

**Table E-1.** Air Quality Monitoring Data at the Bethel Island Monitoring Station (2011–2013)

Pollutant	Monitoring Data by Year		
	2011	2012	2013
<b>O<sub>3</sub></b>			
Highest 1-hour average, ppm	0.091	<b>0.098</b>	0.082
Highest 8-hour average, ppm	<b>0.078</b>	<b>0.088</b>	<b>0.076</b>
Days > state 1-hour standard	0	1	0
Days > federal 8-hour standard	2	2	0
Percent of year covered (8-hour)	98	99	58
<b>PM<sub>10</sub></b>			
Highest 24-hour average, µg/m <sup>3</sup>	49.5	<b>52.3</b>	<b>50.7</b>
Days > state standard	0.0	6.1	na
Days > federal standard	0.0	0.0	na
Percent of year covered	97	100	44
<b>CO</b>			
Highest 8-hour average, µg/m <sup>3</sup>	0.95	0.89	na
Days > federal standard	0	0	0
Percent of year covered	97	40	na

Source: California Air Resources Board 2014.

Note: **Bolded** values represent those in excess of the applicable ambient air quality standards.

ppm = parts per million by volume

µg/m<sup>3</sup> = micrograms per cubic meter

na = insufficient data available to determine the value

**Table E-2. Air Quality Monitoring Data at the Treat Boulevard Monitoring Station (2011–2013)**

Pollutant	Monitoring Data by Year		
	2011	2012	2013
<b>O<sub>3</sub></b>			
Highest 1-hour average, ppm	<b>0.099</b>	0.093	0.074
Highest 8-hour average, ppm	<b>0.079</b>	<b>0.086</b>	0.062
Days > state 1-hour standard	2	0	0
Days > federal 8-hour standard	2	2	0
Percent of year covered (8-hour)	96	98	98
<b>PM<sub>10</sub></b>			
Highest 24-hour average, µg/m <sup>3</sup>	<b>58.8</b>	35.4	<b>50.5</b>
Days > state standard	6.1	0.0	na
Days > federal standard	0.0	0.0	na
Percent of year covered	100	100	58
<b>CO</b>			
Highest 8-hour average, µg/m <sup>3</sup>	1.24	0.82	na
Days > federal standard	0	0	0
Percent of year covered	98	44	na

Source: California Air Resources Board 2014.

Note: **Bolded** values represent those in excess of the applicable ambient air quality standards.

ppm = parts per million by volume

µg/m<sup>3</sup> = micrograms per cubic meter

## Revised Assumptions as of 4/29/2014

Existing Conditions Table E-3

Data Type	Bacon Island	Webb Tract	Bouldin Island	Holland Tract
<b>Recreation</b>				
Number vehicles traveling to recreation area (trips/day)	6	8	5	2
Number vehicles traveling to recreation area (trips/year)	1,610	365	285	76
Number of recreational boats (boats/day)	-	-	-	-
Number of recreational boats (boats/year)	-	-	-	-
<b>Agriculture</b>				
Acres farmed	4,859	4,064	4,933	1,000
Number of harvest vehicles (trips/day)	20	10	15	3
Number of harvest vehicles (trips/year)	714	500	975	50
Gas used for ag activities (gallons/day)	17	33	67	-
Gas used for ag activities (gallons/year)	4,280	8,275	16,801	-
Diesel used for ag activities (gallons/day)	600	490	995	5
Diesel used for ag activities (gallons/year)	60,000	48,987	99,459	500
Acres disturbed by farming (acres/day)	243	203	247	50
Assumes 100 working days per year of farming. Also assumes that an acre of farmland is disturbed an average of 5 times per year, so the acres disturbed per day is total number of acres times 5, divided by 100.				

