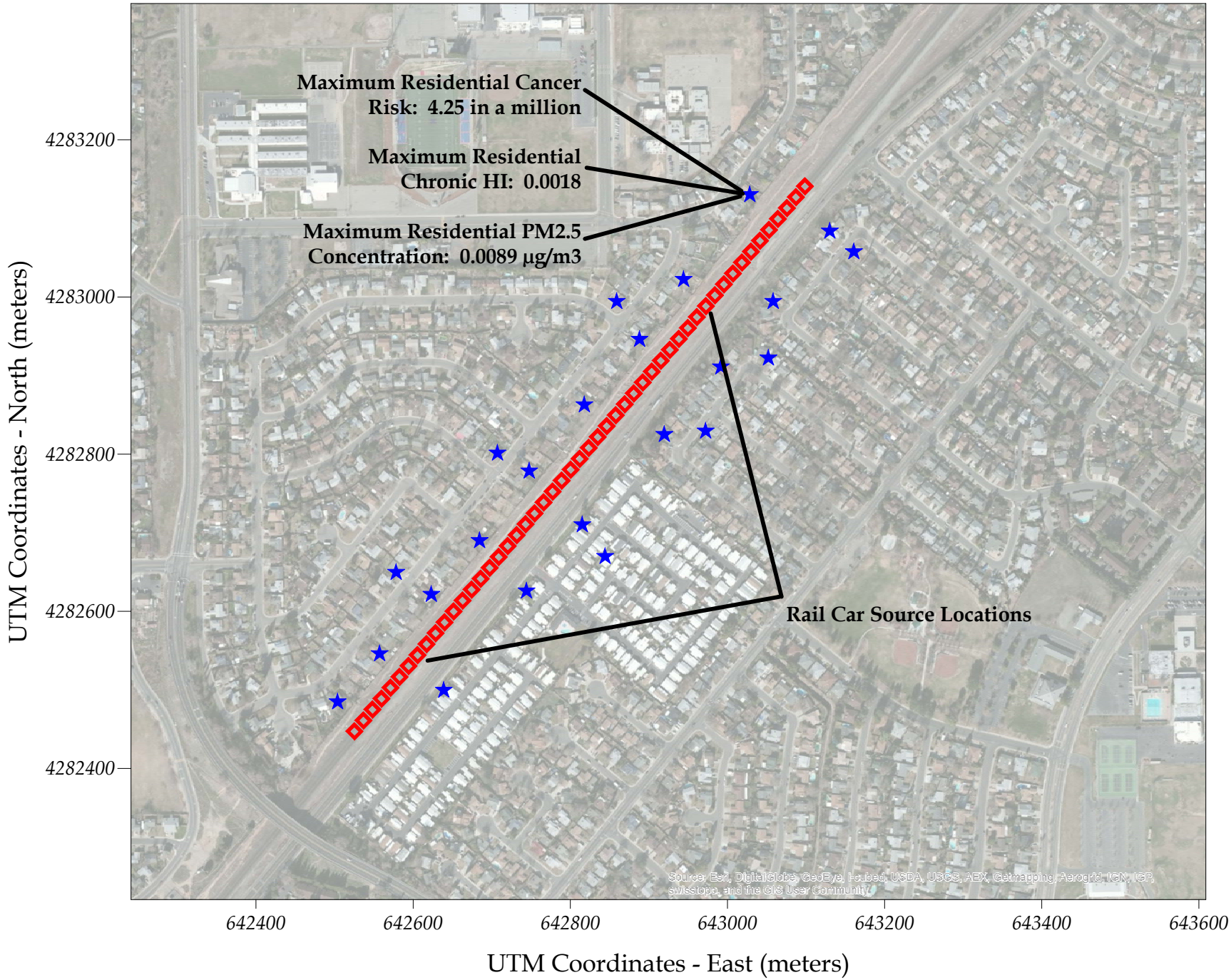
Construction Duration	25	weeks
Number of working days	7	workdays per week
Number of hours/shirt	10	hours/shift
Number of shifts/day	2	shifts/day

Offroad Equipment	Total Equipment-Hours over Project Duration	Total Emissions over The Project Duration (lb/Project)							Fuel Consumption (gal/Project)	
		ROG	CO	NOx	SOx	PM10	PM2.5	CO2e	Diesel	Gasoline
Track Hoes (225)	700	119.12	445.32	1049.12	1.19	40.69	37.44	121695	8243	0
Bulldozer (D-5)	100	8.66	32.52	51.45	0.05	4.53	4.17	4422	302	0
Front End loader (644)	800	67.40	197.31	649.36	0.90	22.33	20.54	79908	5401	0
Air Compressor (185)	400	24.16	67.48	59.22	0.08	5.81	5.35	6009	415	0
Wheel Compactor (small)	200	13.47	70.65	94.06	0.13	7.59	6.99	10851	739	0
50 Ton Hydraulic Crane	1000	69.05	322.72	520.07	0.61	29.80	27.42	53913	3668	0
25 Ton Hydraulic Crane	1100	75.95	354.99	572.07	0.67	32.78	30.16	59305	4034	0
120 Ton Crawler Crane	350	61.48	208.51	575.75	0.71	20.72	19.07	71117	4811	0
