Appendix L

Air Quality Summary Tables

Annual Construction Emissions Summary
Port of Gulfport Expansion Project
Gulfport, Harrison County, Mississippi

PROPOSED PROJECT ALTERNATIVE

	TONS PER YEAR										
Year 2016	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**CO2**	**SO2**	**CH4**	**N20**	**CO2e**	**Total HAPs**
Dredge & Support Equipment	11.77	11.25	10.91	218.01	296.50	30,086	0.283	3.924	0.872	30,444	3.21
Non-Road Construction Equipment	0.42	0.26	0.25	2.77	3.70	784	0.006	0.049	0.055	802	0.01
On-Road and Employee Vehicles	0.31	0.03	0.03	4.80	0.89	344	0.015	0.013	0.007	347	0.02
Maintenance Dredging	0.00	0.00	0.00	0.00	0.00	0	0.000	0.000	0.000	0	0.00
Subtotal	**12.51**	**11.54**	**11.19**	**225.58**	**301.09**	**31,215**	**0.305**	**3.987**	**0.934**	**31,593**	**3.24**
Year 2017	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**CO2**	**SO2**	**CH4**	**N20**	**CO2e**	**Total HAPs**
Dredge & Support Equipment	12.36	11.81	11.46	228.96	311.39	31,597	0.298	4.121	0.916	31,973	3.34
Non-Road Construction Equipment	1.81	1.12	1.09	11.52	16.03	3,453	0.028	0.215	0.241	3,530	0.04
On-Road and Employee Vehicles	0.53	0.07	0.06	7.61	1.85	618	0.026	0.029	0.011	622	0.05
Maintenance Dredging	1.20	1.15	1.12	22.29	30.31	3,076	0.029	0.401	0.089	3,112	0.21
Subtotal	**15.91**	**14.15**	**13.73**	**270.37**	**359.58**	**38,743**	**0.380**	**4.766**	**1.257**	**39,237**	**3.65**
Year 2018	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**CO2**	**SO2**	**CH4**	**N20**	**CO2e**	**Total HAPs**
Dredge & Support Equipment	6.82	6.52	6.33	126.38	171.88	17,441	0.164	2.275	0.506	17,648	1.83
Non-Road Construction Equipment	1.27	0.70	0.68	7.92	9.97	2,747	0.021	0.171	0.191	2,808	0.04
On-Road and Employee Vehicles	0.25	0.04	0.04	3.14	1.06	299	0.012	0.016	0.005	301	0.03
Maintenance Dredging	1.18	1.13	1.09	21.83	29.69	3,013	0.028	0.393	0.087	3,049	0.21
Subtotal	**9.52**	**8.39**	**8.14**	**159.28**	**212.60**	**23,500**	**0.226**	**2.855**	**0.789**	**23806**	**2.11**
Year 2019	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**CO2**	**SO2**	**CH4**	**N20**	**CO2e**	**Total HAPs**
Dredge & Support Equipment	0.22	0.21	0.21	4.13	5.61	569	0.005	0.074	0.017	576	0.06
Non-Road Construction Equipment	0.24	0.12	0.12	2.67	1.67	531	0.004	0.033	0.037	543	0.01
On-Road and Employee Vehicles	0.12	0.005	0.004	1.81	0.26	122	0.006	0.004	0.003	123	0.01
Maintenance Dredging	2.24	2.14	2.07	41.39	56.29	5,712	0.054	0.745	0.166	5,780	0.40
Subtotal	**2.82**	**2.48**	**2.40**	**50.00**	**63.84**	**6,935**	**0.069**	**0.856**	**0.222**	**7022**	**0.47**
Year 2020	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**CO2**	**SO2**	**CH4**	**N20**	**CO2e**	**Total HAPs**
Dredge & Support Equipment	0.00	0.00	0.00	0.00	0.00	0	0.000	0.000	0.000	0	0.00
Non-Road Construction Equipment	0.44	0.33	0.32	1.68	4.00	1,188	0.009	0.074	0.083	1,215	0.02
On-Road and Employee Vehicles	0.22	0.01	0.01	2.91	0.46	208	0.010	0.007	0.005	210	0.01
Maintenance Dredging	1.20	1.15	1.12	22.29	30.31	3,076	0.029	0.401	0.089	3,112	0.21
Subtotal	**1.86**	**1.48**	**1.44**	**26.87**	**34.78**	**4,472**	**0.048**	**0.482**	**0.177**	**4536**	**0.24**
Year 2021	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**CO2**	**SO2**	**CH4**	**N20**	**CO2e**	**Total HAPs**
Dredge & Support Equipment	0.00	0.00	0.00	0.00	0.00	0	0.000	0.000	0.000	0	0.00
Non-Road Construction Equipment	0.06	0.03	0.03	0.18	0.53	136	0.001	0.008	0.009	139	0.002
On-Road and Employee Vehicles	0.54	0.28	0.27	4.23	5.28	1,018	0.034	0.059	0.006	1,021	0.01
Maintenance Dredging	1.15	1.10	1.07	21.38	29.07	2,950	0.028	0.385	0.086	2,985	0.20
Subtotal	**1.75**	**1.41**	**1.37**	**25.79**	**34.88**	**4,104**	**0.063**	**0.453**	**0.101**	**4146**	**0.21**

TOTAL (ALL YEARS)	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**CO2**	**SO2**	**CH4**	**N20**	CO2e	**Total HAPs**
Dredge & Support Equipment	31.18	29.80	28.90	577.48	785.38	79,693	0.751	10.395	2.310	80,641	8.44
Non-Road Construction Equipment	4.25	2.57	2.49	26.75	35.90	8,839	0.069	0.551	0.616	9,037	0.11
On-Road and Employee Vehicles	1.97	0.42	0.41	24.50	9.81	2,610	0.103	0.128	0.036	2,624	0.13
Maintenance Dredging	6.98	6.67	6.47	129.17	175.68	17,826	0.168	2.325	0.517	18,038	1.23
	44.38	**39.46**	**38.27**	**757.90**	**1,006.76**	**108,968**	**1.090**	**13.398**	**3.479**	**110,340**	**9.92**
Peak Annual Emissions	**15.91**	**14.15**	**13.73**	**270.37**	**359.58**	**38,743**	**0.38**	**4.77**	**1.26**	**39,237**	**3.65**

CONSTRUCTION EQUIPMENT / HOURS OF OPERATION
PORT OF GULFPORT EXPANSIONPROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Hrs/Day: 24
Day/Week: 7
Week/Month:

West & East Pier Dredging
Turning Basin Dredging
East Pier
North Harbor
West Pier
West Pier Sheet Pile
Wick Drains
Rail
Utilities

Hrs/Day: 24
Day/Week: 7
Week/Mont
Hours of Operation

EQUIPMENT TYPE	Quantity	2016												2017												2018											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DAYS PER MONTH		31	29	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31	30	31
MECHANICAL DREDGING EQUIPMENT																																					
BUCKET DREDGE	2							1488	1344	1488	1440	1488	1440	1488	1488																						
DREDGE AUXILLARY ENGINES	2							1572	1344	1572	1524	1488	1440	1488	1572																						
MULTIPURPOSE VESSEL	1							456	336	456	84	372	360	372	456																						
MEDIUM DUTY TRUCK	1							124	112	124	120	124	120	124	124																						
BUS	1							62	56	62	60	62	60	62	62																						
TWIN SCREW TUGBOAT (PRIMARY HAULER)	3							1944	1680	1944	1884	1860	1800	1860	1944																						
AUXILLARY ENGINES	3							2316	2232	2244	2400	2160	2232	2232	2100																						
SINGLE SCREW TUGBOAT (TENDER)	1							372	336	372	444	372	360	372	456																						
AUXILLARY ENGINES	1							828	744	804	828	720	744	744	756																						
SINGLE SCREW TUGBOAT	1							456	336	456	444	372	360	372	456																						
AUXILLARY ENGINES	1							828	744	804	828	720	744	744	756																						
MAINTENANCE DREDGING EQUIPMENT (MECH)																																					
BUCKET DREDGE																					744	273											744	249			
DREDGE AUXILLARY ENGINES	1																				828	357											828	333			
MULTIPURPOSE VESSEL																					456	220											456	208			
MEDIUM DUTY TRUCK																					124	45											124	41			
BUS																					62	23											62	21			
TWIN SCREW TUGBOAT (PRIMARY HAULER)																					704	311											704	291			
AUXILLARY ENGINES	1																				828	357											828	333			
SINGLE SCREW TUGBOAT (TENDER)																					456	220											456	208			
AUXILLARY ENGINES	1																				828	357											828	333			
SINGLE SCREW TUGBOAT																					456	220											456	208			
AUXILLARY ENGINES	1																				828	357											828	333			
FILL EQUIPMENT																																					
TWIN SCREW TUGBOAT											1440	1488	1440	1488	1488	1440	1488	1440	1488	1488	1392	1488	1440	1488	1440	1488	1488	1440	1488	1440	1488	1488	1344	1488			
AUXILLARY ENGINES	4										2976	2880	2976	2976	2688	2976	2880	2976	2880	2976	2976	2880	2976	2880	2976	2976	2688	2976	2880	2976	2880	2976	2976	2880			
SINGLE SCREW TUGBOAT											360	372	360	372	372	360	372	360	372	372	348	372	360	372	360	372	372	360	372	360	372	372	336	372			
AUXILLARY ENGINES	1										744	720	744	744	672	744	720	744	720	744	744	720	744	720	744	744	672	744	720	744	720	744	744	720			
CAT 973 3.8CY, 210 HP (placing)											360	372	360	372	372	360	372	360	372	372	348	372	360	372	360	372	372	360	372	360	372	372	336	372			
CAT 973 3.8CY, 210 HP (wick)											360	372	360	372	372	360	372	360	372	372	348	372	360	372	360	372	372	360	372	360	372	372	336	372			
CAT 980GN, 7.0, 300HP(rip rap)											360	372	360	372	372	360	372	360	372	372	348	372	360	372	360	372	372	360	372	360	372	372	336	372			
CAT D4C 80HP, 8MT											360	372	360	372	372	360	372	360	372	372	348	372	360	372	360	372	372	360	372	360	372	372	336	372			
CAT D7R 230 HP, 25MT											360	372	360	372	372	360	372	360	372	372	348	372	360	372	360	372	372	360	372	360	372	372	336	372			
Gen Set 100 KW, DSL											360	372	360	372	372	360	372	360	372	372	348	372	360	372	360	372	372	360	372	360	372	372	336	372			
4 TON EXT.BOOM FORKLIFT											240	248	240	248	248	240	248	240	248	248	232	248	240	248	240	248	248	240	248	240	248	248	224	248			
MULE KAWASAKI 550 W/TOPS											240	248	240	248	248	240	248	240	248	248	232	248	240	248	240	248	248	240	248	240	248	248	224	248			
CAT 563CP, 145 HP											300	310	300	310	310	300	310	300	310	310	290	310	300	310	300	310	310	300	310	300	310	310	280	310			
CAT 563CS, 145 HP											300	310	300	310	310	300	310	300	310	310	290	310	300	310	300	310	310	300	310	300	310	310	280	310			
18 WHEEL WITH FLATBED											120	124	120	124	124	120	124	120	124	124	116	124	120	124	120	124	124	120	124	120	124	124	112	124			
DUMP TRUCKS											960	992	960	992	992	960	992	960	992	992	928	992	960	992	960	992	992	960	992	960	992	992	896	992			
BOOSTER PUMP											360	372	360	372	372	360	372	360	372	372	348	372	360	372	360	372	372	360	372	360	372	372	336	372			
CRANE BARGES WITH FILL											720	744	720	744	744	720	744	720	744	744	696	744	720	744	720	744	744	720	744	720	744	744	672	744			
CRANE BARGES WITH ROCK											720	744	720	744	744	720	744	720	744	744	696	744	720	744	720	744	744	720	744	720	744	744	672	744			
1500 GLN WATER TRUCK, 4×2											300	310	300	310	310	300	310	300	310	310	290	310	300	310	300	310	310	300	310	300	310	310	280	310			
WHARF CONSTRUCTION EQUIPMENT																																					
WORK BARGES																																					
SINGLE SCREW TUGBOAT																																					
AUXILLARY ENGINES																																					
PILING																																					
150 TN CRWLER CRANE																																					
EXCAVATOR-JD 330LC 2.3 CY																																					
PICKUP TRUCKS																																					
ATE D46-32 DIESEL HAMMER																																					
AIR COMPRESSORS																																					
375 CFM, PORT.DSL																																					
WELDING EQUIPMENT																																					
300 AMP DC DIESEL																																					
MISC JOB EQUIPMENT																																					
REG SRVC TRUCK, W/EQUIPMENT																																					
GEN SET 6-10 KW, DSL																																					
TRAILERS																																					
PICKUP TRUCKS																																					
CENT TRASH PUMP 4" W/TRL																																					
CUTTING EQUIPMENT																																					
Torch Cutting Machine																																					
CONCRETE EQUIPMENT																																					
TAMPER (JAMPING JACK) WAC																																					
TROWEL MARCH 48"																																					
VIBRATOR CONCRETE ELEC.2																																					
WICK DRAIN INSTALLATION																																					
EXCAVATOR-JD 330LC 2.3 CY																			310	310	280	310	300	310	300	310	310	300	310	300	310	310	280	310			
PICKUP TRUCKS																			124	124	112	124	120	124	120	124	124	120	124	120	124	124	112	124			
ATE D46-32 DIESEL HAMMER																			310	310	280	310	300	310	300	310	310	300	310	300	310	310	280	310			

EQUIPMENT TYPE	2019												2020												2021											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DAYS PER MONTH	31	28	31	30	31	30	31	31	30	31	30	31	31	29	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31	30	31
MECHANICAL DREDGING EQUIPMENT																																				
BUCKET DREDGE																																				
DREDGE AUXILLARY ENGINES																																				
MULTIPURPOSE VESSEL																																				
MEDIUM DUTY TRUCK																																				
BUS																																				
TWIN SCREW TUGBOAT (PRIMARY HAULER)																																				
AUXILLARY ENGINES																																				
SINGLE SCREW TUGBOAT (TENDER)																																				
AUXILLARY ENGINES																																				
SINGLE SCREW TUGBOAT																																				
AUXILLARY ENGINES																																				
MAINTENANCE DREDGING EQUIPMENT (MECH)																																				
BUCKET DREDGE						720	249				1200						744	273																		
DREDGE AUXILLARY ENGINES						804	333				1572	132					828	357																		
MULTIPURPOSE VESSEL						444	208				468						456	220																		
MEDIUM DUTY TRUCK						120	41				100						124	45																		
BUS						60	21				50						62	23																		
TWIN SCREW TUGBOAT (PRIMARY HAULER)						684	291				668						704	311																		
AUXILLARY ENGINES						804	333				828	108					828	357																		
SINGLE SCREW TUGBOAT (TENDER)						444	208				468						456	220																		
AUXILLARY ENGINES						804	333				828	108					828	357																		
SINGLE SCREW TUGBOAT						444	208				468						456	220																		
AUXILLARY ENGINES						804	333				828	108					828	357																		
FILL EQUIPMENT																																				
TWIN SCREW TUGBOAT																																				
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CAT 973 3.8CY, 210 HP (placing)																																				
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18 WHEEL WITH FLATBED																																				
DUMP TRUCKS																																				
BOOSTER PUMP																																				
CRANE BARGES WITH FILL																																				
CRANE BARGES WITH ROCK																																				
1500 GLN WATER TRUCK, 4×2																																				
WHARF CONSTRUCTION EQUIPMENT																																				
WORK BARGES																																				
SINGLE SCREW TUGBOAT	310	310	300																																	
AUXILLARY ENGINES	744	744	744																																	
PILING																																				
150 TN CRWLER CRANE	310	310	300																																	
EXCAVATOR-JD 330LC 2.3 CY	310	310	300																																	
PICKUP TRUCKS	124	124	120																																	
ATE D46-32 DIESEL HAMMER	310	310	300																																	
AIR COMPRESSORS																																				
375 CFM, PORT.DSL	248	248	240																																	
WELDING EQUIPMENT																																				
300 AMP DC DIESEL	248	248	240																																	
MISC JOB EQUIPMENT																																				
REG SRVC TRUCK, W/EQUIPMENT	124	124	120																																	
GEN SET 6-10 KW, DSL	248	248	240																																	
TRAILERS																																				
PICKUP TRUCKS	124	124	120																																	
CENT TRASH PUMP 4" W/TRL	248	248	240																																	
CUTTING EQUIPMENT																																				
Torch Cutting Machine	124	124	120																																	
CONCRETE EQUIPMENT																																				
TAMPER (JAMPING JACK) WAC	124	124	120																																	
TROWEL MARCH 48"	248	248	240																																	
VIBRATOR CONCRETE ELEC.2																																				
WICK DRAIN INSTALLATION																																				
EXCAVATOR-JD 330LC 2.3 CY																																				
PICKUP TRUCKS																																				
ATE D46-32 DIESEL HAMMER																																				

CONSTRUCTION EQUIPMENT / HOURS OF OPERATION
PORT OF GULFPORT EXPANSIONPROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Hrs/Day: 24
Day/Week: 7
Week/Month:

West & East Pier Dredging
Turning Basin Dredging
East Pier
North Harbor
West Pier
West Pier Sheet Pile
Wick Drains
Rail
Utilities

Hrs/Day: 24
Day/Week: 7
Week/Mont
Hours of Operation

EQUIPMENT TYPE	Quantity	2016	2017	2018	2019	2020	2021
ROAD CONSTRUCTION EQUIPMENT							
PAVER					300 310 300	310 310 300 310 300 310 310 280 310 300	
SOIL COMPACTOR					300 310 300	310 310 300 310 300 310 310 280 310 300	
HYDRAULIC SWEEPER					300 310 300	310 310 300 310 300 310 310 280 310 300	
DUMP TRUCK					600 620 600	620 620 600 620 600 620 620 560 620 600	
ROLLER					300 310 300	310 310 300 310 300 310 310 280 310 300	
BULLDOZER					300 310 300	310 310 300 310 300 310 310 280 310 300	
GRADER					300 310 300	310 310 300 310 300 310 310 280 310 300	
MIXER					300 310 300	310 310 300 310 300 310 310 280 310 300	
BATCHING PLANT					300 310 300	310 310 300 310 300 310 310 280 310 300	
RAIL CONSTRUCTION EQUIPMENT							
GRADERS						310	
BULLDOZERS						310	
ROLLER						310	
GANTRY CRANES						310	
SWING LOADER						310	
RAIL THREADER						310	
18 WHEELER						310	
UNDER CUTTER						310	
UTILITY INFRASTRUCTURE EQUIPMENT							
EXCAVATOR						300 150	
DUMP TRUCK						300 150	
BACKHOE						300 150	
PIPE LAYER						300 150	
TERMINAL/FACILITIES EQUIPMENT							
CRANE 80 TON CRLR,LS138							240 248 240 248 248 224 248
18 WHEEL WITH FLATBED							
30' SCISSOR LIFT							
4 TON EXT. BOOM FORKLIFT							
BULLDOZER CAT D4C							
DELIVERY VEHICLES							
DUMP TRUCK							0 0 0 0 0 0 0
18 WHEEL WITH FLATBED							225 233 225 233 233 210 233
TRACTOR							120 124 120 124 124 112 124
WATER TRUCK							0 0 0 0 0 0 0
BUS							0 0 0 0 0 0 0
EMPLOYEE VEHICLES							153 158 153 158 158 143 158

Proposed Project Alternative - Dredging Emissions Summary 2016

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
MECHANICAL DREDGING EQUIPMENT																									
BUCKET DREDGE	1742	diesel	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	2.6872	2.5677	2.4907	49.7621	67.6764	6867	0.0647	0.8957	0.1990	0.9097
AUXILLARY ENGINES	600	diesel	48		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.9524	0.9101	0.8828	17.6368	23.9860	2434	0.0229	0.3175	0.0705	0.0337
MULTIPURPOSE VESSEL (Crew & Survey)	300	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.1099	0.1051	0.1019	2.0359	2.7689	281	0.0026	0.0366	0.0081	0.0039
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2000	diesel	20	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	3.9459	3.7705	3.6574	73.0723	99.3783	10084	0.0950	1.3153	0.2923	1.3358
AUXILLARY ENGINES	300	diesel	20		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.7236	0.6914	0.6707	13.3992	18.2229	1849	0.0174	0.2412	0.0536	0.0256
SINGLE SCREW TUGBOAT (TENDER)	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.4006	0.3828	0.3713	7.4177	10.0881	1024	0.0096	0.1335	0.0297	0.1356
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.1243	0.1188	0.1152	2.3023	3.1311	318	0.0030	0.0414	0.0092	0.0044
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.4304	0.4113	0.3989	7.9701	10.8393	1100	0.0104	0.1435	0.0319	0.1457
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.1243	0.1188	0.1152	2.3023	3.1311	318	0.0030	0.0414	0.0092	0.0044
MAINTENANCE DREDGING EQUIPMENT (MECH)																									
BUCKET DREDGE	1,742	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
DREDGE AUXILLARY ENGINES	600	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MULTIPURPOSE VESSEL	300	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT (TENDER)	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
FILL EQUIPMENT																									
TWIN SCREW TUGBOAT	2000	diesel (4)	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	1.5511	1.4822	1.4377	28.7239	39.0645	3963.8967	0.0373	0.5170	0.1149	0.5251
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.4704	0.4495	0.4360	8.7119	11.8481	1202.2368	0.0113	0.1568	0.0348	0.0166
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1939	0.1853	0.1797	3.5905	4.8831	495.4871	0.0047	0.0646	0.0144	0.0656
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0588	0.0562	0.0545	1.0890	1.4810	150.2796	0.0014	0.0196	0.0044	0.0021
WHARF CONSTRUCTION EQUIPMENT																									
WORK BARGES	NA	NA	0																						
SINGLE SCREW TUGBOAT	1000	diesel	10		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
															Totals	**11.77**	**11.25**	**10.91**	**218.01**	**296.50**	**30085.91**	**0.28**	**3.92**	**0.87**	**3.21**