Future No Project Conditions Table E-4

Data Type	Bacon	Webb Tract	Bouldin	Holland Tract
<b>Recreation</b>				
Number vehicles traveling to recreation area (trips/day)	43	38	42	29
Number vehicles traveling to recreation area (trips/year)	11,538	1,734	2,394	1,102
Number of recreational boats (boats/day)	-	-	-	-
Number of recreational boats (boats/year)	-	-	-	-
<b>Agriculture</b>				
Acres Farmed	4,960	4,880	5,200	3,680
Number of harvest vehicles (trips/day)	61	4	13	3
Number of harvest vehicles (trips/year)	15,368	890	3,175	671
Gas used for ag activities (gallons/day)	44	99	177	75
Gas used for ag activities (gallons/year)	10,922	24,841	44,276	18,733
Diesel used for ag activities (gallons/day)	612	588	1,048	444
Diesel used for ag activities (gallons/year)	153,118	147,057	262,106	110,896
Acres disturbed by farming (acres/day)	248	244	260	184
Assumes 250 working days per year of farming. Also assumes that an acre of farmland is disturbed an average of 5 times per year, so the acres disturbed per day is total number of acres times 5, divided by 250.				

Alternatives 1 and 2 Construction, Operational, Recreational, and Agricultural Assumptions

Table E-5

	Bacon	Webb	Bouldin	Holland
<b>Construction</b>				
Number worker vehicle trips per day to islands	67	53	30	14
Number worker vehicle trips per day to boat	3	31	1	1
Number of employee boat trips to islands per day	3	12	2	2
Number of material delivery truck trips to island per day	2	2	0	0
Number of barge trips to island per day	1	1	1	0
Number of hours of rock placement per day	5	4	2	2
Quantity of borrow (cubic yards/day)	6,634	5,270	3,300	520
<b>Operations</b>				
Amount of diesel used to pump water (gallons/day)	1,355	1,178	-	-
Amount of diesel used to pump water (gallons/year)	81,300	70,700	-	-
Maintenance vehicle trips (trips/day)	33	25	14	15
Maintenance vehicle trips (trips/year)	8,250	6,250	3,500	3,750
Maintenance vehicle trips to boats (trips/day)	2	8	1	1
Maintenance vehicle trips to boats (trips/year)	500	2,000	250	250
Maintenance boat trips to islands (trips/day)	1	3	1	1
Maintenance boat trips to islands (trips/year)	250	750	250	250
<b>Recreation</b>				
Number of vehicles to recreation areas (trips/day)	6	8	5	2
Number of vehicles to recreation areas (trips/year)	1610	365	285	76
Number-Hours of recreational boats per day	0	0	0	0
Number-Hours of recreational boats per year	0	0	0	0
<b>Agriculture</b>				
Number of harvest vehicles (trips/day)	0	0	1	1
Number of harvest vehicles (trips/year)	0	0	335	168
Gas used for operations(gallons/day)	0	0	60	30
Gas used for operations (gallons/year)	0	0	14,970	7,485
Diesel used for ag activities (gallons/day)	0	0	217	108
Diesel used for ag activities (gallons/year)	0	0	54,200	27,100
Acres disturbed by farming (acres/day)	0	0	44	22

Alternative 3 Construction, Operational, Recreational, and Agricultural Assumptions