Welding Machine (300)	1100	70.66	200.70	185.87	0.25	17.39	16.00	19248	1326	0
Man Lift (40')	1000	38.74	116.49	122.62	0.17	10.25	9.43	13202	905	0
Concrete Pumper (trailer mt.)	50	3.45	10.34	10.76	0.01	0.91	0.83	1156	79	0
Forklift - Telehandler TL1255	1608	61.00	355.62	455.06	0.68	26.18	24.08	60452	4109	0
Bobcat - S770	834	28.86	126.32	127.22	0.18	8.76	8.06	14301	979	0
Excavator - 345BL/C	528	61.32	186.30	521.81	0.81	18.24	16.78	82728	5588	0
Loader - 950G/H	580	48.86	143.05	470.79	0.65	16.19	14.89	57933	3916	0
Light Plant - 4,000 Watt Diesel	1400	93.13	292.03	325.21	0.46	25.66	23.61	35433	2426	0
Scraper - 613C	186	39.67	150.80	352.21	0.39	13.68	12.59	40096	2716	0
Off Road Truck - 730 CAT	386	56.06	164.38	461.63	0.69	16.37	15.06	70474	4762	0
Dozer - D6N LGP	212	18.35	68.94	109.08	0.11	9.61	8.84	9374	640	0
Dozer - D5HXL W/RIPPERS	80	6.93	26.01	41.16	0.04	3.63	3.34	3537	242	0
