Appendix E: Air Quality Spreadsheets

Construction Emissions

At Site Construction Emissions

Equipment	CalEEMod Equipment Code	Include in Peak day?	Fuel	HP	# of equip.	Total Work Days	Hrs/ day	Load Factor	Emission Factors (g/bhp-hr)									Peak Day Emissions (lb/day)						Total Emissions (tons)						GHG, MT				Total Fuel Use, gal
									NO_X	ROG	CO	SO_2	PM_{10}	$PM_{2.5}$	CO2	CH4	N2O	NO_X	ROG	CO	SO_2	PM_{10}	$PM_{2.5}$	NO_X	ROG	CO	SO_2	PM_{10}	$PM_{2.5}$	CO2	CH4	N2O	CO2e	
Loader - anchor install	Rubber Tired Loaders2017-250	0	D	250	1	6	10	0.36	4.755	0.373	1.417	0.005	0.162	0.149	495.9	0.152	0.004	9.41	0.74	2.81	0.01	0.32	0.29	0.03	0.00	0.01	0.00	0.00	0.00	3	0.00	0.00	3	276
Crane - cofferdam install	Cranes2017-250	0	D	128	1	7	24	0.29	6.655	0.561	2.385	0.005	0.297	0.273	499.4	0.153	0.004	13.04	1.10	4.67	0.01	0.58	0.53	0.05	0.00	0.02	0.00	0.00	0.00	3	0.00	0.00	3	319
Pile Driver - cofferdam install	Other Construction Equipment2017-500	0	D	348	1	7	24	0.42	3.777	0.290	2.121	0.005	0.138	0.127	501.1	0.154	0.004	29.15	2.24	16.37	0.04	1.07	0.98	0.10	0.01	0.06	0.00	0.00	0.00	12	0.00	0.00	12	1,255
Well Rig	Other Construction Equipment2017-500	1	D	425	1	3	24	0.42	3.777	0.290	2.121	0.005	0.138	0.127	501.1	0.154	0.004	35.59	2.73	19.99	0.05	1.30	1.20	0.05	0.00	0.03	0.00	0.00	0.00	6	0.00	0.00	6	657
Cement Pump Truck	Off-Highway Trucks2017-500	1	D	302	1	3	8	0.38	3.668	0.325	1.748	0.005	0.136	0.125	501.4	0.154	0.004	7.41	0.66	3.53	0.01	0.28	0.25	0.01	0.00	0.01	0.00	0.00	0.00	1	0.00	0.00	1	141
Cement Bulk Truck	Off-Highway Trucks2017-500	1	D	405	1	3	8	0.38	3.668	0.325	1.748	0.005	0.136	0.125	501.4	0.154	0.004	9.94	0.88	4.73	0.01	0.37	0.34	0.01	0.00	0.01	0.00	0.00	0.00	2	0.00	0.00	2	189
Logging Skid	Other Construction Equipment2017-175	1	D	173	1	3	8	0.38	5.494	0.500	3.338	0.005	0.290	0.267	495.9	0.152	0.004	6.36	0.58	3.86	0.01	0.34	0.31	0.01	0.00	0.01	0.00	0.00	0.00	1	0.00	0.00	1	81
Welding Rig	Welders2017-175	1	D	173	1	3	8	0.45	3.562	0.442	3.124	0.006	0.183	0.183	568.3	0.039	0.004	4.88	0.61	4.28	0.01	0.25	0.25	0.01	0.00	0.01	0.00	0.00	0.00	1	0.00	0.00	1	95
Supply/Crew Boats	Other Construction Equipment2017-500	1	D	1600	1	17	4	0.85	5.037	0.336	3.731	0.005	0.149	0.149	501.1	0.154	0.004	60.28	4.02	44.65	0.06	1.78	1.78	0.51	0.03	0.38	0.00	0.02	0.02	46	0.01	0.00	46	4,726
Crane - cofferdam remove	Cranes2017-250	0	D	128	1	7	24	0.29	6.655	0.561	2.385	0.005	0.297	0.273	499.4	0.153	0.004	13.04	1.10	4.67	0.01	0.58	0.53	0.05	0.00	0.02	0.00	0.00	0.00	3	0.00	0.00	3	319
Pile Driver - cofferdam remove	Other Construction Equipment2017-500	0	D	348	1	7	24	0.42	3.777	0.290	2.121	0.005	0.138	0.127	501.1	0.154	0.004	29.15	2.24	16.37	0.04	1.07	0.98	0.10	0.01	0.06	0.00	0.00	0.00	12	0.00	0.00	12	1,255
Total																		***124.5***	***9.5***	***81.0***	***0.1***	***4.3***	***4.1***	***0.93***	***0.07***	***0.59***	***0.00***	***0.03***	***0.03***	***90***	***0.02***	***0.00***	***90.55***	***9,311***