Table E-6

	Bacon	Webb	Bouldin	Holland
<b>Construction</b>				
Number worker vehicle trips per day to islands	67	53	151	103
Number worker vehicle trips per day to boat	3	31	7	4
Number of employee boat trips to islands per day	3	12	12	16
Number of material delivery truck trips to island per day	2	2	1	1
Number of barge trips to island per day	1	1	1	1
Number of hours of rock placement per day	5	4	2	4
Quantity of borrow (cubic yards/day)	2,613	5,387	35,616	2,400
<b>Operations</b>				
Amount of diesel used to pump water (gallons/day)	228	228	228	228
Amount of diesel used to pump water (gallons/year)	57,000	57,000	57,000	57,000
Maintenance vehicle trips (trips/day)	33	25	27	41
Maintenance vehicle trips (trips/year)	8,250	6,250	6,750	10,250
Maintenance vehicle trips to boats (trips/day)	2	8	2	2
Maintenance vehicle trips to boats (trips/year)	500	2,000	500	500
Maintenance boat trips to islands (trips/day)	1	3	1	2
Maintenance boat trips to islands (trips/year)	250	750	250	500
<b>Recreation</b>				
Number of vehicles to recreation areas (trips/day)	6	8	5	2
Number of vehicles to recreation areas (trips/year)	1610	365	285	76
Number of Hours of recreational boats per day	0	0	0	0
Number of Hours of recreational boats per year	0	0	0	0
<b>Agriculture</b>				
Number of harvest vehicles (trips/day)	0	0	0	0
Gas used for ag activities (gallons/day)	0	0	0	0
Diesel used for ag activities (gallons/day)	0	0	0	0
Acres disturbed by farming (acres/day)	0	0	0	0

Appendix Table E-7. Comparison of Criteria Pollutant Emissions for Existing, Future No-Project and Build Alternatives with Electricity Use for Pumping (ppd)					
	ROG	NOx	CO	PM10	PM2.5
Existing Emissions	94	500	623	7,460	1,814
Future No-Project	80	357	1,448	9,384	2,256
Construction of Alternatives 1 & 2	199	1,614	858	731	303
Operation of Alternatives 1 & 2	19	52	411	665	6
Construction of Alternative 3	527	4,390	2,202	979	597
Operation of Alternative 3	6	6	132	2	2
Net Increase: Operation 1&2 vs. Future No-Project	(61)	(306)	(1,036)	(8,720)	(2,251)
Net Increase: Operation 3 vs. Future No-Project	(74)	(351)	(1,315)	(9,382)	(2,255)
Notes: Assumes electricity used to pump water. Based on assumptions in Tables Air Appendix-1 through -5. Alternatives 1 and 2 assume 3 million kilowatt-hours per year required to pump water. Alternative 3 assumes 6 million kilowatt-hours per year required for pumping. On-road vehicle trip emissions estimated with EMFAC2011. Agricultural emissions estimated with OFFROAD2007.					

Appendix Table E-8. Comparison of Criteria Pollutant Emissions for Existing, Future No-Project, and Build Alternatives with Electricity Used for Pumping (tpy)					
	ROG	NOx	CO	PM10	PM2.5
Existing Emissions	5.8	26.3	58.7	20.4	6.2
Future No-Project	10.0	44.6	180.5	26.4	8.6
Construction of Alternatives 1 & 2	24.9	201.8	107.2	91.4	37.8
Operation of Alternatives 1 & 2	2.5	6.6	53.6	2.3	1.1
Construction of Alternative 3	65.9	548.7	275.3	122.4	74.6
Operation of Alternative 3	0.8	0.8	16.4	0.2	0.2
Net Increase: Operation 1&2 vs. Future No-Project	(8)	(38)	(127)	(24)	(8)
Net Increase: Operation 3 vs. Future No-Project	(9)	(44)	(164)	(26)	(8)
Notes: Assumes electricity used to pump water. Based on assumptions in Tables Air Appendix-1 through -5. Alternatives 1 and 2 assume 3 million kilowatt-hours per year required to pump water. Alternative 3 assumes 6 million kilowatt-hours per year required for pumping. On-road vehicle trip emissions estimated with EMFAC2011. Agricultural emissions estimated with OFFROAD2007.					