Proposed Project Alternative - Dredging Emissions Summary 2017

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
MECHANICAL DREDGING EQUIPMENT																									
BUCKET DREDGE	1742	diesel	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.9205	0.8796	0.8532	17.0456	23.1820	2352	0.0222	0.3068	0.0682	0.3116
AUXILLARY ENGINES	600	diesel	48		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.3260	0.3115	0.3022	6.0368	8.2100	833	0.0078	0.1087	0.0241	0.0115
MULTIPURPOSE VESSEL (Crew & Survey)	300	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0441	0.0421	0.0409	0.8167	1.1108	113	0.0011	0.0147	0.0033	0.0016
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2000	diesel	20	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	1.3508	1.2908	1.2521	25.0150	34.0204	3452	0.0325	0.4503	0.1001	0.4573
AUXILLARY ENGINES	300	diesel	20		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.2307	0.2205	0.2139	4.2731	5.8114	590	0.0056	0.0769	0.0171	0.0082
SINGLE SCREW TUGBOAT (TENDER)	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1470	0.1405	0.1363	2.7225	3.7025	376	0.0035	0.0490	0.0109	0.0498
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0399	0.0382	0.0370	0.7398	1.0061	102	0.0010	0.0133	0.0030	0.0014
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1470	0.1405	0.1363	2.7225	3.7025	376	0.0035	0.0490	0.0109	0.0498
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0399	0.0382	0.0370	0.7398	1.0061	102	0.0010	0.0133	0.0030	0.0014
MAINTENANCE DREDGING EQUIPMENT (MECH)																									
BUCKET DREDGE	1,742	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.3144	0.3005	0.2914	5.8227	7.9189	804	0.0076	0.1048	0.0233	0.1064
DREDGE AUXILLARY ENGINES	600	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.1262	0.1206	0.1170	2.3370	3.1783	323	0.0030	0.0421	0.0093	0.0045
MULTIPURPOSE VESSEL	300	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0360	0.0344	0.0334	0.6671	0.9073	92	0.0009	0.0120	0.0027	0.0013
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.3605	0.3445	0.3341	6.6757	9.0789	921	0.0087	0.1202	0.0267	0.0127
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0631	0.0603	0.0585	1.1685	1.5891	161	0.0015	0.0210	0.0047	0.0022
SINGLE SCREW TUGBOAT (TENDER)	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1201	0.1147	0.1113	2.2237	3.0242	307	0.0029	0.0400	0.0089	0.0406
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0315	0.0301	0.0292	0.5842	0.7946	81	0.0008	0.0105	0.0023	0.0011
SINGLE SCREW TUGBOAT	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1201	0.1147	0.1113	2.2237	3.0242	307	0.0029	0.0400	0.0089	0.0406
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0315	0.0301	0.0292	0.5842	0.7946	81	0.0008	0.0105	0.0023	0.0011
FILL EQUIPMENT																									
TWIN SCREW TUGBOAT	2000	diesel (4)	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	6.2385	5.9612	5.7824	115.5269	157.1165	15942.7056	0.1502	2.0795	0.4621	2.1119
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	1.8664	1.7835	1.7300	34.5634	47.0062	4769.7439	0.0449	0.6221	0.1383	0.0659
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.7798	0.7451	0.7228	14.4409	19.6396	1992.8382	0.0188	0.2599	0.0578	0.2640
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.2333	0.2229	0.2162	4.3204	5.8758	596.2180	0.0056	0.0778	0.0173	0.0082
WHARF CONSTRUCTION EQUIPMENT																									
WORK BARGES	NA	NA	0																						
SINGLE SCREW TUGBOAT	1000	diesel	10		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
															Totals	**13.57**	**12.96**	**12.58**	**251.25**	**341.70**	**34672.49**	**0.33**	**4.52**	**1.00**	**3.55**

Proposed Project Alternative - Dredging Emissions Summary 2018

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
MECHANICAL DREDGING EQUIPMENT																									
BUCKET DREDGE	1742	diesel	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	600	diesel	48		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MULTIPURPOSE VESSEL (Crew & Survey)	300	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2000	diesel	20	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	300	diesel	20		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT (TENDER)	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MAINTENANCE DREDGING EQUIPMENT (MECH)																									
BUCKET DREDGE	1,742	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.3070	0.2934	0.2846	5.6853	7.7319	785	0.0074	0.1023	0.0227	0.1039
DREDGE AUXILLARY ENGINES	600	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.1236	0.1181	0.1146	2.2896	3.1139	316	0.0030	0.0412	0.0092	0.0044
MULTIPURPOSE VESSEL	300	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0354	0.0338	0.0328	0.6553	0.8912	90	0.0009	0.0118	0.0026	0.0013
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.3534	0.3377	0.3275	6.5442	8.9001	903	0.0085	0.1178	0.0262	0.0125
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0618	0.0591	0.0573	1.1448	1.5569	158	0.0015	0.0206	0.0046	0.0022
SINGLE SCREW TUGBOAT (TENDER)	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1179	0.1127	0.1093	2.1842	2.9705	301	0.0028	0.0393	0.0087	0.0399
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0309	0.0295	0.0286	0.5724	0.7785	79	0.0007	0.0103	0.0023	0.0011
SINGLE SCREW TUGBOAT	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1179	0.1127	0.1093	2.1842	2.9705	301	0.0028	0.0393	0.0087	0.0399
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0309	0.0295	0.0286	0.5724	0.7785	79	0.0007	0.0103	0.0023	0.0011
FILL EQUIPMENT																									
TWIN SCREW TUGBOAT	2000	diesel (4)	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	4.6703	4.4627	4.3289	86.4873	117.6227	11935.2495	0.1124	1.5568	0.3459	1.5810
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	1.3960	1.3339	1.2939	25.8515	35.1580	3567.5071	0.0336	0.4653	0.1034	0.0493
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.5838	0.5578	0.5411	10.8109	14.7028	1491.9062	0.0141	0.1946	0.0432	0.1976
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.1745	0.1667	0.1617	3.2314	4.3948	445.9384	0.0042	0.0582	0.0129	0.0062
WHARF CONSTRUCTION EQUIPMENT																									
WORK BARGES	NA	NA	0																						
SINGLE SCREW TUGBOAT	1000	diesel	10		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
															Totals	**8.00**	**7.65**	**7.42**	**148.21**	**201.57**	**20453.46**	**0.19**	**2.67**	**0.59**	**2.04**

Proposed Project Alternative - Dredging Emissions Summary 2019

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
MECHANICAL DREDGING EQUIPMENT																									
BUCKET DREDGE	1742	diesel	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	600	diesel	48		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MULTIPURPOSE VESSEL (Crew & Survey)	300	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2000	diesel	20	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	300	diesel	20		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT (TENDER)	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MAINTENANCE DREDGING EQUIPMENT (MECH)																									
BUCKET DREDGE	1,742	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.6707	0.6409	0.6217	12.4210	16.8926	1714	0.0161	0.2236	0.0497	0.2271
DREDGE AUXILLARY ENGINES	600	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.3026	0.2892	0.2805	5.6039	7.6213	773	0.0073	0.1009	0.0224	0.0107
MULTIPURPOSE VESSEL	300	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0597	0.0570	0.0553	1.1051	1.5029	152	0.0014	0.0199	0.0044	0.0021
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.5835	0.5576	0.5408	10.8054	14.6953	1491	0.0140	0.1945	0.0432	0.0206
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.1104	0.1055	0.1023	2.0444	2.7804	282	0.0027	0.0368	0.0082	0.0039
SINGLE SCREW TUGBOAT (TENDER)	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1989	0.1901	0.1844	3.6835	5.0096	508	0.0048	0.0663	0.0147	0.0673
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0552	0.0527	0.0512	1.0222	1.3902	141	0.0013	0.0184	0.0041	0.0020
SINGLE SCREW TUGBOAT	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1989	0.1901	0.1844	3.6835	5.0096	508	0.0048	0.0663	0.0147	0.0673
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0552	0.0527	0.0512	1.0222	1.3902	141	0.0013	0.0184	0.0041	0.0020
FILL EQUIPMENT																									
TWIN SCREW TUGBOAT	2000	diesel (4)	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WHARF CONSTRUCTION EQUIPMENT																									
WORK BARGES	NA	NA	0																						
SINGLE SCREW TUGBOAT	1000	diesel	10		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1633	0.1561	0.1514	3.0250	4.1139	417.4433	0.0039	0.0544	0.0121	0.0553
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0594	0.0568	0.0551	1.1008	1.4971	151.9131	0.0014	0.0198	0.0044	0.0021
															Totals	**2.46**	**2.35**	**2.28**	**45.52**	**61.90**	**6281.34**	**0.06**	**0.82**	**0.18**	**0.46**

Proposed Project Alternative - Dredging Emissions Summary 2020

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
MECHANICAL DREDGING EQUIPMENT																									
BUCKET DREDGE	1742	diesel	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	600	diesel	48		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MULTIPURPOSE VESSEL (Crew & Survey)	300	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2000	diesel	20	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	300	diesel	20		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT (TENDER)	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MAINTENANCE DREDGING EQUIPMENT (MECH)																									
BUCKET DREDGE	1,742	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.3144	0.3005	0.2914	5.8227	7.9189	804	0.0076	0.1048	0.0233	0.1064
DREDGE AUXILLARY ENGINES	600	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.1262	0.1206	0.1170	2.3370	3.1783	323	0.0030	0.0421	0.0093	0.0045
MULTIPURPOSE VESSEL	300	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0360	0.0344	0.0334	0.6671	0.9073	92	0.0009	0.0120	0.0027	0.0013
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.3605	0.3445	0.3341	6.6757	9.0789	921	0.0087	0.1202	0.0267	0.0127
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0631	0.0603	0.0585	1.1685	1.5891	161	0.0015	0.0210	0.0047	0.0022
SINGLE SCREW TUGBOAT (TENDER)	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1201	0.1147	0.1113	2.2237	3.0242	307	0.0029	0.0400	0.0089	0.0406
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0315	0.0301	0.0292	0.5842	0.7946	81	0.0008	0.0105	0.0023	0.0011
SINGLE SCREW TUGBOAT	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1201	0.1147	0.1113	2.2237	3.0242	307	0.0029	0.0400	0.0089	0.0406
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0315	0.0301	0.0292	0.5842	0.7946	81	0.0008	0.0105	0.0023	0.0011
FILL EQUIPMENT																									
TWIN SCREW TUGBOAT	2000	diesel (4)	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WHARF CONSTRUCTION EQUIPMENT																									
WORK BARGES	NA	NA	0																						
SINGLE SCREW TUGBOAT	1000	diesel	10		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
															Totals	**1.20**	**1.15**	**1.12**	**22.29**	**30.31**	**3075.57**	**0.03**	**0.40**	**0.09**	**0.21**

Proposed Project Alternative - Dredging Emissions Summary 2021

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
MECHANICAL DREDGING EQUIPMENT																									
BUCKET DREDGE	1742	diesel	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	600	diesel	48		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MULTIPURPOSE VESSEL (Crew & Survey)	300	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2000	diesel	20	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	300	diesel	20		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT (TENDER)	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel	12		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MAINTENANCE DREDGING EQUIPMENT (MECH)																									
BUCKET DREDGE	1,742	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.2996	0.2863	0.2777	5.5478	7.5450	766	0.0072	0.0999	0.0222	0.1014
DREDGE AUXILLARY ENGINES	600	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.1211	0.1157	0.1122	2.2423	3.0495	309	0.0029	0.0404	0.0090	0.0043
MULTIPURPOSE VESSEL	300	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0347	0.0332	0.0322	0.6434	0.8751	89	0.0008	0.0116	0.0026	0.0012
TWIN SCREW TUGBOAT (PRIMARY HAULER)	2,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.3463	0.3309	0.3210	6.4126	8.7212	885	0.0083	0.1154	0.0257	0.0122
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0605	0.0579	0.0561	1.1211	1.5247	155	0.0015	0.0202	0.0045	0.0021
SINGLE SCREW TUGBOAT (TENDER)	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1158	0.1107	0.1073	2.1447	2.9169	296	0.0028	0.0386	0.0086	0.0392
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0303	0.0289	0.0281	0.5606	0.7624	77	0.0007	0.0101	0.0022	0.0011
SINGLE SCREW TUGBOAT	1,000	diesel		Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.1158	0.1107	0.1073	2.1447	2.9169	296	0.0028	0.0386	0.0086	0.0392
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0303	0.0289	0.0281	0.5606	0.7624	77	0.0007	0.0101	0.0022	0.0011
FILL EQUIPMENT																									
TWIN SCREW TUGBOAT	2000	diesel (4)	48	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	300	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SINGLE SCREW TUGBOAT	1000	diesel	12	Type 2	0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WHARF CONSTRUCTION EQUIPMENT																									
WORK BARGES	NA	NA	0																						
SINGLE SCREW TUGBOAT	1000	diesel	10		0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0681589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AUXILLARY ENGINES	150	diesel			0.8	0.20	0.19	0.19	3.73	5.07	515	0.005	0.067	0.015	0.0071139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
															Totals	**1.15**	**1.10**	**1.07**	**21.38**	**29.07**	**2950.15**	**0.03**	**0.38**	**0.09**	**0.20**

Proposed Project Alternative - Nonroad Construction Equipment Emissions - 2016

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
FILL EQUIPMENT																									
CAT 973 3.8CY, 210 HP (placing)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.624	0.4	0.388	2.116	4.099	624.7	0.005	0.039	0.044	0.0071076	0.0331	0.0212	0.0206	0.1123	0.2176	33	0.0003	0.0021	0.0023	0.0004
CAT 973 3.8CY, 210 HP (wick)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.624	0.4	0.388	2.116	4.099	624.7	0.005	0.039	0.044	0.0071076	0.0331	0.0212	0.0206	0.1123	0.2176	33	0.0003	0.0021	0.0023	0.0004
CAT 980GN, 7.0, 300HP(rip rap)	300	diesel	12	Tractors/Loaders/Backhoes	0.21	0.624	0.4	0.388	2.116	4.099	624.7	0.005	0.039	0.044	0.0071076	0.0474	0.0303	0.0294	0.1605	0.3108	47	0.0004	0.0030	0.0033	0.0005
CAT D4C 80HP, 8MT	80	diesel	12	Crawler Tractor/Dozers	0.59	0.229	0.313	0.304	2.351	2.455	595.5	0.005	0.037	0.042	0.0071076	0.0130	0.0178	0.0173	0.1336	0.1395	34	0.0003	0.0021	0.0024	0.0004
CAT D7R 230 HP, 25MT	230	diesel	12	Crawler Tractor/Dozers	0.59	0.182	0.123	0.12	0.63	1.855	536.3	0.004	0.033	0.037	0.0071076	0.0298	0.0202	0.0196	0.1029	0.3030	88	0.0007	0.0055	0.0061	0.0012
Gen Set 100 KW, DSL	100	diesel	12	Gen Set	0.43	0.475	0.389	0.378	2.189	3.974	589	0.005	0.037	0.041	0.0071076	0.0246	0.0202	0.0196	0.1133	0.2057	30	0.0003	0.0019	0.0021	0.0004
4 TON EXT.BOOM FORKLIFT	99	diesel	8	Forklift	0.59	0.144	0.05	0.049	0.624	0.73	595.7	0.004	0.037	0.042	0.0071076	0.0067	0.0024	0.0023	0.0293	0.0342	28	0.0002	0.0017	0.0019	0.0003
MULE KAWASAKI 550 W/TOPS	10	gas	8	Other General Industrial Equipment	0.59	7.03	0.136	0.125	298.6	1.742	1044	0.006	0.065	0.073	0.0071076	0.0333	0.0006	0.0006	1.4138	0.0082	5	0.0000	0.0003	0.0003	0.0000
CAT 563CP, 145 HP	145	diesel	10	Rollers	0.59	0.224	0.226	0.219	0.961	2.376	536.2	0.004	0.033	0.037	0.0071076	0.0192	0.0194	0.0188	0.0825	0.2039	46	0.0004	0.0029	0.0032	0.0006
CAT 563CS, 145 HP	145	diesel	10	Rollers	0.59	0.224	0.226	0.219	0.961	2.376	536.2	0.004	0.033	0.037	0.0071076	0.0192	0.0194	0.0188	0.0825	0.2039	46	0.0004	0.0029	0.0032	0.0006
BOOSTER PUMP	235	diesel	12	Pumps	0.43	0.327	0.202	0.196	0.996	3.66	530.1	0.004	0.033	0.037	0.0071076	0.0397	0.0245	0.0238	0.1211	0.4451	64	0.0005	0.0040	0.0045	0.0009
CRANE BARGES WITH FILL	300	diesel	24	Cranes	0.43	0.201	0.103	0.1	0.491	2.271	530.4	0.004	0.033	0.037	0.0071076	0.0623	0.0319	0.0309	0.1524	0.7053	165	0.0013	0.0103	0.0115	0.0022
CRANE BARGES WITH ROCK	300	diesel	24	Cranes	0.43	0.201	0.103	0.1	0.491	2.271	530.4	0.004	0.033	0.037	0.0071076	0.0623	0.0319	0.0309	0.1524	0.7053	165	0.0013	0.0103	0.0115	0.0022
WHARF CONSTRUCTION EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PILING																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
150 TN CRWLER CRANE	282	diesel	10	Crane	0.43	0.201	0.103	0.1	0.491	2.271	530.4	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.173	0.107	0.104	0.555	1.656	536.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.232	0.169	0.164	0.862	2.626	536.1	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
AIR COMPRESSORS																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
375 CFM, PORT.DSL	115	diesel	8	Air Compressors	0.43	0.25	0.178	0.173	0.724	2.884	530.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
WELDING EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
300 AMP DC DIESEL	32.7	diesel	8	Welders	0.21	1.156	0.732	0.71	4.619	5.123	692.6	0.006	0.043	0.048	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MISC JOB EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
GEN SET 6-10 KW, DSL	11	diesel	8	Gen Set	0.43	0.824	0.574	0.556	4.593	5.527	587.9	0.005	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
CENT TRASH PUMP 4" W/TRL	16	gas	8	Pumps	0.43	0.618	0.403	0.391	2.65	4.896	588.5	0.005	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
CUTTING EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
Torch Cutting Machine	70	MAPP	4	AP-42 Emission Factors-LPG		0.0102	0.0091	0.0091	0.0951	0.1699	162	0.0010	0.01	0.011	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
CONCRETE EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
TAMPER (JAMPING JACK) WAC	6	diesel	4	Tampers/Rammers	0.43	0.703	0.486	0.472	4.483	4.882	588.3	0.005	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
TROWEL MARCH 48"	55	gas	8	Other General Industrial Equipment	0.48	1.305	0.072	0.066	28.83	1.881	708.4	0.013	0.044	0.049	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
VIBRATOR CONCRETE ELEC.2	3	none	8	Electric												0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.173	0.107	0.104	0.555	1.656	536.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.232	0.169	0.164	0.862	2.626	536.1	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
ROAD CONSTRUCTION EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
PAVER	142	diesel	10	Pavers	0.59	0.213	0.22	0.213	0.92	2.232	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SOIL COMPACTOR	232	diesel	10	Plate Compactors	0.43	0.232	0.169	0.164	0.862	2.626	536.1	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
HYDRAULIC SWEEPER	100	diesel	10	Hydro Power Units	0.43	0.327	0.304	0.295	1.884	3.367	589.4	0.005	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
ROLLER	175	diesel	10	Rollers	0.59	0.201	0.144	0.139	0.723	2.173	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
BULLDOZER	105	diesel	10	Crawler Dozers/Tractor	0.59	0.197	0.211	0.205	0.867	2.022	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
GRADER	215	diesel	10	Graders	0.59	0.181	0.121	0.118	0.62	1.823	536.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
MIXER	25	diesel	10	Cement & Mortar Mixers	0.43	0.882	0.548	0.532	3.278	5.672	587.7	0.005	0.037	0.0410	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
RAIL CONSTRUCTION EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
GRADERS	215	diesel	10	Graders	0.59	0.181	0.121	0.118	0.62	1.823	536.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
BULLDOZERS	105	diesel	10	Crawler Dozers/Tractor	0.59	0.197	0.211	0.205	0.867	2.022	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
ROLLER	175	diesel	10	Rollers	0.59	0.201	0.144	0.139	0.723	2.173	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
GANTRY CRANES		na	10													0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
SWING LOADER	300	diesel	10	Rubber Tire Loader	0.59	0.201	0.143	0.139	0.723	2.172	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
RAIL THREADER	300	diesel	10	Other Construction Equipment	0.59	0.232	0.169	0.164	0.862	2.626	536.1	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
UNDER CUTTER	600	diesel	10	Excavators	0.59	0.169	0.137	0.133	0.886	2.219	536.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
UTILITY INFRASTRUCTURE EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
EXCAVATOR	17.4	diesel	10	Excavators	0.59	0.472	0.358	0.347	2.377	4.464	594.7	0.005	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
BACKHOES	75	diesel	10	Tractor/Loader/Backhoe	0.21	0.942	0.738	0.716	5.028	4.998	693.2	0.006	0.043	0.048	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
PIPE LAYER	366	diesel	10	Other Construction Equipment	0.59	0.244	0.218	0.212	1.56	3.581	536.1	0.005	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
TERMINAL/FACILITIES EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000
CRANE 80 TON CRLR,LS138	230	diesel	8	Crane	0.43								0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30' SCISSOR LIFT	NA	NA	0										0	0											
4 TON EXT. BOOM FORKLIFT	NA	NA	0										0	0											
BULLDOZER CAT D4C	80	diesel	12	Crawler Tractor/Dozers	0.59								0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DELIVERY VEHICLES																									
TRACTOR	130	diesel	4	Tractor/Loader/Backhoe	0.21								0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
															Totals	**0.4239**	**0.2611**	**0.2532**	**2.7690**	**3.7002**	**784.4495**	**0.0063**	**0.0489**	**0.0547**	**0.0101**