Barge Tug Emissions, by Air District

Equipment	CalEEMod Equipment Code	Include in Peak day?	Fuel	HP	# of equip.	Total Work Days	Hrs/ day	Load Factor	Emission Factors (g/bhp-hr)									Peak Day Emissions (lb/day)						Total Emissions (tons)						GHG, MT				Total Fuel Use, gal
									NO_X	ROG	CO	SO_2	PM_{10}	$PM_{2.5}$	CO2	CH4	N2O	NO_X	ROG	CO	SO_2	PM_{10}	$PM_{2.5}$	NO_X	ROG	CO	SO_2	PM_{10}	$PM_{2.5}$	CO2	CH4	N2O	CO2e	
Barge Tug Boats- Santa Barbara County	Other Construction Equipment2017-500	1	D	3400	2	6	2.00	0.42	5.037	0.336	3.731	0.005	0.149	0.149	501.1	0.154	0.004	63.29	4.22	46.88	0.06	1.87	1.87	0.19	0.01	0.14	0.00	0.01	0.01	17	0.00	0.00	17	1,751
Supply/Crew Boats-Santa Barbara County	Other Construction Equipment2017-500	0	D	1600	1	3	0.67	0.85	5.037	0.336	3.731	0.005	0.149	0.149	501.1	0.154	0.004	10.05	0.67	7.44	0.01	0.30	0.30	0.02	0.00	0.01	0.00	0.00	0.00	1	0.00	0.00	1	139
Barge Tug Boats- Ventura County	Other Construction Equipment2017-500	1	D	3400	2	6	8.75	0.42	5.037	0.336	3.731	0.005	0.149	0.149	501.1	0.154	0.004	276.91	18.46	205.12	0.27	8.19	8.19	0.83	0.06	0.62	0.00	0.02	0.02	74	0.02	0.01	75	7,662
Supply/Crew Boats- Ventura County	Other Construction Equipment2017-500	0	D	1600	1	3	2.92	0.85	5.037	0.336	3.731	0.005	0.149	0.149	501.1	0.154	0.004	43.95	2.93	32.56	0.04	1.30	1.30	0.07	0.00	0.05	0.00	0.00	0.00	6	0.00	0.00	6	608
Barge Tug Boats- SCAQMD	Other Construction Equipment2017-500	1	D	3400	2	6	11.75	0.42	5.037	0.336	3.731	0.005	0.149	0.149	501.1	0.154	0.004	371.85	24.79	275.44	0.37	11.00	11.00	1.12	0.07	0.83	0.00	0.03	0.03	100	0.02	0.01	101	10,289
Supply/Crew Boats- SCAQMD	Other Construction Equipment2017-500	0	D	1600	1	3	3.92	0.85	5.037	0.336	3.731	0.005	0.149	0.149	501.1	0.154	0.004	59.02	3.93	43.72	0.06	1.75	1.75	0.09	0.01	0.07	0.00	0.00	0.00	8	0.00	0.00	8	817
Total																								***2.31***	***0.15***	***1.71***	***0.00***	***0.07***	***0.07***	***206***	***0.05***	***0.01***	***209***	***21,266***
Total SB County																		73.34	4.89	54.33	0.07	2.17	2.17	0.20	0.01	0.15	0.00	0.01	0.01	18	0.00	0.00	18	1890
Total Ventura County																		320.86	21.39	237.68	0.32	9.49	9.49	0.90	0.06	0.66	0.00	0.03	0.03	80	0.02	0.01	81	8270
Total SCAQMD																		430.87	28.72	319.16	0.43	12.74	12.74	1.20	0.08	0.89	0.00	0.04	0.04	108	0.03	0.01	109	11105

Notes:

Emission factors based on CalEEMod for year 2017. For boats, EF based on EPA Tier 2 requirements
Crew/supply and tugboat engine sizes estimated
Cementing activities and logging assumed to only be for 8 hours per day
Supply/Crew boat use would total 4 RT trips/day at 1 hour max per trip
Distance to SB Harbor: 6 nautical miles
Distance to POLA 90 nautical miles (8 in SBC, 35 in VC, 47 in SCAQMD)
Speed of crew/supply boat = 12 knots
Speed of tugs with barge = 4 knots
Crew/supply boat load based on SBCAPCD permit for Ellwood facilities

