

APPENDIX F

AIR QUALITY CALCULATIONS

**GULF INTRACOASTAL WATERWAY (GIWW)
CUTS M-4, M-5, M-7, M-8, M-9, M-12, M-13, AND
M-14, & LONGBOAT PASS CUTS 2 AND 3**

MANATEE COUNTY, FLORIDA



U.S. Army Corps of Engineers
JACKSONVILLE DISTRICT

Summary Tables

Table 1. Gross Construction Emissions for Alternative 1 – No Action

GHG	Fuel (gal)	Total Emissions (g)	Total Emissions (MT)	CO₂e (MT)
CO₂	94,000	959,740,000	959.74	959.74
CH₄	94,000	611,940	0.61	15.30
N₂O	94,000	15,980	0.02	4.76
Total				979.80

Table 2. Gross 50-Year O&M Emissions for Alternative 1 – No Action

GHG	Lifetime Fuel (gal)	Annual Emissions (MT)	Lifetime Emissions (MT)	Lifetime CO₂e (MT)
CO₂	846,000	172.75	8,637.66	8,637.66
CH₄	846,000	0.11	5.51	137.69
N₂O	846,000	0.00	0.14	42.86
Total				8,818.20

Table 3. Gross Construction Emissions for Alternative 2

GHG	Fuel (gal)	Total Emissions (g)	Total Emissions (MT)	CO ₂ e (MT)
CO ₂	250,000	2,552,500,000	2,552.50	2,552.50
CH ₄	250,000	1,627,500	1.63	40.69
N ₂ O	250,000	42,500	0.04	12.67
Total			2,605.85	

Table 4. Gross 50-Year O&M Emissions for Alternative 2

GHG	Lifetime Fuel (gal)	Annual Emissions (MT)	Lifetime Emissions (MT)	Lifetime CO ₂ e (MT)
CO ₂	2,250,000	459.45	22,972.50	22,972.50
CH ₄	2,250,000	0.29	14.65	366.19
N ₂ O	2,250,000	0.01	0.38	113.99
Total			23,452.67	

Table 5. Estimated Net GHG Emissions for Alternative 2

GHG	No Action Construction Emissions (MT CO ₂ e)	No Action 50-Year O&M Emissions (MT CO ₂ e)	Gross Construction Emissions (MT CO ₂ e)	Gross 50-Year O&M Emissions (MT CO ₂ e)	Net GHG Emissions (MT CO ₂ e)
CO ₂	959.74	8,637.66	2,552.50	22,972.50	15,927.63
CH ₄	15.30	137.69	40.69	366.19	10.16
N ₂ O	4.76	42.86	12.67	113.99	0.27
CO ₂ e	979.80	8,818.20	2,605.85	23,452.67	16,260.55

Table 6. Gross Construction Emissions for Alternative 3

GHG	Fuel (gal)	Total Emissions (g)	Total Emissions (MT)	CO ₂ e (MT)
CO ₂	250,000	2,552,500,000	2,552.50	2,552.50
CH ₄	250,000	1,627,500	1.63	40.69
N ₂ O	250,000	42,500	0.04	12.67
Total			2,605.85	

Table 7. Gross 50-Year O&M Emissions for Alternative 3

GHG	Lifetime Fuel (gal)	Annual Emissions (MT)	Lifetime Emissions (MT)	Lifetime CO ₂ e (MT)
CO ₂	2,250,000	459.45	22,972.50	22,972.50
CH ₄	2,250,000	0.29	14.65	366.19
N ₂ O	2,250,000	0.01	0.38	113.99
Total			23,452.67	

Table 8. Estimated Net GHG Emissions for Alternative 3

GHG	No Action Construction Emissions (MT CO ₂ e)	No Action 50-Year O&M Emissions (MT CO ₂ e)	Gross Construction Emissions (MT CO ₂ e)	Gross 50-Year O&M Emissions (MT CO ₂ e)	Net GHG Emissions (MT CO ₂ e)
CO ₂	959.74	8,637.66	2,552.50	22,972.50	15,927.63
CH ₄	15.30	137.69	40.69	366.19	10.16
N ₂ O	4.76	42.86	12.67	113.99	0.27
CO ₂ e	979.80	8,818.20	2,605.85	23,452.67	16,260.55