Proposed Project Alternative - Nonroad Construction Equipment Emissions - 2017

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
FILL EQUIPMENT																									
CAT 973 3.8CY, 210 HP (placing)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.624	0.4	0.388	2.116	4.099	624.7	0.005	0.039	0.044	0.0071076	0.1333	0.0854	0.0829	0.4518	0.8751	133.3736	0.0011	0.0083	0.0093	0.0015
CAT 973 3.8CY, 210 HP (wick)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.624	0.4	0.388	2.116	4.099	624.7	0.005	0.039	0.044	0.0071076	0.1333	0.0854	0.0829	0.4518	0.8751	133.3736	0.0011	0.0083	0.0093	0.0015
CAT 980GN, 7.0, 300HP(rip rap)	300	diesel	12	Tractors/Loaders/Backhoes	0.21	0.624	0.4	0.388	2.116	4.099	624.7	0.005	0.039	0.044	0.0071076	0.1904	0.1220	0.1184	0.6455	1.2502	190.5338	0.0016	0.0119	0.0133	0.0022
CAT D4C 80HP, 8MT	80	diesel	12	Crawler Tractor/Dozers	0.59	0.229	0.313	0.304	2.351	2.455	595.5	0.005	0.037	0.042	0.0071076	0.0523	0.0716	0.0694	0.5372	0.5609	136.0735	0.0011	0.0085	0.0095	0.0016
CAT D7R 230 HP, 25MT	230	diesel	12	Crawler Tractor/Dozers	0.59	0.182	0.123	0.12	0.63	1.855	536.3	0.004	0.033	0.037	0.0071076	0.1199	0.0811	0.0787	0.4140	1.2186	352.3254	0.0027	0.0219	0.0246	0.0047
Gen Set 100 KW, DSL	100	diesel	12	Gen Set	0.43	0.475	0.389	0.378	2.189	3.974	589	0.005	0.037	0.041	0.0071076	0.0989	0.0811	0.0786	0.4557	0.8273	122.6085	0.0010	0.0076	0.0085	0.0015
4 TON EXT.BOOM FORKLIFT	99	diesel	8	Forklift	0.59	0.144	0.05	0.049	0.624	0.73	595.7	0.004	0.037	0.042	0.0071076	0.0271	0.0095	0.0092	0.1177	0.1376	112.3074	0.0008	0.0070	0.0078	0.0013
MULE KAWASAKI 550 W/TOPS	10	gas	8	Other General Industrial Equipment	0.59	7.03	0.136	0.125	298.6	1.742	1044	0.006	0.065	0.073	0.0071076	0.1339	0.0026	0.0024	5.6863	0.0332	19.8816	0.0001	0.0012	0.0014	0.0001
CAT 563CP, 145 HP	145	diesel	10	Rollers	0.59	0.224	0.226	0.219	0.961	2.376	536.2	0.004	0.033	0.037	0.0071076	0.0774	0.0780	0.0757	0.3317	0.8202	185.0562	0.0015	0.0115	0.0129	0.0025
CAT 563CS, 145 HP	145	diesel	10	Rollers	0.59	0.224	0.226	0.219	0.961	2.376	536.2	0.004	0.033	0.037	0.0071076	0.0774	0.0780	0.0757	0.3317	0.8202	185.0562	0.0015	0.0115	0.0129	0.0025
BOOSTER PUMP	235	diesel	12	Pumps	0.43	0.327	0.202	0.196	0.996	3.66	530.1	0.004	0.033	0.037	0.0071076	0.1598	0.0986	0.0957	0.4872	1.7903	259.3214	0.0022	0.0162	0.0181	0.0035
CRANE BARGES WITH FILL	300	diesel	24	Cranes	0.43	0.201	0.103	0.1	0.491	2.271	530.4	0.004	0.033	0.037	0.0071076	0.2506	0.1283	0.1244	0.6130	2.8368	662.5638	0.0053	0.0413	0.0462	0.0089
CRANE BARGES WITH ROCK	300	diesel	24	Cranes	0.43	0.201	0.103	0.1	0.491	2.271	530.4	0.004	0.033	0.037	0.0071076	0.2506	0.1283	0.1244	0.6130	2.8368	662.5638	0.0053	0.0413	0.0462	0.0089
WHARF CONSTRUCTION EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PILING																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
150 TN CRWLER CRANE	282	diesel	10	Crane	0.43	0.201	0.103	0.1	0.491	2.271	530.4	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.173	0.107	0.104	0.555	1.656	536.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.232	0.169	0.164	0.862	2.626	536.1	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AIR COMPRESSORS																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
375 CFM, PORT.DSL	115	diesel	8	Air Compressors	0.43	0.25	0.178	0.173	0.724	2.884	530.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WELDING EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
300 AMP DC DIESEL	32.7	diesel	8	Welders	0.21	1.156	0.732	0.71	4.619	5.123	692.6	0.006	0.043	0.048	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MISC JOB EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GEN SET 6-10 KW, DSL	11	diesel	8	Gen Set	0.43	0.824	0.574	0.556	4.593	5.527	587.9	0.005	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CENT TRASH PUMP 4" W/TRL	16	gas	8	Pumps	0.43	0.618	0.403	0.391	2.65	4.896	588.5	0.005	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CUTTING EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Torch Cutting Machine	70	MAPP	4	AP-42 Emission Factors-LPG		0.0102	0.0091	0.0091	0.0951	0.1699	162	0.0010	0.01	0.011	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CONCRETE EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TAMPER (JAMPING JACK) WAC	6	diesel	4	Tampers/Rammers	0.43	0.703	0.486	0.472	4.483	4.882	588.3	0.005	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TROWEL MARCH 48"	55	gas	8	Other General Industrial Equipment	0.48	1.305	0.072	0.066	28.83	1.881	708.4	0.013	0.044	0.049	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VIBRATOR CONCRETE ELEC.2	3	none	8	Electric												0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.173	0.107	0.104	0.555	1.656	536.3	0.004	0.033	0.037	0.0071076	0.0559	0.0346	0.0336	0.1798	0.5365	173.7725	0.0013	0.0108	0.0121	0.0023
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.232	0.169	0.164	0.862	2.626	536.1	0.004	0.033	0.037	0.0071076	0.0535	0.0391	0.0379	0.1993	0.6070	123.9129	0.0010	0.0077	0.0086	0.0016
ROAD CONSTRUCTION EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PAVER	142	diesel	10	Pavers	0.59	0.213	0.22	0.213	0.92	2.232	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SOIL COMPACTOR	232	diesel	10	Plate Compactors	0.43	0.232	0.169	0.164	0.862	2.626	536.1	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HYDRAULIC SWEEPER	100	diesel	10	Hydro Power Units	0.43	0.327	0.304	0.295	1.884	3.367	589.4	0.005	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROLLER	175	diesel	10	Rollers	0.59	0.201	0.144	0.139	0.723	2.173	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BULLDOZER	105	diesel	10	Crawler Dozers/Tractor	0.59	0.197	0.211	0.205	0.867	2.022	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GRADER	215	diesel	10	Graders	0.59	0.181	0.121	0.118	0.62	1.823	536.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MIXER	25	diesel	10	Cement & Mortar Mixers	0.43	0.882	0.548	0.532	3.278	5.672	587.7	0.005	0.037	0.0410	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL CONSTRUCTION EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GRADERS	215	diesel	10	Graders	0.59	0.181	0.121	0.118	0.62	1.823	536.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BULLDOZERS	105	diesel	10	Crawler Dozers/Tractor	0.59	0.197	0.211	0.205	0.867	2.022	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROLLER	175	diesel	10	Rollers	0.59	0.201	0.144	0.139	0.723	2.173	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GANTRY CRANES		na	10													0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SWING LOADER	300	diesel	10	Rubber Tire Loader	0.59	0.201	0.143	0.139	0.723	2.172	536.2	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL THREADER	300	diesel	10	Other Construction Equipment	0.59	0.232	0.169	0.164	0.862	2.626	536.1	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UNDER CUTTER	600	diesel	10	Excavators	0.59	0.169	0.137	0.133	0.886	2.219	536.3	0.004	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UTILITY INFRASTRUCTURE EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR	17.4	diesel	10	Excavators	0.59	0.472	0.358	0.347	2.377	4.464	594.7	0.005	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BACKHOES	75	diesel	10	Tractor/Loader/Backhoe	0.21	0.942	0.738	0.716	5.028	4.998	693.2	0.006	0.043	0.048	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PIPE LAYER	366	diesel	10	Other Construction Equipment	0.59	0.244	0.218	0.212	1.56	3.581	536.1	0.005	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TERMINAL/FACILITIES EQUIPMENT																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CRANE 80 TON CRLR,LS138	230	diesel	8	Crane	0.43								0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30' SCISSOR LIFT	NA	NA	0										0	0											
4 TON EXT. BOOM FORKLIFT	NA	NA	0										0	0											
BULLDOZER CAT D4C	80	diesel	12	Crawler Tractor/Dozers	0.59	0.229	0.313	0.304	2.351	2.455	595.5	0.005	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DELIVERY VEHICLES																0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRACTOR	130	diesel	4	Tractor/Loader/Backhoe	0.21								0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
															Totals	**1.8144**	**1.1236**	**1.0898**	**11.5159**	**16.0258**	**3452.7242**	**0.0277**	**0.2151**	**0.2407**	**0.0445**

Proposed Project Alternative - Nonroad Construction Equipment Emissions - 2018

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
FILL EQUIPMENT																									
CAT 973 3.8CY, 210 HP (placing)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0853	0.0539	0.0523	0.2822	0.5509	99.8910	0.0008	0.0062	0.0070	0.0011
CAT 973 3.8CY, 210 HP (wick)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0853	0.0539	0.0523	0.2822	0.5509	99.8910	0.0008	0.0062	0.0070	0.0011
CAT 980GN, 7.0, 300HP(rip rap)	300	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.1219	0.0770	0.0747	0.4031	0.7871	142.7014	0.0012	0.0089	0.0099	0.0016
CAT D4C 80HP, 8MT	80	diesel	12	Crawler Tractor/Dozers	0.59	0.1856	0.2158	0.2093	1.6657	1.6829	596	0.0045	0.037	0.042	0.0071076	0.0318	0.0369	0.0358	0.2850	0.2879	101.8909	0.0008	0.0063	0.0071	0.0012
CAT D7R 230 HP, 25MT	230	diesel	12	Crawler Tractor/Dozers	0.59	0.1626	0.0779	0.0756	0.4200	1.2784	536	0.0039	0.033	0.037	0.0071076	0.0800	0.0383	0.0372	0.2066	0.6288	263.7910	0.0019	0.0164	0.0184	0.0035
Gen Set 100 KW, DSL	100	diesel	12	Gen Set	0.43	0.4749	0.3895	0.3778	2.1891	3.9739	589	0.0050	0.037	0.041	0.0071076	0.0740	0.0607	0.0589	0.3412	0.6193	91.7889	0.0008	0.0057	0.0064	0.0011
4 TON EXT.BOOM FORKLIFT	99	diesel	8	Forklift	0.59	0.1440	0.0502	0.0487	0.6242	0.7297	596	0.0040	0.037	0.042	0.0071076	0.0203	0.0071	0.0069	0.0881	0.1030	84.0772	0.0006	0.0052	0.0059	0.0010
MULE KAWASAKI 550 W/TOPS	10	gas	8	Other General Industrial Equipment	0.59	7.0301	0.1364	0.1255	298.61	1.7423	1044	0.0063	0.065	0.073	0.0071076	0.1002	0.0019	0.0018	4.2570	0.0248	14.8841	0.0001	0.0009	0.0010	0.0001
CAT 563CP, 145 HP	145	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0489	0.0458	0.0444	0.1906	0.4484	138.5657	0.0011	0.0086	0.0097	0.0018
CAT 563CS, 145 HP	145	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0489	0.0458	0.0444	0.1906	0.4484	138.5657	0.0011	0.0086	0.0097	0.0018
BOOSTER PUMP	235	diesel	12	Pumps	0.43	0.3267	0.2016	0.1956	0.9960	3.6596	530	0.0044	0.033	0.037	0.0071076	0.1197	0.0738	0.0716	0.3648	1.3403	194.1368	0.0016	0.0121	0.0135	0.0026
CRANE BARGES WITH FILL	300	diesel	24	Cranes	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.1648	0.0716	0.0694	0.3467	1.5634	496.0840	0.0038	0.0309	0.0346	0.0066
CRANE BARGES WITH ROCK	300	diesel	24	Cranes	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.1648	0.0716	0.0694	0.3467	1.5634	496.0840	0.0038	0.0309	0.0346	0.0066
WHARF CONSTRUCTION EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PILING													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
150 TN CRWLER CRANE	282	diesel	10	Crane	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.1537	0.0566	0.0549	0.3238	1.0696	536	0.0038	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AIR COMPRESSORS													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
375 CFM, PORT.DSL	115	diesel	8	Air Compressors	0.43	0.2177	0.1449	0.1405	0.5844	2.2292	530	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WELDING EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
300 AMP DC DIESEL	32.7	diesel	8	Welders	0.21	0.8602	0.5832	0.5657	3.5890	4.7214	693	0.0058	0.043	0.048	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MISC JOB EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GEN SET 6-10 KW, DSL	11	diesel	8	Gen Set	0.43	0.7482	0.5093	0.4940	4.5176	5.1249	588	0.0054	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CENT TRASH PUMP 4" W/TRL	16	gas	8	Pumps	0.43	6.3377	0.1181	0.1087	292.7707	1.6485	1046	0.0064	0.065	0.073	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CUTTING EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Torch Cutting Machine	70	MAPP	4	AP-42 Emission Factors-LPG		0.0102	0.0091	0.0091	0.0951	0.1699	162	0.0010	0.01	0.011	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CONCRETE EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TAMPER (JAMPING JACK) WAC	6	diesel	4	Tampers/Rammers	0.43	0.6526	0.4426	0.4294	4.4611	4.6352	588	0.0054	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TROWEL MARCH 48"	55	gas	8	Other General Industrial Equipment	0.48	0.9144	0.0713	0.0656	19.7008	1.3501	702	0.0043	0.044	0.049	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VIBRATOR CONCRETE ELEC.2	3	none	8	Electric									0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.1537	0.0566	0.0549	0.3238	1.0696	536	0.0038	0.033	0.037	0.0071076	0.0644	0.0237	0.0230	0.1356	0.4479	224.6154	0.0016	0.0140	0.0157	0.0030
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0605	0.0398	0.0386	0.2036	0.6053	160.1772	0.0013	0.0100	0.0112	0.0021
ROAD CONSTRUCTION EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PAVER	142	diesel	10	Pavers	0.59	0.1827	0.1651	0.1602	0.6903	1.6069	536	0.0041	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SOIL COMPACTOR	232	diesel	10	Plate Compactors	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HYDRAULIC SWEEPER	100	diesel	10	Hydro Power Units	0.43	0.2706	0.2388	0.2316	1.5563	2.6585	590	0.0047	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROLLER	175	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BULLDOZER	105	diesel	10	Crawler Dozers/Tractor	0.59	0.1727	0.1451	0.1407	0.6122	1.4113	536	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GRADER	215	diesel	10	Graders	0.59	0.1611	0.0751	0.0728	0.4072	1.2459	536	0.0039	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MIXER	25	diesel	10	Cement & Mortar Mixers	0.43	0.7869	0.4990	0.4841	3.0554	5.3916	588	0.0054	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL CONSTRUCTION EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GRADERS	215	diesel	10	Graders	0.59	0.1611	0.0751	0.0728	0.4072	1.2459	536	0.0039	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BULLDOZERS	105	diesel	10	Crawler Dozers/Tractor	0.59	0.1727	0.1451	0.1407	0.6122	1.4113	536	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROLLER	175	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GANTRY CRANES		na	10										0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SWING LOADER	300	diesel	10	Rubber Tire Loader	0.59	0.1769	0.1060	0.1028	0.5420	1.5998	536	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL THREADER	300	diesel	10	Other Construction Equipment	0.59	0.2187	0.1829	0.1774	1.2900	3.0035	536	0.0044	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UNDER CUTTER	600	diesel	10	Excavators	0.59	0.1582	0.1041	0.1010	0.6610	1.6317	536	0.0041	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UTILITY INFRASTRUCTURE EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR	17.4	diesel	10	Excavators	0.59	0.4716	0.3618	0.3510	2.3768	4.4636	595	0.0055	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BACKHOES	75	diesel	10	Tractor/Loader/Backhoe	0.21	0.7673	0.6063	0.5881	4.2541	4.5973	694	0.0059	0.043	0.048	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PIPE LAYER	366	diesel	10	Other Construction Equipment	0.59	0.2187	0.1829	0.1774	1.2900	3.0035	536	0.0044	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TERMINAL/FACILITIES EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CRANE 80 TON CRLR,LS138	230	diesel	8	Crane	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30' SCISSOR LIFT	NA	NA	0																						
4 TON EXT. BOOM FORKLIFT	NA	NA	0																						
BULLDOZER CAT D4C	80	diesel	12	Crawler Tractor/Dozers	0.59	0.1856	0.2158	0.2093	1.6657	1.6829	596	0.0045	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DELIVERY VEHICLES																									
TRACTOR	130	diesel	4	Tractor/Loader/Backhoe	0.21	0.6012	0.4361	0.4230	2.1342	3.6584	625	0.0052	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
															Totals	**1.2708**	**0.7019**	**0.6807**	**7.9237**	**9.9699**	**2747**	**0.0210**	**0.1711**	**0.1915**	**0.0355**

Proposed Project Alternative - Nonroad Construction Equipment Emissions - 2019

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
FILL EQUIPMENT																									
CAT 973 3.8CY, 210 HP (placing)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 973 3.8CY, 210 HP (wick)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 980GN, 7.0, 300HP(rip rap)	300	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT D4C 80HP, 8MT	80	diesel	12	Crawler Tractor/Dozers	0.59	0.1856	0.2158	0.2093	1.6657	1.6829	596	0.0045	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT D7R 230 HP, 25MT	230	diesel	12	Crawler Tractor/Dozers	0.59	0.1626	0.0779	0.0756	0.4200	1.2784	536	0.0039	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gen Set 100 KW, DSL	100	diesel	12	Gen Set	0.43	0.4749	0.3895	0.3778	2.1891	3.9739	589	0.0050	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4 TON EXT.BOOM FORKLIFT	99	diesel	8	Forklift	0.59	0.1440	0.0502	0.0487	0.6242	0.7297	596	0.0040	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MULE KAWASAKI 550 W/TOPS	10	gas	8	Other General Industrial Equipment	0.59	7.0301	0.1364	0.1255	298.61	1.7423	1044	0.0063	0.065	0.073	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 563CP, 145 HP	145	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 563CS, 145 HP	145	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BOOSTER PUMP	235	diesel	12	Pumps	0.43	0.3267	0.2016	0.1956	0.9960	3.6596	530	0.0044	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CRANE BARGES WITH FILL	300	diesel	24	Cranes	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CRANE BARGES WITH ROCK	300	diesel	24	Cranes	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WHARF CONSTRUCTION EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PILING													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
150 TN CRWLER CRANE	282	diesel	10	Crane	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0217	0.0094	0.0091	0.0456	0.2056	65.2393	0.0005	0.0041	0.0045	0.0009
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.1537	0.0566	0.0549	0.3238	1.0696	536	0.0038	0.033	0.037	0.0071076	0.0216	0.0080	0.0077	0.0455	0.1504	75.4183	0.0005	0.0047	0.0053	0.0010
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0203	0.0134	0.0130	0.0684	0.2032	53.7821	0.0004	0.0034	0.0037	0.0007
AIR COMPRESSORS													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
375 CFM, PORT.DSL	115	diesel	8	Air Compressors	0.43	0.2177	0.1449	0.1405	0.5844	2.2292	530	0.0042	0.033	0.037	0.0071076	0.0087	0.0058	0.0056	0.0234	0.0894	21.2789	0.0002	0.0013	0.0015	0.0003
WELDING EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
300 AMP DC DIESEL	32.7	diesel	8	Welders	0.21	0.8602	0.5832	0.5657	3.5890	4.7214	693	0.0058	0.043	0.048	0.0071076	0.0048	0.0032	0.0032	0.0200	0.0263	3.8633	0.0000	0.0002	0.0003	0.0000
MISC JOB EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GEN SET 6-10 KW, DSL	11	diesel	8	Gen Set	0.43	0.7482	0.5093	0.4940	4.5176	5.1249	588	0.0054	0.037	0.041	0.0071076	0.0029	0.0020	0.0019	0.0173	0.0197	2.2569	0.0000	0.0001	0.0002	0.0000
CENT TRASH PUMP 4" W/TRL	16	gas	8	Pumps	0.43	6.3377	0.1181	0.1087	292.7707	1.6485	1046	0.0064	0.065	0.073	0.0071076	0.0354	0.0007	0.0006	1.6342	0.0092	5.8400	0.0000	0.0004	0.0004	0.0000
CUTTING EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Torch Cutting Machine	70	MAPP	4	AP-42 Emission Factors-LPG		0.0102	0.0091	0.0091	0.0951	0.1699	162	0.0010	0.01	0.011	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CONCRETE EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TAMPER (JAMPING JACK) WAC	6	diesel	4	Tampers/Rammers	0.43	0.6526	0.4426	0.4294	4.4611	4.6352	588	0.0054	0.037	0.041	0.0071076	0.0007	0.0005	0.0004	0.0047	0.0049	0.6158	0.0000	0.0000	0.0000	0.0000
TROWEL MARCH 48"	55	gas	8	Other General Industrial Equipment	0.48	0.9144	0.0713	0.0656	19.7008	1.3501	702	0.0043	0.044	0.049	0.0071076	0.0196	0.0015	0.0014	0.4220	0.0289	15.0309	0.0001	0.0009	0.0010	0.0002
VIBRATOR CONCRETE ELEC.2	3	none	8	Electric									0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.1537	0.0566	0.0549	0.3238	1.0696	536	0.0038	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROAD CONSTRUCTION EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PAVER	142	diesel	10	Pavers	0.59	0.1827	0.1651	0.1602	0.6903	1.6069	536	0.0041	0.033	0.037	0.0071076	0.0154	0.0139	0.0135	0.0580	0.1350	45.0695	0.0003	0.0028	0.0031	0.0006
SOIL COMPACTOR	232	diesel	10	Plate Compactors	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0203	0.0133	0.0129	0.0682	0.2028	53.6601	0.0004	0.0033	0.0037	0.0007
HYDRAULIC SWEEPER	100	diesel	10	Hydro Power Units	0.43	0.2706	0.2388	0.2316	1.5563	2.6585	590	0.0047	0.037	0.041	0.0071076	0.0117	0.0103	0.0100	0.0671	0.1147	25.4300	0.0002	0.0016	0.0018	0.0003
ROLLER	175	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0196	0.0183	0.0178	0.0764	0.1797	55.5414	0.0004	0.0035	0.0039	0.0007
BULLDOZER	105	diesel	10	Crawler Dozers/Tractor	0.59	0.1727	0.1451	0.1407	0.6122	1.4113	536	0.0040	0.033	0.037	0.0071076	0.0107	0.0090	0.0087	0.0380	0.0877	33.3279	0.0002	0.0021	0.0023	0.0004
GRADER	215	diesel	10	Graders	0.59	0.1611	0.0751	0.0728	0.4072	1.2459	536	0.0039	0.033	0.037	0.0071076	0.0205	0.0096	0.0093	0.0518	0.1585	68.2470	0.0005	0.0043	0.0048	0.0009
MIXER	25	diesel	10	Cement & Mortar Mixers	0.43	0.7869	0.4990	0.4841	3.0554	5.3916	588	0.0054	0.037	0.041	0.0071076	0.0085	0.0054	0.0052	0.0329	0.0581	6.3408	0.0001	0.0004	0.0004	0.0001
RAIL CONSTRUCTION EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GRADERS	215	diesel	10	Graders	0.59	0.1611	0.0751	0.0728	0.4072	1.2459	536	0.0039	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BULLDOZERS	105	diesel	10	Crawler Dozers/Tractor	0.59	0.1727	0.1451	0.1407	0.6122	1.4113	536	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROLLER	175	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GANTRY CRANES		na	10										0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SWING LOADER	300	diesel	10	Rubber Tire Loader	0.59	0.1769	0.1060	0.1028	0.5420	1.5998	536	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL THREADER	300	diesel	10	Other Construction Equipment	0.59	0.2187	0.1829	0.1774	1.2900	3.0035	536	0.0044	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UNDER CUTTER	600	diesel	10	Excavators	0.59	0.1582	0.1041	0.1010	0.6610	1.6317	536	0.0041	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UTILITY INFRASTRUCTURE EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR	17.4	diesel	10	Excavators	0.59	0.4716	0.3618	0.3510	2.3768	4.4636	595	0.0055	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BACKHOES	75	diesel	10	Tractor/Loader/Backhoe	0.21	0.7673	0.6063	0.5881	4.2541	4.5973	694	0.0059	0.043	0.048	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PIPE LAYER	366	diesel	10	Other Construction Equipment	0.59	0.2187	0.1829	0.1774	1.2900	3.0035	536	0.0044	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TERMINAL/FACILITIES EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CRANE 80 TON CRLR,LS138	230	diesel	8	Crane	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30' SCISSOR LIFT	NA	NA	0																						
4 TON EXT. BOOM FORKLIFT	NA	NA	0																						
BULLDOZER CAT D4C	80	diesel	12	Crawler Tractor/Dozers	0.59	0.1856	0.2158	0.2093	1.6657	1.6829	596	0.0045	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DELIVERY VEHICLES																									
TRACTOR	130	diesel	4	Tractor/Loader/Backhoe	0.21	0.6012	0.4361	0.4230	2.1342	3.6584	625	0.0052	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
														Totals		**0.2422**	**0.1242**	**0.1204**	**2.6736**	**1.6742**	**530.9422**	**0.0040**	**0.0331**	**0.0370**	**0.0069**

