

**APPENDIX T**

**scwd<sup>2</sup> Regional Seawater Desalination Project EIR**

**Air Quality & Climate Calculations**

**Attachment T-1**  
**scwd<sup>2</sup> Regional Seawater Desalination Project EIR**  
**Construction Emissions**  
**(April 4, 2012)**







**scwd<sup>2</sup> Regional Seawater Desalination Project EIR  
Construction Emission Estimations  
Construction Equipment List and Schedule**

Prepared by URS and CDM, April 2012  
(Assumptions are in dark blue color font)

Construction Area/Component	Equipment Name	Hp	Fuel Type (diesel/gas)	Quantity	Daily (Hours)	Duration (months)	Month # / Equipment Quantity																																	
							Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24	Month 25	Month 26	Month 27	Month 28	Month 29	Month 30	Month 31	Month 32		
Worker vehicles in Intertie System Improvements	Worker Vehicle	150	G/D	varied	-	14	40	40	40	40	36	32	32	32	28	20	20	20	20	28																				
Water trucks in Intertie System Improvements	Water Truck	250	D	1	-	14	1	1	1	1	1	1	1	1	1	1	1	1	1	1																				

**Notes:**

- Equipment assumptions for the desalination plant assume the construction schedule for Sites A-1 or A-2. Equipment durations would need to be adjusted per the schedule for Site A-3a and A-3b.
- If shoring and sheeting is required for soils support to construct below grade foundations, buried structures and pipe trenches, pile driving equipment will be used in conjunction with the 50-ton service crane. Estimated duration pile driving equipment is potentially onsite for shoring and sheeting is 3 months; potential operation of the pile driving equipment would be intermittent.
- Need for pile-type foundations and large-scale pile driving equipment including a 100-ton crane will be determined after site is selected and geotechnical work is completed. Estimated duration equipment is potentially onsite is 6 months; potential operation of pile driving equipment would be intermittent.
- All tasks in this category will overlap.
- The major desalination components should be scheduled so that the seawater intake, brine conveyance and treated water distribution facilities are operational when the testing and commissioning begin at the plant, approximately 6 months before the official commissioning date for the plant.
- Pipeline work would be completed by 2 crews: C1 and C2.
- If radial collector wells are used, up to 6 months would need to be added to the overall construction schedule for the intake component.
- The construction period for the brine pipeline includes mobilization and demobilization.

**Assumptions:**

- Construction schedule for "Split Site A-3a&b" and intake screen alternative for "Bedrock" will require more equipment and take longer time to complete. Therefore, those were chosen to calculate the construction emission calculations (more conservative).
- "Site Grading (Mobilize/Clear/Grade/Demobilize)" will take about 5 months
- "Underground Utilities and Piping" will take about 10 months
- "Civil Work - Foundations, Structures and Buildings" will take about 20 months; "Pile-Driving Rig for Shoring and Sheeting" will be used up to 4 month duration (month 9 through 12) and "Pile Driver Rig/100-Ton Crane for Pile Foundations" will be used up to 6 month duration (month 9 through 14).
- "Major Equipment Installation" will take about 18 months
- "Piping and Electrical Work" will take about 30 months
- "Final Grading, Paving, Landscaping and Site Restoration" will take about 6 months
- "Mobilizing/Site Grading/Demobilizing" will take about 3 months
- "Pump Station/Shaft Excavation" will occur in months 10 - 15.
- "PS Building/Elec/Mech" will occur in month 12 and 13.
- "Final Grading, Paving & Site Restoration" will occur in month 14 and 15.
- "Intake Pipeline/Dredging" will take about 4 months from month 2 through 5.
- "Paver - concrete/asphalt" used in "Transfer Pipeline" will occur in month 14 and 15.
- Crew team #1 will do the Intertie System Improvements construction work from Ocean St to DeLaveaga Tanks - Prospect Heights (or DeLaveaga Park Rd alternative) and will occur from month 1 through 9 and month 14.
- Crew team #2 will do the Intertie System Improvements construction work from DeLaveaga Tanks to McGregor Pump Station and will occur from month 1 through 14
- Worker vehicles include the the site visit cars from regulators, special inspectors, equipment vendors and other persons.
- Peak workforce are from project description, traffic data, and assumptions. Number of worker vehicles are assumed to be the same as the peak workforce.
- Numbers of water trucks are from assumptions.
- "Hauling spoils to disposal site" will occur in months 4-7.

scwd<sup>2</sup> Regional Seawater Desalination Project EIR  
**Construction Emission Estimations**  
**Emission Factors**  
 (Assumptions are in dark blue color font)

1.. Mobile Source (off-road Equipment and on-road vehicles) - Exhaust Emission Factors

ONSITE - OFFROAD EQUIPMENT

Equipment Name	Hp	Fuel Type (diesel/gas)	EF source	EF source name (hp)	Weight (tons)	Maximum on-site traveling distance per trip (mile/day/unit/rip)	Number of trip (single trip/day/unit)	Maximum total on-site traveling distance (mile/day/unit)	Emission Factors (unit: lbs/day/unit)													
									Fugitive Dust PM10	Exhaust PM10	Total PM10	Fugitive Dust PM2.5	Exhaust PM2.5	Total PM2.5	CO	VOC	NOx	SOx	CO2	CH4	N2O	CO2e
Air Compressors	200	D	OFFROAD2007/2011	Air Compressors (250)	2	-	-	-	-	0.26	0.26	-	0.24	0.24	2.32	0.77	8.42	0.01	1,048.82	0.07	-	1,050.28
Air Compressors	350	D	OFFROAD2007/2011	Air Compressors (500)	3	-	-	-	-	0.43	0.43	-	0.39	0.39	4.14	1.26	13.04	0.02	1,852.27	0.11	-	1,854.65
Backhoe - Cat 446	101	D	OFFROAD2007/2011	Tractors/Loaders/Backhoes	10	0.15	4	0.61	-	0.27	0.27	-	0.25	0.25	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
Barge	200	D	OFFROAD2007/2011	Other Construction Equipme	10	-	-	-	-	0.35	0.35	-	0.32	0.32	4.06	1.10	10.74	0.02	2,032.08	0.10	-	2,034.17
Compactor	70	D	OFFROAD2007/2011	Rollers (50)	5	0.15	4	0.61	-	0.18	0.18	-	0.17	0.17	2.26	0.75	1.99	0.00	207.68	0.07	-	209.11
Compactor	70-150	D	OFFROAD2007/2011	Rollers (175)	8	0.15	4	0.61	-	0.41	0.41	-	0.37	0.37	4.94	0.94	7.61	0.01	864.39	0.08	-	866.17
Concrete Pump	177	D	OFFROAD2007/2011	Pumps (175)	1	-	-	-	-	0.46	0.46	-	0.42	0.42	5.91	1.04	9.40	0.01	1,119.98	0.09	-	1,121.96
Crane -100 Ton	265	D	OFFROAD2007/2011	Cranes (250)	20	0.15	4	0.61	-	0.40	0.40	-	0.37	0.37	2.25	0.78	8.76	0.01	896.47	0.07	-	897.95
Crane -50 Ton	200	D	OFFROAD2007/2011	Cranes (250)	10	0.15	4	0.61	-	0.40	0.40	-	0.37	0.37	2.25	0.78	8.76	0.01	896.47	0.07	-	897.95
Dozer	70-150	D	OFFROAD2007/2011	Rubber Tired Dozers (175)	10	0.15	10	1.52	-	0.67	0.67	-	0.62	0.62	6.71	0.83	11.86	0.01	1,034.88	0.15	-	1,037.96
Excavator	325	D	OFFROAD2007/2011	Excavators (500)	10	0.15	10	1.52	-	0.37	0.37	-	0.34	0.34	4.08	0.44	10.48	0.02	1,868.20	0.12	-	1,870.71
Generator - 113 KW	174	D	OFFROAD2007/2011	Generator Sets (175)	1	-	-	-	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
Getman Buggy	40	D	OFFROAD2007/2011	Other Construction Equipme	1	0.15	10	1.52	-	0.15	0.15	-	0.13	0.13	2.05	0.53	1.97	0.00	223.72	0.05	-	224.73
Horizontal Drill	200	D	OFFROAD2007/2011	Bore/Drill Rigs (250)	5	-	-	-	-	0.20	0.20	-	0.18	0.18	2.74	0.34	6.66	0.02	1,503.46	0.05	-	1,504.58
Loader	150+	D	OFFROAD2007/2011	Rubber Tired Loaders (175)	5	0.15	10	1.52	-	0.39	0.39	-	0.36	0.36	5.00	0.48	7.11	0.01	849.76	0.08	-	851.52
Loader - Cat 966	235	D	OFFROAD2007/2011	Rubber Tired Loaders (250)	8	0.15	10	1.52	-	0.30	0.30	-	0.28	0.28	2.84	0.44	8.75	0.01	1,190.74	0.09	-	1,192.54
Locomotive - 12 Ton	120	D	OFFROAD2007/2011	Other Construction Equipme	12	-	-	-	-	0.40	0.40	-	0.37	0.37	4.18	0.73	5.25	0.01	646.29	0.07	-	647.67
Paver - concrete/ashalt	70	D	OFFROAD2007/2011	Pavers (120)	5	0.15	4	0.61	-	0.54	0.54	-	0.50	0.50	4.00	0.33	6.35	0.01	553.07	0.09	-	555.06
Pile Driver Rig/100-Ton Crane for Pile Foundations	400-500	D	OFFROAD2007/2011	Bore/Drill Rigs (500)	8	-	-	-	-	0.33	0.33	-	0.30	0.30	4.41	0.54	10.15	0.02	2,488.23	0.09	-	2,490.06
Pile-Driving Rig for Shoring and Sheeting	200	D	OFFROAD2007/2011	Bore/Drill Rigs (250)	5	-	-	-	-	0.20	0.20	-	0.18	0.18	2.74	0.34	6.66	0.02	1,503.46	0.05	-	1,504.58
Roller Compacter	100	D	OFFROAD2007/2011	Rollers (120)	5	0.15	4	0.61	-	0.39	0.39	-	0.36	0.36	3.22	0.73	4.72	0.01	471.49	0.07	-	472.88
RT Forklift	70-150	D	OFFROAD2007/2011	Rough Terrain Forklifts (175)	3	0.15	10	1.52	-	0.43	0.43	-	0.39	0.39	5.79	1.01	7.78	0.01	998.30	0.09	-	1,000.21
small boat	100	G	OFFROAD2007/2011	Vessels w/Outboard Engine	5	-	-	-	-	3.17	3.17	-	2.94	2.94	32.02	17.00	2.23	0.01	345.32	1.06	0.10	398.10
Spoils Separator	200	D	OFFROAD2007/2011	Other Construction Equipme	5	0.15	4	0.60	-	0.35	0.35	-	0.32	0.32	4.06	1.10	10.74	0.02	2,032.08	0.10	-	2,034.17
Trash Pump	10	D	OFFROAD2007/2011	Pumps (15)	1	-	-	-	-	0.04	0.04	-	0.03	0.03	0.39	0.09	0.58	0.00	59.34	0.01	-	59.52
Winch	150	D	OFFROAD2007/2011	Other Construction Equipme	1	-	-	-	-	0.38	0.38	-	0.35	0.35	4.69	0.69	7.27	0.01	851.36	0.06	-	852.67