Table 9. Gross Construction Emissions for Alternative 4

GHG	Fuel(gal)	Total Emissions (g)	Total Emissions (MT)	CO ₂ e (MT)
CO ₂	364,000	3,716,440,000	3,716.44	3,716.44
CH ₄	364,000	1,627,500	1.74	43.57
N ₂ O	364,000	42,500	0.15	44.60
Total				3,804.60

Table 10. Gross 50-Year O&M Emissions for Alternative 4

GHG	Lifetime Fuel(gal)	Annual Emissions (MT)	Lifetime Emissions (MT)	Lifetime CO ₂ e (MT)
CO ₂	3,276,000	668.96	33,447.96	33,447.96
CH ₄	3,276,000	0.31	15.68	392.09
N ₂ O	3,276,000	0.03	1.35	401.39
Total				34,241.44

Table 11. Estimated Net GHG Emissions for Alternative 4

GHG	No Action Construction Emissions (MT CO ₂ e)	No Action 50-Year O&M Emissions (MT CO ₂ e)	Gross Construction Emissions (MT CO ₂ e)	Gross 50-Year O&M Emissions (MT CO ₂ e)	Net GHG Emissions (MT CO ₂ e)
CO ₂	959.74	8,637.66	3,716.44	33,447.96	27,567.06
CH ₄	15.30	137.69	43.57	392.09	11.19
N ₂ O	4.76	42.86	44.60	401.39	1.23
CO ₂ e	979.80	8,818.20	3,804.60	34,241.44	28,213.29

	Calculation of Construction Emissions Using Fuel Volumes				Fuel Volumes Debugging - Error Message
	GHG	Fuel Volume ¹ (Gallons)	Emissions Factor ² (Grams of Emissions/ Gallons of Fuel)	Emissions ³ (grams)	
No Action Alternative	CO ₂	94,000	10,210.00	959,740,000.00	Sufficient Data Has Been Input
	CH ₄	94,000	6.51	611,940.00	Sufficient Data Has Been Input
	N ₂ O	94,000	0.17	15,980.00	Sufficient Data Has Been Input

	Calculation of Construction Emissions Using Fuel Volumes				
	GHG	Fuel Volume ¹ (Gallons)	Emissions Factor ² (Grams of Emissions/ Gallons of Fuel)	Emissions ³ (grams)	
Alternative 2	CO ₂	250,000	10,210.00	2,552,500,000.00	Sufficient Data Has Been Input
	CH ₄	250,000	6.51	1,627,500.00	Sufficient Data Has Been Input
	N ₂ O	250,000	0.17	42,500.00	Sufficient Data Has Been Input

	Calculation of Construction Emissions Using Fuel Volumes				
	GHG	Fuel Volume ¹ (Gallons)	Emissions Factor ² (Grams of Emissions/ Gallons of Fuel)	Emissions ³ (grams)	
Alternative 3	CO ₂	250,000	10,210.00	2552500000	Sufficient Data Has Been Input
	CH ₄	250,000	6.51	1627500	Sufficient Data Has Been Input
	N ₂ O	250,000	0.17	42500	Sufficient Data Has Been Input

	Calculation of Construction Emissions Using Fuel Volumes				
	GHG	Fuel Volume ¹ (Gallons)	Emissions Factor ² (Grams of Emissions/ Gallons of Fuel)	Emissions ³ (grams)	
Alternative 4 Off-Shore	CO ₂	250,000	10,210.00	2552500000	Sufficient Data Has Been Input
	CH ₄	250,000	6.51	1627500	Sufficient Data Has Been Input
	N ₂ O	250,000	0.17	42500	Sufficient Data Has Been Input

	Calculation of Construction Emissions Using Fuel Volumes				
	GHG	Fuel Volume ¹ (Gallons)	Emissions Factor ² (Grams of Emissions/ Gallons of Fuel)	Emissions ³ (grams)	
Alternative 4 Upland	CO ₂	114,000	10,210.00	1163940000	Sufficient Data Has Been Input
	CH ₄	114,000	1.01	115140	Sufficient Data Has Been Input
	N ₂ O	114,000	0.94	107160	Sufficient Data Has Been Input

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Total Construction Emissions from Fuel and Miles							NEAT Input ↓	
		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)	CO ₂ e MT			Emissions Total (grams)
No Action Alternative	CO ₂	959,740,000	2115866.241	959.74	959.74	Total No Action Alternative	CO ₂	959,740,000
	CH ₄	611,940	1349.097868	0.61	15.30		CH ₄	611,940
	N ₂ O	15,980	35.22989823	0.02	4.76		N ₂ O	15,980
Σ					979.80			