Proposed Project Alternative - Nonroad Construction Equipment Emissions - 2020

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
FILL EQUIPMENT																									
CAT 973 3.8CY, 210 HP (placing)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 973 3.8CY, 210 HP (wick)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 980GN, 7.0, 300HP(rip rap)	300	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT D4C 80HP, 8MT	80	diesel	12	Crawler Tractor/Dozers	0.59	0.1856	0.2158	0.2093	1.6657	1.6829	596	0.0045	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT D7R 230 HP, 25MT	230	diesel	12	Crawler Tractor/Dozers	0.59	0.1626	0.0779	0.0756	0.4200	1.2784	536	0.0039	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gen Set 100 KW, DSL	100	diesel	12	Gen Set	0.43	0.4749	0.3895	0.3778	2.1891	3.9739	589	0.0050	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4 TON EXT.BOOM FORKLIFT	99	diesel	8	Forklift	0.59	0.1440	0.0502	0.0487	0.6242	0.7297	596	0.0040	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MULE KAWASAKI 550 W/TOPS	10	gas	8	Other General Industrial Equipment	0.59	7.0301	0.1364	0.1255	298.61	1.7423	1044	0.0063	0.065	0.073	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 563CP, 145 HP	145	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 563CS, 145 HP	145	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BOOSTER PUMP	235	diesel	12	Pumps	0.43	0.3267	0.2016	0.1956	0.9960	3.6596	530	0.0044	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CRANE BARGES WITH FILL	300	diesel	24	Cranes	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CRANE BARGES WITH ROCK	300	diesel	24	Cranes	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WHARF CONSTRUCTION EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PILING													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
150 TN CRWLER CRANE	282	diesel	10	Crane	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.1537	0.0566	0.0549	0.3238	1.0696	536	0.0038	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AIR COMPRESSORS													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
375 CFM, PORT.DSL	115	diesel	8	Air Compressors	0.43	0.2177	0.1449	0.1405	0.5844	2.2292	530	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WELDING EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
300 AMP DC DIESEL	32.7	diesel	8	Welders	0.21	0.8602	0.5832	0.5657	3.5890	4.7214	693	0.0058	0.043	0.048	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MISC JOB EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GEN SET 6-10 KW, DSL	11	diesel	8	Gen Set	0.43	0.7482	0.5093	0.4940	4.5176	5.1249	588	0.0054	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CENT TRASH PUMP 4" W/TRL	16	gas	8	Pumps	0.43	6.3377	0.1181	0.1087	292.7707	1.6485	1046	0.0064	0.065	0.073	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CUTTING EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Torch Cutting Machine	70	MAPP	4	AP-42 Emission Factors-LPG		0.0102	0.0091	0.0091	0.0951	0.1699	162	0.0010	0.01	0.011	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CONCRETE EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TAMPER (JAMPING JACK) WAC	6	diesel	4	Tampers/Rammers	0.43	0.6526	0.4426	0.4294	4.4611	4.6352	588	0.0054	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TROWEL MARCH 48"	55	gas	8	Other General Industrial Equipment	0.48	0.9144	0.0713	0.0656	19.7008	1.3501	702	0.0043	0.044	0.049	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VIBRATOR CONCRETE ELEC.2	3	none	8	Electric									0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.1537	0.0566	0.0549	0.3238	1.0696	536	0.0038	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROAD CONSTRUCTION EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PAVER	142	diesel	10	Pavers	0.59	0.1827	0.1651	0.1602	0.6903	1.6069	536	0.0041	0.033	0.037	0.0071076	0.0513	0.0464	0.0450	0.1938	0.4511	150.5619	0.0012	0.0094	0.0105	0.0020
SOIL COMPACTOR	232	diesel	10	Plate Compactors	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0677	0.0446	0.0432	0.2278	0.6774	179.2602	0.0014	0.0112	0.0125	0.0024
HYDRAULIC SWEEPER	100	diesel	10	Hydro Power Units	0.43	0.2706	0.2388	0.2316	1.5563	2.6585	590	0.0047	0.037	0.041	0.0071076	0.0390	0.0344	0.0334	0.2242	0.3831	84.9528	0.0007	0.0053	0.0059	0.0010
ROLLER	175	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0655	0.0613	0.0594	0.2552	0.6004	185.5448	0.0014	0.0116	0.0129	0.0025
BULLDOZER	105	diesel	10	Crawler Dozers/Tractor	0.59	0.1727	0.1451	0.1407	0.6122	1.4113	536	0.0040	0.033	0.037	0.0071076	0.0359	0.0301	0.0292	0.1271	0.2930	111.3370	0.0008	0.0069	0.0078	0.0015
GRADER	215	diesel	10	Graders	0.59	0.1611	0.0751	0.0728	0.4072	1.2459	536	0.0039	0.033	0.037	0.0071076	0.0685	0.0319	0.0309	0.1731	0.5296	227.9900	0.0016	0.0142	0.0159	0.0030
MIXER	25	diesel	10	Cement & Mortar Mixers	0.43	0.7869	0.4990	0.4841	3.0554	5.3916	588	0.0054	0.037	0.041	0.0071076	0.0283	0.0180	0.0174	0.1101	0.1942	21.1826	0.0002	0.0013	0.0015	0.0003
RAIL CONSTRUCTION EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GRADERS	215	diesel	10	Graders	0.59	0.1611	0.0751	0.0728	0.4072	1.2459	536	0.0039	0.033	0.037	0.0071076	0.0070	0.0033	0.0032	0.0177	0.0540	23.2490	0.0002	0.0014	0.0016	0.0003
BULLDOZERS	105	diesel	10	Crawler Dozers/Tractor	0.59	0.1727	0.1451	0.1407	0.6122	1.4113	536	0.0040	0.033	0.037	0.0071076	0.0037	0.0031	0.0030	0.0130	0.0299	11.3534	0.0001	0.0007	0.0008	0.0002
ROLLER	175	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0067	0.0062	0.0061	0.0260	0.0612	18.9207	0.0001	0.0012	0.0013	0.0003
GANTRY CRANES		na	10										0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SWING LOADER	300	diesel	10	Rubber Tire Loader	0.59	0.1769	0.1060	0.1028	0.5420	1.5998	536	0.0040	0.033	0.037	0.0071076	0.0107	0.0064	0.0062	0.0328	0.0968	32.4377	0.0002	0.0020	0.0023	0.0004
RAIL THREADER	300	diesel	10	Other Construction Equipment	0.59	0.2187	0.1829	0.1774	1.2900	3.0035	536	0.0044	0.033	0.037	0.0071076	0.0132	0.0111	0.0107	0.0780	0.1817	32.4303	0.0003	0.0020	0.0023	0.0004
UNDER CUTTER	600	diesel	10	Excavators	0.59	0.1582	0.1041	0.1010	0.6610	1.6317	536	0.0041	0.033	0.037	0.0071076	0.0191	0.0126	0.0122	0.0800	0.1974	64.8820	0.0005	0.0040	0.0045	0.0009
UTILITY INFRASTRUCTURE EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR	17.4	diesel	10	Excavators	0.59	0.4716	0.3618	0.3510	2.3768	4.4636	595	0.0055	0.037	0.041	0.0071076	0.0016	0.0012	0.0012	0.0081	0.0152	2.0191	0.0000	0.0001	0.0001	0.0000
BACKHOES	75	diesel	10	Tractor/Loader/Backhoe	0.21	0.7673	0.6063	0.5881	4.2541	4.5973	694	0.0059	0.043	0.048	0.0071076	0.0040	0.0032	0.0031	0.0222	0.0239	3.6132	0.0000	0.0002	0.0003	0.0000
PIPE LAYER	366	diesel	10	Other Construction Equipment	0.59	0.2187	0.1829	0.1774	1.2900	3.0035	536	0.0044	0.033	0.037	0.0071076	0.0156	0.0131	0.0127	0.0921	0.2145	38.2887	0.0003	0.0024	0.0027	0.0005
TERMINAL/FACILITIES EQUIPMENT													0	0	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CRANE 80 TON CRLR,LS138	230	diesel	8	Crane	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30' SCISSOR LIFT	NA	NA	0																						
4 TON EXT. BOOM FORKLIFT	NA	NA	0																						
BULLDOZER CAT D4C	80	diesel	12	Crawler Tractor/Dozers	0.59	0.1856	0.2158	0.2093	1.6657	1.6829	596	0.0045	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DELIVERY VEHICLES																									
TRACTOR	130	diesel	4	Tractor/Loader/Backhoe	0.21	0.6012	0.4361	0.4230	2.1342	3.6584	625	0.0052	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
														Totals		**0.4378**	**0.3267**	**0.3169**	**1.6811**	**4.0033**	**1188**	**0.0091**	**0.0740**	**0.0828**	**0.0156**

Proposed Project Alternative - Nonroad Construction Equipment Emissions - 2021

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Equipment Type	Operating Load (%)	Emission Factors (grams per horsepower hour)										Air Contaminant Emissions (tons per year)									
		Primary Engine				VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs	VOC	PM10	PM2.5	CO	NOx	CO2	SO2	CH4	N20	Total HAPs
FILL EQUIPMENT																									
CAT 973 3.8CY, 210 HP (placing)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 973 3.8CY, 210 HP (wick)	210	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 980GN, 7.0, 300HP(rip rap)	300	diesel	12	Tractors/Loaders/Backhoes	0.21	0.5337	0.3374	0.3273	1.7653	3.4469	625	0.0051	0.039	0.044	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT D4C 80HP, 8MT	80	diesel	12	Crawler Tractor/Dozers	0.59	0.1856	0.2158	0.2093	1.6657	1.6829	596	0.0045	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT D7R 230 HP, 25MT	230	diesel	12	Crawler Tractor/Dozers	0.59	0.1626	0.0779	0.0756	0.4200	1.2784	536	0.0039	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gen Set 100 KW, DSL	100	diesel	12	Gen Set	0.43	0.4749	0.3895	0.3778	2.1891	3.9739	589	0.0050	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4 TON EXT.BOOM FORKLIFT	99	diesel	8	Forklift	0.59	0.1440	0.0502	0.0487	0.6242	0.7297	596	0.0040	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MULE KAWASAKI 550 W/TOPS	10	gas	8	Other General Industrial Equipment	0.59	7.0301	0.1364	0.1255	298.61	1.7423	1044	0.0063	0.065	0.073	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 563CP, 145 HP	145	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CAT 563CS, 145 HP	145	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BOOSTER PUMP	235	diesel	12	Pumps	0.43	0.3267	0.2016	0.1956	0.9960	3.6596	530	0.0044	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CRANE BARGES WITH FILL	300	diesel	24	Cranes	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CRANE BARGES WITH ROCK	300	diesel	24	Cranes	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WHARF CONSTRUCTION EQUIPMENT																									
PILING																									
150 TN CRWLER CRANE	282	diesel	10	Crane	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.1537	0.0566	0.0549	0.3238	1.0696	536	0.0038	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AIR COMPRESSORS																									
375 CFM, PORT.DSL	115	diesel	8	Air Compressors	0.43	0.2177	0.1449	0.1405	0.5844	2.2292	530	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WELDING EQUIPMENT																									
300 AMP DC DIESEL	32.7	diesel	8	Welders	0.21	0.8602	0.5832	0.5657	3.5890	4.7214	693	0.0058	0.043	0.048	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MISC JOB EQUIPMENT																									
GEN SET 6-10 KW, DSL	11	diesel	8	Gen Set	0.43	0.7482	0.5093	0.4940	4.5176	5.1249	588	0.0054	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CENT TRASH PUMP 4" W/TRL	16	gas	8	Pumps	0.43	6.3377	0.1181	0.1087	292.7707	1.6485	1046	0.0064	0.065	0.073	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CUTTING EQUIPMENT																									
Torch Cutting Machine	70	MAPP	4	AP-42 Emission Factors-LPG		0.0102	0.0091	0.0091	0.0951	0.1699	162	0.0010	0.01	0.011	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CONCRETE EQUIPMENT																									
TAMPER (JAMPING JACK) WAC	6	diesel	4	Tampers/Rammers	0.43	0.6526	0.4426	0.4294	4.4611	4.6352	588	0.0054	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TROWEL MARCH 48"	55	gas	8	Other General Industrial Equipment	0.48	0.9144	0.0713	0.0656	19.7008	1.3501	702	0.0043	0.044	0.049	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
VIBRATOR CONCRETE ELEC.2	3	none	8	Electric									0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION																									
EXCAVATOR-JD 330LC 2.3 CY	235	diesel	10	Excavators	0.59	0.1537	0.0566	0.0549	0.3238	1.0696	536	0.0038	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATE D46-32 DIESEL HAMMER	230	diesel	10	Other Construction Equipment	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROAD CONSTRUCTION EQUIPMENT																									
PAVER	142	diesel	10	Pavers	0.59	0.1827	0.1651	0.1602	0.6903	1.6069	536	0.0041	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SOIL COMPACTOR	232	diesel	10	Plate Compactors	0.43	0.2024	0.1334	0.1294	0.6816	2.0264	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HYDRAULIC SWEEPER	100	diesel	10	Hydro Power Units	0.43	0.2706	0.2388	0.2316	1.5563	2.6585	590	0.0047	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROLLER	175	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BULLDOZER	105	diesel	10	Crawler Dozers/Tractor	0.59	0.1727	0.1451	0.1407	0.6122	1.4113	536	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GRADER	215	diesel	10	Graders	0.59	0.1611	0.0751	0.0728	0.4072	1.2459	536	0.0039	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MIXER	25	diesel	10	Cement & Mortar Mixers	0.43	0.7869	0.4990	0.4841	3.0554	5.3916	588	0.0054	0.037	0.041	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL CONSTRUCTION EQUIPMENT																									
GRADERS	215	diesel	10	Graders	0.59	0.1611	0.0751	0.0728	0.4072	1.2459	536	0.0039	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BULLDOZERS	105	diesel	10	Crawler Dozers/Tractor	0.59	0.1727	0.1451	0.1407	0.6122	1.4113	536	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROLLER	175	diesel	10	Rollers	0.59	0.1894	0.1771	0.1718	0.7376	1.7354	536	0.0042	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GANTRY CRANES		na	10																						
SWING LOADER	300	diesel	10	Rubber Tire Loader	0.59	0.1769	0.1060	0.1028	0.5420	1.5998	536	0.0040	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL THREADER	300	diesel	10	Other Construction Equipment	0.59	0.2187	0.1829	0.1774	1.2900	3.0035	536	0.0044	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UNDER CUTTER	600	diesel	10	Excavators	0.59	0.1582	0.1041	0.1010	0.6610	1.6317	536	0.0041	0.033	0.037	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UTILITY INFRASTRUCTURE EQUIPMENT																									
EXCAVATOR	17.4	diesel	10	Excavators	0.59	0.4716	0.3618	0.3510	2.3768	4.4636	595	0.0055	0.037	0.041	0.0071076	0.0008	0.0006	0.0006	0.0040	0.0076	1.0095	0.0000	0.0001	0.0001	0.0000
BACKHOES	75	diesel	10	Tractor/Loader/Backhoe	0.21	0.7673	0.6063	0.5881	4.2541	4.5973	694	0.0059	0.043	0.048	0.0071076	0.0020	0.0016	0.0015	0.0111	0.0120	1.8066	0.0000	0.0001	0.0001	0.0000
PIPE LAYER	366	diesel	10	Other Construction Equipment	0.59	0.2187	0.1829	0.1774	1.2900	3.0035	536	0.0044	0.033	0.037	0.0071076	0.0078	0.0065	0.0063	0.0461	0.1072	19.1443	0.0002	0.0012	0.0013	0.0003
TERMINAL/FACILITIES EQUIPMENT																									
CRANE 80 TON CRLR,LS138	230	diesel	8	Crane	0.43	0.1763	0.0765	0.0742	0.3707	1.6719	531	0.0040	0.033	0.037	0.0071076	0.0326	0.0142	0.0137	0.0685	0.3091	98.0902	0.0007	0.0061	0.0068	0.0013
30' SCISSOR LIFT	NA	NA	0																						
4 TON EXT. BOOM FORKLIFT	NA	NA	0																						
BULLDOZER CAT D4C	80	diesel	12	Crawler Tractor/Dozers	0.59	0.1856	0.2158	0.2093	1.6657	1.6829	596	0.0045	0.037	0.042	0.0071076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DELIVERY VEHICLES																									
TRACTOR	130	diesel	4	Tractor/Loader/Backhoe	0.21	0.6012	0.4361	0.4230	2.1342	3.6584	625	0.0052	0.039	0.044	0.0071076	0.0153	0.0111	0.0108	0.0545	0.0934	15.9432	0.0001	0.0010	0.0011	0.0002
															Totals	**0.0585**	**0.0340**	**0.0330**	**0.1842**	**0.5293**	**135.9939**	**0.0011**	**0.0085**	**0.0095**	**0.0018**

Proposed Project Alternative - On-Road Construction Equipment Emissions 2016

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Number of Vehicles per Day	Daily Travel Per Vehicle	Number of Travel Days per year	Annual Vehicle Miles Traveled	Air Contaminant Emissions (tons per year)										
		Primary Engine						NO_x	VOC	CO	SO_2	$PM_{2.5}$	PM_{10}	PM	CO_2	CH_4	N_2O	HAPs
DREDGING EQUIPMENT																		
BUCKET DREDGE																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	181	9050	0.0439	0.0090	0.0306	0.0001	0.0022	0.0022	0.0022	4.8496	0.0004	0.0000	0.0016
BUS (CREW)	210	diesel	3	1	50	121	6033.333	0.0693	0.0060	0.0268	0.0002	0.0033	0.0034	0.0034	5.8505	0.0004	0.0000	0.0019
SUPERINTENDENT (Truck)		gasoline	3	1	50	26	1314	0.0011	0.0005	0.0087	0.0000	0.0000	0.0000	0.0000	0.4946	0.0000	0.0000	0.0000
MAINTENANCE DREDGING EQUIPMENT (MECH)																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS	210	diesel	3	1	10	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SUPERINTENDENT (Truck)		gasoline	3	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FILL EQUIPMENT																		
18 WHEEL WITH FLATBED	335	diesel	4	1	160	91	14560	0.1430	0.0112	0.0463	0.0007	0.0075	0.0078	0.0078	23.9157	0.0015	0.0001	0.0029
DUMP TRUCKS	550	diesel	32	4	50	91	4550	0.0865	0.0131	0.0359	0.0005	0.0042	0.0044	0.0044	17.0306	0.0020	0.0001	0.0036
1500 GLN WATER TRUCK, 4×2	410	gas	10	1	50	91	4550	0.0192	0.0081	0.1057	0.0002	0.0000	0.0000	0.0000	3.7055	0.0001	0.0001	0.0006
2- 7 passenger van		gasoline	0.17/3	2	20/50	99	12964	0.0254	0.0116	0.1815	0.0005	0.0003	0.0003	0.0003	9.7391	0.0004	0.0003	0.0007
8- cars		gasoline	0.17/3	8	20/50	99	51857	0.1470	0.0786	1.5619	0.0055	0.0035	0.0038	0.0038	118.2424	0.0032	0.0017	0.0034
8- trucks		gasoline	0.17/3	8	20/50	99	51857	0.3433	0.1680	2.7341	0.0073	0.0047	0.0051	0.0051	156.1266	0.0052	0.0043	0.0094
WHARF CONSTRUCTION EQUIPMENT																		
PILING																		
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MISC JOB EQUIPMENT																		
REG SRVC TRUCK, W/EQUIPMENT	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRAILERS	NA	NA	0				0											
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6- cars		gasoline	0.17/3	6	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6- trucks		gasoline	0.17/3	6	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION																		
PICKUP TRUCKS	350	gasoline	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- cars		gasoline	0.17/3	3	20/50	0	2192	0.0023	0.0012	0.0248	0.0001	0.0001	0.0001	0.0001	1.8744	0.0001	0.0000	0.0001
3- trucks		gasoline	0.17/3	3	20/50	0	2192	0.0054	0.0027	0.0433	0.0001	0.0001	0.0001	0.0001	2.4750	0.0001	0.0001	0.0001
ROAD CONSTRUCTION EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- cars		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- trucks		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL CONSTRUCTION EQUIPMENT																		
18 WHEELER	300	diesel	10	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- cars		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- trucks		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UTILITY INFRASTRUCTURE EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- cars		gasoline	0.17/3	3	20/50	0	0											
3- trucks		gasoline	0.17/3	3	20/50	0	0											
TERMINAL/FACILITIES EQUIPMENT																		
18 WHEEL WITH FLATBED	NA	NA	0	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- cars		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- trucks		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DELIVERY VEHICLES																		
DUMP TRUCKS	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18 WHEEL WITH FLATBED	400	diesel	7.5	15	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WATER TRUCK	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS		diesel	0	1	10	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EMPLOYEE VEHICLES	350	gasoline	5.1	30	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
							Totals	**0.88653**	**0.31009**	**4.79963**	**0.01524**	**0.02592**	**0.0271968**	**0.0272**	**344.304**	**0.01339**	**0.00681**	**0.024**

Proposed Project Alternative - On-Road Construction Equipment Emissions 2017

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Number of Vehicles per Day	Daily Travel Per Vehicle	Number of Travel Days per year	Annual Vehicle Miles Traveled	Air Contaminant Emissions (tons per year)										
		Primary Engine						NO_x	VOC	CO	SO_2	$PM_{2.5}$	PM_{10}	PM	CO_2	CH_4	N_2O	HAPs
DREDGING EQUIPMENT																		
BUCKET DREDGE																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	62	3100	0.0150	0.0031	0.0105	0.0001	0.0007	0.0008	0.0008	1.6612	0.0001	0.0000	0.0005
BUS (CREW)	210	diesel	2	1	50	62	3100	0.0356	0.0031	0.0138	0.0001	0.0017	0.0018	0.0018	3.0060	0.0002	0.0000	0.0010
SUPERINTENDENT (Truck)		gasoline	3	1	50	8	421	0.0003	0.0002	0.0028	0.0000	0.0000	0.0000	0.0000	0.1586	0.0000	0.0000	0.0000
MAINTENANCE DREDGING EQUIPMENT (MECH)																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	42	2118	0.0103	0.0021	0.0072	0.0000	0.0005	0.0005	0.0005	1.1349	0.0001	0.0000	0.0004
BUS	210	diesel	3	1	10	28	282	0.0032	0.0003	0.0013	0.0000	0.0002	0.0002	0.0002	0.2738	0.0000	0.0000	0.0001
SUPERINTENDENT (Truck)		gasoline	3	1	50	6	295	0.0002	0.0001	0.0019	0.0000	0.0000	0.0000	0.0000	0.1112	0.0000	0.0000	0.0000
FILL EQUIPMENT																		
18 WHEEL WITH FLATBED	335	diesel	4	1	160	366	58560	0.5753	0.0452	0.1861	0.0029	0.0303	0.0312	0.0312	96.1885	0.0062	0.0004	0.0118
DUMP TRUCKS	550	diesel	32	4	50	366	18300	0.3480	0.0525	0.1446	0.0021	0.0171	0.0176	0.0176	68.4966	0.0079	0.0004	0.0143
1500 GLN WATER TRUCK, 4×2	410	gas	10	1	50	366	18300	0.0774	0.0327	0.4252	0.0007	0.0002	0.0002	0.0002	14.9035	0.0006	0.0005	0.0025
2- 7 passenger van		gasoline	0.17/3	2	20/50	391	17207	0.0337	0.0154	0.2409	0.0006	0.0004	0.0004	0.0004	12.9264	0.0005	0.0004	0.0009
8- cars		gasoline	0.17/3	8	20/50	391	68829	0.1952	0.1043	2.0730	0.0073	0.0046	0.0050	0.0050	156.9399	0.0043	0.0022	0.0046
8- trucks		gasoline	0.17/3	8	20/50	391	68829	0.4557	0.2229	3.6290	0.0097	0.0063	0.0068	0.0068	207.2226	0.0069	0.0057	0.0125
WHARF CONSTRUCTION EQUIPMENT																		
PILING																		
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MISC JOB EQUIPMENT																		
REG SRVC TRUCK, W/EQUIPMENT	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRAILERS	NA	NA	0				0											
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6- cars		gasoline	0.17/3	6	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6- trucks		gasoline	0.17/3	6	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION																		
PICKUP TRUCKS	350	gas	4	1	50	212	10600	0.0088	0.0043	0.0699	0.0002	0.0001	0.0001	0.0001	3.9892	0.0001	0.0001	0.0002
3- cars		gasoline	0.17/3	3	20/50	229	25811	0.0274	0.0147	0.2915	0.0010	0.0006	0.0007	0.0007	22.0697	0.0006	0.0003	0.0006
3- trucks		gasoline	0.17/3	3	20/50	229	25811	0.0641	0.0313	0.5103	0.0014	0.0009	0.0010	0.0010	29.1407	0.0010	0.0008	0.0018
ROAD CONSTRUCTION EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- cars		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- trucks		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL CONSTRUCTION EQUIPMENT																		
18 WHEELER	300	diesel	10	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- cars		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- trucks		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UTILITY INFRASTRUCTURE EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- cars		gasoline	0.17/3	3	20/50	0	0											
3- trucks		gasoline	0.17/3	3	20/50	0	0											
TERMINAL/FACILITIES EQUIPMENT																		
18 WHEEL WITH FLATBED	NA	NA	0	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- cars		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- trucks		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DELIVERY VEHICLES																		
DUMP TRUCKS	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18 WHEEL WITH FLATBED	400	diesel	7.5	15	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WATER TRUCK	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS			0	1	10	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EMPLOYEE VEHICLES	350	gas	5.1	30	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
							Totals	**1.85022**	**0.53226**	**7.60787**	**0.02608**	**0.06355**	**0.0662354**	**0.06624**	**618.223**	**0.02852**	**0.01093**	**0.051**