ONSITE - ONROAD VEHICLE

Vehicle Name	Hp	Fuel Type (diesel/gas)	EF source	EF source name (hp)	Weight (tons)	Maximum on-site traveling distance per trip (mile/day/unit/rip)	Number of trip (single trip/day/unit)	Maximum total on-site traveling distance (mile/day/unit)	Emission Factors (unit: lbs/day/unit)													
									Fugitive Dust PM10	Exhaust PM10	Total PM10	Fugitive Dust PM2.5	Exhaust PM2.5	Total PM2.5	CO	VOC	NOx	SOx	CO2	CH4	N2O	CO2e
Dump Truck	140	D	EMFAC2011	MHDT - Medium Heavy Duty	15	0.15	4	0.61	1.90E-04	4.06E-04	5.96E-04	7.86E-05	3.73E-04	4.52E-04	5.50E-03	9.70E-04	3.49E-02	3.00E-05	3.10E+00	6.81E-06	6.41E-06	3.10E+00
Pickup Truck	150-300	G	EMFAC2011	LDT - Light Duty Trucks	5	0.15	4	0.61	5.97E-05	8.37E-05	1.43E-04	2.37E-05	7.38E-05	9.75E-05	1.10E-01	1.54E-02	6.23E-03	1.89E-05	1.58E+00	1.09E-04	1.38E-04	1.63E+00
Water Truck	250	D	EMFAC2011	MHDT - Medium Heavy Duty	15	0.15	4	0.61	1.90E-04	3.94E-04	5.84E-04	7.86E-05	3.62E-04	4.41E-04	5.51E-03	9.56E-04	3.40E-02	3.01E-05	3.10E+00	6.81E-06	6.41E-06	3.10E+00
Worker Vehicle	150	G/D	EMFAC2011	LDA - Passenger Cars	2	0.15	2	0.30	2.99E-05	5.18E-05	8.17E-05	1.18E-05	4.71E-05	5.89E-05	6.25E-02	9.03E-03	4.15E-03	1.35E-05	1.11E+00	4.65E-05	4.27E-05	1.13E+00

OFFSITE - ONROAD VEHICLE

Vehicle Name	Hp	Fuel Type (diesel/gas)	EF source	EF source name (hp)	Weight (tons)	Maximum off-site traveling distance per trip (mile/day/unit/rip)	Number of trip (single trip/day/unit)	Maximum total off-site traveling distance (mile/day/unit)	Emission Factors (unit: lbs/day/unit)													
									Fugitive Dust PM10	Exhaust PM10	Total PM10	Fugitive Dust PM2.5	Exhaust PM2.5	Total PM2.5	CO	VOC	NOx	SOx	CO2	CH4	N2O	CO2e
Dump Truck	140	D	EMFAC2011	MHDT - Medium Heavy Duty	15	25.00	4	100.00	3.14E-02	4.22E-02	7.35E-02	1.30E-02	3.88E-02	5.18E-02	2.20E-01	7.45E-02	2.08E+00	2.55E-03	2.64E+02	1.12E-03	1.06E-03	2.64E+02
Pickup Truck	150-300	G	EMFAC2011	LDT - Light Duty Trucks	5	25.00	4	100.00	9.86E-03	1.16E-03	1.10E-02	3.91E-03	1.02E-03	4.93E-03	1.10E+00	1.04E-01	1.03E-01	9.11E-04	8.25E+01	1.79E-02	2.28E-02	8.99E+01
Water Truck	250	D	EMFAC2011	MHDT - Medium Heavy Duty	15	25.00	4	100.00	3.14E-02	4.08E-02	7.21E-02	1.30E-02	3.75E-02	5.05E-02	2.15E-01	7.24E-02	2.00E+00	2.55E-03	2.63E+02	1.12E-03	1.06E-03	2.64E+02
Worker Vehicle	150	G/D	EMFAC2011	LDA - Passenger Cars	2	25.00	2	50.00	4.93E-03	3.80E-04	5.31E-03	1.95E-03	3.47E-04	2.30E-03	2.59E-01	2.49E-02	2.52E-02	3.94E-04	3.44E+01	7.67E-03	7.05E-03	3.68E+01

Notes:

- Weight and numbers of trip are from assumptions
- Off-site distances are assumed to be from the project site to the forest edge of the county boundary.
- On-site distances for desalination plant construction were estimated from plot plans using Site A-3a and A-3b; Assumed the same maximum daily onsite travel distance for the construction of Intertie System Improvements, Intake Pump Station, and Intake Pipeline Construction.
- Worker Vehicle EFs are calculated from the fleet-mixed of diesel and gas fuel vehicles from EMFAC2011.
- G: gasoline; D: Diesel
- Water trucks are Medium-Heavy Duty Diesel instate Truck with GVWR>26000 lbs (T6 instate heavy).
- Off-road Trucks (dump) are Dump Trucks. Dump Trucks are Medium-Heavy Duty Diesel instate construction Truck with GVWR>26000 lbs (T6 instate construction heavy)
- To be conservative, the higher emission factors from OFFROAD2007 and OFFROAD2011 were chose for In-Use Off-Road Equipment.
- Greenhouse Gas Global Warming Potential (GWP) - Intergovernmental Panel on Climate Change, Second Assessment Report (1996) from CCAR General Reporting Protocol January 2009.

CO2	CH4	N2O
1	21	310

- PM<sub>2.5</sub> emission factors determined using guidance from SCAQMD Final - Methodology to Calculate PM<sub>2.5</sub> and PM<sub>2.5</sub> Significance Thresholds 10/1/2006, Appendix A - Updated CEIDARS Table with PM<sub>2.5</sub> Fractions
  - PM<sub>2.5</sub> Fraction of PM<sub>10</sub>, Diesel = 0.920
  - PM<sub>2.5</sub> Fraction of PM<sub>10</sub>, Gasoline-catalyst = 0.928
  - PM<sub>2.5</sub> Fraction of PM<sub>10</sub>, Diesel off-road equipment = 0.920
- Locomotive will be using on the temporary rail track/rack. Therefore, the fugitive dust emissions from traveling on road surface will be negligible and the distance traveling directly on road is 0.
- OFFROAD equipment EFs are based on 8 hours operating per day here but the emission calculation will be adjusted by the actual operating hours.
- CH4 and N2O emission factors are from California Climate Action Registry, January 2009, General Reporting Protocol version 3.1, accessed November 1, 2011.

2. Mobile Source (off-road Equipment and on-road vehicles) - Fugitive Dust Emission Factors

ONSITE

(1) Fugitive Dust Emissions from Traveling on unpaved surfaces

Assumed all the on-site travel will be on unpaved road.

$$E = k * (s/12)^a * (W/3)^b * [(365 - P)/365]$$

Source: EPA AP-42 Section 13.2.2 Unpaved Roads Equations 1a and 2

E = size-specific emission factor (lb/VMT)

k, a, b = empirical constants

0.56 s = surface material silt content (%) Construction sites - Scraper routes (smallest)

W = mean vehicle weight (tons)

61 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC data - SANTA CRUZ Station:(047916) ) constants

	PM <sub>10</sub>	PM <sub>2.5</sub>
k	1.5	0.15
a	0.9	0.9
b	0.45	0.45

Industrial Roads

The fugitive dust on all on-site unpaved surface will be mitigated. SCAQMD CEQA Handbook 2007 - Mitigation Measures and Control Efficiencies ([http://www.aqmd.gov/CEQA/handbook/mitigation/fugitive/MM\\_fugitive.html](http://www.aqmd.gov/CEQA/handbook/mitigation/fugitive/MM_fugitive.html))

61% mitigation efficiency from watering every 3 hours

57% mitigation efficiency from limiting speeds to 15 mph

83% mitigation efficiency from watering every 3 hours and limiting speeds to 15 mph

(2) Bulldozing & grading

Source: EPA AP-42 Section 11.9

$$E = p * 1 * s^{1.5} / M^{1.4}$$

PM10 Emissions from bulldozing (lb/hr); Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.75 p = particle size multiplier for PM10

6.9 s = Silt content (%) (from Table 11.9-3 for bulldozers overburden)

7.9 M = Moisture content of surface material (%) (from Table 11.9-3 for bulldozers overburden)

0.75 lb/hr of PM10

$$E = p * 5.7 * s^{1.2} / M^{1.3}$$

PM2.5 Emissions from bulldozing (lb/hr); Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.105 p = particle size multiplier for PM2.5

6.9 s = Silt content (%) (from Table 11.9-3 for bulldozers overburden)

7.9 M = Moisture content of surface material (%) (from Table 11.9-3 for bulldozers overburden)

0.41 lb/hr of PM2.5

$$E = p * 0.051 * S^{2.0}$$

PM10 Emissions from grading (lb/VMT); Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.6 p = particle size multiplier for PM10

7.1 S = mean vehicle speed (mph) (from Table 11.9-3 for grader)

1.54 lb/VMT of PM10

$$E = p * 0.040 * S^{2.5}$$

PM2.5 Emissions from grading (lb/VMT); Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.031 p = particle size multiplier for PM2.5

7.1 S = mean vehicle speed (mph) (from Table 11.9-3 for grader)

0.17 lb/VMT of PM2.5

For the Backhoes also using for Dirt Piling or Material Handling in pipeline construction, their PM Efs were divided by 2 to avoid double counting.