Total Construction Emissions from Fuel and Miles						NEAT Input ↓		
		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)	CO ₂ e MT			Emissions Total (grams)
Alternative 2	CO ₂	2,552,500,000	5627303.833	2,552.50	2,552.50	Total Alternative 2	CO ₂	2,552,500,000
	CH ₄	1,627,500	3588.026244	1.63	40.69		CH ₄	1,627,500
	N ₂ O	42,500	93.69653786	0.04	12.67		N ₂ O	42,500
Σ					2,605.85			

Total Construction Emissions from Fuel and Miles						NEAT Input ↓		
		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)	CO ₂ e MT			Emissions Total (grams)
Alternative 3	CO ₂	2,552,500,000	5627303.833	2,552.50	2,552.50	Total Alternative 3	CO ₂	2,552,500,000
	CH ₄	1,627,500	3588.026244	1.63	40.69		CH ₄	1,627,500
	N ₂ O	42,500	93.69653786	0.04	12.67		N ₂ O	42,500
Σ					2,605.85			

Total Construction Emissions from Fuel and Miles						NEAT Input ↓				
		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)	CO ₂ e MT			Emissions Total (grams)	Emissions Total (Metric Tons)	CO ₂ e MT
Alternative 4 Off-Shore	CO ₂	2,552,500,000	5627303.833	2,552.50	2,552.50	Total Alternative 4	CO ₂	3,716,440,000	3,716.44	3,716.44
	CH ₄	1,627,500	3588.026244	1.63	40.69		CH ₄	1,627,500	1.74	43.57
	N ₂ O	42,500	93.69653786	0.04	12.67		N ₂ O	42,500	0.15	44.60
Σ					2,605.85	3,804.60				

Total Emissions from Fuel and Miles									
		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)	CO ₂ e MT				
Alternative 4 Upland	CO ₂	1,163,940,000	2566050.548	1163.94	1,163.94				
	CH ₄	115,140	253.8404557	0.11514	2.88				
	N ₂ O	107,160	236.2475529	0.10716	31.93				
					Σ	1,198.75			

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Calculation of O&M Emissions Using Fuel Volumes					
	GHG	Fuel Volume ¹ (Gallons)	Emissions Factor ² (Grams of Emissions/ Gallons of Fuel)	Emissions ³ (grams)	Fuel Volumes Debugging - Error Message
No Action Alternative	CO ₂	94,000	10,210.00	959,740,000.00	Sufficient Data Has Been Input
	CH ₄	94,000	6.51	611,940.00	Sufficient Data Has Been Input
	N ₂ O	94,000	0.17	15,980.00	Sufficient Data Has Been Input

50-Year Fuel (gallons)

846,000

846,000

846,000

Calculation of O&M Emissions Using Fuel Volumes					
	GHG	Fuel Volume ¹ (Gallons)	Emissions Factor ² (Grams of Emissions/ Gallons of Fuel)	Emissions ³ (grams)	Fuel Volumes Debugging - Error Message
Alternative 2	CO ₂	250,000	10,210.00	2,552,500,000.00	Sufficient Data Has Been Input
	CH ₄	250,000	6.51	1,627,500.00	Sufficient Data Has Been Input
	N ₂ O	250,000	0.17	42,500.00	Sufficient Data Has Been Input

2,250,000

2,250,000

2,250,000

Calculation of O&M Emissions Using Fuel Volumes					
	GHG	Fuel Volume ¹ (Gallons)	Emissions Factor ² (Grams of Emissions/ Gallons of Fuel)	Emissions ³ (grams)	Fuel Volumes Debugging - Error Message
Alternative 3	CO ₂	250,000	10,210.00	2552500000	Sufficient Data Has Been Input
	CH ₄	250,000	6.51	1627500	Sufficient Data Has Been Input
	N ₂ O	250,000	0.17	42500	Sufficient Data Has Been Input

2,250,000

2,250,000

2,250,000

Calculation of O&M Emissions Using Fuel Volumes					
	GHG	Fuel Volume ¹ (Gallons)	Emissions Factor ² (Grams of Emissions/ Gallons of Fuel)	Emissions ³ (grams)	Fuel Volumes Debugging - Error Message
Alternative 4 Off-Shore	CO ₂	250,000	10,210.00	2552500000	Sufficient Data Has Been Input
	CH ₄	250,000	6.51	1627500	Sufficient Data Has Been Input
	N ₂ O	250,000	0.17	42500	Sufficient Data Has Been Input