Proposed Project Alternative - On-Road Construction Equipment Emissions 2018

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Number of Vehicles per Day	Daily Travel Per Vehicle	Number of Travel Days per year	Annual Vehicle Miles Traveled	Air Contaminant Emissions (tons per year)										
		Primary Engine						NO_x	VOC	CO	SO_2	$PM_{2.5}$	PM_{10}	PM	CO_2	CH_4	N_2O	HAPs
DREDGING EQUIPMENT																		
BUCKET DREDGE																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS (CREW)	210	diesel	2	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SUPERINTENDENT (Truck)		gasoline	3	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MAINTENANCE DREDGING EQUIPMENT (MECH)																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	41	2068	0.0100	0.0021	0.0070	0.0000	0.0005	0.0005	0.0005	1.1081	0.0001	0.0000	0.0004
BUS	210	diesel	3	1	10	83	827.1605	0.0095	0.0008	0.0037	0.0000	0.0005	0.0005	0.0005	0.8021	0.0001	0.0000	0.0003
SUPERINTENDENT (Truck)		gasoline	3	1	50	9	443	0.0004	0.0002	0.0029	0.0000	0.0000	0.0000	0.0000	0.1668	0.0000	0.0000	0.0000
FILL EQUIPMENT																		
18 WHEEL WITH FLATBED	335	diesel	4	1	160	274	43840	0.4307	0.0338	0.1393	0.0022	0.0227	0.0234	0.0234	72.0100	0.0046	0.0003	0.0088
DUMP TRUCKS	550	diesel	32	4	50	274	13700	0.2605	0.0393	0.1082	0.0016	0.0128	0.0132	0.0132	51.2789	0.0059	0.0003	0.0107
1500 GLN WATER TRUCK, 4×2	410	gas	10	1	50	274	13700	0.0580	0.0245	0.3183	0.0005	0.0001	0.0001	0.0001	11.1572	0.0004	0.0004	0.0019
2- 7 passenger van		gasoline	0.17/3	2	20/50	293	4243	0.0083	0.0038	0.0594	0.0001	0.0001	0.0001	0.0001	3.1873	0.0001	0.0001	0.0002
8- cars		gasoline	0.17/3	8	20/50	293	16971	0.0481	0.0257	0.5112	0.0018	0.0011	0.0012	0.0012	38.6975	0.0010	0.0006	0.0011
8- trucks		gasoline	0.17/3	8	20/50	293	16971	0.1124	0.0550	0.8948	0.0024	0.0015	0.0017	0.0017	51.0960	0.0017	0.0014	0.0031
WHARF CONSTRUCTION EQUIPMENT																		
PILING																		
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MISC JOB EQUIPMENT																		
REG SRVC TRUCK, W/EQUIPMENT	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRAILERS	NA	NA	0				0											
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6- cars		gasoline	0.17/3	6	20/50	0	13011	0.0277	0.0148	0.2939	0.0010	0.0007	0.0007	0.0007	22.2511	0.0006	0.0003	0.0006
6- trucks		gasoline	0.17/3	6	20/50	0	13011	0.0646	0.0316	0.5145	0.0014	0.0009	0.0010	0.0010	29.3802	0.0010	0.0008	0.0018
WICK DRAIN INSTALLATION																		
PICKUP TRUCKS	350	gas	4	1	50	274	13700	0.0113	0.0055	0.0903	0.0002	0.0002	0.0002	0.0002	5.1558	0.0002	0.0001	0.0003
3- cars		gasoline	0.17/3	3	20/50	293	6364	0.0068	0.0036	0.0719	0.0003	0.0002	0.0002	0.0002	5.4418	0.0001	0.0001	0.0002
3- trucks		gasoline	0.17/3	3	20/50	293	6364	0.0158	0.0077	0.1258	0.0003	0.0002	0.0002	0.0002	7.1854	0.0002	0.0002	0.0004
ROAD CONSTRUCTION EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- cars		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- trucks		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL CONSTRUCTION EQUIPMENT																		
18 WHEELER	300	diesel	10	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- cars		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- trucks		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UTILITY INFRASTRUCTURE EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- cars		gasoline	0.17/3	3	20/50	0	0											
3- trucks		gasoline	0.17/3	3	20/50	0	0											
TERMINAL/FACILITIES EQUIPMENT																		
18 WHEEL WITH FLATBED	NA	NA	0	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- cars		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- trucks		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DELIVERY VEHICLES																		
DUMP TRUCKS	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18 WHEEL WITH FLATBED	400	diesel	7.5	15	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
WATER TRUCK	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS			0	1	10	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EMPLOYEE VEHICLES	350	gas	5.1	30	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
							Totals	**1.06401**	**0.24848**	**3.14126**	**0.01192**	**0.04139**	**0.0429426**	**0.04294**	**298.918**	**0.01617**	**0.00459**	**0.03**

Proposed Project Alternative - On-Road Construction Equipment Emissions 2019

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Number of Vehicles per Day	Daily Travel Per Vehicle	Number of Travel Days per year	Annual Vehicle Miles Traveled	Air Contaminant Emissions (tons per year)										
		Primary Engine						NO_x	VOC	CO	SO_2	$PM_{2.5}$	PM_{10}	PM	CO_2	CH_4	N_2O	HAPs
DREDGING EQUIPMENT																		
BUCKET DREDGE																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS (CREW)	210	diesel	2	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SUPERINTENDENT (Truck)		gasoline	3	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MAINTENANCE DREDGING EQUIPMENT (MECH)																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	65	3268	0.0032	0.0015	0.0110	0.0001	0.0000	0.0000	0.0000	1.2275	0.0000	0.0000	0.0001
BUS	210	diesel	3	1	10	131	1307.16	0.0150	0.0013	0.0058	0.0000	0.0007	0.0007	0.0007	1.2675	0.0001	0.0000	0.0004
SUPERINTENDENT (Truck)		gasoline	3	1	50	9	443	0.0004	0.0002	0.0029	0.0000	0.0000	0.0000	0.0000	0.1668	0.0000	0.0000	0.0000
FILL EQUIPMENT																		
18 WHEEL WITH FLATBED	335	diesel	4	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DUMP TRUCKS	550	diesel	32	4	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1500 GLN WATER TRUCK, 4×2	410	gas	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2- 7 passenger van		gasoline	0.17/3	2	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- cars		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- trucks		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WHARF CONSTRUCTION EQUIPMENT																		
PILING																		
PICKUP TRUCKS	350	gas	4	1	50	92	4600	0.0038	0.0019	0.0303	0.0001	0.0001	0.0001	0.0001	1.7312	0.0001	0.0000	0.0001
MISC JOB EQUIPMENT																		
REG SRVC TRUCK, W/EQUIPMENT	350	gas	4	1	50	92	4600	0.0045	0.0021	0.0322	0.0001	0.0001	0.0001	0.0001	1.7278	0.0001	0.0001	0.0001
TRAILERS	NA	NA	0				0											
PICKUP TRUCKS	350	gas	4	1	50	92	4600	0.0038	0.0019	0.0303	0.0001	0.0001	0.0001	0.0001	1.7312	0.0001	0.0000	0.0001
6- cars		gasoline	0.17/3	6	20/50	96	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6- trucks		gasoline	0.17/3	6	20/50	96	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION																		
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- cars		gasoline	0.17/3	3	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- trucks		gasoline	0.17/3	3	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROAD CONSTRUCTION EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	182	9100	0.0385	0.0163	0.0180	0.0003	0.0001	0.0001	0.0001	7.4110	0.0003	0.0002	0.0012
5- cars		gasoline	0.17/3	5	20/50	99	32411	0.0574	0.0307	0.6101	0.0022	0.0014	0.0015	0.0015	46.1884	0.0013	0.0007	0.0013
5- trucks		gasoline	0.17/3	5	20/50	99	32411	0.1341	0.0656	1.0680	0.0028	0.0018	0.0020	0.0020	60.9870	0.0020	0.0017	0.0037
RAIL CONSTRUCTION EQUIPMENT																		
18 WHEELER	300	diesel	10	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
5- cars		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- trucks		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UTILITY INFRASTRUCTURE EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- cars		gasoline	0.17/3	3	20/50	0	0											
3- trucks		gasoline	0.17/3	3	20/50	0	0											
TERMINAL/FACILITIES EQUIPMENT																		
18 WHEEL WITH FLATBED	NA	NA	0	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
8- cars		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- trucks		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DELIVERY VEHICLES																		
DUMP TRUCKS	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18 WHEEL WITH FLATBED	400	diesel	7.5	15	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
WATER TRUCK	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS			0	1	10	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EMPLOYEE VEHICLES	350	gas	5.1	30	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
							Totals	**0.26073**	**0.12131**	**1.80871**	**0.0057**	**0.00419**	**0.0045134**	**0.00451**	**122.438**	**0.00388**	**0.00278**	**0.007**

Proposed Project Alternative - On-Road Construction Equipment Emissions 2020

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Number of Vehicles per Day	Daily Travel Per Vehicle	Number of Travel Days per year	Annual Vehicle Miles Traveled	Air Contaminant Emissions (tons per year)										
		Primary Engine						NO_x	VOC	CO	SO_2	$PM_{2.5}$	PM_{10}	PM	CO_2	CH_4	N_2O	HAPs
DREDGING EQUIPMENT																		
BUCKET DREDGE																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS (CREW)	210	diesel	2	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SUPERINTENDENT (Truck)		gasoline	3	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MAINTENANCE DREDGING EQUIPMENT (MECH)																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	42	2118	0.0021	0.0010	0.0072	0.0000	0.0000	0.0000	0.0000	0.7955	0.0000	0.0000	0.0001
BUS	210	diesel	3	1	10	28	282.3868	0.0032	0.0003	0.0013	0.0000	0.0002	0.0002	0.0002	0.2738	0.0000	0.0000	0.0001
SUPERINTENDENT (Truck)		gasoline	3	1	50	6	295	0.0002	0.0001	0.0019	0.0000	0.0000	0.0000	0.0000	0.1112	0.0000	0.0000	0.0000
FILL EQUIPMENT																		
18 WHEEL WITH FLATBED	335	diesel	4	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DUMP TRUCKS	550	diesel	32	4	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1500 GLN WATER TRUCK, 4×2	410	gas	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2- 7 passenger van		gasoline	0.17/3	2	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- cars		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- trucks		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WHARF CONSTRUCTION EQUIPMENT																		
PILING																		
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MISC JOB EQUIPMENT																		
REG SRVC TRUCK, W/EQUIPMENT	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRAILERS	NA	NA	0				0											
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6- cars		gasoline	0.17/3	6	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6- trucks		gasoline	0.17/3	6	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION																		
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- cars		gasoline	0.17/3	3	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- trucks		gasoline	0.17/3	3	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROAD CONSTRUCTION EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	608	30400	0.1286	0.0543	0.0600	0.0012	0.0003	0.0003	0.0003	24.7577	0.0009	0.0008	0.0041
5- cars		gasoline	0.17/3	5	20/50	327	14261	0.0253	0.0135	0.2684	0.0009	0.0006	0.0006	0.0006	20.3229	0.0006	0.0003	0.0006
5- trucks		gasoline	0.17/3	5	20/50	327	14261	0.0590	0.0289	0.4699	0.0013	0.0008	0.0009	0.0009	26.8343	0.0009	0.0007	0.0016
RAIL CONSTRUCTION EQUIPMENT																		
18 WHEELER	300	diesel	10	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
5- cars		gasoline	0.17/3	5	20/50	32	3654	0.0065	0.0035	0.0688	0.0002	0.0002	0.0002	0.0002	5.2067	0.0001	0.0001	0.0002
5- trucks		gasoline	0.17/3	5	20/50	32	3654	0.0151	0.0074	0.1204	0.0003	0.0002	0.0002	0.0002	6.8749	0.0002	0.0002	0.0004
UTILITY INFRASTRUCTURE EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	30	1500	0.0063	0.0027	0.0030	0.0001	0.0000	0.0000	0.0000	1.2216	0.0000	0.0000	0.0002
3- cars		gasoline	0.17/3	3	20/50	33	4314											
3- trucks		gasoline	0.17/3	3	20/50	33	4314											
TERMINAL/FACILITIES EQUIPMENT																		
18 WHEEL WITH FLATBED	NA	NA	0	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
8- cars		gasoline	0.17/3	8	20/50	0	23006	0.0652	0.0349	0.6929	0.0024	0.0015	0.0017	0.0017	52.4566	0.0014	0.0008	0.0015
8- trucks		gasoline	0.17/3	8	20/50	0	23006	0.1523	0.0745	1.2130	0.0032	0.0021	0.0023	0.0023	69.2634	0.0023	0.0019	0.0042
DELIVERY VEHICLES																		
DUMP TRUCKS	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18 WHEEL WITH FLATBED	400	diesel	7.5	15	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
WATER TRUCK	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS			0	1	10	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EMPLOYEE VEHICLES	350	gas	5.1	30	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
							Totals	**0.46392**	**0.22097**	**2.90678**	**0.00971**	**0.00585**	**0.0063498**	**0.00635**	**208.119**	**0.00656**	**0.00483**	**0.013**

Proposed Project Alternative - On-Road Construction Equipment Emissions 2021

Equipment Type	Engine Horsepower	Type of fuel	Hours/ Day	Number of Vehicles per Day	Daily Travel Per Vehicle	Number of Travel Days per year	Annual Vehicle Miles Traveled	Air Contaminant Emissions (tons per year)										
		Primary Engine						NO_x	VOC	CO	SO_2	$PM_{2.5}$	PM_{10}	PM	CO_2	CH_4	N_2O	HAPs
DREDGING EQUIPMENT																		
BUCKET DREDGE																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS (CREW)	210	diesel	2	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SUPERINTENDENT (Truck)		gasoline	3	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MAINTENANCE DREDGING EQUIPMENT (MECH)																		
MEDIUM DUTY TRUCK	250	diesel	4	1	50	40	2017.901	0.0020	0.0009	0.0068	0.0000	0.0000	0.0000	0.0000	0.7579	0.0000	0.0000	0.0001
BUS	210	diesel	3	1	10	27	269.0535	0.0031	0.0003	0.0012	0.0000	0.0001	0.0002	0.0002	0.2609	0.0000	0.0000	0.0001
SUPERINTENDENT (Truck)		gasoline	3	1	50	6	295	0.0002	0.0001	0.0019	0.0000	0.0000	0.0000	0.0000	0.1112	0.0000	0.0000	0.0000
FILL EQUIPMENT																		
18 WHEEL WITH FLATBED	335	diesel	4	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DUMP TRUCKS	550	diesel	32	4	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1500 GLN WATER TRUCK, 4×2	410	gas	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2- 7 passenger van		gasoline	0.17/3	2	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- cars		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8- trucks		gasoline	0.17/3	8	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WHARF CONSTRUCTION EQUIPMENT																		
PILING																		
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MISC JOB EQUIPMENT																		
REG SRVC TRUCK, W/EQUIPMENT	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRAILERS	NA	NA	0				0											
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6- cars		gasoline	0.17/3	6	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6- trucks		gasoline	0.17/3	6	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WICK DRAIN INSTALLATION																		
PICKUP TRUCKS	350	gas	4	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- cars		gasoline	0.17/3	3	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3- trucks		gasoline	0.17/3	3	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ROAD CONSTRUCTION EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- cars		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- trucks		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RAIL CONSTRUCTION EQUIPMENT																		
18 WHEELER	300	diesel	10	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
5- cars		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5- trucks		gasoline	0.17/3	5	20/50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UTILITY INFRASTRUCTURE EQUIPMENT																		
DUMP TRUCKS	550	diesel	10	1	50	15	750	0.0032	0.0013	0.0015	0.0000	0.0000	0.0000	0.0000	0.6108	0.0000	0.0000	0.0001
3- cars		gasoline	0.17/3	3	20/50	33	0											
3- trucks		gasoline	0.17/3	3	20/50	33	0											
TERMINAL/FACILITIES EQUIPMENT																		
18 WHEEL WITH FLATBED	NA	NA	0	1	160	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
8- cars		gasoline	0.17/3	8	20/50	229	16971	0.0481	0.0257	0.5112	0.0018	0.0011	0.0012	0.0012	38.6975	0.0010	0.0006	0.0011
8- trucks		gasoline	0.17/3	8	20/50	229	16971	0.1124	0.0550	0.8948	0.0024	0.0015	0.0017	0.0017	51.0960	0.0017	0.0014	0.0031
DELIVERY VEHICLES																		
DUMP TRUCKS	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18 WHEEL WITH FLATBED	400	diesel	7.5	15	160	212	33920	4.9987	0.3928	1.6172	0.0255	0.2632	0.2714	0.2714	835.7364	0.0540	0.0031	
WATER TRUCK	NA	NA	0	1	50	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BUS			0	1	10	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EMPLOYEE VEHICLES	350	gas	5.1	30	50	212	10600	0.1127	0.0602	1.1972	0.0042	0.0027	0.0029	0.0029	90.6362	0.0025	0.0013	0.0026
							Totals	**5.28034**	**0.53634**	**4.23183**	**0.03397**	**0.26877**	**0.2773635**	**0.27736**	**1017.91**	**0.05924**	**0.00639**	**0.007**

ON-ROAD FREIGHT AND EMPLOYEE VEHICLE EMISSIONS
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY, MISSISSIPPI

No-Action Alternative

Equipment Type	Type of fuel	Projected Daily Vehicle Volume	Number of Vehicles per Year	Daily Travel Per Vehicle*	Annual Vehicle Miles Traveled	Air Contaminant Emissions (tons per year)											
						NO_x	CO	PM_{10}	$PM_{2.5}$	VOC	SO_2	PM	CO_2	CH_4	N_2O	CO2e	HAPs
2020																	
Combination Long-haul Truck	Diesel	508	132,080	160	21,132,800	101.84	28.97	4.30	4.17	7.88	0.66	4.30	69,139	2.63	0.13	69,234	0.80
Passenger Car	Gasoline	1662	432,151	50	21,607,560	3.74	71.90	0.19	0.18	2.51	0.25	0.19	11,435	0.14	0.07	11,458	0.05
Single Unit Short-Haul Truck	Gasoline	525	136,469	50	6,823,440	28.90	154.76	0.06	0.06	11.60	0.25	0.06	11,565	0.16	0.12	11,605	0.49
					Totals	**134.48**	**255.63**	**4.55**	**4.40**	**21.98**	**1.16**	**4.55**	**92,138**	**2.93**	**0.31**	**92,296**	**1.35**
2060																	
Combination Long-haul Truck	Diesel	1235	321,100	160	51,376,000	123.72	35.11	2.84	2.76	9.90	1.57	2.84	168,084	6.43	0.31	168,316	1.14
Passenger Car	Gasoline	6063	1,576,255	50	78,812,760	6.65	209.59	0.68	0.63	6.92	0.24	0.68	36,919	0.42	0.23	36,999	0.11
Single Unit Short-Haul Truck	Gasoline	1914	497,765	50	24,888,240	90.24	473.50	0.21	0.19	37.84	0.27	0.21	42,188	0.11	0.25	42,266	1.54
					Totals	**220.61**	**718.20**	**3.73**	**3.57**	**54.66**	**2.08**	**3.73**	**247,190**	**6.97**	**0.79**	**247,581**	**2.79**

Proposed Project Alternative

Equipment Type	Type of fuel	Number of Vehicles per Year	Number of Vehicles per Year	Daily Travel Per Vehicle	Annual Vehicle Miles Traveled	Air Contaminant Emissions (tons per year)											
						NO_x	CO	PM_{10}	$PM_{2.5}$	VOC	SO_2	PM	CO_2	CH_4	N_2O	CO2e	HAPs
2020																	
Combination Long-haul Truck	Diesel	861	223,860	160	35,817,600	172.60	49.11	7.28	7.07	13.35	1.12	7.28	117,182	4.46	0.22	117,343	1.35
Passenger Car	Gasoline	2817	732,503	50	36,625,160	6.34	121.87	0.33	0.30	4.25	0.42	0.33	19,382	0.23	0.11	19,421	0.09
Single Unit Short-Haul Truck	Gasoline	890	231,317	50	11,565,840	48.99	262.31	0.10	0.10	19.65	0.43	0.10	19,603	0.27	0.20	19,670	0.84
					Totals	**227.94**	**433.29**	**7.71**	**7.46**	**37.26**	**1.97**	**7.71**	**156,167**	**4.96**	**0.53**	**156,434**	**2.28**
2060																	
Combination Long-haul Truck	Diesel	2030	527,800	160	84,448,000	203.36	57.71	4.67	4.53	16.27	2.58	4.67	276,284	10.57	0.51	276,665	1.87
Passenger Car	Gasoline	9965	2,590,931	50	129,546,560	10.94	344.51	1.12	1.03	11.37	0.39	1.12	60,684	0.70	0.38	60,816	0.18
Single Unit Short-Haul Truck	Gasoline	3147	818,189	50	40,909,440	148.32	778.31	0.34	0.31	62.20	0.45	0.34	69,345	0.19	0.40	69,474	2.54
					Totals	**362.63**	**1180.53**	**6.13**	**5.88**	**89.85**	**3.42**	**6.13**	**406,313**	**11.45**	**1.29**	**406,954**	**4.59**

* Assumes Port operates 5 days per week.

EMISSION FACTORS FOR DAILY COMMUTE AND DELIVERY VEHICLES - 2020													
			Emission Factor[1] (g/mile)										
Year	**Type of Vehicle**	**SourceType ID**	**NO_x**	**VOC**	**CO**	**SO_2**	**$PM_{2.5}$**	**PM_{10}**	**PM**	**CO_2**	**CH_4**	**N_2O**	**HAPs**
2020	Passenger Car	21	0.157129	0.105387	3.018532	0.010479	0.0075	0.0081	0.0081	480.08	0.0057	0.0028	0.0022
2020	Passenger Truck	31	0.4632	0.21488	4.555511	0.013361	0.0100	0.0109	0.0109	612.08	0.0072	0.0055	0.0067
2020	Single Unit Short-haul Truck	52	3.842687	1.541566	20.57477	0.033564	0.0075	0.0082	0.0082	1537.61	0.0213	0.0154	0.0658
2020	Combination Long-haul Truck	62	4.371616	0.338246	1.243783	0.028359	0.1790	0.1845	0.1845	2967.95	0.1130	0.0055	0.0343

Key:
1. Emission factors derived from EPA's mobile source emission model, MOVES2010b.