**(3) Dirt Piling or Material Handling in pipeline construction**

Source: PM10 Emissions from Material Handling (lb/ton) from EPA AP-42 Chapter 13.2.4 Eq. 1

$$E = k * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$$

E = Emission factor (lb/ton material handled)

6.2 U = Mean Wind speed (mph). Source: 1996-2006 annual average, WRCC - MONTEREY AIRPORT ASOS (<http://www.wrcc.dri.edu/htmlfiles/westwind.final.html#CALIFORNIA>)

12 M = Moisture content of surface material (%) (from Table 13.2.4-1 for cover at municipal landfill constants)

	PM <sub>10</sub>	PM <sub>2.5</sub>
k	0.35	0.053

0.00012 lb/ton of PM10

0.00002 lb/ton of PM2.5

6,236 density of soil (lb/yd<sup>3</sup>) (The range of surficial soil density (total unit weight) is from about sigma low 115 to sigma high 135 lb/cf. Use the highest as the most conservative value.)

	Desalination Plant				Intake Pump Station and Pipeline			Intertie System Improvements			
	site grading	Underground Utilities and Piping	Civil Work - Foundations, Structures and Buildings	Final Grading, Paving, Landscaping and Site Restoration	Pump Station	Transfer Pipeline	Brine Conveyance	Crew #1	Crew #2	MORRISSEY pump station upgrade	MCGREGOR pump station upgrade
total cut and fill (CY)	6,250	6,250	6,250	6,250	7,463	10,648	4,222	16,000	22,223	7,463	-
total cut and fill (ton)	19,486	19,486	19,486	19,486	23,268	33,198	13,163	49,885	69,287	23,268	-
soil export/import (CY)	750	750	750	750	3,556	1,651	1,228	9,425	13,091	3,556	-
soil export/import (ton)	2,338	2,338	2,338	2,338	11,085	5,148	3,829	29,385	40,815	11,085	-
days (Paving Period)	86	214	429	129	171	64	64	214	300	107	86
	Month 1 through 4	Month 2 through 11	Month 4 through 23	Month 27 through 32	Month 1, 2, and 10 through 15	Month 13 through 15	Month 10 through 12	Month 1 through 9 and 14	Month 1 through 14	Month 1 through 5	Month 1 through 4
cut and fill PM10 (lb/day)	0.03	0.01	0.01	0.02	0.02	0.06	0.02	0.03	0.03	0.03	-
cut and fill PM2.5 (lb/day)	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	-
Process by each Backhoe (%)	100%	50%	50%	100%	100%	100%	100%	100%	100%	100%	-
Process by each Excavator (%)	0%	50%	50%	0%	0%	0%	0%	0%	0%	0%	-
Process by each Loader (%)	0%	100%	100%	100%	0%	100%	100%	100%	100%	100%	-
each dump truck PM10 (lb/day)	0.0033	0.0013	0.0007	0.0022	0.0078	0.0097	0.0072	0.0166	0.0164	0.0125	-
each dump truck PM2.5 (lb/day)	0.0005	0.0002	0.0001	0.0003	0.0012	0.0015	0.0011	0.0025	0.0025	0.0019	-

The fugitive dust emissions from dirt piling and material handling during cut and fill for intake screen, radical well, and intake pipeline is negligible since the soil will be wet there.

Assume the minimal soil export/import (soil cut will be used in fill as much as possible)

Assume the total amount of soil cut, fill, and export/import for desalination plant is equally distributed to 4 different sub-phases, "site grading", "Underground Utilities and Piping", "Civil Work - Foundations, Structures and Buildings", and "Final Grading, Paving, Landscaping and Site Restoration".

Assume the total amount of soil cut, fill, and export/import for all pump stations is equally distributed to 2 different phases, "Intake Pump Station and Pipeline - Pump Station" and "intertie system improvements - MORRISSEY pump station upgrade". There's no soil cut, fill, and export/import activity in "intertie system improvements - MCGREGOR pump station upgrade" sub-phase.

Assume the total amount of soil cut, fill, and export/import for Intake Pump Station and Pipeline - Pump Station construction is then equally distributed to 4 different sub-phases, "Mobilizing/Site Grading/Demobilizing", "Pump Station/Shaft Excavation", "PS Building/Elec/Mech", and "Final Grading, Paving & Site Restoration".

Assume soil cut/fill/export for the intake pipeline is submerged and then fully saturated when on-shore, thus not producing fugitive emissions; not included in the "Intake Pump Station and Pipeline" figures.

per unit equipment/vehicle

Equipment/Vehicle Name	(1) Travel on unpaved surfaces			(2) Bulldozing & grading			(3) Dirt Piling or Material Handling			Total Mitigated EF		
	PM <sub>10</sub> EF (lbs/day)	PM <sub>2.5</sub> EF (lbs/day)	Mitigation Efficiency	PM <sub>10</sub> EF (lbs/day)	PM <sub>2.5</sub> EF (lbs/day)	Mitigation Efficiency	PM <sub>10</sub> EF (lbs/day)	PM <sub>2.5</sub> EF (lbs/day)	Mitigation Efficiency	PM <sub>10</sub> EF (lbs/day)	PM <sub>2.5</sub> EF (lbs/day)	
<b>Desalination Plant</b>												
Site Grading	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.00	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	0.47	0.05	61%	0.03	0.00	61%	0.19	0.02
	Dozer	-	-	0%	6.02	3.31	61%	-	-	0%	2.35	1.29
	RT Forklift	0.12	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Underground Utilities and Piping	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.00	0.00	61%	0.00	0.00
	Backhoe - Cat 446	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Loader	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Excavator	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Dozer	0.21	0.02	83%	-	-	0%	-	-	0%	0.03	0.00
Civil Work - Foundations, Structures and Buildings	Compactor	0.07	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	RT Forklift	0.12	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.00	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	-	-	0%	0.00	0.00	61%	0.00	0.00
Crane -50 Ton	0.08	0.01	83%	-	-	0%	-	-	0%	0.01	0.00	
Pile-Driving Rig for Shoring and Sheeting	-	-	0%	-	-	0%	-	-	0%	-	-	
Pile Driver Rig/100-Ton Crane for Pile Foundations	-	-	0%	-	-	0%	-	-	0%	-	-	
Compactor	0.07	0.01	83%	-	-	0%	-	-	0%	0.01	0.00	
Loader	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00	
Dozer	0.21	0.02	83%	-	-	0%	-	-	0%	0.03	0.00	
Excavator	-	-	0%	-	-	0%	0.00	0.00	61%	0.00	0.00	
RT Forklift	0.12	0.01	83%	-	-	0%	-	-	0%	0.02	0.00	
Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00	
Major Equipment Installation	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Crane -50 Ton	0.08	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Backhoes - Cat 446	0.08	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	RT Forklift	0.12	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-	
Backhoes - Cat 446	0.08	0.01	83%	-	-	0%	-	-	0%	0.01	0.00	
RT Forklift	0.12	0.01	83%	-	-	0%	-	-	0%	0.02	0.00	
Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00	
Piping and Electrical Work	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Backhoes - Cat 446	0.08	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	RT Forklift	0.12	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
Off-road Trucks (dump)	-	-	0%	-	-	0%	0.00	0.00	61%	0.00	0.00	
Compactor	0.07	0.01	83%	-	-	0%	-	-	0%	0.01	0.00	
Loader	-	-	0%	-	-	0%	0.02	0.00	61%	0.01	0.00	
Backhoes - Cat 446	-	-	0%	0.47	0.05	61%	0.02	0.00	61%	0.19	0.02	
Paver - concrete	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00	
RT Forklift	0.12	0.01	83%	-	-	0%	-	-	0%	0.02	0.00	
Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00	
Testing and Commissioning	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	RT Forklift	0.12	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Worker vehicle in Desalination Plant	Worker Vehicle	0.02	0.00	83%	-	-	0%	-	-	0%	0.00	0.00
Water trucks in Pipeline and Pump Station constructions	Water Truck	0.10	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
<b>Intake Pump Station and Pipeline</b>												
Mobilizing/Site Grading/Demobilizing	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	0.47	0.05	61%	0.02	0.00	61%	0.19	0.02
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Pump Station/Shaft Excavation	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	-	-	0%	0.02	0.00	61%	0.01	0.00
	Crane -100 Ton	0.11	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-	

PS Building/Elec/Mech	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Compactor	0.07	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	RT Forklift	0.12	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	-	-	0%	0.02	0.00	61%	0.01	0.00
	Crane -100 Ton	0.11	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
Final Grading, Paving & Site Restoration	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	0.47	0.05	61%	0.02	0.00	61%	0.19	0.02
	Paver - concrete	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Intake Pipeline/Tunnel	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	0.10	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Backhoes - Cat 446	0.08	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Crane -100 Ton	0.11	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Locomotive - 12 Ton	-	-	0%	-	-	0%	-	-	0%	-	-
	Concrete Pump	-	-	0%	-	-	0%	-	-	0%	-	-
	Compactor	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Trash Pump	-	-	0%	-	-	0%	-	-	0%	-	-
Hauling Spoils to Disposal Site	Getman Buggy	0.07	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Loader - 966	0.19	0.02	83%	-	-	0%	-	-	0%	0.03	0.00
	Off-road Trucks (dump)	0.10	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Spoils Separator	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Intake Pipeline/Dredging	Barge	-	-	0%	-	-	0%	-	-	0%	-	-
	Crane -100 Ton	0.11	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	small boat	-	-	0%	-	-	0%	-	-	0%	-	-
Intake Screens/Structure Alternatives - bedrock	Winch	-	-	0%	-	-	0%	-	-	0%	-	-
	Barge	-	-	0%	-	-	0%	-	-	0%	-	-
	Crane -100 Ton	0.11	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
Transfer Pipeline	small boat	-	-	0%	-	-	0%	-	-	0%	-	-
	Horizontal Drill	-	-	0%	-	-	0%	-	-	0%	-	-
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	-	-	0%	0.06	0.01	61%	0.02	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Loader - Cat 966	-	-	0%	-	-	0%	0.06	0.01	61%	0.02	0.00
Brine Conveyance	Roller Compactor	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Paver - concrete/ashalt	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	-	-	0%	0.02	0.00	61%	0.01	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Worker vehicle in Intake Pump Station and Pipeline constructions	Loader - Cat 966	-	-	0%	-	-	0%	0.02	0.00	61%	0.01	0.00
	Roller Compactor	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Water trucks in Intake Pump Station and Pipeline constructions	Paver - concrete/ashalt	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Worker Vehicle	0.02	0.00	83%	-	-	0%	-	-	0%	0.00	0.00
Intertie System Improvements	Water Truck	0.10	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	-	-	0%	0.03	0.00	61%	0.01	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Roller Compactor	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Loader - Cat 966	-	-	0%	-	-	0%	0.03	0.00	61%	0.01	0.00
Crew Team #1	Paver - concrete/ashalt	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	-	-	0%	0.03	0.00	61%	0.01	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Roller Compactor	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Crew Team #2	Loader - Cat 966	-	-	0%	-	-	0%	0.03	0.00	61%	0.01	0.00
	Paver - concrete/ashalt	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	-	-	0%	0.03	0.00	61%	0.01	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Crew Team #2	Roller Compactor	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Loader - Cat 966	-	-	0%	-	-	0%	0.03	0.00	61%	0.01	0.00
	Paver - concrete/ashalt	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-