2,250,000

2,250,000

2,250,000

Calculation of Emissions Using Fuel Volumes					
	GHG	Fuel Volume ¹ (Gallons)	Emissions Factor ² (Grams of Emissions/ Gallons of Fuel)	Emissions ³ (grams)	Fuel Volumes Debugging - Error Message
Alternative 4 Upland	CO ₂	114,000	10,210.00	1163940000	Sufficient Data Has Been Input
	CH ₄	114,000	1.01	115140	Sufficient Data Has Been Input
	N ₂ O	114,000	0.94	107160	Sufficient Data Has Been Input

1,026,000

1,026,000

1,026,000

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Total Emissions from Fuel and Miles						Lifetime O&M Emissions from Fuel and Miles				
		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)	CO ₂ e MT			Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)
No Action Alternative	CO ₂	959,740,000	2115866.241	959.74	959.74	No Action Alternative	CO ₂	8,637,660,000	19042796.17	8637.66
	CH ₄	611,940	1349.097868	0.61194	15.30		CH ₄	5,507,460	12141.88081	5.50746
	N ₂ O	15,980	35.22989823	0.01598	4.76		N ₂ O	143,820	317.0690841	0.14382
Σ					979.80					
Total Emissions from Fuel and Miles						Lifetime O&M Emissions from Fuel and Miles				
		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)	CO ₂ e MT			Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)
Alternative 2	CO ₂	2,552,500,000	5627303.833	2552.5	2,552.50	Alternative 2	CO ₂	22,972,500,000	50645734.49	22972.5
	CH ₄	1,627,500	3588.026244	1.6275	40.69		CH ₄	14,647,500	32292.23619	14.6475
	N ₂ O	42,500	93.69653786	0.0425	12.67		N ₂ O	382,500	843.2688407	0.3825
Σ					2,605.85					
Total Emissions from Fuel and Miles						Lifetime O&M Emissions from Fuel and Miles				
		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)	CO ₂ e MT			Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)
Alternative 3	CO ₂	2,552,500,000	5627303.833	2552.5	2,552.50	Alternative 3	CO ₂	22,972,500,000	50645734.49	22972.5
	CH ₄	1,627,500	3588.026244	1.6275	40.69		CH ₄	14,647,500	32292.23619	14.6475
	N ₂ O	42,500	93.69653786	0.0425	12.67		N ₂ O	382,500	843.2688407	0.3825
Σ					2,605.85					
Total Emissions from Fuel and Miles						Lifetime O&M Emissions from Fuel and Miles				
		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)	CO ₂ e MT			Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)
Alternative 4 Off-Shore	CO ₂	2,552,500,000	5627303.833	2552.5	2,552.50	Alternative 4 Off-Shore	CO ₂	22,972,500,000	50645734.49	22972.5
	CH ₄	1,627,500	3588.026244	1.6275	40.69		CH ₄	14,647,500	32292.23619	14.6475
	N ₂ O	42,500	93.69653786	0.0425	12.67		N ₂ O	382,500	843.2688407	0.3825
Σ					2,605.85					
Total Emissions from Fuel and Miles						Lifetime O&M Emissions from Fuel and Miles				
		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)	CO ₂ e MT			Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)
Alternative 4 Upland	CO ₂	1,163,940,000	2566050.548	1163.94	1,163.94	Alternative 4 Upland	CO ₂	10,475,460,000	23094454.93	10475.46
	CH ₄	115,140	253.8404557	0.11514	2.88		CH ₄	1,036,260	2284.564102	1.03626
	N ₂ O	107,160	236.2475529	0.10716	31.93		N ₂ O	964,440	2126.227976	0.96444
Σ					1,198.75					

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Annual O&M Emissions from Fuel and Miles

		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)
No Action Alternative	CO ₂	172,753,200	380855.923	172.7532
	CH ₄	110,149	242.837616	0.1101492
	N ₂ O	2,876	6.34138168	0.0028764

Annual O&M Emissions from Fuel and Miles

		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)
Alternative 2	CO ₂	459,450,000	1012914.69	459.45
	CH ₄	292,950	645.844724	0.29295
	N ₂ O	7,650	16.8653768	0.00765