Appendix Table E-9. Comparison of Criteria Pollutant Emissions for Existing, Future No-Project, and Build Alternatives with Diesel Used for Pumping (ppd)					
Pounds per Day	ROG	NOx	CO	PM10	PM2.5
Existing Emissions	94	500	623	7,460	1,814
Future No-Project	80	357	1,448	9,384	2,256
Construction of Alternatives 1 & 2	199	1,614	858	731	303
Operation of Alternatives 1 & 2	140	1,574	740	773	114
Construction of Alternative 3	527	4,390	2,202	979	597
Operation of Alternative 3	50	554	250	41	41
Net Increase: Operation 1&2 vs. Future No-Project	60	1,217	(708)	(8,612)	(2,142)
Net Increase: Operation 3 vs. Future No-Project	(30)	197	(1,197)	(9,344)	(2,216)
Notes: Assumes diesel engines used to pump water. Based on assumptions in Tables Air Appendix-1 through -5. Alternatives 1 and 2 assume 3 million kilowatt-hours per year required to pump water. Alternative 3 assumes 6 million kilowatt-hours per year required for pumping. On-road vehicle trip emissions estimated with EMFAC2011. Agricultural emissions estimated with OFFROAD2007.					

Appendix Table E-10. Comparison of Criteria Pollutant Emissions for Existing, Future No-Project, and Build Alternatives with Diesel Used for Pumping (tpy)					
Tons per Year	ROG	NOx	CO	PM10	PM2.5
Existing Emissions	5.8	26.3	58.7	20.4	6.2
Future No-Project	10.0	44.6	180.5	26.4	8.6
Construction of Alternatives 1 & 2	24.9	201.8	107.2	91.4	37.8
Operation of Alternatives 1 & 2	6.1	52.2	63.4	5.6	4.3
Construction of Alternative 3	65.9	548.7	275.3	122.4	74.6
Operation of Alternative 3	6.2	69.3	31.2	5.1	5.1
Net Increase: Operation 1&2 vs. Future No-Project	(4)	8	(117)	(21)	(4)
Net Increase: Operation 3 vs. Future No-Project	(4)	25	(149)	(21)	(4)
Notes: Assumes diesel engines used to pump water. Based on assumptions in Tables Air Appendix-1 through -5. Alternatives 1 and 2 assume 3 million kilowatt-hours per year required to pump water. Alternative 3 assumes 6 million kilowatt-hours per year required for pumping. On-road vehicle trip emissions estimated with EMFAC2011. Agricultural emissions estimated with OFFROAD2007.					



**Table 3P-4. Construction Emissions for Alternatives 1, 2, and 3**

Alternative	CO <sub>2</sub> e metric tons/yr	CO <sub>2</sub> tons/yr	CH <sub>4</sub> tons/yr	N <sub>2</sub> O tons/yr
Alternatives 1 & 2	2,773	3,014	0.16	0.13
Alternative 3	4,657	5,026	0.37	0.32

Notes: Construction emissions based on activity levels as specified in Table Appendix Air-5 and -6.

**Table 3P-2 Existing Greenhouse Gas Emissions**

Emission Source	CO <sub>2</sub> e metric tons/yr	CO <sub>2</sub> tons/yr	CH <sub>4</sub> tons/yr	N <sub>2</sub> O tons/yr
Peat Oxidation	231,737	255,374	-	-
Farming	2,296	2,488	0.5	0.1
Recreation	16	18	-	-
Total	234,050	257,880	0.5	0.1

Notes: Estimates of peat oxidation based emission factors included in Jones & Stokes report (2008) and assume 15,022 acres with emissions of 17 tons CO<sub>2</sub> per acre per year. Farming and recreational emissions based on activity levels as specified in Table Appendix Air-3.

**Table 3P-3 Future No-Project Greenhouse Gas Emissions**

Emission Source	CO <sub>2</sub> e metric tons/yr	CO <sub>2</sub> tons/yr	CH <sub>4</sub> tons/yr	N <sub>2</sub> O tons/yr
Peat Oxidation	231,737	255,374	-	-
Farming	7,457	8,105	0.7	0.3
Recreation	90	99	-	-
Total	239,283	263,578	0.7	0.3
Net Change from Existing	5,233	5,698	0.3	0.2

Notes: Estimates of peat oxidation based on emission factors included in Jones & Stokes report (2008) and assume 15,022 acres with emissions of 17 tons CO<sub>2</sub> per acre per year. Farming and recreational emissions based on activity levels as specified in Table Appendix Air-4.