EMISSION FACTORS FOR DAILY COMMUTE AND DELIVERY VEHICLES - 2050													
			Emission Factor[1] (g/mile)										
Year	**Type of Vehicle**	**SourceType ID**	**NO_x**	**VOC**	**CO**	**SO_2**	**$PM_{2.5}$**	**PM_{10}**	**PM**	**CO_2**	**CH_4**	**N_2O**	**HAPs**
2050	Passenger Car	21	0.0766	0.079648	2.412541	0.002765	0.0072	0.0078	0.0078	424.96	0.0049	0.0026	0.0013
2050	Passenger Truck	31	0.262652	0.126532	3.262481	0.003454	0.0095	0.0103	0.0103	530.75	0.0048	0.0032	0.0034
2050	Single Unit Short-haul Truck	52	3.289127	1.379411	17.25928	0.010007	0.0070	0.0076	0.0076	1537.74	0.0042	0.0089	0.0563
2050	Combination Long-haul Truck	62	2.184623	0.174817	0.61991	0.027696	0.048664	0.050168	0.050168	2967.97	0.113513	0.005504	0.0201

Key:
1. Emission factors derived from EPA's mobile source emission model, MOVES2010b.

PROJECTED LINE HAUL LOCOMOTIVE ACTIVITY
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Assumptions:

Workdays per Year	250	
Containers per Railcar	4	
Containers per Train	148	
Railcars per Train (US 90 to Gulfport Rail Yard)	37	
Railcars per Train (North of Gulfport Rail Yard)	60	
One-way Distance (US 90 to Gulfport Rail Yard)	1.7	miles
One-way Distance (North of Gulfport Rail Yard to O'Neal Road)	5.6	miles

No Action Alternative

	2020		2060	
	Inbound	**Outbound**	**Inbound**	**Outbound**
Rail Cars per Weekday	72	72	525	525
Trains per Week Day (US 90 to Gulfport Rail Yard)	1.9	1.9	14.2	14.2
Trains per Week Day (North of Gulfport Rail Yard)	1.2	1.2	8.8	8.8
Trains per Year (US 90 to Gulfport Rail Yard)	475	475	3550	3550
Trains per Year (North of Gulfport Rail Yard)	300	300	2200	2200
Trains per Year	775	775	5750	5750
Locomotives per Train	4	4	4	4

Proposed Project Alternative - Port Expansion

	2020		2060	
	Inbound	**Outbound**	**Inbound**	**Outbound**
Rail Cars per Weekday	122	122	865	865
Trains per Week Day (US 90 to Gulfport Rail Yard)	3.3	3.3	23.4	23.4
Trains per Week Day (North of Gulfport Rail Yard)	2.0	2.0	14.4	14.4
Trains per Year (US 90 to Gulfport Rail Yard)	825	825	5850	5850
Trains per Year (North of Gulfport Rail Yard)	500	500	3600	3600
Trains per Year	1325	1325	9450	9450
Locomotives per Train	4	4	4	4

LINE-HAUL LOCOMOTIVE EMISSION ESTIMATES
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Air Emission Factors, grams per horsepower-hour

Tier	MY	Date	HC	VOC	CO	NOx	PM10	PM2.5	SO2	CO2	CH4	NO2
Tier 0	1973 - 1992	2010	0.30	0.32	1.28	7.20	0.20	0.19	0.0049	487	0.013	0.04
Tier 1	1993 - 2004	2010	0.29	0.31	1.28	6.70	0.20	0.19	0.0049	487	0.013	0.04
Tier 2	2005 - 2011	2013	0.13	0.14	1.28	4.95	0.08	0.08	0.0049	487	0.013	0.04
Tier 3	2012 - 2014	2012	0.13	0.14	1.28	4.95	0.08	0.08	0.0049	487	0.013	0.04
Tier 4	2015 or Later	2015	0.04	0.04	1.28	1.00	0.015	0.01	0.0049	487	0.013	0.04
Surrogate	2015 or Later	2020	0.22	0.23	1.28	6.06	0.14	0.14	0.0049	483	0.013	0.04

Ref: "Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories", Tables 5-8 and 5-9, U.S. Environmental Protection Agency, April 2009.
Surrogate emission factors were used for estimating 2020 air emissions.
Tier 4 emission factors were used for estimating 2060 air emissions.

No Action Alternative - US 90 to Gulfport Rail Yard

	Engine Tier	Engine Horsepower	Number of Locomotives	Horsepower in Use (Total)	Trains per Year - Inbound	Trains per Year - Outbound	Hours per One-way Trip	Engine Load Factor %
2020	3	4000	4	16000	475	475	0.17	0.28
2060	4	4000	4	16000	3550	3550	0.17	0.28

* Without more specific data, the average line-haul locomotive load factor was taken from "Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories", Tables 5-2, U.S. Environmental Protection Agency, April 2009.

No Action Alternative - North of Gulfport Rail Yard

	Engine Tier	Engine Horsepower	Number of Locomotives	Horsepower in Use (Total)	Trains per Year - Inbound	Trains per Year - Outbound	Hours per One-way Trip	Engine Load Factor %
2020	3	4000	4	16000	300	300	0.31	0.28
2060	4	4000	4	16000	2200	2200	0.31	0.28

Estimated Air Emissions, tons per year - US 90 to Gulfport Rail Yard

	HC	VOC	CO	NOx	PM10	PM2.5	SO2	CO2	CH4	NO2	CO2e
2020	0.18	0.18	1.02	4.83	0.11	0.11	0.004	385	0.01	0.03	395
2060	0.24	0.25	7.63	5.96	0.09	0.09	0.03	2,903	0.08	0.24	2,976

Estimated Air Emissions, tons per year - North of Gulfport Rail Yard

	HC	VOC	CO	NOx	PM10	PM2.5	SO2	CO2	CH4	NO2	CO2e
2020	0.20	0.21	1.18	5.57	0.13	0.12	0.005	444	0.01	0.04	455
2060	0.27	0.28	8.62	6.74	0.10	0.10	0.03	3,280	0.09	0.27	3,363

Proposed Project Alternative - Port Expansion - US 90 to Gulfport Rail Yard

	Engine Tier	Engine Horsepower	Number of Locomotives	Horsepower in Use (Total)	Trains per Year - Inbound	Trains per Year - Outbound	Hours per One-way Trip	Engine Load Factor %
2020	3	4000	4	16000	825	825	0.17	0.28
2060	4	4000	4	16000	5850	5850	0.17	0.28

Proposed Project Alternative - Port Expansion - North of Gulfport Rail Yard

	Engine Tier	Engine Horsepower	Number of Locomotives	Horsepower in Use (Total)	Trains per Year - Inbound	Trains per Year - Outbound	Hours per One-way Trip	Engine Load Factor %
2020	3	4000	4	16000	500	500	0.31	0.28
2060	4	4000	4	16000	3600	3600	0.31	0.28

Estimated Air Emissions, tons per year - US 90 to Gulfport Rail Yard

	HC	VOC	CO	NOx	PM10	PM2.5	SO2	CO2	CH4	NO2	CO2e
2020	0.30	0.32	1.77	8.39	0.19	0.19	0.01	669	0.02	0.06	686
2060	0.39	0.41	12.57	9.82	0.15	0.14	0.05	4,784	0.13	0.39	4,904

Estimated Air Emissions, tons per year - North of Gulfport Rail Yard

	HC	VOC	CO	NOx	PM10	PM2.5	SO2	CO2	CH4	NO2	CO2e
2020	0.34	0.35	1.96	9.28	0.21	0.21	0.01	739	0.02	0.06	758
2060	0.44	0.46	14.11	11.02	0.17	0.16	0.05	5,368	0.14	0.44	5,503

SUMMARY OF EMISSIONS - CONTAINER VESSEL EMISSIONS INCREASE
NO ACTION ALTERNATIVE - 2020
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Diesel Engines - Main Propulsion and Auxiliary Power Engines

Mode	Max HP [1]	Load [1] Factor	HP	Hr/Call (average)	NOx		CO		PM10		PM2.5		VOC		SO2		CO2		CH4		N2O		CO_2e		HAPs	
					g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call
Diesel (MDO)																										
Cruise/ RSZ / Maneuvering																										
Cruise (FNC Entrance to RSZ)	41,438	0.83	34,393	0.6	11.28	215,900	1.04	19,978	0.14	2,701	0.13	2,485	0.45	8,562	0.27	5,161	439	8.4E+06	0.0045	86	0.023	443	446	8.5E+06	0.068	1,303
Reduced Speed Zone - Incoming	41,438	0.10	4,112	2.3	11.28	108,847	1.04	10,072	0.14	1,362	0.13	1,253	0.45	4,316	0.27	2,602	439	4.2E+06	0.0045	43	0.023	223	446	4.3E+06	0.068	657
Maneuvering - Inbound	41,438	0.03	1,410	0.5	11.28	7,956	1.04	736	0.14	100	0.13	92	0.45	316	0.27	190	439	3.1E+05	0.0045	3	0.023	16	446	3.1E+05	0.068	48
Loading/Hotelling	41,438	-	-	23.0	11.28	-	1.04	-	0.14	-	0.13	-	0.45	-	0.27	-	439	0.0E+00	0.0045	-	0.023	-	446	0.0E+00	0.068	-
Maneuvering - Outgoing	41,438	0.05	2,105	0.5	11.28	11,876	1.04	1,099	0.14	149	0.13	137	0.45	471	0.27	284	439	4.6E+05	0.0045	5	0.023	24	446	4.7E+05	0.068	72
Reduced Speed Zone - Outbound	41,438	0.10	4,112	2.3	11.28	108,847	1.04	10,072	0.14	1,362	0.13	1,253	0.45	4,316	0.27	2,602	439	4.2E+06	0.0045	43	0.023	223	446	4.3E+06	0.068	657
Cruise (RSZ to FNC Entrance)	41,438	0.83	34,393	0.6	11.28	215,900	1.04	19,978	0.14	2,701	0.13	2,485	0.45	8,562	0.27	5,161	439	8.4E+06	0.0045	86	0.023	443	446	8.5E+06	0.068	1,303
Cruise/ RSZ /Hotelling/ Maneuvering Total				29.8		669,326		61,934		8,373		7,703		26,543		16,000		2.6E+07		266		1,372.4		2.6E+07		4,039.8
Auxiliary Engines (MGO) [2]																										
Cruise/ RSZ / Maneuvering																										
Cruise (9 nautical mile CZB to RSZ)	9,116	0.13	1,185	1.0	9.23	10,933	0.82	972	0.13	159	0.13	150	3.0E-01	354	0.31	371	515	6.1E+05	3.0E-03	4	2.3E-02	27	522	6.2E+05	0.068	81
Reduced Speed Zone - Incoming	9,116	0.25	2,279	2.9	9.23	61,662	0.82	5,483	0.13	897	0.13	847	3.0E-01	1,994	0.31	2,093	515	3.4E+06	3.0E-03	20	2.3E-02	155	522	3.5E+06	0.068	455
Maneuvering - Incoming	9,116	0.48	4,376	0.5	9.23	20,184	0.82	1,795	0.13	294	0.13	277	3.0E-01	653	0.31	685	515	1.1E+06	3.0E-03	7	2.3E-02	51	522	1.1E+06	0.068	149
Loading/Hotelling	9,116	0.19	1,732	23.0	9.23	367,515	0.82	32,679	0.13	5,347	0.13	5,050	3.0E-01	11,883	0.31	12,477	515	2.1E+07	3.0E-03	119	2.3E-02	922	522	2.1E+07	0.068	2,713
Maneuvering - Outgoing	9,116	0.48	4,376	0.5	9.23	20,184	0.82	1,795	0.13	294	0.13	277	3.0E-01	653	0.31	685	515	1.1E+06	3.0E-03	7	2.3E-02	51	522	1.1E+06	0.068	149
Reduced Speed Zone - Outgoing	9,116	0.25	2,279	2.9	9.23	61,662	0.82	5,483	0.13	897	0.13	847	3.0E-01	1,994	0.31	2,093	515	3.4E+06	3.0E-03	20	2.3E-02	155	522	3.5E+06	0.068	455
Cruise (RSZ to FNC Entrance)	9,116	0.13	1,185	1.0	9.23	10,933	0.82	972	0.13	159	0.13	150	3.0E-01	354	0.31	371	515	6.1E+05	3.0E-03	4	2.3E-02	27	522	6.2E+05	0.068	81
Cruise/ RSZ / Maneuvering Total				31.9		553,071		49,178		8,047		7,600		17,883		18,777		3.1E+07		179		1,387.0		3.1E+07		4,082.6
Auxiliary Boiler (MGO)																										
Maneuvering - Incoming	679	0.85	577	0.5	1.49	430	0.15	43	0.13	37	0.11	32	0.07	22	0.43	123	688	2.0E+05	0.001	0	0.060	17	707	2.0E+05	0.068	20
Loading/Hotelling	679	0.85	577	23.0	1.49	19,785	0.15	1,978	0.13	1,682	0.11	1,484	0.07	989	0.43	5,639	688	9.1E+06	0.001	20	0.060	792	707	9.4E+06	0.068	903
Maneuvering - Outgoing	679	0.85	577	0.5	1.49	430	0.15	43	0.13	37	0.11	32	0.07	22	0.43	123	688	2.0E+05	0.001	0	0.060	17	707	2.0E+05	0.068	20
Auxiliary Boiler Total				24.0		20,645		2,065		1,755		1,548		1,032		5,884		9.5E+06		21		826		9.8E+06		943

Assist Activity	Miles	Speed (kn	Time (Hours)
Cruise (FNC Entrance to RSZ)	13	20.3	0.6
Reduced Speed Zone	27	10	2.3
Maneuver (Inbound)	0	7	0.5
Offload/Hotel/Load	0	0	23.0
Maneuver (Outbound)	0	8	0.5
Reduced Speed Zone	27	10	2.3
Cruise (RSZ to FNC Entrance)	13	20.3	0.6
Total			**29.8**

Fuel	% Calls	Mode	Calls/Year	Emissions (Tons Per Year)										
				NOx	CO	PM10	PM2.5	VOC	SO2	CO2	CH4	N2O	CO_2e	HAPs
MDO	100%	Diesel Engine	**192**	141.53	13.10	1.77	1.63	5.61	3.38	5,508	0.06	0.29	5,599	0.85
MGO	100%	Auxiliary Engines	**192**	116.95	10.399	1.70	1.61	3.78	3.97	6,529	0.04	0.29	6,621.14	0.86
MGO	100%	Auxiliary Boiler	**192**	4.37	0.44	0.37	0.33	0.22	1.24	2,015	0.00	0.17	2,068.82	0.20
		Total		**262.84**	**23.93**	**3.84**	**3.56**	**9.61**	**8.60**	**14,052**	**0.10**	**0.76**	**14,289**	**1.92**
		Container Plus Tugboat Emissions Total		**335.26**	**42.15**	**5.78**	**5.44**	**11.61**	**8.65**	**19,151**	**0.76**	**0.91**	**19,448**	**2.59**

Marine Diesel Oil (0.10 % Sulfur)			Marine Gas Oil (0.10% Sulfur)		
Pollutant	**g/kw-hr [3]**	**g/hp-hr**	**Pollutant**	**g/kw-hr [4]**	**g/hp-hr**
NOx	15.13	11.28	NOx	12.37	9.23
CO	1.40	1.04	CO	1.10	0.82
PM_{10}	0.19	0.14	PM_{10}	0.18	0.13
$PM_{2.5}$	0.17	0.13	$PM_{2.5}$	0.17	0.13
VOC	0.60	0.45	VOC	0.40	0.30
SO_2	0.36	0.27	SO_2	0.42	0.31
CO_2	589	439	CO_2	691	515
CH_4	0.006	0.0045	CH_4	0.004	0.003
N_2O	0.031	0.023	N_2O	0.031	0.02

Auxiliary Boiler Emission Factors**		
Pollutant	**g/kw-hr [5]**	**g/hp-hr**
NOx	2.00	1.49
CO	0.20	0.15
PM_{10}	0.17	0.13
$PM_{2.5}$	0.15	0.11
VOC	0.10	0.07
SO_2	0.57	0.43
CO_2	923	688
CH_4	0.002	0.001
N_2O	0.080	0.06

** Steam Turbine Emission Factors
Marine Gas Oil (0.10% Sulfur)

HAP Emission Factors [6]		
HAP*	**lb/MMBtu**	**g/HP-hr**
Benzene	7.76E-04	8.96E-04
Toluene	2.81E-04	3.24E-04
Xylenes	1.93E-04	2.23E-04
Formaldehyd	7.89E-05	9.11E-05
Acetaldehyd	2.52E-05	2.91E-05
Acrolein	7.88E-06	9.09E-06
Naphthalene	1.30E-04	1.50E-04
Total PAH	2.12E-04	2.45E-04
Diesel-PM_{10}	5.73E-02	6.61E-02

*HAP = Hazardous Air Pollutant
PAH = Polycylic Aromatic Hydrocarbons

1. Horsepower rating and load factors for auxiliary engines are based on U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009, Tables 2-4 and 2-7.
2. Auxiliary Engine horsepower is assumed to be 22% of main propulsion engine based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 2-4.
3. U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Tables 2-9 & 2-13 (assumes Slow Speed Diesel (SSD) engine model year 2000 or later).
4. U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009 Tables 2-13 & 2-16
5. U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009 Tables 2-9 & 2-13 (emission factor for Steam Turbine).
6. Hazardous Air Pollutant (HAP) emission factors were totals from Tables 3.4-3 and 3.4-4; AP-42, Compilation of Emission Factors, U.S. Environmental Protection Agency, October 1996.

SUMMARY OF EMISSIONS - ASSIST TUGBOAT EMISSIONS
NO ACTION ALTERNATIVE - 2020
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Diesel Engines - Main Propulsion and Auxiliary Power Engines

Mode	No. of Tugs	Engine /Tug	HP/ Engine [1]	Load Factor[2]	Hr/Call (average)	NOx		CO		PM_{10}		$PM_{2.5}$		VOC		SO_2		CO_2		CH_4		N_2O		CO_2e		HAPs	
						g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call
Main Engines																											
Cruise	-	2	2,065			7.3		1.9		0.19		0.19		0.20		0.005		515		0.07		0.01		521		0.07	
Reduced Speed Zone	2	2	2,065	0.79	2.9	7.3	139,879	1.9	35,683	0.19	3,683	0.19	3,572	0.20	3,854	0.005	93	515	9,848,590	0.07	1,286	0.01	286	521	9,964,148	0.07	1,303
Maneuvering	2	2	2,065	0.79	0.5	7.3	23,847	1.9	6,083	0.19	628	0.19	609	0.20	657	0.005	16	515	1,679,045	0.07	219	0.01	49	521	1,698,745	0.07	222
Maneuvering	2	2	2,065	0.79	0.5	7.3	23,847	1.9	6,083	0.19	628	0.19	609	0.20	657	0.005	16	515	1,679,045	0.07	219	0.01	49	521	1,698,745	0.07	222
Reduced Speed Zone	2	2	2,065	0.79	2.9	7.3	139,879	1.9	35,683	0.19	3,683	0.19	3,572	0.20	3,854	0.005	93	515	9,848,590	0.07	1,286	0.01	286	521	9,964,148	0.07	1,303
Loading/Hotelling		2	2,065			7.3		1.9		0.19		0.19		0.20		0.005		515		0.07		0.01		521		0.07	
Total					6.9		327,452		83,534		8,621		8,362		9,022		217		23,055,270		3,009		669		23,325,786		3,051
Auxiliary Engines																											
Cruise	-	2	134			7.3		1.3		0.26		0.25		0.20		0.00		515		0.07		0.01		521		0.07	
Reduced Speed Zone	2	2	134	0.56	2.9	7.3	6,438	1.3	1,117	0.26	226	0.25	219	0.20	177	0.00	4	515	453,300	0.07	59	0.01	13	521	458,619	0.07	60
Maneuvering	2	2	134	0.56	0.5	7.3	1,098	1.3	190	0.26	39	0.25	37	0.20	30	0.00	1	515	77,281	0.07	10	0.01	2	521	78,188	0.07	10
Maneuvering	2	2	134	0.56	0.5	7.3	1,098	1.3	190	0.26	39	0.25	37	0.20	30	0.00	1	515	77,281	0.07	10	0.01	2	521	78,188	0.07	10
Reduced Speed Zone	2	2	134	0.56	2.9	7.3	6,438	1.3	1,117	0.26	226	0.25	219	0.20	177	0.00	4	515	453,300	0.07	59	0.01	13	521	458,619	0.07	60
Loading/Hotelling		2	134			7.3		1.3		0.26		0.25		0.20		0.00		515		0.07		0.01		521		0.07	
Total					6.9		15,072		2,614		529		513		415		10		1,061,163		139		31		1,073,614		140

Assist Activity	Miles	Speed (knots)	Time (Hours)
Cruise (FNC Entrance to RSZ)	13		
Reduced Speed Zone	27	8	2.9
Maneuver (Inbound)	0	0	0.5
Offload/Hotel/Load	0	0	23.0
Maneuver (Outbound)	0	0	0.5
Reduced Speed Zone	27	8	2.9
Cruise (RSZ to FNC Entrance)	13		
Total			**29.9**

Pollutant	Main Engines[3]		Auxiliary Engines[3]	
	g/kw-hr	g/hp-hr	g/kw-hr	g/hp-hr
NOx	9.8	7.3	9.8	7.31
CO	2.5	1.9	1.7	1.27
PM_{10}[4]	0.26	0.19	0.34	0.26
$PM_{2.5}$[5]	0.25	0.19	0.33	0.25
VOC	0.27	0.20	0.27	0.20
SO_2[4]	0.01	0.00	0.01	0.005
CO_2	690	515	690	515
CH_4	0.09	0.07	0.09	0.07
N_2O	0.02	0.01	0.02	0.01

Calls/Year	Mode	Emissions (Tons Per Year)										
		NOx	CO	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO_2	CH_4	N_2O	CO_2e	HAPs
192	Main Engines	69.24	17.66	1.82	1.77	1.91	4.6E-02	4,875	6.4E-01	1.4E-01	4,932	6.5E-01
	Auxiliary Engines	3.19	0.55	0.11	0.11	0.09	2.1E-03	224	2.9E-02	6.5E-03	227	3.0E-02
	Total	**72.43**	**18.22**	**1.93**	**1.88**	**2.00**	**0.05**	**5,099**	**0.67**	**0.15**	**5,159**	**0.67**

HAP Emission Factors [6]

HAP*	lb/MMBtu	g/HP-hr
Benzene	7.76E-04	8.96E-04
Toluene	2.81E-04	3.24E-04
Xylenes	1.93E-04	2.23E-04
Formaldehyde	7.89E-05	9.11E-05
Acetaldehyde	2.52E-05	2.91E-05
Acrolein	7.88E-06	9.09E-06
Naphthalene	1.30E-04	1.50E-04
Total PAH	2.12E-04	2.45E-04
Diesel-PM_{10}	5.73E-02	6.61E-02

*HAP = Hazardous Air Pollutant
PAH = Polycylic Aromatic Hydrocarbons

1. Horsepower ratings are based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventori* es, ICF International, April 2009, Table 3-10.
2. Load factors are based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-3.
3. U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-8 (assumes the use of Category 1, Tier 1 engines built after 2000).
4. Corrected per U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-9 (assumes the use of only ULSD fuel).
5. $PM_{2.5}$ = 0.97 x PM_{10} per U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Page 3-9
6. *Hazardous Air Pollutant (HAP) emission factors were totals from Tables 3.4-3 and 3.4-4; AP-42, Compilation of Emission Factors, U.S. Environmental Protection Agency, October 1996.*