Annual O&M Emissions from Fuel and Miles

		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)
Alternative 3	CO ₂	459,450,000	1012914.69	459.45
	CH ₄	292,950	645.844724	0.29295
	N ₂ O	7,650	16.8653768	0.00765

Annual O&M Emissions from Fuel and Miles

		Emissions Total (grams)	Emissions Total (pounds)	Emissions Total (Metric Tons)
Alternative 4 Off-Shore	CO ₂	459,450,000	1012914.69	459.45
	CH ₄	292,950	645.844724	0.29295
	N ₂ O	7,650	16.8653768	0.00765

NEAT Input ↓

		Annual Emissions Total (grams)	Annual Emissions Total (MT)	Lifetime Emissions Total (MT)	Lifetime CO ₂ e(MT)
Total No Action Alternative	CO ₂	172,753,200	172.75	8,637.66	8,637.66
	CH ₄	110,149	0.11	5.51	137.69
	N ₂ O	2,876	0.00	0.14	42.86
		Σ 8,818.20			

NEAT Input ↓

		Annual Emissions Total (grams)	Annual Emissions Total (MT)	Lifetime Emissions Total (MT)	Lifetime CO ₂ e(MT)
Total Alternative 2	CO ₂	459,450,000	459.45	22,972.50	22,972.50
	CH ₄	292,950	0.29	14.65	366.19
	N ₂ O	7,650	0.01	0.38	113.99
		Σ 23,452.67			

NEAT Input ↓

		Annual Emissions Total (grams)	Annual Emissions Total (MT)	Lifetime Emissions Total (MT)	Lifetime CO ₂ e(MT)
Total Alternative 3	CO ₂	459,450,000	459.45	22,972.50	22,972.50
	CH ₄	292,950	0.29	14.65	366.19
	N ₂ O	7,650	0.01	0.38	113.99
		Σ 23,452.67			

NEAT Input ↓

		Annual Emissions Total (grams)	Annual Emissions Total (MT)	Lifetime Emissions Total (MT)	Lifetime CO ₂ e(MT)
Total Alternative 4	CO ₂	668,959,200	668.96	33,447.96	33,447.96
	CH ₄	313,675	0.31	15.68	392.09
	N ₂ O	26,939	0.03	1.35	401.39
		Σ 34,241.44			

Gulf Intracoastal Waterway O&M Dredging, Manatee County, Florida
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PEAT Model Step	Data Source	Assumptions
Step 1: Project Data	Marin, PM-WC	
Step 2: Construction Emissions	Angell, EN-C	Water side equipment only < 1 year duration
Step 3: O&M Emissions		Dredging every 5-7 years. Assume worst case scenario. Same volume as initial construction.
Step 4: Wetland and Aquatic Habitat Emissions	N/A	
Step 5: Embodied Carbon in Materials	N/A	
Step 6: Net Emissions		Construction + O&M

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Alternative Sequential Identifier	Input Names for Project Alternatives/Construction Phases:	Construction Timing			Operations & Maintenance, Monitoring and Management Timing		
		Starting Year	Ending Year	Construction Years Total	Starting Year	Ending Year	O&M Project Lifetime (default is 50 years)
1	No Action - Alternative 1	2027	2027	1	2028	2078	50
2	Alternative 2	2027	2027	1	2028	2078	50
3	Alternative 3	2027	2027	1	2028	2078	50
4	Alternative 4	2027	2027	1	2028	2078	50
5	Alternative 5	Choose Construction Starting Year	Choose Construction End Year	Ending year input must be equal or more than starting year value	Choose a Construction End Year First	Choose a Construction End Year First	50
6	Alternative 6	Choose Construction Starting Year	Choose Construction End Year	Ending year input must be equal or more than starting year value	Choose a Construction End Year First	Choose a Construction End Year First	50
7	Alternative 7	Choose Construction Starting Year	Choose Construction End Year	Ending year input must be equal or more than starting year value	Choose a Construction End Year First	Choose a Construction End Year First	50
8	Alternative 8	Choose Construction Starting Year	Choose Construction End Year	Ending year input must be equal or more than starting year value	Choose a Construction End Year First	Choose a Construction End Year First	50

Note - the O&M project lifetime gets used to calculate Net emissions and also carries through to the social costs which are calculated for each specific year.
The dates of construction start and end carry through most all subsequent steps for calculations.