MORRISSEY pump station upgrade	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Off-road Trucks (dump)	-	-	0%	-	-	0%	0.01	0.00	61%	0.00	0.00
	Backhoes - Cat 446	-	-	0%	0.47	0.05	61%	0.03	0.00	61%	0.19	0.02
	Crane -100 Ton	0.11	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
MCGREGOR pump station upgrade	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
	Air Compressors	-	-	0%	-	-	0%	-	-	0%	-	-
	Generator - 113 KW	-	-	0%	-	-	0%	-	-	0%	-	-
	Crane -100 Ton	0.11	0.01	83%	-	-	0%	-	-	0%	0.02	0.00
	Pickup Truck	0.06	0.01	83%	-	-	0%	-	-	0%	0.01	0.00
Worker vehicles in Intertie System Improvements	Worker Vehicle	0.02	0.00	83%	-	-	0%	-	-	0%	0.00	0.00
Water trucks in Intertie System Improvements	Water Truck	0.10	0.01	83%	-	-	0%	-	-	0%	0.02	0.00

**OFFSITE**

**(1) Fugitive Dust Emissions from Traveling on Paved Road**

Assumed all the off-site travel will be on paved road.

$$E = [ k * (sL/2)^{0.91} * (W)^{1.02} ] (1 - P/4N)$$

Source: EPA AP-42 Section 13.2.1 Paved Roads Equation 2 (Jan. 2011 version)

E = particulate emission factor (lb/VMT),

k = particle size multiplier for particle size range and units of interest (lb/VMT),

	PM <sub>10</sub>	PM <sub>2.5</sub>	Unit
k	0.0022	0.00054	lb/VMT

0.6 sL = road surface silt loading (grams per square meter) (g/m<sup>2</sup>), From AP-42 Table 13.2.1-2, Ubiquitous Baseline, ADT<500

W = average weight (tons) of the vehicles traveling the road, and

C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

61 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC data - SANTA CRUZ Station:(047916) )

365 N = number of days in the year (averaging period)

**per unit equipment/vehicle**

Equipment/Vehicle Name	(1) Travel on unpaved surfaces			Total Mitigated EF	
	PM <sub>10</sub> EF (lbs/day)	PM <sub>2.5</sub> EF (lbs/day)	Mitigation Efficiency	PM <sub>10</sub> EF (lbs/day)	PM <sub>2.5</sub> EF (lbs/day)
<b>On-road Vehicle</b>					
Dump Truck	1.12	0.27	0%	1.12	0.27
Pickup Truck	0.36	0.09	0%	0.36	0.09
Water Truck	1.12	0.27	0%	1.12	0.27
Worker Vehicle	0.07	0.02	0%	0.07	0.02

**3. Area Sources**

**Fugitive VOC from Architectural Coatings**

Assumed architectural coating will only apply to desalination plant buildings

$$E = EF * F * A$$

Source: CalEEMod Appendix A

12.61 E: VOC emissions in lbs per day

25% F: fraction of interior surface area.

75% F: fraction of exterior surface area.

113,950 A: building surface area in square foot, assumed the total surface area for painting equals 2 times the floor square footage for non-residential land use.

0.0047 EF: emission factor (lb/sqft)

$$EF = C_{voc} / 454 * 3.875 / 180$$

100 C = VOC content (g/L). California's standards are: 150 g/l for nonflat finishes and 100 g/l for flat. Assumed surface is flat.

2 month painting (month 25 and 26)

**Fugitive VOC from Paving**

$$E = EF * A$$

Source: CalEEMod Appendix A

E: VOC off-gassing emissions in lbs

2.62 EF: lbs per acre

A: asphalt paving area (acre)

20% of total footprint will be paved

	Desalination Plant	Intake Pump Station and Pipeline	Intertie System Improvements
Footprint (acres)	7.20	11.75	15.09
A (acres)	1.44	2.35	3.02
days (Paving Period)	129	107	300
	Month 27 through 32	Month 10 through 12 and 14 through 15	Month 1 through 14
E (lbs)	3.77	6.16	7.91
E (lb/day)	0.03	0.06	0.03

**Fugitive PM from wind erosion on storage Piles**

$E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J$

Source: SCAQMD Table A9-9-E  
 PM10 Emission factor from wind erosion of storage piles per day per acre  
 7.5 G = Silt content (%) (from CEQA Handbook Table A9-9-E-1 for overburden)  
 61 H = Number of days with >= 0.01 inches of precipitation per year (from WRCC data - SANTA CRUZ Station:(047916) )  
 5 I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height (assumptions)  
 0.5 J = Fraction of TSP that is PM10 = 0.5 (PM2.5/PM10 = 0.222)  
 1.833 lb/acre/day

	Desalination Plant	Intake Pump Station and Pipeline	Intertie System Improvements
# of piles (assumptions)	1	2	3
Size of Pile (acre) (assumptions)	0.10	0.10	0.10
Total Pile acres	0.10	0.20	0.30
Period having piles	Month 1 through 32	Month 1 through 7 and 10 through 16	Month 1 through 14
E (lbs/day)	0.18	0.37	0.55
PM10 (lbs/day)	0.09	0.18	0.27
PM2.5 (lbs/day)	0.02	0.04	0.06

**4. Summary of Emission Factors**

per unit equipment/vehicle

	Equipment/Vehicle Name	unit	Emission Factors (unit: lbs/day/unit)													
			Fugitive Dust PM10	Exhaust PM10	Total PM10	Fugitive Dust PM2.5	Exhaust PM2.5	Total PM2.5	CO	VOC	NOx	SOx	CO2	CH4	N2O	CO2e
<b>ONSITE</b>																
<b>Desalination Plant</b>																
Site Grading	Air Compressors	1	-	0.43	0.43	-	0.39	0.39	4.14	1.26	13.04	0.02	1,852.27	0.11	-	1,854.65
	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	Off-road Trucks (dump)	1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
	Backhoes - Cat 446	1	0.19	0.27	0.46	0.02	0.25	0.27	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
	Dozer	1	2.35	0.67	3.02	1.29	0.62	1.91	6.71	0.83	11.86	0.01	1,034.88	0.15	-	1,037.96
	RT Forklift	1	0.02	0.43	0.45	0.00	0.39	0.39	5.79	1.01	7.78	0.01	998.30	0.09	-	1,000.21
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
Underground Utilities and Piping	Air Compressors	1	-	0.43	0.43	-	0.39	0.39	4.14	1.26	13.04	0.02	1,852.27	0.11	-	1,854.65
	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	Off-road Trucks (dump)	1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
	Backhoe - Cat 446	1	0.00	0.27	0.27	0.00	0.25	0.25	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
	Loader	1	0.00	0.39	0.39	0.00	0.36	0.36	5.00	0.48	7.11	0.01	849.76	0.08	-	851.52
	Excavator	1	0.00	0.37	0.37	0.00	0.34	0.34	4.08	0.44	10.48	0.02	1,868.20	0.12	-	1,870.71
	Dozer	1	0.03	0.67	0.71	0.00	0.62	0.62	6.71	0.83	11.86	0.01	1,034.88	0.15	-	1,037.96
	Compactor	1	0.01	0.41	0.42	0.00	0.37	0.38	4.94	0.94	7.61	0.01	864.39	0.08	-	866.17
	RT Forklift	1	0.02	0.43	0.45	0.00	0.39	0.39	5.79	1.01	7.78	0.01	998.30	0.09	-	1,000.21
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
Civil Work - Foundations, Structures and Buildings	Air Compressors	1	-	0.43	0.43	-	0.39	0.39	4.14	1.26	13.04	0.02	1,852.27	0.11	-	1,854.65
	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	Off-road Trucks (dump)	1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
	Backhoes - Cat 446	1	0.00	0.27	0.27	0.00	0.25	0.25	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
	Crane -50 Ton	1	0.01	0.40	0.42	0.00	0.37	0.37	2.25	0.78	8.76	0.01	896.47	0.07	-	897.95
	Pile-Driving Rig for Shoring and Sheeting	1	-	0.20	0.20	-	0.18	0.18	2.74	0.34	6.66	0.02	1,503.46	0.05	-	1,504.58
	Pile Driver Rig/100-Ton Crane for Pile Foundations	1	-	0.33	0.33	-	0.30	0.30	4.41	0.54	10.15	0.02	2,488.23	0.09	-	2,490.06
	Compactor	1	0.01	0.37	0.42	0.00	0.36	0.38	4.94	0.94	7.61	0.01	864.39	0.08	-	866.17
	Loader	1	0.00	0.39	0.39	0.00	0.36	0.36	5.00	0.48	7.11	0.01	849.76	0.08	-	851.52
	Dozer	1	0.03	0.67	0.71	0.00	0.62	0.62	6.71	0.83	11.86	0.01	1,034.88	0.15	-	1,037.96
	Excavator	1	0.00	0.37	0.37	0.00	0.34	0.34	4.08	0.44	10.48	0.02	1,868.20	0.12	-	1,870.71
	RT Forklift	1	0.02	0.43	0.45	0.00	0.39	0.39	5.79	1.01	7.78	0.01	998.30	0.09	-	1,000.21
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
Major Equipment Installation	Air Compressors	1	-	0.43	0.43	-	0.39	0.39	4.14	1.26	13.04	0.02	1,852.27	0.11	-	1,854.65
	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	Crane -50 Ton	1	0.01	0.40	0.42	0.00	0.37	0.37	2.25	0.78	8.76	0.01	896.47	0.07	-	897.95
	Backhoes - Cat 446	1	0.01	0.27	0.28	0.00	0.25	0.25	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
	RT Forklift	1	0.02	0.43	0.45	0.00	0.39	0.39	5.79	1.01	7.78	0.01	998.30	0.09	-	1,000.21
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
Piping and Electrical Work	Air Compressors	1	-	0.43	0.43	-	0.39	0.39	4.14	1.26	13.04	0.02	1,852.27	0.11	-	1,854.65
	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	Backhoes - Cat 446	1	0.01	0.27	0.28	0.00	0.25	0.25	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
	RT Forklift	1	0.02	0.43	0.45	0.00	0.39	0.39	5.79	1.01	7.78	0.01	998.30	0.09	-	1,000.21
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
Final Grading	Air Compressors	1	-	0.43	0.43	-	0.39	0.39	4.14	1.26	13.04	0.02	1,852.27	0.11	-	1,854.65
	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	Off-road Trucks (dump)	1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10