Blade - 140H/M with GPS	368	36.14	180.94	275.76	0.34	15.56	14.31	30595	2081	0
Loader - John Deere 210 - 4/1 Bucket	528	34.31	146.75	212.62	0.24	18.56	17.08	20888	1424	0
Roller - (Dirt) 84" SD	488	32.21	132.73	204.28	0.23	17.43	16.04	19331	1318	0
Paver - CAT AP800	200	23.80	104.21	184.35	0.19	10.30	9.47	17220	1172	0
Excavator - 320CL	110	9.15	26.08	83.66	0.13	2.74	2.52	11702	791	0
Compactor - 32" Walk Behind	80	0.63	3.30	3.95	0.01	0.15	0.14	542	37	0
Paver - Lee boy Paver	40	3.71	13.54	22.38	0.02	1.95	1.80	1860	127	0
Roller - (AC) 42"/47"	136	8.98	36.99	56.93	0.06	4.86	4.47	5387	367	0
Loader - 966G/H	210	17.69	51.79	170.46	0.24	5.86	5.39	20976	1418	0
Track - Low Railer	302	20.34	106.68	142.03	0.19	11.47	10.55	16385	1115	0
Track - Production Tamper	302	29.35	105.82	307.03	0.50	9.93	9.14	51452	3473	0
Track - Regulator	302	18.91	118.72	161.96	0.24	8.49	7.81	21569	1465	0
Loader - Backhoe - 420D	370	17.20	87.40	113.07	0.15	9.49	8.73	12844	875	0

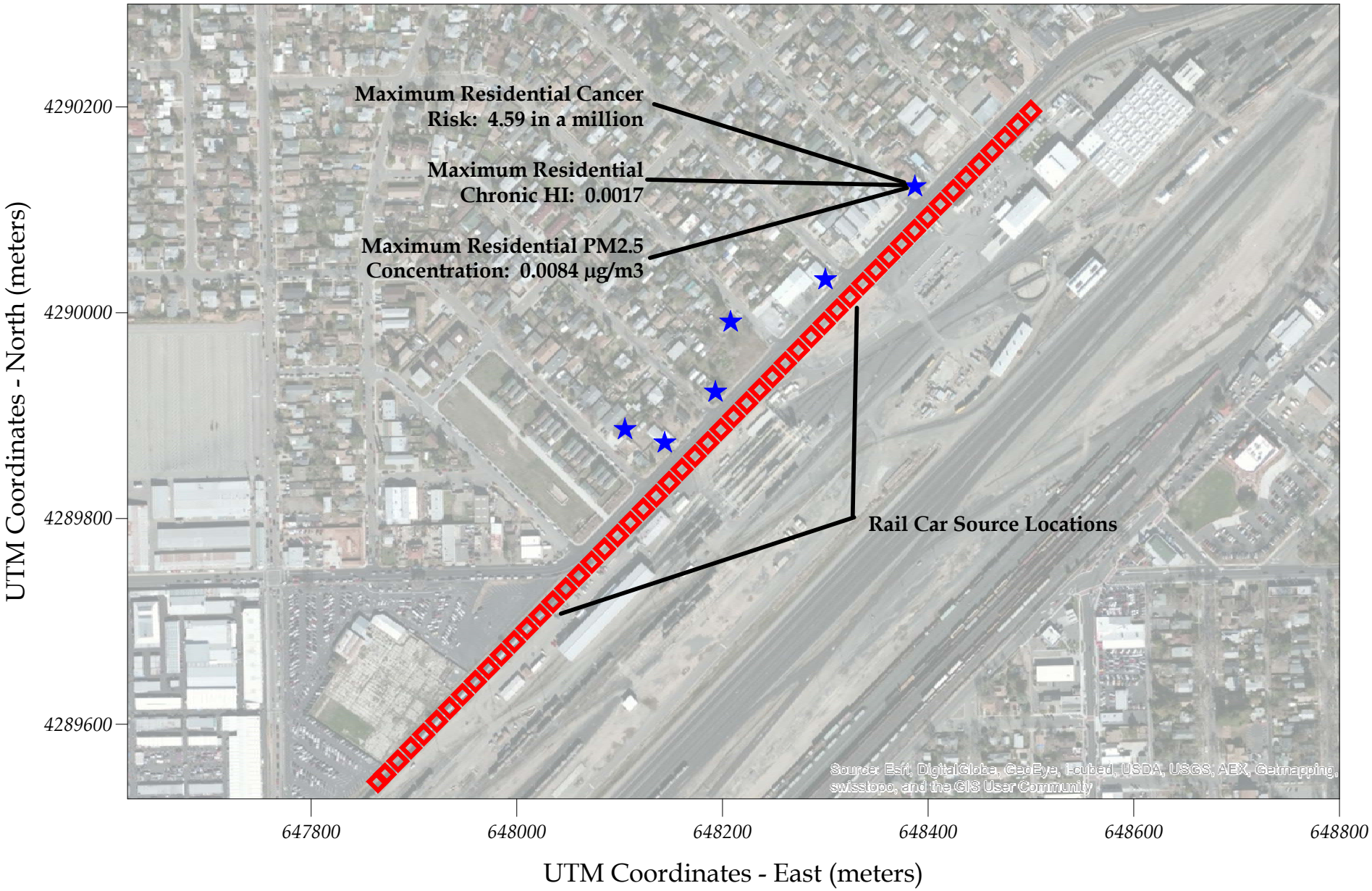