**Table 3P-5 Alternative 1 Greenhouse Gas Emissions with Electricity Used for Pumping**

Emission Source	CO <sub>2</sub> e metric tons/yr	CO <sub>2</sub> tons/yr	CH <sub>4</sub> tons/yr	N <sub>2</sub> O tons/yr
Peat Oxidation	125,825	138,659	-	-
Farming	979	1,054	0.1	0.070
Recreation	12	14	-	-
Pumping & Maintenance	633	689	0.05	0.026
Methane Flux	3,001		157.5	
Total	130,451	140,416	158	0.097
Net Change from Existing	(103,599)	(117,464)	157	(0)
Net Change from Future No-Project	(108,832)	(123,162)	157	(0)

Notes: Estimates of peat oxidation based on Jones & Stokes reports (2007 and 2008). Farming, recreational, and pumping emissions based on activity levels as specified in Table Appendix Air-5. Methane flux based on report by Alex Horne, Ph.D. (2009). Assumes electricity used to pump water. Alternatives 1 and 2 assume 3 million kilowatt-hours per year required to pump water. Alternative 3 assumes 6 million kilowatt-hours per year required for pumping. On-road vehicle trip emissions estimated with EMFAC2011. Agricultural emissions estimated with OFFROAD2007.

**Table 3P-7 Alternative 3 Greenhouse Gas Emissions with Electricity Used for Pumping**

Emission Source	CO <sub>2</sub> e metric tons/yr	CO <sub>2</sub> tons/yr	CH <sub>4</sub> tons/yr	N <sub>2</sub> O tons/yr
Peat Oxidation	27,263	30,044		
Farming	-	-	-	-
Recreation	12	14	-	-
Pumping & Maintenance	1,083	1,182	0.07	0.04
Methane Flux	5,628		295.3	
Total	33,987	31,239	295	0
Net Change from Existing	(200,063)	(226,641)	294.9	(0.1)
Net Change from Future No Project	(205,296)	(232,339)	294.6	(0.3)

Notes: Estimates of peat oxidation based on Jones & Stokes report (2008). Farming, recreational, and pumping emissions based on activity levels as specified in Table Appendix Air-5. Methane flux based on report by Alex Horne, Ph.D. (2009). Assumes diesel fuel used to pump water. Alternatives 1 and 2 assume 3 million kilowatt-hours per year required to pump water. Alternative 3 assumes 6 million kilowatt-hours per year required for pumping. On-road vehicle trip emissions estimated with EMFAC2011. Agricultural emissions estimated with OFFROAD2007.

**Table 3P-6 Alternative 1 Greenhouse Gas Emissions with Diesel Fuel Used for Pumping**

Emission Source	CO <sub>2</sub> e metric tons/yr	CO <sub>2</sub> tons/yr	CH <sub>4</sub> tons/yr	N <sub>2</sub> O tons/yr
Peat Oxidation	125,825	138,659	-	-
Farming	979	1,054	0.12	0.07
Recreation	12	14	-	-
Pumping & Maintenance	1,786	1,951	0.27	0.04
Methane Flux	3,001	-	157.5	-
Total	131,603	141,678	157.9	0.1
Net Change from Existing	(102,446)	(116,202)	157.4	0.0
Net Change from Future No-Project	(107,680)	(121,900)	157.1	(0.2)

Notes: Estimates of peat oxidation based on Jones & Stokes report (2008). Farming, recreational, and pumping emissions based on activity levels as specified in Table Appendix Air-5. Methane flux based on report by Alex Horne, Ph.D. (2009). Assumes diesel fuel used to pump water. Alternatives 1 and 2 assume 3 million kilowatt-hours per year required to pump water. Alternative 3 assumes 6 million kilowatt-hours per year required for pumping. On-road vehicle trip emissions estimated with EMFAC2011. Agricultural emissions estimated with OFFROAD2007.