Final Grading, Paving, Landscaping and Site Restoration	Compactor	1	0.01	0.41	0.42	0.00	0.37	0.38	4.94	0.94	7.61	0.01	864.39	0.08	-	866.17
	Loader	1	0.01	0.39	0.40	0.00	0.36	0.36	5.00	0.48	7.11	0.01	849.76	0.08	-	851.52
	Backhoes - Cat 446	1	0.19	0.27	0.46	0.02	0.25	0.27	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
	Paver - concrete	1	0.01	0.54	0.55	0.00	0.50	0.50	4.00	0.33	6.35	0.01	553.07	0.09	-	555.06
	RT Forklift	1	0.02	0.43	0.45	0.00	0.39	0.39	5.79	1.01	7.78	0.01	998.30	0.09	-	1,000.21
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
Testing and Commissioning	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	RT Forklift	1	0.02	0.43	0.45	0.00	0.39	0.39	5.79	1.01	7.78	0.01	998.30	0.09	-	1,000.21
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
Worker vehicle in Desalination Plant	Worker Vehicle	1	0.00	0.00	0.00	0.00	0.00	0.06	0.01	0.00	0.00	1.11	0.00	0.00	1.13	
Water trucks in Pipeline and Pump Station constructions	Water Truck	1	0.02	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
Area Source	Paving VOC, Wind Erosion	1	0.09		0.09	0.02		0.02		0.03						
<b>Intake Pump Station and Pipeline</b>																
Mobilizing/Site Grading/Demobilizing	Air Compressors	1	-	0.26	0.26	-	0.24	0.24	2.32	0.77	8.42	0.01	1,048.82	0.07	-	1,050.28
	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	Off-road Trucks (dump)	1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
	Backhoes - Cat 446	1	0.19	0.27	0.46	0.02	0.25	0.27	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
	Pump Station/Shaft Excavation	Air Compressors	1	-	0.26	0.26	-	0.24	0.24	2.32	0.77	8.42	0.01	1,048.82	0.07	-
Generator - 113 KW		1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
Off-road Trucks (dump)		1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
Backhoes - Cat 446		1	0.01	0.27	0.27	0.00	0.25	0.25	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
Crane -100 Ton		1	0.02	0.40	0.42	0.00	0.37	0.37	2.25	0.78	8.76	0.01	896.47	0.07	-	897.95
Pickup Truck		1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
PS Building/Elec/Mech	Air Compressors	1	-	0.26	0.26	-	0.24	0.24	2.32	0.77	8.42	0.01	1,048.82	0.07	-	1,050.28
	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	Compactor	1	0.01	0.41	0.42	0.00	0.37	0.38	4.94	0.94	7.61	0.01	864.39	0.08	-	866.17
	RT Forklift	1	0.02	0.43	0.45	0.00	0.39	0.39	5.79	1.01	7.78	0.01	998.30	0.09	-	1,000.21
	Off-road Trucks (dump)	1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
	Backhoes - Cat 446	1	0.01	0.27	0.27	0.00	0.25	0.25	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
Final Grading, Paving & Site Restoration	Crane -100 Ton	1	0.02	0.40	0.42	0.00	0.37	0.37	2.25	0.78	8.76	0.01	896.47	0.07	-	897.95
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
	Air Compressors	1	-	0.26	0.26	-	0.24	0.24	2.32	0.77	8.42	0.01	1,048.82	0.07	-	1,050.28
	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	Off-road Trucks (dump)	1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
	Backhoes - Cat 446	1	0.19	0.27	0.46	0.02	0.25	0.27	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
Intake Pipeline/Tunnel	Paver - concrete	1	0.01	0.54	0.55	0.00	0.50	0.50	4.00	0.33	6.35	0.01	553.07	0.09	-	555.06
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
	Air Compressors	1	-	0.26	0.26	-	0.24	0.24	2.32	0.77	8.42	0.01	1,048.82	0.07	-	1,050.28
	Generator - 113 KW	1	-	0.44	0.44	-	0.41	0.41	5.90	1.01	9.37	0.01	1,134.81	0.09	-	1,136.73
	Off-road Trucks (dump)	1	0.02	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
	Backhoes - Cat 446	1	0.01	0.27	0.28	0.00	0.25	0.25	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
	Crane -100 Ton	1	0.02	0.40	0.42	0.00	0.37	0.37	2.25	0.78	8.76	0.01	896.47	0.07	-	897.95
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
	Locomotive - 12 Ton	1	-	0.40	0.40	-	0.37	0.37	4.18	0.73	5.25	0.01	646.29	0.07	-	647.67
	Concrete Pump	1	-	0.46	0.46	-	0.42	0.42	5.91	1.04	9.40	0.01	1,119.98	0.09	-	1,121.96
	Compactor	1	0.01	0.18	0.19	0.00	0.17	0.17	2.26	0.75	1.99	0.00	207.68	0.07	-	209.11
	Trash Pump	1	-	0.04	0.04	-	0.03	0.03	0.39	0.09	0.58	0.00	59.34	0.01	-	59.52
	Getman Buggy	1	0.01	0.15	0.16	0.00	0.13	0.14	2.05	0.53	1.97	0.00	223.72	0.05	-	224.73
Hauling Spoils to Disposal Site	Loader - 966	1	0.03	0.30	0.33	0.00	0.28	0.28	2.84	0.44	8.75	0.01	1,190.74	0.09	-	1,192.54
	Off-road Trucks (dump)	1	0.02	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
	Spoils Separator	1	0.01	0.35	0.36	0.00	0.32	0.32	4.06	1.10	10.74	0.02	2,032.08	0.10	-	2,034.17
Intake Pipeline/Dredging	Barge	1	-	0.53	0.53	-	0.49	0.49	6.09	1.65	16.11	0.03	3,048.12	0.15	-	3,051.25
	Crane -100 Ton	1	0.02	0.60	0.62	0.00	0.56	0.56	3.38	1.17	13.14	0.02	1,344.70	0.11	-	1,346.92
	Air Compressors	1	-	0.39	0.39	-	0.36	0.36	3.47	1.16	12.63	0.02	1,573.22	0.10	-	1,575.43
	Generator - 113 KW	1	-	0.66	0.66	-	0.61	0.61	8.85	1.52	14.06	0.02	1,702.22	0.14	-	1,705.10
	small boat	1	-	4.75	4.75	-	4.41	4.41	48.03	25.50	3.35	0.01	517.98	1.59	0.15	597.16
Intake Screens/Structure Alternatives - bedrock	Winch	1	-	0.58	0.58	-	0.53	0.53	7.03	1.04	10.90	0.01	1,277.04	0.09	-	1,279.01
	Barge	1	-	0.53	0.53	-	0.49	0.49	6.09	1.65	16.11	0.03	3,048.12	0.15	-	3,051.25
	Crane -100 Ton	1	0.02	0.60	0.62	0.00	0.56	0.56	3.38	1.17	13.14	0.02	1,344.70	0.11	-	1,346.92
	Air Compressors	1	-	0.39	0.39	-	0.36	0.36	3.47	1.16	12.63	0.02	1,573.22	0.10	-	1,575.43
	Generator - 113 KW	1	-	0.66	0.66	-	0.61	0.61	8.85	1.52	14.06	0.02	1,702.22	0.14	-	1,705.10
Transfer Pipeline	small boat	1	-	4.75	4.75	-	4.41	4.41	48.03	25.50	3.35	0.01	517.98	1.59	0.15	597.16
	Horizontal Drill	1	-	0.20	0.20	-	0.18	0.18	2.74	0.34	6.66	0.02	1,503.46	0.05	-	1,504.58
	Air Compressors	1	-	0.26	0.26	-	0.24	0.24	2.32	0.77	8.42	0.01	1,048.82	0.07	-	1,050.28
	Off-road Trucks (dump)	1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
	Backhoes - Cat 446	1	0.02	0.27	0.29	0.00	0.25	0.25	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
	Loader - Cat 966	1	0.02	0.30	0.32	0.00	0.28	0.28	2.84	0.44	8.75	0.01	1,190.74	0.09	-	1,192.54
	Roller Compacter	1	0.01	0.39	0.40	0.00	0.36	0.36	3.22	0.73	4.72	0.01	471.49	0.07	-	472.88
Brine Conveyance	Paver - concrete/ashalt	1	0.01	0.54	0.55	0.00	0.50	0.50	4.00	0.33	6.35	0.01	553.07	0.09	-	555.06
	Air Compressors	1	-	0.26	0.26	-	0.24	0.24	2.32	0.77	8.42	0.01	1,048.82	0.07	-	1,050.28
	Off-road Trucks (dump)	1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	3.10	0.00	0.00	3.10
	Backhoes - Cat 446	1	0.01	0.27	0.28	0.00	0.25	0.25	2.80	0.51	3.39	0.00	413.45	0.05	-	414.41
	Pickup Truck	1	0.01	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.01	0.00	1.58	0.00	0.00	1.63
	Loader - Cat 966	1														