SUMMARY OF EMISSIONS - CONTAINER VESSEL EMISSIONS INCREASE
NO ACTION ALTERNATIVE - 2060
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Diesel Engines - Main Propulsion and Auxiliary Power Engines

Mode	Max HP [1]	Load [1] Factor	HP	Hr/Call (average)	NOx		CO		PM10		PM2.5		VOC		SO2		CO2		CH4		N2O		CO_2e		HAPs	
					g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call
Diesel (MDO)																										
Cruise/ RSZ / Maneuvering																										
Cruise (FNC Entrance to RSZ)	41,438	0.83	34,393	0.6	7.55	144,532	1.04	19,978	0.14	2,701	0.13	2,485	0.45	8,562	0.27	5,161	439	8.4E+06	0.0045	86	0.023	443	446	8.5E+06	0.068	1,303
Reduced Speed Zone - Incoming	41,438	0.10	4,112	2.3	7.55	72,866	1.04	10,072	0.14	1,362	0.13	1,253	0.45	4,316	0.27	2,602	439	4.2E+06	0.0045	43	0.023	223	446	4.3E+06	0.068	657
Maneuvering - Inbound	41,438	0.03	1,410	0.5	7.55	5,326	1.04	736	0.14	100	0.13	92	0.45	316	0.27	190	439	3.1E+05	0.0045	3	0.023	16	446	3.1E+05	0.068	48
Loading/Hotelling	41,438	-	-	23.0	7.55	-	1.04	-	0.14	-	0.13	-	0.45	-	0.27	-	439	0.0E+00	0.0045	-	0.023	-	446	0.0E+00	0.068	-
Maneuvering - Outgoing	41,438	0.05	2,105	0.5	7.55	7,950	1.04	1,099	0.14	149	0.13	137	0.45	471	0.27	284	439	4.6E+05	0.0045	5	0.023	24	446	4.7E+05	0.068	72
Reduced Speed Zone - Outbound	41,438	0.13	5,473	2.1	7.55	88,168	1.04	12,187	0.14	1,647	0.13	1,516	0.45	5,223	0.27	3,148	439	5.1E+06	0.0045	52	0.023	270	446	5.2E+06	0.068	795
Cruise (RSZ to FNC Entrance)	41,438	0.83	34,393	0.6	7.55	144,532	1.04	19,978	0.14	2,701	0.13	2,485	0.45	8,562	0.27	5,161	439	8.4E+06	0.0045	86	0.023	443	446	8.5E+06	0.068	1,303
Cruise/ RSZ /Hotelling/ Maneuvering Total				29.6		463,374		64,049		8,659		7,966		27,449		16,547		2.7E+07		275		1,419.3		2.7E+07		4,177.8
Auxiliary Engines (MGO) [2]																										
Cruise/ RSZ / Maneuvering																										
Cruise (9 nautical mile CZB to RSZ)	9,116	0.13	1,185	1.0	6.06	7,176	0.82	972	0.13	159	0.13	150	3.0E-01	354	0.31	371	515	6.1E+05	3.0E-03	4	2.3E-02	27	522	6.2E+05	0.068	81
Reduced Speed Zone - Incoming	9,116	0.25	2,279	2.9	6.06	40,475	0.82	5,483	0.13	897	0.13	847	3.0E-01	1,994	0.31	2,093	515	3.4E+06	3.0E-03	20	2.3E-02	155	522	3.5E+06	0.068	455
Maneuvering - Incoming	9,116	0.48	4,376	0.5	6.06	13,249	0.82	1,795	0.13	294	0.13	277	3.0E-01	653	0.31	685	515	1.1E+06	3.0E-03	7	2.3E-02	51	522	1.1E+06	0.068	149
Loading/Hotelling	9,116	0.19	1,732	23.0	6.06	241,238	0.82	32,679	0.13	5,347	0.13	5,050	3.0E-01	11,883	0.31	12,477	515	2.1E+07	3.0E-03	119	2.3E-02	922	522	2.1E+07	0.068	2,713
Maneuvering - Outgoing	9,116	0.48	4,376	0.5	6.06	13,249	0.82	1,795	0.13	294	0.13	277	3.0E-01	653	0.31	685	515	1.1E+06	3.0E-03	7	2.3E-02	51	522	1.1E+06	0.068	149
Reduced Speed Zone - Outgoing	9,116	0.25	2,279	2.9	6.06	40,475	0.82	5,483	0.13	897	0.13	847	3.0E-01	1,994	0.31	2,093	515	3.4E+06	3.0E-03	20	2.3E-02	155	522	3.5E+06	0.068	455
Cruise (RSZ to FNC Entrance)	9,116	0.13	1,185	1.0	6.06	7,176	0.82	972	0.13	159	0.13	150	3.0E-01	354	0.31	371	515	6.1E+05	3.0E-03	4	2.3E-02	27	522	6.2E+05	0.068	81
Cruise/ RSZ / Maneuvering Total				31.9		363,039		49,178		8,047		7,600		17,883		18,777		3.1E+07		179		1,387.0		3.1E+07		4,082.6
Auxiliary Boiler (MGO)																										
Maneuvering - Incoming	679	0.85	577	0.5	1.49	430	0.15	43	0.13	37	0.11	32	0.07	22	0.43	123	688	2.0E+05	0.001	0	0.060	17	707	2.0E+05	0.068	20
Loading/Hotelling	679	0.85	577	23.0	1.49	19,785	0.15	1,978	0.13	1,682	0.11	1,484	0.07	989	0.43	5,639	688	9.1E+06	0.001	20	0.060	792	707	9.4E+06	0.068	903
Maneuvering - Outgoing	679	0.85	577	0.5	1.49	430	0.15	43	0.13	37	0.11	32	0.07	22	0.43	123	688	2.0E+05	0.001	0	0.060	17	707	2.0E+05	0.068	20
Auxiliary Boiler Total				24.0		20,645		2,065		1,755		1,548		1,032		5,884		9.5E+06		21		826		9.8E+06		943

Assist Activity	Miles	Speed (kn	Time (Hours)
Cruise (FNC Entrance to RSZ)	13	20.3	0.6
Reduced Speed Zone	27	10	2.3
Maneuver (Inbound)	0	7	0.5
Offload/Hotel/Load	0	0	23.0
Maneuver (Outbound)	0	8	0.5
Reduced Speed Zone	27	11	2.1
Cruise (RSZ to FNC Entrance)	13	20.3	0.6
Total			**29.6**

Fuel	% Calls	Mode	Calls/Year	Emissions (Tons Per Year)										
				NOx	CO	PM10	PM2.5	VOC	SO2	CO2	CH4	N2O	CO_2e	HAPs
MDO	100%	Diesel Engine	**667**	340.52	47.07	6.36	5.85	20.17	12.16	19,795	0.20	1.04	20,123	3.07
MGO	100%	Auxiliary Engines	**667**	266.79	36.140	5.91	5.59	13.14	13.80	22,693	0.13	1.02	23,011.49	3.00
MGO	100%	Auxiliary Boiler	**667**	15.17	1.52	1.29	1.14	0.76	4.32	7,001	0.02	0.61	7,190.08	0.69
		Total		**622.48**	**84.72**	**13.57**	**12.58**	**34.07**	**30.28**	**49,489**	**0.35**	**2.67**	**50,324**	**6.76**
		Container Plus Tugboat Emissions Total		**797.14**	**213.15**	**20.19**	**19.00**	**41.01**	**30.45**	**67,212**	**2.66**	**3.18**	**68,255**	**9.11**

Marine Diesel Oil (0.10 % Sulfur)			Marine Gas Oil (0.10% Sulfur)		
Pollutant	**g/kw-hr [3, 4]**	**g/hp-hr**	**Pollutant**	**g/kw-hr [4, 5]**	**g/hp-hr**
NOx	10.13	7.55	NOx	8.12	6.06
CO	1.40	1.04	CO	1.10	0.82
PM_{10}	0.19	0.14	PM_{10}	0.18	0.13
$PM_{2.5}$	0.17	0.13	$PM_{2.5}$	0.17	0.13
VOC	0.60	0.45	VOC	0.40	0.30
SO_2	0.36	0.27	SO_2	0.42	0.31
CO_2	589	439	CO_2	691	515
CH_4	0.006	0.0045	CH_4	0.004	0.003
N_2O	0.031	0.023	N_2O	0.031	0.02

Auxiliary Boiler Emission Factors**		
Pollutant	**g/kw-hr [6]**	**g/hp-hr**
NOx	2.00	1.49
CO	0.20	0.15
PM_{10}	0.17	0.13
$PM_{2.5}$	0.15	0.11
VOC	0.10	0.07
SO_2	0.57	0.43
CO_2	923	688
CH_4	0.002	0.001
N_2O	0.080	0.06

** Steam Turbine Emission Factors
Marine Gas Oil (0.10% Sulfur)

HAP Emission Factors [7]		
HAP*	**lb/MMBtu**	**g/HP-hr**
Benzene	7.76E-04	8.96E-04
Toluene	2.81E-04	3.24E-04
Xylenes	1.93E-04	2.23E-04
Formaldehyd	7.89E-05	9.11E-05
Acetaldehyd	2.52E-05	2.91E-05
Acrolein	7.88E-06	9.09E-06
Naphthalene	1.30E-04	1.50E-04
Total PAH	2.12E-04	2.45E-04
Diesel-PM_{10}	5.73E-02	6.61E-02

*HAP = Hazardous Air Pollutant
PAH = Polycylic Aromatic Hydrocarbons

1. Horsepower rating and load factors for auxiliary engines are based on U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009, Tables 2-4 and 2-7.
2. Auxiliary Engine horsepower is assumed to be 22% of main propulsion engine based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 2-4.
3. U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Tables 2-9 & 2-13 (assumes Slow Speed Diesel (SSD).
4. Corrected for Emission Area Control Standards and International Ship Engine and Fuel Standards (MARPOL Annex VI). Assumes engine model year 2020.
5. U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009 Tables 2-13 & 2-16
6. U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009 Tables 2-9 & 2-13 (emission factor for Steam Turbine).
7. Hazardous Air Pollutant (HAP) emission factors were totals from Tables 3.4-3 and 3.4-4; AP-42, Compilation of Emission Factors, U.S. Environmental Protection Agency, October 1996.

SUMMARY OF EMISSIONS - ASSIST TUGBOAT EMISSIONS
NO ACTION ALTERNATIVE - 2060
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Diesel Engines - Main Propulsion and Auxiliary Power Engines

Mode	No. of Tugs	Engine /Tug	HP/ Engine [1]	Load Factor[2]	Hr/Call (average)	NOx		CO		PM_{10}		$PM_{2.5}$		VOC		SO_2		CO_2		CH_4		N_2O		CO_2e		HAPs	
						g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call
Main Engines																											
Cruise	-	2	2,065			5.1		3.7		0.19		0.19		0.20		0.005		515		0.07		0.01		521		0.07	
Reduced Speed Zone	2	2	2,065	0.79	2.9	5.1	97,059	3.7	71,367	0.19	3,683	0.19	3,572	0.20	3,854	0.005	93	515	9,848,590	0.07	1,286	0.01	286	521	9,964,148	0.07	1,303
Maneuvering	2	2	2,065	0.79	0.5	5.1	16,547	3.7	12,167	0.19	628	0.19	609	0.20	657	0.005	16	515	1,679,045	0.07	219	0.01	49	521	1,698,745	0.07	222
Maneuvering	2	2	2,065	0.79	0.5	5.1	16,547	3.7	12,167	0.19	628	0.19	609	0.20	657	0.005	16	515	1,679,045	0.07	219	0.01	49	521	1,698,745	0.07	222
Reduced Speed Zone	2	2	2,065	0.79	2.9	5.1	97,059	3.7	71,367	0.19	3,683	0.19	3,572	0.20	3,854	0.005	93	515	9,848,590	0.07	1,286	0.01	286	521	9,964,148	0.07	1,303
Loading/Hotelling		2	2,065			5.1		3.7		0.19		0.19		0.20		0.005		515		0.07		0.01		521		0.07	
Total					6.9		227,211		167,067		8,621		8,362		9,022		217		23,055,270		3,009		669		23,325,786		3,051
Auxiliary Engines																											
Cruise	-	2	134			5.1		3.7		0.19		0.19		0.20		0.00		515		0.07		0.01		521		0.07	
Reduced Speed Zone	2	2	134	0.56	2.9	5.1	4,467	3.7	3,285	0.19	169	0.19	164	0.20	177	0.00	4	515	453,300	0.07	59	0.01	13	521	458,619	0.07	60
Maneuvering	2	2	134	0.56	0.5	5.1	762	3.7	560	0.19	29	0.19	28	0.20	30	0.00	1	515	77,281	0.07	10	0.01	2	521	78,188	0.07	10
Maneuvering	2	2	134	0.56	0.5	5.1	762	3.7	560	0.19	29	0.19	28	0.20	30	0.00	1	515	77,281	0.07	10	0.01	2	521	78,188	0.07	10
Reduced Speed Zone	2	2	134	0.56	2.9	5.1	4,467	3.7	3,285	0.19	169	0.19	164	0.20	177	0.00	4	515	453,300	0.07	59	0.01	13	521	458,619	0.07	60
Loading/Hotelling		2	134			5.1		3.7		0.19		0.19		0.20		0.00		515		0.07		0.01		521		0.07	
Total					6.9		10,458		7,690		397		385		415		10		1,061,163		139		31		1,073,614		140

Assist Activity	Miles	Speed (knots)	Time (Hours)
Cruise (FNC Entrance to RSZ)	13		
Reduced Speed Zone	27	8	2.9
Maneuver (Inbound)	0	0	0.5
Offload/Hotel/Load	0	0	23.0
Maneuver (Outbound)	0	0	0.5
Reduced Speed Zone	27	8	2.9
Cruise (RSZ to FNC Entrance)	13		
Total			**29.9**

Pollutant	Main Engines[3]		Auxiliary Engines[3]	
	g/kw-hr	g/hp-hr	g/kw-hr	g/hp-hr
NOx	6.8	5.1	6.8	5.07
CO	5.0	3.7	5.0	3.73
PM_{10}[4]	0.26	0.19	0.26	0.19
$PM_{2.5}$[5]	0.25	0.19	0.25	0.19
VOC	0.27	0.20	0.27	0.20
SO_2[4]	0.01	0.00	0.01	0.00
CO_2	690	515	690	515
CH_4	0.09	0.07	0.09	0.07
N_2O	0.02	0.01	0.02	0.01

Calls/Year	Mode	Emissions (Tons Per Year)										
		NOx	CO	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO_2	CH_4	N_2O	CO_2e	HAPs
667	Main Engines	166.97	122.77	6.34	6.15	6.63	1.6E-01	16,943	2.2E+00	4.9E-01	17,142	2.2E+00
	Auxiliary Engines	7.69	5.65	0.29	0.28	0.31	7.3E-03	780	1.0E-01	2.3E-02	789	1.0E-01
	Total	**174.66**	**128.42**	**6.63**	**6.43**	**6.93**	**0.17**	**17,723**	**2.31**	**0.51**	**17,931**	**2.35**

HAP Emission Factors [6]

HAP*	lb/MMBtu	g/HP-hr
Benzene	7.76E-04	8.96E-04
Toluene	2.81E-04	3.24E-04
Xylenes	1.93E-04	2.23E-04
Formaldehyde	7.89E-05	9.11E-05
Acetaldehyde	2.52E-05	2.91E-05
Acrolein	7.88E-06	9.09E-06
Naphthalene	1.30E-04	1.50E-04
Total PAH	2.12E-04	2.45E-04
Diesel-PM_{10}	5.73E-02	6.61E-02

*HAP = Hazardous Air Pollutant
PAH = Polycylic Aromatic Hydrocarbons

1. Horsepower ratings are based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventori* es, ICF International, April 2009, Table 3-10.
2. Load factors are based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-3.
3. U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-8 (assumes the use of Category 1, Tier 2 engines).
4. Corrected per U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-9 (assumes the use of only ULSD fuel).
5. $PM_{2.5}$ = 0.97 x PM_{10} per U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Page 3-9
6. *Hazardous Air Pollutant (HAP) emission factors were totals from Tables 3.4-3 and 3.4-4; AP-42, Compilation of Emission Factors, U.S. Environmental Protection Agency, October 1996.*

SUMMARY OF EMISSIONS - CONTAINER VESSEL EMISSIONS INCREASE
PROPOSED PROJECT ALTERNATIVE - 2020
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Diesel Engines - Main Propulsion and Auxiliary Power Engines

Mode	Max HP [1]	Load [1] Factor	HP	Hr/Call (average)	NOx		CO		PM10		PM2.5		VOC		SO2		CO2		CH4		N2O		CO_2e		HAPs	
					g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call
Diesel (MDO)																										
Cruise/ RSZ / Maneuvering																										
Cruise (FNC Entrance to RSZ)	41,438	0.83	34,393	0.6	11.28	215,900	1.04	19,978	0.14	2,701	0.13	2,485	0.45	8,562	0.27	5,161	439	8.4E+06	0.0045	86	0.023	443	446	8.5E+06	0.068	1,303
Reduced Speed Zone - Incoming	41,438	0.10	4,112	2.3	11.28	108,847	1.04	10,072	0.14	1,362	0.13	1,253	0.45	4,316	0.27	2,602	439	4.2E+06	0.0045	43	0.023	223	446	4.3E+06	0.068	657
Maneuvering - Inbound	41,438	0.03	1,410	0.5	11.28	7,956	1.04	736	0.14	100	0.13	92	0.45	316	0.27	190	439	3.1E+05	0.0045	3	0.023	16	446	3.1E+05	0.068	48
Loading/Hotelling	41,438	-	-	23.0	11.28	-	1.04	-	0.14	-	0.13	-	0.45	-	0.27	-	439	0.0E+00	0.0045	-	0.023	-	446	0.0E+00	0.068	-
Maneuvering - Outgoing	41,438	0.05	2,105	0.5	11.28	11,876	1.04	1,099	0.14	149	0.13	137	0.45	471	0.27	284	439	4.6E+05	0.0045	5	0.023	24	446	4.7E+05	0.068	72
Reduced Speed Zone - Outbound	41,438	0.13	5,473	2.1	11.28	131,704	1.04	12,187	0.14	1,647	0.13	1,516	0.45	5,223	0.27	3,148	439	5.1E+06	0.0045	52	0.023	270	446	5.2E+06	0.068	795
Cruise (RSZ to FNC Entrance)	41,438	0.83	34,393	0.6	11.28	215,900	1.04	19,978	0.14	2,701	0.13	2,485	0.45	8,562	0.27	5,161	439	8.4E+06	0.0045	86	0.023	443	446	8.5E+06	0.068	1,303
Cruise/ RSZ /Hotelling/ Maneuvering Total				29.6		692,184		64,049		8,659		7,966		27,449		16,547		2.7E+07		275		1,419.3		2.7E+07		4,177.8
Auxiliary Engines (MGO) [2]																										
Cruise/ RSZ / Maneuvering																										
Cruise (9 nautical mile CZB to RSZ)	9,116	0.13	1,185	1.0	9.23	10,933	0.82	972	0.13	159	0.13	150	3.0E-01	354	0.31	371	515	6.1E+05	3.0E-03	4	2.3E-02	27	522	6.2E+05	0.068	81
Reduced Speed Zone - Incoming	9,116	0.25	2,279	2.9	9.23	61,662	0.82	5,483	0.13	897	0.13	847	3.0E-01	1,994	0.31	2,093	515	3.4E+06	3.0E-03	20	2.3E-02	155	522	3.5E+06	0.068	455
Maneuvering - Incoming	9,116	0.48	4,376	0.5	9.23	20,184	0.82	1,795	0.13	294	0.13	277	3.0E-01	653	0.31	685	515	1.1E+06	3.0E-03	7	2.3E-02	51	522	1.1E+06	0.068	149
Loading/Hotelling	9,116	0.19	1,732	23.0	9.23	367,515	0.82	32,679	0.13	5,347	0.13	5,050	3.0E-01	11,883	0.31	12,477	515	2.1E+07	3.0E-03	119	2.3E-02	922	522	2.1E+07	0.068	2,713
Maneuvering - Outgoing	9,116	0.48	4,376	0.5	9.23	20,184	0.82	1,795	0.13	294	0.13	277	3.0E-01	653	0.31	685	515	1.1E+06	3.0E-03	7	2.3E-02	51	522	1.1E+06	0.068	149
Reduced Speed Zone - Outgoing	9,116	0.25	2,279	2.9	9.23	61,662	0.82	5,483	0.13	897	0.13	847	3.0E-01	1,994	0.31	2,093	515	3.4E+06	3.0E-03	20	2.3E-02	155	522	3.5E+06	0.068	455
Cruise (RSZ to FNC Entrance)	9,116	0.13	1,185	1.0	9.23	10,933	0.82	972	0.13	159	0.13	150	3.0E-01	354	0.31	371	515	6.1E+05	3.0E-03	4	2.3E-02	27	522	6.2E+05	0.068	81
Cruise/ RSZ / Maneuvering Total				31.9		553,071		49,178		8,047		7,600		17,883		18,777		3.1E+07		179		1,387.0		3.1E+07		4,082.6
Auxiliary Boiler (MGO)																										
Maneuvering - Incoming	679	0.85	577	0.5	1.49	430	0.15	43	0.13	37	0.11	32	0.07	22	0.43	123	688	2.0E+05	0.001	0	0.060	17	707	2.0E+05	0.068	20
Loading/Hotelling	679	0.85	577	23.0	1.49	19,785	0.15	1,978	0.13	1,682	0.11	1,484	0.07	989	0.43	5,639	688	9.1E+06	0.001	20	0.060	792	707	9.4E+06	0.068	903
Maneuvering - Outgoing	679	0.85	577	0.5	1.49	430	0.15	43	0.13	37	0.11	32	0.07	22	0.43	123	688	2.0E+05	0.001	0	0.060	17	707	2.0E+05	0.068	20
Auxiliary Boiler Total				24.0		20,645		2,065		1,755		1,548		1,032		5,884		9.5E+06		21		826		9.8E+06		943

Assist Activity	Miles	Speed (kn	Time (Hours)
Cruise (FNC Entrance to RSZ)	13	20.3	0.6
Reduced Speed Zone	27	10	2.3
Maneuver (Inbound)	0	7	0.5
Offload/Hotel/Load	0	0	23.0
Maneuver (Outbound)	0	8	0.5
Reduced Speed Zone	27	11	2.1
Cruise (RSZ to FNC Entrance)	13	20.3	0.6
Total			**29.6**

Fuel	% Calls	Mode	Calls/Year	Emissions (Tons Per Year)										
				NOx	CO	PM10	PM2.5	VOC	SO2	CO2	CH4	N2O	CO_2e	HAPs
MDO	100%	Diesel Engine	**325**	248.09	22.96	3.10	2.86	9.84	5.93	9,655	0.10	0.51	9,814	1.50
MGO	100%	Auxiliary Engines	**325**	198.23	17.626	2.88	2.72	6.41	6.73	11,068	0.06	0.50	11,223.44	1.46
MGO	100%	Auxiliary Boiler	**325**	7.40	0.74	0.63	0.55	0.37	2.11	3,415	0.01	0.30	3,506.83	0.34
		Total		**453.73**	**41.32**	**6.62**	**6.13**	**16.62**	**14.77**	**24,138**	**0.17**	**1.30**	**24,545**	**3.30**
		Container Plus Tugboat Emissions Total		**526.15**	**59.54**	**8.55**	**8.01**	**18.61**	**14.82**	**29,237**	**0.84**	**1.45**	**29,704**	**3.97**

Marine Diesel Oil (0.10 % Sulfur)			Marine Gas Oil (0.10% Sulfur)		
Pollutant	**g/kw-hr [3]**	**g/hp-hr**	**Pollutant**	**g/kw-hr [4]**	**g/hp-hr**
NOx	15.13	11.28	NOx	12.37	9.23
CO	1.40	1.04	CO	1.10	0.82
PM_{10}	0.19	0.14	PM_{10}	0.18	0.13
$PM_{2.5}$	0.17	0.13	$PM_{2.5}$	0.17	0.13
VOC	0.60	0.45	VOC	0.40	0.30
SO_2	0.36	0.27	SO_2	0.42	0.31
CO_2	589	439	CO_2	691	515
CH_4	0.006	0.0045	CH_4	0.004	0.003
N_2O	0.031	0.023	N_2O	0.031	0.02

Auxiliary Boiler Emission Factors**		
Pollutant	**g/kw-hr [5]**	**g/hp-hr**
NOx	2.00	1.49
CO	0.20	0.15
PM_{10}	0.17	0.13
$PM_{2.5}$	0.15	0.11
VOC	0.10	0.07
SO_2	0.57	0.43
CO_2	923	688
CH_4	0.002	0.001
N_2O	0.080	0.06

** Steam Turbine Emission Factors
Marine Gas Oil (0.10% Sulfur)

HAP Emission Factors [6]		
HAP*	**lb/MMBtu**	**g/HP-hr**
Benzene	7.76E-04	8.96E-04
Toluene	2.81E-04	3.24E-04
Xylenes	1.93E-04	2.23E-04
Formaldehyd	7.89E-05	9.11E-05
Acetaldehyd	2.52E-05	2.91E-05
Acrolein	7.88E-06	9.09E-06
Naphthalene	1.30E-04	1.50E-04
Total PAH	2.12E-04	2.45E-04
Diesel-PM_{10}	5.73E-02	6.61E-02

*HAP = Hazardous Air Pollutant
PAH = Polycylic Aromatic Hydrocarbons

1. Horsepower rating and load factors for auxiliary engines are based on U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009, Tables 2-4 and 2-7.
2. Auxiliary Engine horsepower is assumed to be 22% of main propulsion engine based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 2-4.
3. U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Tables 2-9 & 2-13 (assumes Slow Speed Diesel (SSD) engine model year 2000 or later).
4. U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009 Tables 2-13 & 2-16
5. U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009 Tables 2-9 & 2-13 (emission factor for Steam Turbine).
6. Hazardous Air Pollutant (HAP) emission factors were totals from Tables 3.4-3 and 3.4-4; AP-42, Compilation of Emission Factors, U.S. Environmental Protection Agency, October 1996.