Vehicles	Total VMT over Project Duration	Total Emissions over The Project Duration (lb/Project)							Fuel Consumption (gal/Project)	
		ROG	CO	NOx	SOx	PM10	PM2.5	CO2e	Diesel	Gasoline
Onsite 1/2 Ton Pick-up Truck	3500	2.18	22.81	2.77	0.04	56.48	5.77	3621	0	199
Onsite Dump Truck (Tandum)	2384	2.76	12.45	56.81	0.09	40.27	5.42	9478	430	0
Onsite Shuttle Truck	8000	10.05	92.95	8.42	0.07	129.16	13.24	6967	0	388
Onsite Concrete Trucks (8 yd)	262	0.30	1.37	6.23	0.01	4.42	0.59	1040	47	0
Onsite Truck - Foreman/Superintendent/PM	9120	5.69	59.43	7.21	0.10	147.17	15.03	9436	0	518
Onsite Truck - Crew w/Small Tools	13250	8.26	86.34	10.48	0.14	213.82	21.84	13709	0	752
Onsite Truck - Water	1600	1.85	8.36	38.12	0.06	27.02	3.64	6361	289	0
Onsite Asphalt Delivery	350	0.40	1.83	8.34	0.01	5.91	0.80	1391	63	0
Offsite 18 Wheeler (Deliveries)	1314	1.52	6.86	31.31	0.05	1.39	0.95	5224	237	0
Offsite Asphalt Delivery	2800	3.24	14.62	66.72	0.11	2.96	2.02	11131	506	0