Worker vehicle in Intake Pump Station and Pipeline constructions	Worker Vehicle	1	0.08	0.00	0.08	0.02	0.00	0.02	0.26	0.02	0.03	0.00	34.42	0.01	0.01	36.76
Water trucks in Intake Pump Station and Pipeline constructions	Water Truck	1	1.15	0.04	1.19	0.29	0.04	0.32	0.21	0.07	2.00	0.00	263.41	0.00	0.00	263.76
Area Source	Paving VOC, Wind Erosion	1	-	-	-	-	-	-	-	1.00	2.00	3.00	4.00	5.00	6.00	7.00
<b>Intertie System Improvements</b>																
Crew Team #1	Air Compressors	1	-	-	-	-	-	-	-	1.00	2.00	3.00	4.00	5.00	6.00	7.00
	Off-road Trucks (dump)	1	1.15	0.04	1.19	0.29	0.04	0.33	0.22	0.07	2.08	0.00	263.69	0.00	0.00	264.04
	Backhoes - Cat 446	1	-	-	-	-	-	-	-	1.00	2.00	3.00	4.00	5.00	6.00	7.00
	Pickup Truck	1	0.37	0.00	0.37	0.09	0.00	0.09	1.10	0.10	0.10	0.00	82.48	0.02	0.02	89.92
	Roller Compactor	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Loader - Cat 966	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Paver - concrete/ashalt	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crew Team #2	Air Compressors	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Off-road Trucks (dump)	1	1.15	0.04	1.19	0.29	0.04	0.33	0.22	0.07	2.08	0.00	263.69	0.00	0.00	264.04
	Backhoes - Cat 446	1	-	-	-	-	-	-	-	1.00	2.00	3.00	4.00	5.00	6.00	7.00
	Pickup Truck	1	0.37	0.00	0.37	0.09	0.00	0.09	1.10	0.10	0.10	0.00	82.48	0.02	0.02	89.92
	Roller Compactor	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Loader - Cat 966	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Paver - concrete/ashalt	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MORRISSEY pump station upgrade	Air Compressors	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Generator - 113 KW	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Off-road Trucks (dump)	1	1.15	0.04	1.19	0.29	0.04	0.33	0.22	0.07	2.08	0.00	263.69	0.00	0.00	264.04
	Backhoes - Cat 446	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Crane -100 Ton	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MCGREGOR pump station upgrade	Pickup Truck	1	0.37	0.00	0.37	0.09	0.00	0.09	1.10	0.10	0.10	0.00	82.48	0.02	0.02	89.92
	Air Compressors	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Generator - 113 KW	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Crane -100 Ton	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worker vehicles in Intertie System Improvements	Worker Vehicle	1	0.08	0.00	0.08	0.02	-	0.02	0.26	0.02	0.03	0.00	34.42	0.01	0.01	36.76
Water trucks in Intertie System Improvements	Water Truck	1	1.15	0.04	1.19	0.29	0.04	0.32	0.21	0.07	2.00	0.00	263.41	0.00	0.00	263.76
Area Source	Paving VOC, Wind Erosion	1	-	-	-	-	-	-	-	1.00	2.00	3.00	4.00	5.00	6.00	7.00

scwd<sup>2</sup> Regional Seawater Desalination Project EIR  
 Construction Emission Estimations  
 Emission Inventory Summary

ONSITE+OFFSITE	Unit: lb per day									
	Fugitive Dust PM10	Exhaust PM10	Total PM10	Fugitive Dust PM2.5	Exhaust PM2.5	Total PM2.5	CO	VOC	NOx	SOx
Month 1	29.31	9.77	38.62	7.88	8.97	16.75	137.20	27.61	223.56	12.33
Month 2	37.96	30.64	68.15	10.00	28.25	38.15	383.16	106.80	480.67	12.72
Month 3	35.86	29.63	65.03	9.50	27.32	36.72	369.51	103.20	455.14	9.69
Month 4	40.25	34.64	74.42	10.57	31.93	42.39	426.91	113.47	568.39	9.85
Month 5	34.66	31.25	65.46	8.51	28.81	37.22	384.77	105.60	493.72	9.75
Month 6	32.19	17.05	48.78	7.93	15.67	23.50	236.59	42.87	371.65	9.56
Month 7	32.01	17.05	48.78	7.89	15.67	23.50	236.59	42.87	371.65	9.56
Month 8	27.67	26.47	53.87	6.82	24.42	31.18	328.69	94.30	394.50	9.61
Month 9	27.35	27.00	54.07	6.74	24.90	31.59	334.55	95.04	411.20	9.65
Month 10	32.40	15.71	47.65	8.00	14.44	22.34	223.31	38.24	347.91	6.54
Month 11	33.23	18.10	50.87	8.19	16.64	24.73	252.40	44.06	398.25	6.61
Month 12	33.24	17.33	50.11	8.19	15.93	24.02	242.83	43.61	380.72	6.59
Month 13	31.99	16.58	48.11	7.88	15.24	23.02	230.94	42.34	367.24	6.56
Month 14	37.01	17.90	54.46	9.11	16.46	25.47	241.01	44.85	390.44	12.58
Month 15	24.91	13.73	38.37	6.11	12.63	18.68	190.84	33.75	295.04	3.44
Month 16	15.73	9.79	25.24	3.84	9.00	12.78	149.64	26.30	213.74	3.33
Month 17	11.32	8.73	19.95	2.77	8.03	10.78	131.91	22.21	185.83	0.29
Month 18	11.32	8.73	19.95	2.77	8.03	10.78	131.91	22.21	185.83	0.29
Month 19	11.32	8.73	19.95	2.77	8.03	10.78	131.91	22.21	185.83	0.29
Month 20	11.32	8.73	19.95	2.77	8.03	10.78	131.91	22.21	185.83	0.29
Month 21	11.32	8.73	19.95	2.77	8.03	10.78	131.91	22.24	185.83	0.29
Month 22	11.32	8.73	19.95	2.77	8.03	10.78	131.91	22.24	185.83	0.29
Month 23	11.32	8.73	19.95	2.77	8.03	10.78	131.91	22.24	185.83	0.29
Month 24	9.30	4.46	13.66	2.29	4.10	6.36	81.87	13.66	96.31	0.17
Month 25	9.30	4.46	13.66	2.29	4.10	6.36	81.87	26.27	96.31	0.17
Month 26	9.30	4.46	13.66	2.29	4.10	6.36	81.87	26.27	96.31	0.17
Month 27	12.24	8.27	20.42	2.98	7.61	10.57	131.18	34.38	170.67	0.27
Month 28	12.24	8.27	20.42	2.98	7.61	10.57	131.18	34.38	170.67	0.27
Month 29	11.40	5.88	17.19	2.78	5.41	8.17	102.10	28.57	120.33	0.20
Month 30	11.40	5.88	17.19	2.78	5.41	8.17	102.10	28.57	120.33	0.20
Month 31	11.40	5.88	17.19	2.78	5.41	8.17	102.10	28.57	120.33	0.20
Month 32	15.06	6.17	21.14	4.38	5.67	10.03	103.24	28.46	126.53	0.20
Max. Daily	40.25	34.64	74.42	10.57	31.93	42.39	426.91	113.47	568.39	12.72

Total Project Construction GHG	Unit: Metric Ton			
	CO2	CH4	N2O	CO2e
Total Project	11,738.38	3.38	2.82	11,864.47

ONSITE ONLY	Unit: lb per day									
	Fugitive Dust PM10	Exhaust PM10	Total PM10	Fugitive Dust PM2.5	Exhaust PM2.5	Total PM2.5	CO	VOC	NOx	SOx
Month 1	4.03	9.22	12.79	1.53	8.48	9.90	97.58	19.18	187.28	0.25
Month 2	<b>4.48</b>	29.98	34.00	<b>1.57</b>	27.66	29.13	324.08	96.41	438.39	0.61
Month 3	4.26	29.01	32.82	1.55	26.77	28.21	312.84	94.09	417.15	0.58
Month 4	4.46	<b>33.89</b>	<b>37.90</b>	1.57	<b>31.26</b>	<b>32.72</b>	<b>367.38</b>	<b>103.93</b>	<b>523.95</b>	<b>0.73</b>
Month 5	1.83	30.56	31.93	0.25	28.19	28.33	330.89	96.65	451.87	0.64
Month 6	1.56	16.40	17.50	0.22	15.09	15.20	186.16	34.30	332.20	0.46
Month 7	1.38	16.40	17.50	0.18	15.09	15.20	186.16	34.30	332.20	0.46
Month 8	1.23	25.95	26.90	0.16	23.95	24.05	281.11	86.16	361.50	0.52
Month 9	1.21	26.48	27.42	0.16	24.44	24.54	288.01	87.00	378.29	0.56
Month 10	1.46	15.05	16.06	0.21	13.85	13.96	171.85	30.57	310.35	0.44
Month 11	1.55	17.44	18.53	0.22	16.05	16.16	198.74	36.18	360.49	0.51
Month 12	1.55	16.68	17.77	0.22	15.34	15.46	189.17	35.74	342.95	0.48
Month 13	1.52	15.93	16.99	0.22	14.66	14.77	181.42	34.86	329.88	0.46
Month 14	1.75	17.12	18.42	0.24	15.75	15.90	186.57	34.74	342.43	0.47
Month 15	1.32	13.26	14.30	0.17	12.20	12.31	149.58	28.28	268.63	0.36
Month 16	1.12	9.58	10.42	0.15	8.81	8.90	116.16	21.88	200.44	0.28
Month 17	0.67	8.61	9.18	0.08	7.92	7.98	104.16	19.45	179.12	0.25
Month 18	0.67	8.61	9.18	0.08	7.92	7.98	104.16	19.45	179.12	0.25
Month 19	0.67	8.61	9.18	0.08	7.92	7.98	104.16	19.45	179.12	0.25
Month 20	0.67	8.61	9.18	0.08	7.92	7.98	104.16	19.45	179.12	0.25
Month 21	0.67	8.61	9.18	0.08	7.92	7.98	104.16	19.48	179.12	0.25
Month 22	0.67	8.61	9.18	0.08	7.92	7.98	104.16	19.48	179.12	0.25
Month 23	0.67	8.61	9.18	0.08	7.92	7.98	104.16	19.48	179.12	0.25
Month 24	0.54	4.38	4.83	0.07	4.03	4.08	56.54	11.18	91.88	0.13
Month 25	0.54	4.38	4.83	0.07	4.03	4.08	56.54	23.79	91.88	0.13
Month 26	0.54	4.38	4.83	0.07	4.03	4.08	56.54	23.79	91.88	0.13
Month 27	0.84	8.15	8.90	0.10	7.50	7.58	101.25	31.41	163.75	0.22
Month 28	0.84	8.15	8.90	0.10	7.50	7.58	101.25	31.41	163.75	0.22
Month 29	0.75	5.76	6.42	0.09	5.30	5.37	74.36	25.80	113.61	0.16
Month 30	0.75	5.76	6.42	0.09	5.30	5.37	74.36	25.80	113.61	0.16
Month 31	0.75	5.76	6.42	0.09	5.30	5.37	74.36	25.80	113.61	0.16
Month 32	3.26	6.01	9.18	1.40	5.53	6.90	75.28	25.63	117.73	0.16
<b>Max. Daily</b>	<b>4.48</b>	<b>33.89</b>	<b>37.90</b>	<b>1.57</b>	<b>31.26</b>	<b>32.72</b>	<b>367.38</b>	<b>103.93</b>	<b>523.95</b>	<b>0.73</b>
<b>MBUAPCD CEQA THRESHOLD</b>			<b>82</b>							
<b>Exceed Threshold or not?</b>			<b>No</b>							
<b>BAAQMD CEQA THRESHOLD</b>		<b>82</b>			<b>54</b>			<b>54</b>	<b>54</b>	
<b>Exceed Threshold or not?</b>		<b>No</b>			<b>No</b>			<b>Yes</b>	<b>Yes</b>	