**Table 3P-8 Alternative 3 Greenhouse Gas Emissions with Diesel Fuel Used for Pumping**

Emission Source	CO <sub>2</sub> e metric tons/yr	CO <sub>2</sub> tons/yr	CH <sub>4</sub> tons/yr	N <sub>2</sub> O tons/yr
Peat Oxidation	27,263	30,044	-	-
Farming	-	-	-	-
Recreation	12	14	-	-
Pumping & Maintenance	2,614	2,857	0.40	0.05
Methane Flux	5,628	-	295.3	-
Total	35,517	32,915	295.7	0.0
Net Change from Existing	(198,532)	(224,965)	295.3	(0.1)
Net Change from Future No Project	(203,766)	(230,663)	295.0	(0.3)

Notes: Estimates of peat oxidation based on Jones & Stokes report (2008). Farming, recreational, and pumping emissions based on activity levels as specified in Table Appendix Air-6. Methane flux based on report by Alex Horne, Ph.D. (2009). Assumes electricity used to pump water. Alternatives 1 and 2 assume 3 million kilowatt-hours per year required to pump water. Alternative 3 assumes 6 million kilowatt-hours per year required for pumping. On-road vehicle trip emissions estimated with EMFAC2011. Agricultural emissions estimated with OFFROAD2007.

Appendix Table E-11. Comparison of GHG Emissions for Existing, Future No-Project and Build Alternatives with Electricity Use for Pumping (metric tons per year)				
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
Existing Emissions	2,274.1	0.4	0.1	2,312.7
Future No-Project	7,444.8	0.7	0.3	7,547.6
Construction of Alternatives 1 & 2	2,735.0	0.1	0.1	2,773.3
Operation of Alternatives 1 & 2	1,594.1	0.2	0.1	1,624.5
Construction of Alternative 3	4,560.9	0.3	0.3	4,657.0
Operation of Alternative 3	1,084.6	0.1	0.0	1,095.8
Net Increase: Operation 1&2 vs. Future No-Project	(5,850.7)	(0.6)	(0.2)	(5,923.1)
Net Increase: Operation 3 vs. Future No-Project	(6,360.2)	(0.7)	(0.2)	(6,451.8)
Notes: Assumes electricity used to pump water. Based on assumptions in Tables Air Appendix-1 through -5. Alternatives 1 and 2 assume 3 million kilowatt-hours per year required to pump water. Alternative 3 assumes 6 million kilowatt-hours On road vehicle emissions estimated with EMFAC2011. Agricultural emissions estimated with OFFROAD2007.				

Appendix Table E-12. Comparison of GHG Emissions for Existing, Future No-Project and Build Alternatives with Diesel Used for Pumping (metric tons per year)

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
Existing Emissions	2,274.1	0.4	0.1	2,312.7
Future No-Project	7,444.8	0.7	0.3	7,547.6
Construction of Alternatives 1 & 2	2,735.0	0.1	0.1	2,773.3
Operation of Alternatives 1 & 2	2,739.4	0.4	0.1	2,777.1
Construction of Alternative 3	4,560.9	0.3	0.3	4,657.0
Operation of Alternative 3	2,605.1	0.4	0.0	2,626.6
Net Increase: Operation 1&2 vs. Future No-Project	(4,705.4)	(0.4)	(0.2)	(4,770.4)
Net Increase: Operation 3 vs. Future No-Project	(4,839.6)	(0.4)	(0.2)	(4,921.0)

Notes: Assumes diesel engines used to pump water.  
 Based on assumptions in Tables Air Appendix-1 through -5.  
 Alternatives 1 and 2 assume 3 million kilowatt-hours per year required to pump water. Alternative 3 assumes 6 million kilowatt-hours  
 On road vehicle emissions estimated with EMFAC2011.  
 Agricultural emissions estimated with OFFROAD2007.