Offsite Concrete Trucks (8 yd)	1072	1.24	5.60	25.55	0.04	1.13	0.77	4262	194	0
Offsite Construction Worker Commute Vehicles	282224	153.61	1454.93	126.86	2.21	86.77	26.73	208166	0	11797
Total Project Equipment Emissions	lb/project	1218.75	4655.42	8692.99	11.33	447.92	412.09	1045904	70964	0
Total Project Onsite Vehicles Emissions	lb/project	31.49	285.53	138.38	0.52	624.24	66.32	52003	830	1857
Total Project Offsite Vehicles Emissions	lb/project	159.60	1482.02	250.43	2.41	92.26	30.46	228783	936	11797
Total Project All Soucrces Emissions	lb/project	1409.85	6422.96	9081.79	14.27	1164.42	508.87	1326690	72730	13654
Average Daily Equipment Emissions	lb/day	6.96	26.60	49.67	0.06	2.56	2.35	5977	406	0
Average Daily Onsite Vehicles Emissions	lb/day	0.18	1.63	0.79	0.00	3.57	0.38	297	5	11
Average Daily Offsite Vehicles Emissions	lb/day	0.91	8.47	1.43	0.01	0.53	0.17	1307	5	67
Average Daily All Soucrces Emissions	lb/day	8.06	36.70	51.90	0.08	6.65	2.91	7581	416	78