**Attachment T-2**  
**scwd<sup>2</sup> Regional Seawater Desalination Project EIR**  
**Operational Emissions**  
**(February 20, 2013)**



**scwd<sup>2</sup> Regional Seawater Desalination Project EIR**  
**Operational Emission Estimations**  
**- Emission Inventory for Criteria Pollutants**

**1. Summary of Maximum Daily Emissions**

**Table B-1, Maximum Daily Emissions (unit in pounds per day)**

Emission Category	Maximum Daily Emissions (unit: lbs/day)									
	Fugitive Dust PM10	Exhaust PM10	Total PM10	Fugitive Dust PM2.5	Exhaust PM2.5	Total PM2.5	CO	VOC	NOx	SOx
<b>Direct Emissions</b>										
Worker Vehicles (onsite travel)	0.01	0.00	0.01	0.00	0.00	0.00	0.67	0.10	0.04	0.00
Delivery Trucks (onsite travel)	0.03	0.00	0.03	0.01	0.00	0.01	0.02	0.00	0.14	0.00
Diesel Generators (4)	-	0.06	0.06	-	0.06	0.06	11.18	0.61	6.39	4.86
Forklift	-	0.04	0.04	-	0.04	0.04	0.66	0.09	0.77	0.00
Fireplace/Stove	-	0.00	0.00	-	0.00	0.00	0.01	0.00	0.02	0.00
Consumer Products	-	-	-	-	-	-	-	1.22	-	-
Architectural Coatings	-	-	-	-	-	-	-	0.15	-	-
<b>Direct Emissions subtotal</b>	<b>0.03</b>	<b>0.11</b>	<b>0.14</b>	<b>0.01</b>	<b>0.11</b>	<b>0.12</b>	<b>12.54</b>	<b>2.17</b>	<b>7.36</b>	<b>4.86</b>
<b>Indirect Emissions</b>										
Worker Vehicles (offsite travel)	1.07	0.00	1.07	0.27	0.00	0.28	2.79	0.26	0.27	0.01
Delivery Trucks (offsite travel)	4.58	0.04	4.63	1.14	0.04	1.18	0.33	0.10	4.45	0.01
<b>Indirect Emissions subtotal</b>	<b>5.65</b>	<b>0.05</b>	<b>5.70</b>	<b>1.41</b>	<b>0.04</b>	<b>1.46</b>	<b>3.12</b>	<b>0.36</b>	<b>4.72</b>	<b>0.01</b>
<b>Total project</b>	<b>5.69</b>	<b>0.16</b>	<b>5.84</b>	<b>1.42</b>	<b>0.15</b>	<b>1.57</b>	<b>15.66</b>	<b>2.52</b>	<b>12.08</b>	<b>4.88</b>

**2. Summary of Maximum Annual Emissions**

**Table B-2, Maximum Annual Emissions (unit in tons per year for all pollutants)**

Emission Category	Maximum Annual Emissions (unit: tons/year for all pollutants)									
	Fugitive Dust PM10	Exhaust PM10	Total PM10	Fugitive Dust PM2.5	Exhaust PM2.5	Total PM2.5	CO	VOC	NOx	SOx
<b>Direct Emissions</b>										
Worker Vehicles (onsite travel)	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.01	0.01	0.00
Delivery Trucks (onsite travel)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
Diesel Generators (4)	-	0.00	0.00	-	0.00	0.00	0.07	0.00	0.04	0.03
Forklift	-	0.01	0.01	-	0.01	0.01	0.12	0.02	0.14	0.00
Fireplace/Stove	-	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	-	-	-	-	-	-	-	0.22	-	-
Architectural Coatings	-	-	-	-	-	-	-	0.03	-	-
<b>Direct Emissions subtotal</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.00</b>	<b>0.01</b>	<b>0.01</b>	<b>0.29</b>	<b>0.28</b>	<b>0.21</b>	<b>0.03</b>
<b>Indirect Emissions</b>										
Worker Vehicles (offsite travel)	0.16	0.00	0.16	0.04	0.00	0.04	0.41	0.04	0.04	0.00
Delivery Trucks (offsite travel)	0.67	0.01	0.68	0.17	0.01	0.17	0.05	0.01	0.65	0.00
<b>Indirect Emissions subtotal</b>	<b>0.83</b>	<b>0.01</b>	<b>0.83</b>	<b>0.21</b>	<b>0.01</b>	<b>0.21</b>	<b>0.46</b>	<b>0.05</b>	<b>0.69</b>	<b>0.00</b>
<b>Total project</b>	<b>0.83</b>	<b>0.02</b>	<b>0.85</b>	<b>0.21</b>	<b>0.01</b>	<b>0.22</b>	<b>0.75</b>	<b>0.34</b>	<b>0.90</b>	<b>0.03</b>

**3. CEQA Threshold Comparisons**

**Table B-3, Project Operational Emissions Comparing with CEQA Thresholds (unit in lbs per day)**

Pollutant	PM10	CO	VOC	NOx	SOx
scope	direct	direct	direct + indirect	direct + indirect	direct
MBUAPCD CEQA Thresholds of significance (lb/day)	82	550	137	137	150
Project Operational Emissions (lb/day)	0.14	13	3	12	5
Exceed MBUAPCD CEQA Thresholds of significance?	No	No	No	No	No

**scwd<sup>2</sup> Regional Seawater Desalination Project EIR**  
**Operational Emission Estimations**  
**- Emission Inventory for Greenhouse Gases**

**1. Summary of Maximum Annual Emissions**

**Table C-1, Maximum Annual Emissions (metric ton per year)**

Emission Category	Maximum Annual Emissions (metric ton/year)			
	CO2	CH4	N2O	CO2e
<b>Direct Emissions</b>				
Worker Vehicles (onsite travel)	1.92	0.00	0.00	1.95
Delivery Trucks (onsite travel)	1.85	0.00	0.00	1.85
Worker Vehicles (offsite travel)	58.97	0.01	0.01	63.32
Delivery Trucks (offsite travel)	106.42	0.00	0.00	106.56
Diesel Generators (4)	12.18	0.00	0.00	12.30
Forklift	18.55	0.00	-	18.58
Fireplace/Stove	3.41	0.00	0.00	3.43
Consumer Products	-	-	-	-
Architectural Coatings	-	-	-	-
<b>Direct Emissions subtotal</b>	<b>203.29</b>	<b>0.02</b>	<b>0.01</b>	<b>207.98</b>
<b>Indirect Emissions</b>				
Electricity Purchasing (net emissions)	3,289.59	0.27	0.07	3,317.55
Water Supply and Wastewater	8.49	0.00	0.00	8.56
<b>Indirect Emissions subtotal</b>	<b>3,298.07</b>	<b>0.27</b>	<b>0.07</b>	<b>3,326.11</b>
<b>Total project project</b>	<b>3,501.36</b>	<b>0.29</b>	<b>0.09</b>	<b>3,534.09</b>
<b>Net Emissions</b>				
Baseline Emissions - City and District Operations (2010)	1,378.10	0.09	0.03	1,387.85
<b>Net GHG Emissions</b>	<b>2,123.26</b>	<b>0.19</b>	<b>0.06</b>	<b>2,146.24</b>
<b>Offsets or Other GHG Minimization Projects</b>				<b>(2,146.24)</b>
<b>Total project Emissions</b>				<b>0.00</b>

Note:

The CO2e emissions from electricity purchased are also included and presented in this Table. The net emissions are the project emissions minus baseline operation of the City and District during baseline year 2010 operations. To reach the carbon neutral goal for the project, the rest GHG emissions will be fully offsetted through minimization projects and/or certified offset purchasing.

## 2. GHG CEQA Threshold Comparisons

**Table C-2, Project Operational GHG Emissions Comparing with CEQA Thresholds (metric ton per year)**

Pollutant	CO2e	
	direct + indirect (except stationary diesel engine)	stationary diesel engine only
scope		
CEQA Thresholds of significance (MT/yr) <sup>1</sup>	1,100	10,000
Project Operational Emissions (MT/yr)	2,146	12
Exceed CEQA Thresholds of significance?	Yes	No

**Note:**

The CEQA significant thresholds presented were determined by the City of Santa Cruz. These thresholds are the same as the BAAQMD's CEQA guidance.



**scwd<sup>2</sup> Regional Seawater Desalination Project EIR**  
**Operational Emission Estimations**

**- Emission Factors**

(Assumptions are in dark blue color font)

**1. Diesel Generators**

Station	Quantity	kW capacity	hours testing per month	hours testing per day	hours testing per year	max fuel usage, gal/hr
Aptos Pump Station	1	100	2	2	24	20.7
Main Plant Site	1	250	2	2	24	20.7
McGregor Pump Station	1	125	2	2	24	20.7
Morrissey Pump Station	1	250	2	2	24	20.7

EFs for NOx, VOC, CO, and PM comply with EPA Off-road Compression Ignition Diesel Engine Standard for Interim Tier 4.  
 EFs for SOx, CO2 from EPA AP-42 Ch. 3.3 (uncontrolled).  
 All PM10 is PM2.5 from this diesel engine combustion.  
 Maximum fuel usage from Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines, CARB October 2000.

**2. Mobile Source (Off-road Equipment and Vehicle)**

- 8 hours per day each shift
- 12 maximum number of employees per day during normal operations
- 2 maximum number of visitor, delivery, inspector, and other people driving passenger cars to the site per day (assumptions)
- 14 maximum passenger cars on site during operation
- 6 maximum number of trucks per day during facility operation
- 80% factor, used for estimation the numbers of Passenger Cars and Delivery Trucks from maximum daily to maximum annually.

