

**ATTACHMENT B: SUMMARY OF CONSTRUCTION-PHASE EMISSIONS
– SITE 8**

**Windsor Substation - Alternative Site 8
Summary of Construction Phase Emissions**

Emissions	CO ₂ ¹	CO ₂ ¹ with APM ³	CH ₄ ²
Peak Daily (lb/day)			
Access Road and Substation Construction - September 2012 - October 2012	4578	3891	0.023
GC Tower - November 2012 - February 2013	5295	4501	0.076
GC Line - November 2012 - February 2013	1591	1352	0.019
Distribution Overhead - January 2013 - May 2013	3381	2874	0.072
Distribution Underground - January 2013 - May 2013	4373	3717	0.016
Max Daily	14640	12444	0.18
Average Daily 2012	4632	3937	0.03
Average Daily 2013	6918	5880	0.09
Tons per Phase			
Access Road and Substation Construction - September 2012 - October 2012	64.8	55.0	0.0004
GC Tower - November 2012 - February 2013	6.0	5.1	0.0001
GC Line - November 2012 - February 2013	4.4	3.7	0.0001
Distribution Overhead - January 2013 - May 2013	133.5	113.5	0.0027
Distribution Underground - January 2013 - May 2013	144.8	123.1	0.0006
Total tons per year 2012	70.0	59.5	0.000
Total tons per year 2013	283.6	241.0	0.003

1. Metric tons
2. Methane emissions from truck use only (metric tons).
3. Implementation of APM was assumed to reduce construction equipment, construction vehicles, and worker commutes by approximately 15 percent.

Windsor Substation - Alternative Site 8

Emissions calcs for Construction equipment

Emissions factors, approximate HP ratings, and load defaults are from URBEMIS 2007, Ver 9.2.4.

Equipment lists and construction schedule supplied by PG&E, February 2011.

Access Road and Substation Construction - September 2012 - October 2012

Equipment	Fuel	Number	Days Operating*	HP	Load	Hr/day	Emissions Factor, g/hp/hr CO2	Emissions, lb/day CO2	Emissions, ton/phase** CO2
Man Lift	Diesel	2	40	120	0.46	8	261.653	509.6	9.2
Forklift	Diesel	1	40	175	0.3	8	170.643	158.0	2.9
Crawler Backhoe	Diesel	1	40	175	0.55	8	312.846	531.2	9.6
Sheep's Foot Roller	Diesel	1	20	120	0.56	10	318.534	472.0	4.3
Excavator	Diesel	1	20	175	0.57	10	324.222	713.1	6.5
Loader	Diesel	1	20	175	0.55	10	312.846	664.0	6.0
D-3 Bulldozer	Diesel	1	40	50	0.55	8	312.846	151.8	2.8
Water Truck	Diesel	1	40	250	0.5	8	324.222	714.9	13.0
Total								3914.5	54.2

GC Tower - November 2012 - February 2013

Equipment	Fuel	Number	Days Operating**	HP	Load	Hr/day	Emissions Factor, g/hp/hr CO2	Emissions, lb/day CO2	Emissions, ton/phase** CO2*
Excavator	Diesel	1	2	175	0.57	12	324.222	855.7	0.8
Crane	Diesel	1	1	250	0.43	4	244.589	231.9	0.1
Air Compressor	Diesel	1	2	250	0.48	2	273.029	144.5	0.1
Backhoe	Diesel	1	2	175	0.55	7	312.846	464.8	0.4
Water Truck	Diesel	1	5	250	0.5	12	324.222	1072.4	2.4
Total								2769.3	3.9

GC Line - November 2012 - February 2013

Equipment	Fuel	Number	Days Operating**	HP	Load	Hr/day	Emissions Factor, g/hp/hr CO2	Emissions, lb/day CO2	Emissions, ton/phase** CO2*
Water Truck	Diesel	1	8	250	0.5	8	324.222	714.9	2.6
Puller	Diesel	1	2	25	0.51	2	290.093	16.3	0.0
Crane	Diesel	1	1	250	0.43	6	244.589	347.9	0.2
Total								1079.1	2.8

Distribution Overhead - January 2013 - May 2013

Equipment	Fuel	Number	Days Operating**	HP	Load	Hr/day	Emissions Factor, g/hp/hr CO2	Emissions, lb/day CO2	Emissions, ton/phase** CO2*
Water Truck	Diesel	1	110	250	0.5	8	324.222	714.9	35.7
Puller	Diesel	1	65	25	0.51	8	290.093	65.2	1.9
Total								780.2	37.6

Distribution Underground - January 2013 - May 2013

Equipment	Fuel	Number	Days Operating**	HP	Load	Hr/day	Emissions Factor, g/hp/hr CO2	Emissions, lb/day CO2	Emissions, ton/phase** CO2*
Water Truck	Diesel	1	80	250	0.5	8	324.222	714.9	25.9
Crawler Backhoe	Diesel	1	80	175	0.55	8	312.846	531.2	19.3
Excavator	Diesel	1	68	175	0.57	8	324.222	570.5	17.6
HDD Rig	Diesel	1	68	175	0.75	8	426.608	987.7	30.5
Bore Rig	Diesel	1	68	175	0.75	8	426.608	987.7	30.5
Total								3792.0	123.7

* Calculated based on the PG&E estimates.