Average Annual Equipment Emissions	tpy	0.61	2.33	4.35	0.01	0.22	0.21	523		
Average Annual Onsite Vehicles Emissions	tpy	0.02	0.14	0.07	0.00	0.31	0.03	26		
Average Annual Offsite Vehicles Emissions	tpy	0.08	0.74	0.13	0.00	0.05	0.02	114		
Average Annual All Soucrces Emissions	tpy	0.70	3.21	4.54	0.01	0.58	0.25	663		



Yolo Solono County Rail Source Locations and Modeling Health Risk Results
Valero Crude by Rail Project
Benicia, California



Sacramento County Rail Source Locations and Modeling Health Risk Results
Valero Crude by Rail Project
Benicia, California



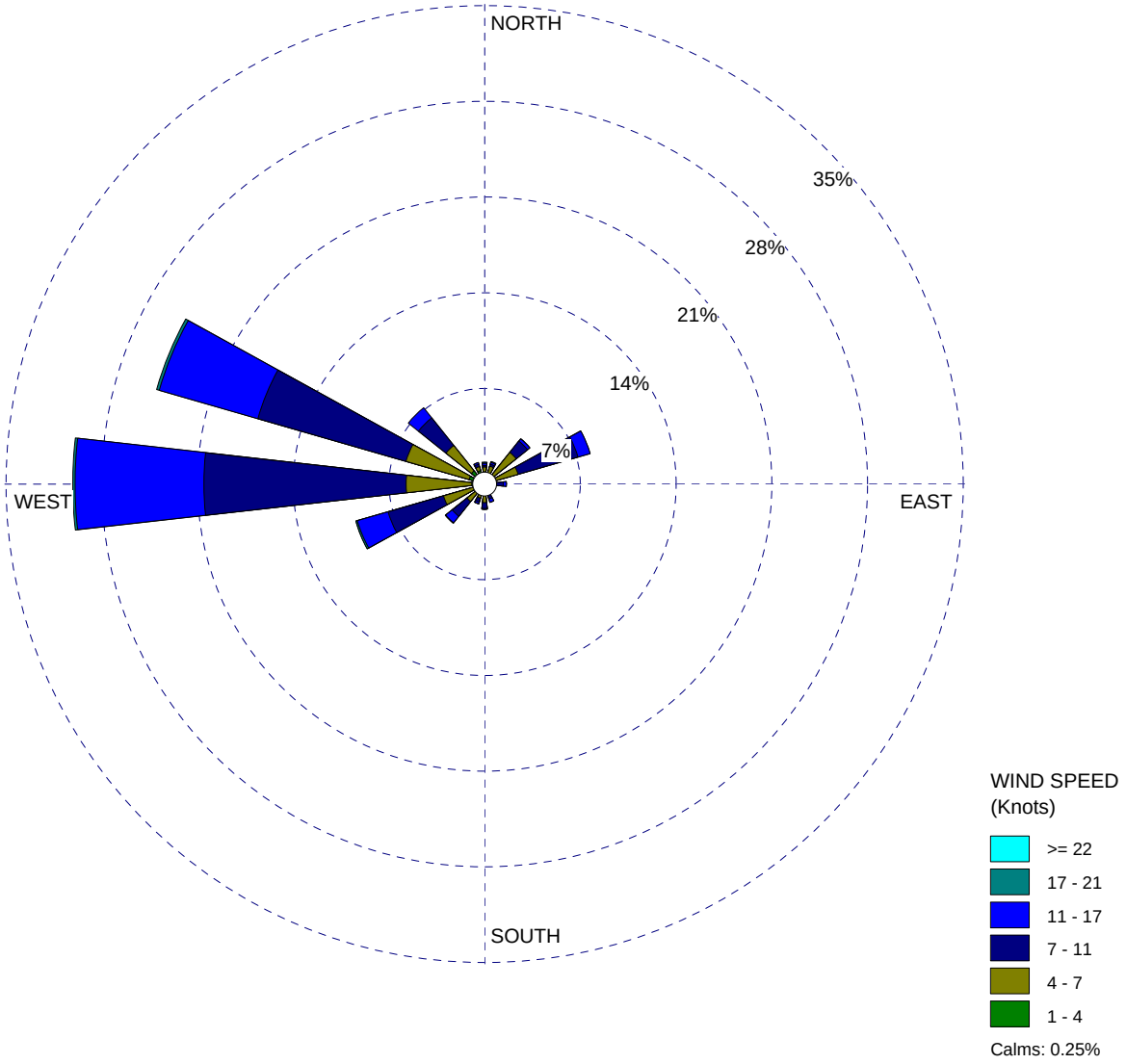
Placer County Rail Source Locations and Modeling Health Risk Results
Valero Crude by Rail Project
Benicia, California

WIND ROSE PLOT:

Valero Refinery, Benicia, California

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
2000, 2001, 2003, 2004	**Start Date: 1/1/2000 - 00:00** **End Date: 12/31/2005 - 23:00**	MODELER:	