**Exhaust Emission Factors and Assumptions**

Equipment/ Vehicle	Fuel	Qty/Day	Horsepower (hp)	operating hour (hr/day)	Weight (ton)	Maximum on- site traveling distance per trip (mile/day/uni- t/trip)	Maximum off- site traveling distance per trip (mile/day/uni- t/trip)	Number of trip (single trip/day/unit)	Maximum total on-site traveling distance (mile/day/uni- t)	Maximum total off-site traveling distance (mile/day/uni- t)	Emission Factor Sources
Worker Vehicles (Passenger Cars)	G/D	14	200	-	2	0.15	25.00	2	0.30	50.00	EMFAC2011 and CCAR Protocol
Delivery Trucks (T6 instate heavy)	D	6	400	-	20	0.15	25.00	2	0.30	50.00	EMFAC2011 and CCAR Protocol
Forklift	D	1	150	2	5	0.30	-	10	3.03	-	OFFROAD2011 and OFFROAD2007

**Notes:**

1. Horsepower, weight, operating hour per day, and numbers of trip are from assumptions
2. off-site distances were assumed to be from the project site to the furthest edge of the county boundary.
3. on-site distances were estimated from plot plans using Site A-3a and A-3b.
4. Worker Vehicle EFs are calculated from the fleet-mix of diesel and gas fuel vehicles from EMFAC2011.
5. G: gasoline; D: Diesel
6. Assume delivery trucks are Medium-Heavy Duty Diesel instate Truck with GVWR>26000 lbs (T6 instate heavy - DSL)
7. To be conservative, the higher emission factors from OFFROAD2007 and OFFROAD2011 were chosen for In-Use Off-Road Equipment.
8. Assumed all PM10 is PM2.5 for exhaust emissions.

**Fugitive Dust Emissions from Traveling on Paved Road**

$$E = [ k * (sL/2)^{0.91} * (W)^{1.02} ] (1 - P/4N)$$

Source: EPA AP-42 Section 13.2.1 Paved Roads Equation 2 (Jan. 2011 version)

E = particulate emission factor (lb/VMT),

k = particle size multiplier for particle size range and units of interest (lb/VMT),

	PM <sub>10</sub>	PM <sub>2.5</sub>	Unit
k	0.0022	0.00054	lb/VMT

0.6 sL = road surface silt loading (grams per square meter) (g/m<sup>2</sup>),

From AP-42 Table 13.2.1-2, Ubiquitous Baseline, ADT<500

W = average weight (tons) of the vehicles traveling the road, and

C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

61 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC data - SANTA CRUZ Station: 047916)

365 N = number of days in the year (averaging period)

**3. Area Sources**

**Hearths**

Assumed no wood or biomass hearth will be used.

**Natural Gas Fireplaces/Stoves**

1,050 BTU per standard cubic foot, heating value from natural gas (from EPA AP-42)  
 60,000 BTU per hour, maximum heating rate for a natural gas stove (the assumed value from CalEEMod AppendixA)  
 3 hours used per day (maximum, assumptions)  
 171.43 cubic foot of natural gas per day (maximum)  
 Criteria pollutant EFs from EPA AP-42 Ch. 1.4 (uncontrolled)  
 Assumed all PM<sub>10</sub> is PM<sub>2.5</sub> from this natural gas combustion.

**Consumer Products**

2.14E-05 lbs/sqft/day, VOC EF from CalEEMod AppendixA  
 56,975.00 square foot, estimated total building/facility size area

**Architectural Coatings**

$E = EF * F * A * R$  Reapplication

Source: CalEEMod Appendix A  
 54.03 E: VOC emissions in lbs (per year)  
 25% F: fraction of interior surface area.  
 75% F: fraction of exterior surface area.  
 113,950.00 A, building surface area in square foot, assumed the total surface area for painting equals 2 times the floor square footage for non-residential land use.  
 10% Reapplication  
 0.0047 EF: emission factor (lb/sqft)

$EF = C_{voc} / 454 * 3.875 / 180$

100 C = VOC content (g/L). California's standards are: 150 g/l for nonflat finishes and 100 g/l for flat. Assumed surface is flat.

**Landscape Equipment**

assumed all landscape maintenance equipment are electric.

**4. Others**

Assumed there will be no other emission sources during operation.

**5. Emission Factor Summary**

**Table A-1, Summary of Emission Factors**

	Daily Emission Factors (unit: lbs/day/unit)													
	Fugitive Dust PM10	Exhaust PM10	Total PM10	Fugitive Dust PM2.5	Exhaust PM2.5	Total PM2.5	CO	VOC	NOx	SOx	CO2	CH4	N2O	CO2e
<b>On-site Emission Factors</b>														
Diesel Generators	0.00E+00	6.39E-02	6.39E-02	0.00E+00	6.39E-02	6.39E-02	1.12E+01	6.07E-01	6.39E+00	4.86E+00	2.24E+03	5.47E-01	3.65E-02	2.26E+03
Worker Vehicles	4.63E-04	4.82E-05	5.11E-04	1.18E-04	4.46E-05	1.63E-04	4.81E-02	6.91E-03	3.14E-03	1.32E-05	1.04E+00	4.65E-05	4.27E-05	1.05E+00
Delivery Trucks	4.63E-03	7.66E-05	4.71E-03	1.15E-03	7.05E-05	1.22E-03	3.40E-03	3.69E-04	2.38E-02	2.30E-05	2.33E+00	3.40E-06	3.20E-06	2.33E+00
Forklift	0.00E+00	4.26E-02	4.26E-02	0.00E+00	4.26E-02	4.26E-02	6.64E-01	9.19E-02	7.70E-01	1.26E-03	1.12E+02	8.30E-03	0.00E+00	1.12E+02
Fireplace/Stove	0.00E+00	1.30E-03	1.30E-03	0.00E+00	1.30E-03	1.30E-03	6.86E-03	9.43E-04	1.61E-02	1.03E-04	2.06E+01	3.94E-04	3.77E-04	2.07E+01
Consumer Products	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Architectural Coatings	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>Off-site Emission Factors</b>														
Worker Vehicles	7.64E-02	3.19E-04	7.67E-02	1.95E-02	2.98E-04	1.98E-02	1.99E-01	1.86E-02	1.95E-02	3.93E-04	3.18E+01	7.67E-03	7.05E-03	3.41E+01
Delivery Trucks	7.64E-01	7.09E-03	7.71E-01	1.90E-01	6.52E-03	1.97E-01	5.57E-02	1.63E-02	7.42E-01	1.28E-03	1.34E+02	5.62E-04	5.29E-04	1.34E+02

**Notes:**

1. Greenhouse Gas Global Warming Potential (GWP) - Intergovernmental Panel on Climate Change, Second Assessment Report (1996) from CCAR General Reporting Protocol January 2009.

CO2	CH4	N2O
1	21	310

2. Emission factors for Diesel Generators include all four units; cannot use one EF and multiply it by 4 units because they have different max kW capacities.

scwd<sup>2</sup> Regional Seawater Desalination Project EIR

Operational Emission Estimations

- Emission Factors

(Assumptions are in dark blue color font)

4. Electricity Purchasing

- 15.00 kWh per 1,000 gallons for maximum product water generated
- 2.50 MGD of product water generated (maximum).
- 37,500.00 kWh total energy consumption per day (maximum).  
 assumed the energy consumptions listed above include the electricity use from HVAC system, water heating system, lighting system, office equipment, appliances, plug-ins, and other minor facility sources.
- 444.64 lbs CO2/MWh, PG&E's 2010 GHG emission factor from the 2010 EPS Report.
- 370 lbs CO2/MWh, PG&E's project emission factor for 2016
- 0.0302 lbs CH4/MWh, emission factor for California, source: CCAR General Reporting Protocol (Jan 2009)
- 0.0081 lbs N2O/MWh, emission factor for California, source: CCAR General Reporting Protocol (Jan 2009)

Net CO2 emission calculations from electricity purchasing

	Baseline 2010	Average Rainfall 2016	Max Drought 2016	kWh per 1,000 gallons
max desal water SCWD (million gal/yr)	0	0	535	15.0
max desal water SqCWD (million gal/yr)	0	912	378	15.0
max ground water SCWD (million gal/yr)	151	170	210	2.85
max ground water SqCWD (million gal/yr)	1332	534	911	1.99
max surface water (million gal/yr)	3047	3,547	2,601	1.23
max energy use (MWh/yr)	6,831	19,595	19,308	
<b>GHG Emission estimate</b>				
				<b>GWP</b>
CO2 emission factor (lb/MWh)	444.64	370	370	1
CH4 emission factor (lb/MWh)	0.0302	0.0302	0.0302	21
N2O emission factor (lb/MWh)	0.0081	0.0081	0.0081	310
Annual CO2e emissions (metric ton/yr)	1,388	3,318	3,269	
<b>Avoided GHG Emissions (metric ton/yr)</b>				
PV Panels on Desalination Facility	0	50	50	
Micro-hydro at GHWTP and Newell Creek Dam	0	84	84	
PV Panels at GHWTP	0	25	25	
Annual CO2e emissions minus Avoided emissions (metric ton/yr)	1,388	3,159	3,110	
<b>Project difference CO2e (tonne/yr)</b>		<b>1771</b>	<b>1722</b>	

5. Water Supply and Wastewater

Water Supply and Wastewater

- 25,600 gallon per day, assumed indoor water usage and process water (potable water)
  - gallon per day, assumed the outdoor water usage
- 5,411 kWh/MG, water energy intensity (potable water) in northern California
- 3,500 kWh/MG, water energy intensity, outdoor uses in northern California (assumes use of grey water)  
Source: CEC 2006, REFINING ESTIMATES OF WATER RELATED ENERGY USE IN CALIFORNIA
- 138.52 kWh/day, energy consumption for indoor water uses
  - kWh/day, energy consumption for outdoor water uses

	Baseline 2010	Average Rainfall 2016	Max Drought 2016			Net emissions (tonne/yr) = Baseline - Avg Rainfall 2016	Net emissions (tonne/yr) = Baseline - Max Drought 2016
max energy use (MWh/yr)	0	50.56	50.56				
<b>Emission estimate with projected GHG reduction in PG&amp;E power profile</b>				<b>GWP</b>			
CO2 emission factor (lb/MWh)	444.64	370	370	1	CO2 emissions (tonne/yr)	8.4879	8.488
CH4 emission factor (lb/MWh)	0.0302	0.0302	0.0302	21	CH4 emissions (tonne/yr)	0.0007	0.001
N2O emission factor (lb/MWh)	0.0081	0.0081	0.0081	310	N2O emissions (tonne/yr)	0.0002	0.000
Annual CO2e emissions (metric ton/yr)	0	8.56	8.56				
<b>Project difference CO2e (tonne/yr)</b>		<b>8.56</b>	<b>8.56</b>				