** metric tons.

Windsor Substation - Alternative Site 8
Emissions calcs for on-site and commute truck miles
Equipment lists and usage percents supplied by PG&E, February 2011.

Truck	Fuel	Number	Days Operating	Average VMT Per day	Total VMT per day	Total VMT per phase	Emissions Factors (lb/mile) ¹		Emissions, tons/phase		Emissions, lb/day	
							CO2	CH4	CO2 ²	CH4 ²	CO2	CH4
Access Road and Substation Construction - September 2012 - October 2012												
Pickup	Gasoline	4	40	30	105	4200	1.10153	0.00007	2.10	1.37E-04	115.7	7.53E-03
1 - ton Truck	Diesel	1	40	30	30	1200	4.21591	0.00012	2.29	6.34E-05	126.5	3.50E-03
Truck -mounted Digger	Diesel	1	40	30	30	1200	4.21591	0.00012	2.29	6.34E-05	126.5	3.50E-03
Dump Truck	Diesel	1	20	40	40	800	4.21591	0.00012	1.53	4.23E-05	168.6	4.66E-03
Concrete Truck	Diesel	1	40	30	30	1200	4.21591	0.00012	2.29	6.34E-05	126.5	3.50E-03
Total									10.51	3.69E-04	663.7	2.27E-02
GC Tower - November 2012 - February 2013												
Pickup	Gasoline	3	5	30	90	450	1.10153	0.00007	0.22	1.46E-05	99.1	6.45E-03
Crew-cab Pickup	Gasoline	2	5	30	60	300	1.10153	0.00007	0.15	9.76E-06	66.1	4.30E-03
Boom Truck	Diesel	1	1	30	30	30	4.21591	0.00012	0.06	1.59E-06	126.5	3.50E-03
Concrete Truck	Diesel	8	1	30	240	240	4.21591	0.00012	0.46	1.27E-05	1011.8	2.80E-02
Dump Truck	Diesel	5	2	40	200	400	4.21591	0.00012	0.76	2.11E-05	843.2	2.33E-02
2-ton Flat-bed Truck	Diesel	1	5	30	30	150	4.21591	0.00012	0.29	7.93E-06	126.5	3.50E-03
Potholer / Vac Truck	Diesel	2	2	30	60	120	4.21591	0.00012	0.23	6.34E-06	253.0	6.99E-03
Total									2.17	7.41E-05	2526.1	7.60E-02
GC Line - November 2012 - February 2013												
Pickup	Gasoline	3	8	30	90	720	1.10153	0.00007	0.36	2.34E-05	99.1	6.45E-03
Crew-cab Pickup	Gasoline	1	8	30	30	240	1.10153	0.00007	0.12	7.80E-06	33.0	2.15E-03
Bucket Truck	Diesel	2	8	30	60	480	4.21591	0.00012	0.92	2.54E-05	253.0	6.99E-03
Line Truck	Diesel	1	4	30	30	120	4.21591	0.00012	0.23	6.34E-06	126.5	3.50E-03
Total									1.63	6.29E-05	511.6	1.91E-02
Distribution Overhead - January 2013 - May 2013												
Pickup	Gasoline	3	110	30	90	9900	1.10087	0.00007	4.94	3.01E-04	99.1	6.04E-03
Crew-cab Pickup	Gasoline	3	110	30	90	9900	1.10087	0.00007	4.94	3.01E-04	99.1	6.04E-03
Line Truck	Diesel	3	110	30	90	9900	4.21519	0.00010	18.93	4.69E-04	379.4	9.40E-03
Bucket Truck	Diesel	5	65	30	150	9750	4.21519	0.00010	18.64	4.62E-04	632.3	1.57E-02
Splicing Van	Diesel	5	85	30	150	12750	4.21519	0.00010	24.38	6.04E-04	632.3	1.57E-02
Crane Truck	Diesel	6	70	30	180	12600	4.21519	0.00010	24.09	5.97E-04	758.7	1.88E-02
Total									95.93	2.73E-03	2600.8	7.16E-02
Distribution Underground - January 2013 - May 2013												
Pickup	Gasoline	1	80	30	30	2400	1.10087	0.00007	1.20	7.30E-05	33.0	2.01E-03
Crew Truck	Diesel	1	80	30	30	2400	4.21519	0.00010	4.59	1.14E-04	126.5	3.13E-03
Dump/Cement Truck	Diesel	1	80	100	100	8000	4.21519	0.00010	15.30	3.79E-04	421.5	1.04E-02
Total									21.08	5.66E-04	581.0	1.56E-02

1: Most conservative emissions factors from EMFAC2007 v.2.3 for the SCAQMD.

2: Calculated in metric tons.

Windsor Substation - Alternative Site 8
Summary of Construction Phase Emissions of Criteria Pollutants

Pollutant	Average Daily lb/day emissions				
	Construction-Related Threshold	Original Project (Site A)		Site 8 Alternative	
	YEAR:	2011	2012	2012	2013
NOx	54	23.7	48.8	24.4	43.2
ROG	54	3.6	5.1	3.5	4.4
PM-10 (exhaust)	82	1.5	2.5	1.5	2.0
PM2.5 (exhaust)	54	1.4	2.1	1.3	1.8