Choose the no-action alternative from the drop down menu below:

No Action - Alternative 1

Note: drop down menu will not automatically refresh when a new name is written for the no-action alternative above, and must be re-selected from the drop down menu after changing the name.

Gulf Intracoastal Waterway O&M Dredging, Manatee County, Florida
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No Action - Alternative 1	Year:	2027		
Air Quality Pollutant Emissions (Clean Air Act)		Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)			0.00	0.00
Carbon Monoxide (CO)			0.00	0.00
Sulfur Oxides (SOx)			0.00	0.00
Nitrous Oxides (NOx)			0.00	0.00
Particulate Matter - 2.5 micron (PM _{2.5})			0.00	0.00
Particulate Matter - 10 micron (PM ₁₀)			0.00	0.00
Lead (Pb)			0.00	0.00
Greenhouse Gas Emissions (NEPA)	Year:	2027		
Carbon Dioxide (CO ₂)		694,280,000.00	2,115,866.24	959.74
Methane (CH ₄)		442,680.00	1,349.10	0.61
Nitrous Oxide (N ₂ O)		11,560.00	35.23	0.02
Alternative 2	Year:	2027		
Air Quality Pollutant Emissions (Clean Air Act)		Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)			0.00	0.00
Carbon Monoxide (CO)			0.00	0.00
Sulfur Oxides (SOx)			0.00	0.00
Nitrous Oxides (NOx)			0.00	0.00
Particulate Matter - 2.5 micron (PM _{2.5})			0.00	0.00
Particulate Matter - 10 micron (PM ₁₀)			0.00	0.00
Lead (Pb)			0.00	0.00
Greenhouse Gas Emissions (NEPA)	Year:	2027		
Carbon Dioxide (CO ₂)		592,180,000.00	5,627,303.83	2,552.51
Methane (CH ₄)		377,580.00	3,588.03	1.63
Nitrous Oxide (N ₂ O)		9,860.00	93.70	0.04
Alternative 3	Year:	2027		
Air Quality Pollutant Emissions (Clean Air Act)		Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)			0.00	0.00
Carbon Monoxide (CO)			0.00	0.00
Sulfur Oxides (SOx)			0.00	0.00
Nitrous Oxides (NOx)			0.00	0.00
Particulate Matter - 2.5 micron (PM _{2.5})			0.00	0.00
Particulate Matter - 10 micron (PM ₁₀)			0.00	0.00
Lead (Pb)			0.00	0.00
Greenhouse Gas Emissions (NEPA)	Year:	2027		
Carbon Dioxide (CO ₂)		469,660,000.00	5,627,303.83	2,552.51
Methane (CH ₄)		299,460.00	3,588.03	1.63
Nitrous Oxide (N ₂ O)		7,820.00	93.70	0.04
Alternative 4	Year:	2027		
Air Quality Pollutant Emissions (Clean Air Act)		Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)			0.00	0.00
Carbon Monoxide (CO)			0.00	0.00
Sulfur Oxides (SOx)			0.00	0.00
Nitrous Oxides (NOx)			0.00	0.00
Particulate Matter - 2.5 micron (PM _{2.5})			0.00	0.00
Particulate Matter - 10 micron (PM ₁₀)			0.00	0.00
Lead (Pb)			0.00	0.00
Greenhouse Gas Emissions (NEPA)	Year:	2027		
Carbon Dioxide (CO ₂)		408,400,000.00	8,193,354.38	3,716.45
Methane (CH ₄)		260,400.00	3,588.03	1.63
Nitrous Oxide (N ₂ O)		6,800.00	93.70	0.04

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No Action - Alternative 1		Years	Yearly O&M Emissions				Project Lifetime O&M Emissions		
			1				50		
Air Quality Pollutant Emissions (Clean Air Act)			Grams	Pounds	Metric Tons		Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)				0.00	0.00		0.00	0.00	0.00
Carbon Monoxide (CO)				0.00	0.00		0.00	0.00	0.00
Sulfur Oxides (SOx)				0.00	0.00		0.00	0.00	0.00
Nitrous Oxides (NOx)				0.00	0.00		0.00	0.00	0.00
Particulate Matter - 2.5 micron (PM _{2.5})				0.00	0.00		0.00	0.00	0.00
Particulate Matter - 10 micron (PM ₁₀)				0.00	0.00		0.00	0.00	0.00
Lead - (Pb)				0.00	0.00		0.00	0.00	0.00
Greenhouse Gas Emissions (NEPA)									
Carbon Dioxide (CO ₂)			124,970,400.00	380,855.92	172.75		8,637,660,000.00	19,042,796.17	8,637.68
Methane (CH ₄)			79,682.40	242.84	0.11		5,507,460.00	12,141.88	5.51
Nitrous Oxide (N ₂ O)			2,080.80	6.34	0.00		143,820.00	317.07	0.14