	CALM WINDS: **0.25%**	TOTAL COUNT: **43824 hrs.**	
	AVG. WIND SPEED: **8.59 Knots**	DATE: **6/10/2014**	PROJECT NO.:

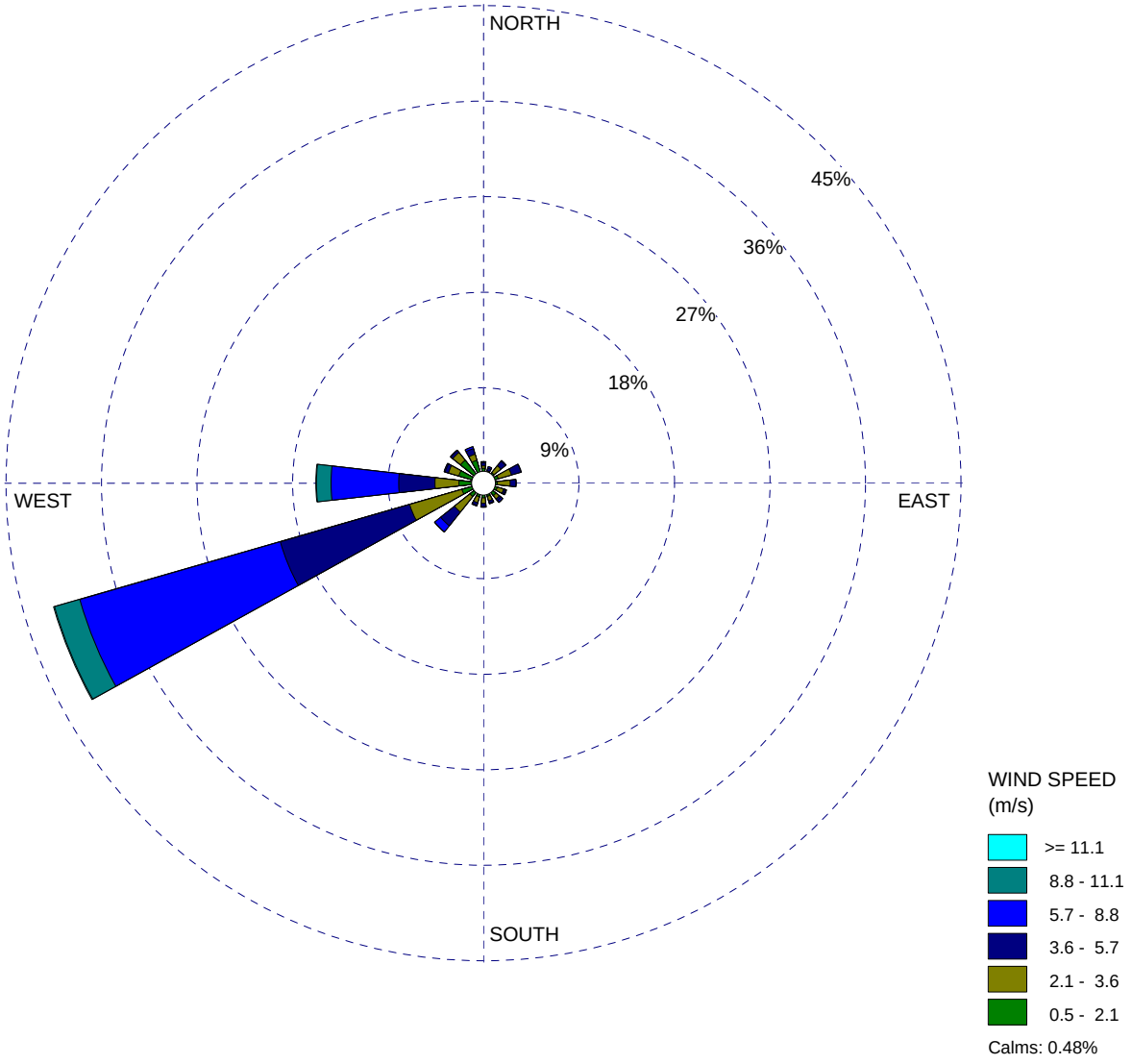
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Suisun City, California

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
2001 through 2005	**Start Date: 1/1/2001 - 00:00** **End Date: 12/31/2005 - 23:00**	MODELER:	
	CALM WINDS: **0.48%**	TOTAL COUNT: **43824 hrs.**	
	AVG. WIND SPEED: **4.30 m/s**	DATE: **6/12/2014**	PROJECT NO.:

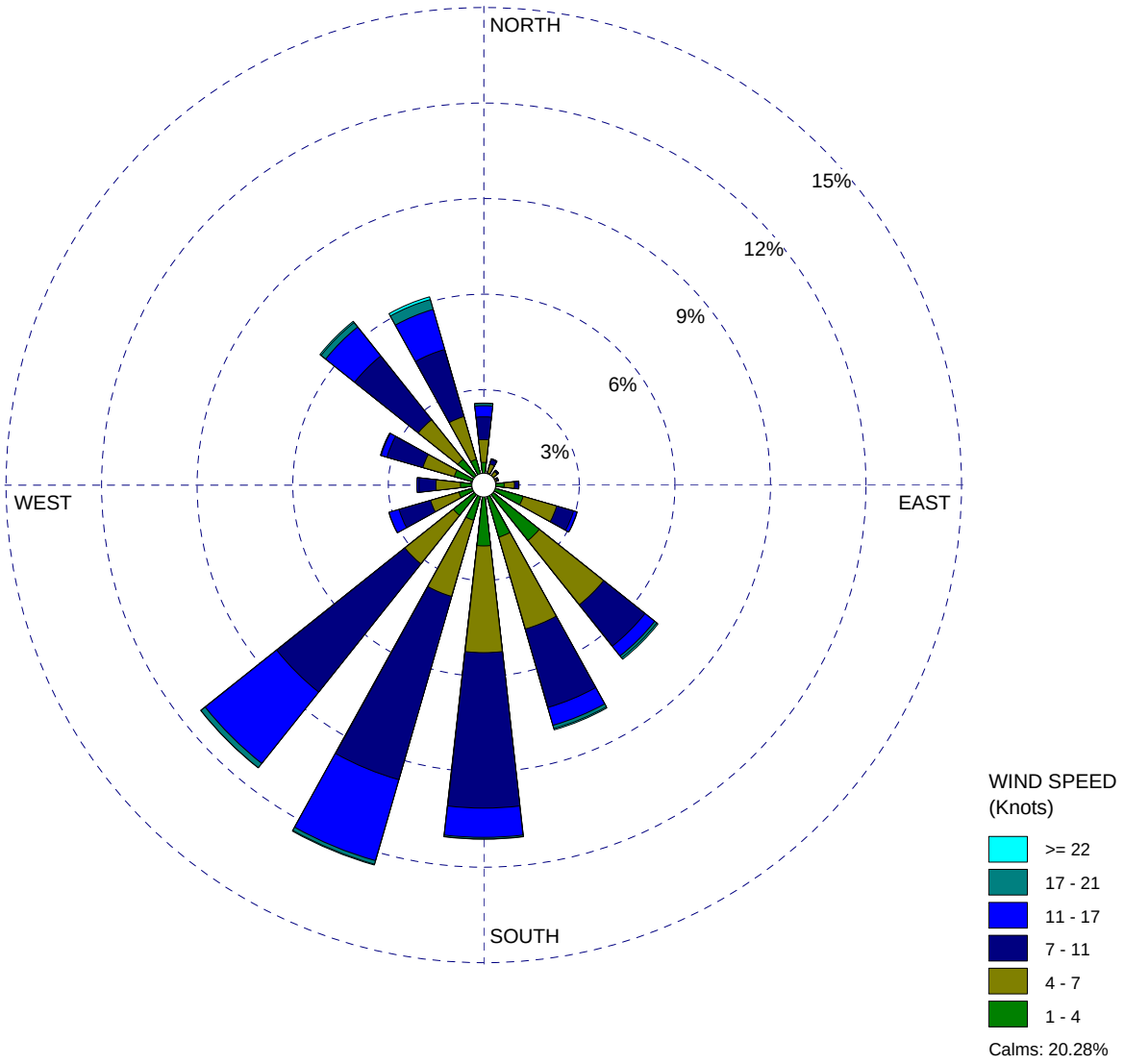
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Sacramento Executive Airport

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
2001 through 2005	**Start Date: 1/1/1985 - 00:00** **End Date: 12/31/1989 - 23:00**	MODELER:	
	CALM WINDS: **20.28%**	TOTAL COUNT: **43824 hrs.**	
	AVG. WIND SPEED: **6.06 Knots**	DATE: **6/12/2014**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software