On-Road Transportation

Source	Vehicle Type	Parameters						Emission Factors, lbs/mile									Peak Day Emissions, lbs/day						Annual Emissions, Tons						Annual Emissions, MT			
		Include in Peak day?	Number of Vehicles per Day	Daily Trips (one way)	No. of days per year	Distance One Way (miles)	Miles per year	NOx	ROC	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	NOx	ROC	CO	SO2	PM10	PM2.5	NOx	ROC	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Workers Commuting - Personnel in SBC	Gasoline	1	25	50	17	12.3	10,455	2.3E-04	4.6E-05	2.1E-03	6.9E-06	3.0E-06	2.8E-06	5.6E-01	3.4E-05	6.8E-08	0.140	0.028	1.301	0.004	0.002	0.002	0.001	0.000	0.011	0.000	0.000	0.000	0.000	2.6	0.00	0.00	2.6
Trucks - Misc to SB Harbor	Diesel	1	4	8	3	12.3	295	1.6E-02	4.3E-04	1.7E-03	3.6E-05	1.9E-04	1.8E-04	3.6E+00	3.3E-05	6.5E-08	1.547	0.043	0.170	0.004	0.019	0.018	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.5	0.00	0.00	0.5
Total			***29***														***1.7***	***0.1***	***1.5***	***0.0***	***0.0***	***0.0***	***0.00***	***0.00***	***0.01***	***0.00***	***0.00***	***0.00***	***3.1***	***0.00***	***0.00***	***3.1***

Notes:

Emission factors based on EMFAC2014 for SB County at 45 mph. LDA and T7 contruction trucks with trailer
CH4 and SO2 emission factors based on CalEEMod for SBC
Distance based on CalEEMod for SBC
Number of trucks estimated

Barge Tug Emissions, by Air District, Tier 3 Engines

Equipment	CalEEMod Equipment Code	Include in Peak day?	Fuel	HP	# of equip.	Total Work Days	Hrs/ day	Load Factor	Emission Factors (g/bhp-hr)									Peak Day Emissions (lb/day)						Total Emissions (tons)						GHG, MT				Total Fuel Use, gal
									NO_X	ROG	CO	SO_2	PM_{10}	$PM_{2.5}$	CO2	CH4	N2O	NO_X	ROG	CO	SO_2	PM_{10}	$PM_{2.5}$	NO_X	ROG	CO	SO_2	PM_{10}	$PM_{2.5}$	CO2	CH4	N2O	CO2e	
Barge Tug Boats- Santa Barbara County	Other Construction Equipment2017-500	1	D	3400	2	6	2.00	0.42	3.900	0.300	3.700	0.005	0.080	0.080	501.1	0.154	0.004	49.00	3.77	46.49	0.06	1.01	1.01	0.15	0.01	0.14	0.00	0.00	0.00	17	0.00	0.00	17	1,751
Supply/Crew Boats-Santa Barbara County	Other Construction Equipment2017-500	0	D	1600	1	3	0.67	0.85	3.900	0.300	3.700	0.005	0.080	0.080	501.1	0.154	0.004	7.78	0.60	7.38	0.01	0.16	0.16	0.01	0.00	0.01	0.00	0.00	0.00	1	0.00	0.00	1	139
Barge Tug Boats- Ventura County	Other Construction Equipment2017-500	1	D	3400	2	6	8.75	0.42	3.900	0.300	3.700	0.005	0.080	0.080	501.1	0.154	0.004	214.39	16.49	203.39	0.27	4.40	4.40	0.64	0.05	0.61	0.00	0.01	0.01	74	0.02	0.01	75	7,662
Supply/Crew Boats- Ventura County	Other Construction Equipment2017-500	0	D	1600	1	3	2.92	0.85	3.900	0.300	3.700	0.005	0.080	0.080	501.1	0.154	0.004	34.03	2.62	32.28	0.04	0.70	0.70	0.05	0.00	0.05	0.00	0.00	0.00	6	0.00	0.00	6	608
Barge Tug Boats- SCAQMD	Other Construction Equipment2017-500	1	D	3400	2	6	11.75	0.42	3.900	0.300	3.700	0.005	0.080	0.080	501.1	0.154	0.004	287.89	22.15	273.13	0.37	5.91	5.91	0.86	0.07	0.82	0.00	0.02	0.02	100	0.02	0.01	101	10,289
Supply/Crew Boats- SCAQMD	Other Construction Equipment2017-500	0	D	1600	1	3	3.92	0.85	3.900	0.300	3.700	0.005	0.080	0.080	501.1	0.154	0.004	45.70	3.52	43.35	0.06	0.94	0.94	0.07	0.01	0.07	0.00	0.00	0.00	8	0.00	0.00	8	817
Total																								***1.79***	***0.14***	***1.69***	***0.00***	***0.04***	***0.04***	***206***	***0.04***	***0.01***	***208***	***21,266***
Total SB County																		56.78	4.37	53.87	0.07	1.16	1.16	0.16	0.01	0.15	0.00	0.00	0.00	18	0.00	0.00	18	1890
Total Ventura County																		248.42	19.11	235.68	0.32	5.10	5.10	0.69	0.05	0.66	0.00	0.01	0.01	81	0.02	0.01	81	8270
Total SCAQMD																		333.59	25.66	316.48	0.43	6.84	6.84	0.93	0.07	0.88	0.00	0.02	0.02	108	0.02	0.01	109	11105