Alternative 2 Years		Yearly O&M Emissions				Project Lifetime O&M Emissions		
		1				50		
Air Quality Pollutant Emissions (Clean Air Act)		Grams	Pounds	Metric Tons		Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)			0.00	0.00		0.00	0.00	0.00
Carbon Monoxide (CO)			0.00	0.00		0.00	0.00	0.00
Sulfur Oxides (SOx)			0.00	0.00		0.00	0.00	0.00
Nitrous Oxides (NOx)			0.00	0.00		0.00	0.00	0.00
Particulate Matter - 2.5 micron (PM _{2.5})			0.00	0.00		0.00	0.00	0.00
Particulate Matter - 10 micron (PM ₁₀)			0.00	0.00		0.00	0.00	0.00
Lead - (Pb)			0.00	0.00		0.00	0.00	0.00
Greenhouse Gas Emissions (NEPA)								
Carbon Dioxide (CO ₂)		106,592,400.00	1,012,914.69	459.45		22,972,500,000.00	50,645,734.49	22,972.55
Methane (CH ₄)		67,964.40	645.84	0.29		14,647,500.00	32,292.24	14.65
Nitrous Oxide (N ₂ O)		1,774.80	16.87	0.01		382,500.00	843.27	0.38

Alternative 3		Years	Yearly O&M Emissions				Project Lifetime O&M Emissions		
			1				50		
Air Quality Pollutant Emissions (Clean Air Act)			Grams	Pounds	Metric Tons		Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)				0.00	0.00		0.00	0.00	0.00
Carbon Monoxide (CO)				0.00	0.00		0.00	0.00	0.00
Sulfur Oxides (SOx)				0.00	0.00		0.00	0.00	0.00
Nitrous Oxides (NOx)				0.00	0.00		0.00	0.00	0.00
Particulate Matter - 2.5 micron (PM _{2.5})				0.00	0.00		0.00	0.00	0.00
Particulate Matter - 10 micron (PM ₁₀)				0.00	0.00		0.00	0.00	0.00
Lead - (Pb)				0.00	0.00		0.00	0.00	0.00
Greenhouse Gas Emissions (NEPA)									
Carbon Dioxide (CO ₂)			84,538,800.00	1,012,914.69	459.45		22,972,500,000.00	50,645,734.49	22,972.55
Methane (CH ₄)			53,902.80	645.84	0.29		14,647,500.00	32,292.24	14.65
Nitrous Oxide (N ₂ O)			1,407.60	16.87	0.01		382,500.00	843.27	0.38

Alternative 4 Air Quality Pollutant Emissions (Clean Air Act)		Years	Yearly O&M Emissions				Project Lifetime O&M Emissions		
			1				50		
			Grams	Pounds	Metric Tons		Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)				0.00	0.00		0.00	0.00	0.00
Carbon Monoxide (CO)				0.00	0.00		0.00	0.00	0.00
Sulfur Oxides (SOx)				0.00	0.00		0.00	0.00	0.00
Nitrous Oxides (NOx)				0.00	0.00		0.00	0.00	0.00
Particulate Matter - 2.5 micron (PM _{2.5})				0.00	0.00		0.00	0.00	0.00
Particulate Matter - 10 micron (PM ₁₀)				0.00	0.00		0.00	0.00	0.00
Lead - (Pb)				0.00	0.00		0.00	0.00	0.00
Greenhouse Gas Emissions (NEPA)									
Carbon Dioxide (CO ₂)			73,512,000.00	1,474,803.79	668.96		33,447,960,000.00	73,740,189.42	33,448.03
Methane (CH ₄)			46,872.00	691.54	0.31		15,683,760.00	34,576.80	15.68
Nitrous Oxide (N ₂ O)			1,224.00	59.39	0.03		1,346,940.00	2,969.50	1.35

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Gross and Net Total Emissions for the project alternatives are calculated below:

Include O&M Air Pollutant Emissions In Net Calculations YES						
Gross Emissions				Net Emissions		
No Action - Alternative 1						
Pollutant Emissions (Clean Air Act)	Grams	Pounds	Metric Tons	Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)	0	0	0	0	0	0
Carbon Monoxide (CO)	0	0	0	0	0	0
Sulfur Oxides (SOx)	0	0	0	0	0	0
Nitrous Oxides (NOx)	0	0	0	0	0	0
Particulate Matter - 2.5 micron (PM _{2.5})	0	0	0	0	0	0
Particulate Matter - 10 micron (PM ₁₀)	0	0	0	0	0	0
Lead - (Pb)	0	0	0	0	0	0
Greenhouse Gas Emissions (NEPA)						
Carbon Dioxide (CO ₂)	9,597,400,000	21,158,662	9,597	0	0	0
Methane (CH ₄)	6,119,400	13,491	6	0	0	0
Nitrous Oxide (N ₂ O)	159,800	352	0	0	0	0
Carbon Dioxide Equivalents (CO ₂ e)	9,798,005,400	21,600,922	9,798	0	0	0
Alternative 2						
Pollutant Emissions (Clean Air Act)	Grams	Pounds	Metric Tons	Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)	0	0	0	0	0	0
Carbon Monoxide (CO)	0	0	0	0	0	0
Sulfur Oxides (SOx)	0	0	0	0	0	0
Nitrous Oxides (NOx)	0	0	0	0	0	0
Particulate Matter - 2.5 micron (PM _{2.5})	0	0	0	0	0	0
Particulate Matter - 10 micron (PM ₁₀)	0	0	0	0	0	0
Lead - (Pb)	0	0	0	0	0	0
Greenhouse Gas Emissions (NEPA)						
Carbon Dioxide (CO ₂)	25,525,000,000	56,273,038	25,525	15,927,600,000	35,114,376	15,928
Methane (CH ₄)	16,275,000	35,880	16	10,155,600	22,389	10
Nitrous Oxide (N ₂ O)	425,000	937	0	265,200	585	0
Carbon Dioxide Equivalents (CO ₂ e)	26,058,525,000	57,449,261	26,059	16,260,519,600	35,848,339	16,261
Alternative 3						
Pollutant Emissions (Clean Air Act)	Grams	Pounds	Metric Tons	Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)	0	0	0	0	0	0
Carbon Monoxide (CO)	0	0	0	0	0	0
Sulfur Oxides (SOx)	0	0	0	0	0	0
Nitrous Oxides (NOx)	0	0	0	0	0	0
Particulate Matter - 2.5 micron (PM _{2.5})	0	0	0	0	0	0
Particulate Matter - 10 micron (PM ₁₀)	0	0	0	0	0	0
Lead - (Pb)	0	0	0	0	0	0
Greenhouse Gas Emissions (NEPA)						
Carbon Dioxide (CO ₂)	25,525,000,000	56,273,038	25,525	15,927,600,000	35,114,376	15,928
Methane (CH ₄)	16,275,000	35,880	16	10,155,600	22,389	10
Nitrous Oxide (N ₂ O)	425,000	937	0	265,200	585	0
Carbon Dioxide Equivalents (CO ₂ e)	26,058,525,000	57,449,261	26,059	16,260,519,600	35,848,339	16,261
Alternative 4						
Pollutant Emissions (Clean Air Act)	Grams	Pounds	Metric Tons	Grams	Pounds	Metric Tons
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)	0	0	0	0	0	0
Carbon Monoxide (CO)	0	0	0	0	0	0
Sulfur Oxides (SOx)	0	0	0	0	0	0
Nitrous Oxides (NOx)	0	0	0	0	0	0
Particulate Matter - 2.5 micron (PM _{2.5})	0	0	0	0	0	0
Particulate Matter - 10 micron (PM ₁₀)	0	0	0	0	0	0
Lead - (Pb)	0	0	0	0	0	0
Greenhouse Gas Emissions (NEPA)						
Carbon Dioxide (CO ₂)	37,164,400,000	81,933,544	37,164	27,567,000,000	60,774,881	27,567
Methane (CH ₄)	17,311,260	38,165	17	11,191,860	24,674	11
Nitrous Oxide (N ₂ O)	1,389,440	3,063	1	1,229,640	2,711	1
Carbon Dioxide Equivalents (CO ₂ e)	38,011,234,620	83,800,496	38,011	28,213,229,220	62,199,574	28,213