SUMMARY OF EMISSIONS - ASSIST TUGBOAT EMISSIONS
PROPOSED PROJECT ALTERNATIVE - 2020
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Diesel Engines - Main Propulsion and Auxiliary Power Engines

Mode	No. of Tugs	Engine /Tug	HP/ Engine [1]	Load Factor[2]	Hr/Call (average)	NOx		CO		PM_{10}		$PM_{2.5}$		VOC		SO_2		CO_2		CH_4		N_2O		CO_2e		HAPs	
						g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call
Main Engines																											
Cruise	-	2	2,065			7.3		1.9		0.19		0.19		0.20		0.005		515		0.07		0.01		521		0.07	
Reduced Speed Zone	2	2	2,065	0.79	2.9	7.3	139,879	1.9	35,683	0.19	3,683	0.19	3,572	0.20	3,854	0.005	93	515	9,848,590	0.07	1,286	0.01	286	521	9,964,148	0.07	1,303
Maneuvering	2	2	2,065	0.79	0.5	7.3	23,847	1.9	6,083	0.19	628	0.19	609	0.20	657	0.005	16	515	1,679,045	0.07	219	0.01	49	521	1,698,745	0.07	222
Maneuvering	2	2	2,065	0.79	0.5	7.3	23,847	1.9	6,083	0.19	628	0.19	609	0.20	657	0.005	16	515	1,679,045	0.07	219	0.01	49	521	1,698,745	0.07	222
Reduced Speed Zone	2	2	2,065	0.79	2.9	7.3	139,879	1.9	35,683	0.19	3,683	0.19	3,572	0.20	3,854	0.005	93	515	9,848,590	0.07	1,286	0.01	286	521	9,964,148	0.07	1,303
Loading/Hotelling		2	2,065			7.3		1.9		0.19		0.19		0.20		0.005		515		0.07		0.01		521		0.07	
Total					6.9		327,452		83,534		8,621		8,362		9,022		217		23,055,270		3,009		669		23,325,786		3,051
Auxiliary Engines																											
Cruise	-	2	134			7.3		1.3		0.26		0.25		0.20		0.00		515		0.07		0.01		521		0.07	
Reduced Speed Zone	2	2	134	0.56	2.9	7.3	6,438	1.3	1,117	0.26	226	0.25	219	0.20	177	0.00	4	515	453,300	0.07	59	0.01	13	521	458,619	0.07	60
Maneuvering	2	2	134	0.56	0.5	7.3	1,098	1.3	190	0.26	39	0.25	37	0.20	30	0.00	1	515	77,281	0.07	10	0.01	2	521	78,188	0.07	10
Maneuvering	2	2	134	0.56	0.5	7.3	1,098	1.3	190	0.26	39	0.25	37	0.20	30	0.00	1	515	77,281	0.07	10	0.01	2	521	78,188	0.07	10
Reduced Speed Zone	2	2	134	0.56	2.9	7.3	6,438	1.3	1,117	0.26	226	0.25	219	0.20	177	0.00	4	515	453,300	0.07	59	0.01	13	521	458,619	0.07	60
Loading/Hotelling		2	134			7.3		1.3		0.26		0.25		0.20		0.00		515		0.07		0.01		521		0.07	
Total					6.9		15,072		2,614		529		513		415		10		1,061,163		139		31		1,073,614		140

Assist Activity	Miles	Speed (knots)	Time (Hours)
Cruise (FNC Entrance to RSZ)	13		
Reduced Speed Zone	27	8	2.9
Maneuver (Inbound)	0	0	0.5
Offload/Hotel/Load	0	0	23.0
Maneuver (Outbound)	0	0	0.5
Reduced Speed Zone	27	8	2.9
Cruise (RSZ to FNC Entrance)	13		
Total			**29.9**

Pollutant	Main Engines[3]		Auxiliary Engines[3]	
	g/kw-hr	g/hp-hr	g/kw-hr	g/hp-hr
NOx	9.8	7.3	9.8	7.31
CO	2.5	1.9	1.7	1.27
PM_{10}[4]	0.26	0.19	0.34	0.26
$PM_{2.5}$[5]	0.25	0.19	0.33	0.25
VOC	0.27	0.20	0.27	0.20
SO_2[4]	0.01	0.00	0.01	0.00
CO_2	690	515	690	515
CH_4	0.09	0.07	0.09	0.07
N_2O	0.02	0.01	0.02	0.01

Calls/Year	Mode	Emissions (Tons Per Year)										
		NOx	CO	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO_2	CH_4	N_2O	CO_2e	HAPs
325	Main Engines	117.37	29.94	3.09	3.00	3.23	7.8E-02	8,264	1.1E+00	2.4E-01	8,361	1.1E+00
	Auxiliary Engines	5.40	0.94	0.19	0.18	0.15	3.6E-03	380	5.0E-02	1.1E-02	385	5.0E-02
	Total	**122.77**	**30.88**	**3.28**	**3.18**	**3.38**	**0.08**	**8,644**	**1.13**	**0.25**	**8,745**	**1.14**

HAP Emission Factors [6]

HAP*	lb/MMBtu	g/HP-hr
Benzene	7.76E-04	8.96E-04
Toluene	2.81E-04	3.24E-04
Xylenes	1.93E-04	2.23E-04
Formaldehyde	7.89E-05	9.11E-05
Acetaldehyde	2.52E-05	2.91E-05
Acrolein	7.88E-06	9.09E-06
Naphthalene	1.30E-04	1.50E-04
Total PAH	2.12E-04	2.45E-04
Diesel-PM_{10}	5.73E-02	6.61E-02

*HAP = Hazardous Air Pollutant
PAH = Polycylic Aromatic Hydrocarbons

1. Horsepower ratings are based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventori* es, ICF International, April 2009, Table 3-10.
2. Load factors are based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-3.
3. U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-8 (assumes the use of Category 1, Tier 1 engines built after 2000).
4. Corrected per U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-9 (assumes the use of only ULSD fuel).
5. $PM_{2.5}$ = 0.97 x PM_{10} per U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Page 3-9
6. *Hazardous Air Pollutant (HAP) emission factors were totals from Tables 3.4-3 and 3.4-4; AP-42, Compilation of Emission Factors, U.S. Environmental Protection Agency, October 1996.*

SUMMARY OF EMISSIONS - CONTAINER VESSEL EMISSIONS INCREASE
PROPOSED PROJECT ALTERNATIVE - 2060
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Diesel Engines - Main Propulsion and Auxiliary Power Engines

Mode	Max HP [1]	Load [1] Factor	HP	Hr/Call (average)	NOx		CO		PM10		PM2.5		VOC		SO2		CO2		CH4		N2O		CO_2e		HAPs	
					g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call
Diesel (MDO)																										
Cruise/ RSZ / Maneuvering																										
Cruise (FNC Entrance to RSZ)	41,438	0.83	34,393	0.6	7.55	144,532	1.04	19,978	0.14	2,701	0.13	2,485	0.45	8,562	0.27	5,161	439	8.4E+06	0.0045	86	0.023	443	446	8.5E+06	0.068	1,303
Reduced Speed Zone - Incoming	41,438	0.10	4,112	2.3	7.55	72,866	1.04	10,072	0.14	1,362	0.13	1,253	0.45	4,316	0.27	2,602	439	4.2E+06	0.0045	43	0.023	223	446	4.3E+06	0.068	657
Maneuvering - Inbound	41,438	0.03	1,410	0.5	7.55	5,326	1.04	736	0.14	100	0.13	92	0.45	316	0.27	190	439	3.1E+05	0.0045	3	0.023	16	446	3.1E+05	0.068	48
Loading/Hotelling	41,438	-	-	23.0	7.55	-	1.04	-	0.14	-	0.13	-	0.45	-	0.27	-	439	0.0E+00	0.0045	-	0.023	-	446	0.0E+00	0.068	-
Maneuvering - Outgoing	41,438	0.05	2,105	0.5	7.55	7,950	1.04	1,099	0.14	149	0.13	137	0.45	471	0.27	284	439	4.6E+05	0.0045	5	0.023	24	446	4.7E+05	0.068	72
Reduced Speed Zone - Outbound	41,438	0.13	5,473	2.1	7.55	88,168	1.04	12,187	0.14	1,647	0.13	1,516	0.45	5,223	0.27	3,148	439	5.1E+06	0.0045	52	0.023	270	446	5.2E+06	0.068	795
Cruise (RSZ to FNC Entrance)	41,438	0.83	34,393	0.6	7.55	144,532	1.04	19,978	0.14	2,701	0.13	2,485	0.45	8,562	0.27	5,161	439	8.4E+06	0.0045	86	0.023	443	446	8.5E+06	0.068	1,303
Cruise/ RSZ /Hotelling/ Maneuvering Total				29.6		463,374		64,049		8,659		7,966		27,449		16,547		2.7E+07		275		1,419.3		2.7E+07		4,177.8
Auxiliary Engines (MGO) [2]																										
Cruise/ RSZ / Maneuvering																										
Cruise (9 nautical mile CZB to RSZ)	9,116	0.13	1,185	1.0	6.06	7,176	0.82	972	0.13	159	0.13	150	3.0E-01	354	0.31	371	515	6.1E+05	3.0E-03	4	2.3E-02	27	522	6.2E+05	0.068	81
Reduced Speed Zone - Incoming	9,116	0.25	2,279	2.9	6.06	40,475	0.82	5,483	0.13	897	0.13	847	3.0E-01	1,994	0.31	2,093	515	3.4E+06	3.0E-03	20	2.3E-02	155	522	3.5E+06	0.068	455
Maneuvering - Incoming	9,116	0.48	4,376	0.5	6.06	13,249	0.82	1,795	0.13	294	0.13	277	3.0E-01	653	0.31	685	515	1.1E+06	3.0E-03	7	2.3E-02	51	522	1.1E+06	0.068	149
Loading/Hotelling	9,116	0.19	1,732	23.0	6.06	241,238	0.82	32,679	0.13	5,347	0.13	5,050	3.0E-01	11,883	0.31	12,477	515	2.1E+07	3.0E-03	119	2.3E-02	922	522	2.1E+07	0.068	2,713
Maneuvering - Outgoing	9,116	0.48	4,376	0.5	6.06	13,249	0.82	1,795	0.13	294	0.13	277	3.0E-01	653	0.31	685	515	1.1E+06	3.0E-03	7	2.3E-02	51	522	1.1E+06	0.068	149
Reduced Speed Zone - Outgoing	9,116	0.25	2,279	2.9	6.06	40,475	0.82	5,483	0.13	897	0.13	847	3.0E-01	1,994	0.31	2,093	515	3.4E+06	3.0E-03	20	2.3E-02	155	522	3.5E+06	0.068	455
Cruise (RSZ to FNC Entrance)	9,116	0.13	1,185	1.0	6.06	7,176	0.82	972	0.13	159	0.13	150	3.0E-01	354	0.31	371	515	6.1E+05	3.0E-03	4	2.3E-02	27	522	6.2E+05	0.068	81
Cruise/ RSZ / Maneuvering Total				31.9		363,039		49,178		8,047		7,600		17,883		18,777		3.1E+07		179		1,387.0		3.1E+07		4,082.6
Auxiliary Boiler (MGO)																										
Maneuvering - Incoming	679	0.85	577	0.5	1.49	430	0.15	43	0.13	37	0.11	32	0.07	22	0.43	123	688	2.0E+05	0.001	0	0.060	17	707	2.0E+05	0.068	20
Loading/Hotelling	679	0.85	577	23.0	1.49	19,785	0.15	1,978	0.13	1,682	0.11	1,484	0.07	989	0.43	5,639	688	9.1E+06	0.001	20	0.060	792	707	9.4E+06	0.068	903
Maneuvering - Outgoing	679	0.85	577	0.5	1.49	430	0.15	43	0.13	37	0.11	32	0.07	22	0.43	123	688	2.0E+05	0.001	0	0.060	17	707	2.0E+05	0.068	20
Auxiliary Boiler Total				24.0		20,645		2,065		1,755		1,548		1,032		5,884		9.5E+06		21		826		9.8E+06		943

Assist Activity	Miles	Speed (kn	Time (Hours)
Cruise (FNC Entrance to RSZ)	13	20.3	0.6
Reduced Speed Zone	27	10	2.3
Maneuver (Inbound)	0	7	0.5
Offload/Hotel/Load	0	0	23.0
Maneuver (Outbound)	0	8	0.5
Reduced Speed Zone	27	11	2.1
Cruise (RSZ to FNC Entrance)	13	20.3	0.6
Total			**29.6**

Fuel	% Calls	Mode	Calls/Year	Emissions (Tons Per Year)										
				NOx	CO	PM10	PM2.5	VOC	SO2	CO2	CH4	N2O	CO_2e	HAPs
MDO	100%	Diesel Engine	**1,133**	578.89	80.02	10.82	9.95	34.29	20.67	33,652	0.34	1.77	34,209	5.22
MGO	100%	Auxiliary Engines	**1,133**	453.54	61.437	10.05	9.49	22.34	23.46	38,578	0.22	1.73	39,119.53	5.10
MGO	100%	Auxiliary Boiler	**1,133**	25.79	2.58	2.19	1.93	1.29	7.35	11,903	0.03	1.03	12,223.14	1.18
		Total		**1,058.22**	**144.03**	**23.06**	**21.38**	**57.92**	**51.48**	**84,132**	**0.59**	**4.54**	**85,551**	**11.50**
		Container Plus Tugboat Emissions Total		**1,355.14**	**362.35**	**34.33**	**32.31**	**69.71**	**51.76**	**114,260**	**4.53**	**5.41**	**116,033**	**15.48**

Marine Diesel Oil (0.10 % Sulfur)			Marine Gas Oil (0.10% Sulfur)		
Pollutant	g/kw-hr [3, 4]	g/hp-hr	Pollutant	g/kw-hr [4, 5]	g/hp-hr
NOx	10.13	7.55	NOx	8.12	6.06
CO	1.40	1.04	CO	1.10	0.82
PM_{10}	0.19	0.14	PM_{10}	0.18	0.13
$PM_{2.5}$	0.17	0.13	$PM_{2.5}$	0.17	0.13
VOC	0.60	0.45	VOC	0.40	0.30
SO_2	0.36	0.27	SO_2	0.42	0.31
CO_2	589	439	CO_2	691	515
CH_4	0.006	0.0045	CH_4	0.004	0.003
N_2O	0.031	0.023	N_2O	0.031	0.02

Auxiliary Boiler Emission Factors**		
Pollutant	g/kw-hr [6]	g/hp-hr
NOx	2.00	1.49
CO	0.20	0.15
PM_{10}	0.17	0.13
$PM_{2.5}$	0.15	0.11
VOC	0.10	0.07
SO_2	0.57	0.43
CO_2	923	688
CH_4	0.002	0.001
N_2O	0.080	0.06

** Steam Turbine Emission Factors
Marine Gas Oil (0.10% Sulfur)

HAP Emission Factors [7]		
HAP*	lb/MMBtu	g/HP-hr
Benzene	7.76E-04	8.96E-04
Toluene	2.81E-04	3.24E-04
Xylenes	1.93E-04	2.23E-04
Formaldehyd	7.89E-05	9.11E-05
Acetaldehyd	2.52E-05	2.91E-05
Acrolein	7.88E-06	9.09E-06
Naphthalene	1.30E-04	1.50E-04
Total PAH	2.12E-04	2.45E-04
Diesel-PM_{10}	5.73E-02	6.61E-02

*HAP = Hazardous Air Pollutant
PAH = Polycylic Aromatic Hydrocarbons

1. Horsepower rating and load factors for auxiliary engines are based on U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009, Tables 2-4 and 2-7.
2. Auxiliary Engine horsepower is assumed to be 22% of main propulsion engine based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 2-4.
3. U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Tables 2-9 & 2-13 (assumes Slow Speed Diesel (SSD).
4. Corrected for Emission Area Control Standards and International Ship Engine and Fuel Standards (MARPOL Annex VI). Assumes engine model year 2020.
5. U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009 Tables 2-13 & 2-16
6. U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009 Tables 2-9 & 2-13 (emission factor for Steam Turbine).
7. Hazardous Air Pollutant (HAP) emission factors were totals from Tables 3.4-3 and 3.4-4; AP-42, Compilation of Emission Factors, U.S. Environmental Protection Agency, October 1996.

SUMMARY OF EMISSIONS - ASSIST TUGBOAT EMISSIONS
PROPOSED PROJECT ALTERNATIVE - 2060
PORT OF GULFPORT EXPANSION PROJECT
GULFPORT, HARRISON COUNTY MISSISSIPPI

Diesel Engines - Main Propulsion and Auxiliary Power Engines

Mode	No. of Tugs	Engine /Tug	HP/ Engine [1]	Load Factor[2]	Hr/Call (average)	NOx		CO		PM_{10}		$PM_{2.5}$		VOC		SO_2		CO_2		CH_4		N_2O		CO_2e		HAPs	
						g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call	g/hp-hr	g/call
Main Engines																											
Cruise	-	2	2,065			5.1		3.7		0.19		0.19		0.20		0.005		515		0.07		0.01		521		0.07	
Reduced Speed Zone	2	2	2,065	0.79	2.9	5.1	97,059	3.7	71,367	0.19	3,683	0.19	3,572	0.20	3,854	0.005	93	515	9,848,590	0.07	1,286	0.01	286	521	9,964,148	0.07	1,303
Maneuvering	2	2	2,065	0.79	0.5	5.1	16,547	3.7	12,167	0.19	628	0.19	609	0.20	657	0.005	16	515	1,679,045	0.07	219	0.01	49	521	1,698,745	0.07	222
Maneuvering	2	2	2,065	0.79	0.5	5.1	16,547	3.7	12,167	0.19	628	0.19	609	0.20	657	0.005	16	515	1,679,045	0.07	219	0.01	49	521	1,698,745	0.07	222
Reduced Speed Zone	2	2	2,065	0.79	2.9	5.1	97,059	3.7	71,367	0.19	3,683	0.19	3,572	0.20	3,854	0.005	93	515	9,848,590	0.07	1,286	0.01	286	521	9,964,148	0.07	1,303
Loading/Hotelling		2	2,065			5.1		3.7		0.19		0.19		0.20		0.005		515		0.07		0.01		521		0.07	
Total					6.9		227,211		167,067		8,621		8,362		9,022		217		23,055,270		3,009		669		23,325,786		3,051
Auxiliary Engines																											
Cruise	-	2	134			5.1		3.7		0.19		0.19		0.20		0.00		515		0.07		0.01		521		0.07	
Reduced Speed Zone	2	2	134	0.56	2.9	5.1	4,467	3.7	3,285	0.19	169	0.19	164	0.20	177	0.00	4	515	453,300	0.07	59	0.01	13	521	458,619	0.07	60
Maneuvering	2	2	134	0.56	0.5	5.1	762	3.7	560	0.19	29	0.19	28	0.20	30	0.00	1	515	77,281	0.07	10	0.01	2	521	78,188	0.07	10
Maneuvering	2	2	134	0.56	0.5	5.1	762	3.7	560	0.19	29	0.19	28	0.20	30	0.00	1	515	77,281	0.07	10	0.01	2	521	78,188	0.07	10
Reduced Speed Zone	2	2	134	0.56	2.9	5.1	4,467	3.7	3,285	0.19	169	0.19	164	0.20	177	0.00	4	515	453,300	0.07	59	0.01	13	521	458,619	0.07	60
Loading/Hotelling		2	134			5.1		3.7		0.19		0.19		0.20		0.00		515		0.07		0.01		521		0.07	
Total					6.9		10,458		7,690		397		385		415		10		1,061,163		139		31		1,073,614		140

Assist Activity	Miles	Speed (knots)	Time (Hours)
Cruise (FNC Entrance to RSZ)	13		
Reduced Speed Zone	27	8	2.9
Maneuver (Inbound)	0	0	0.5
Offload/Hotel/Load	0	0	23.0
Maneuver (Outbound)	0	0	0.5
Reduced Speed Zone	27	8	2.9
Cruise (RSZ to FNC Entrance)	13		
Total			**29.9**

Pollutant	Main Engines[3]		Auxiliary Engines[3]	
	g/kw-hr	g/hp-hr	g/kw-hr	g/hp-hr
NOx	6.8	5.1	6.8	5.07
CO	5.0	3.7	5.0	3.73
PM_{10}[4]	0.26	0.19	0.26	0.19
$PM_{2.5}$[5]	0.25	0.19	0.25	0.19
VOC	0.27	0.20	0.27	0.20
SO_2[4]	0.01	0.00	0.01	0.00
CO_2	690	515	690	515
CH_4	0.09	0.07	0.09	0.07
N_2O	0.02	0.01	0.02	0.01

Calls/Year	Mode	Emissions (Tons Per Year)										
		NOx	CO	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO_2	CH_4	N_2O	CO_2e	HAPs
1,133	Main Engines	283.85	208.72	10.77	10.45	11.27	2.7E-01	28,803	3.8E+00	8.4E-01	29,141	3.8E+00
	Auxiliary Engines	13.06	9.61	0.50	0.48	0.52	1.2E-02	1,326	1.7E-01	3.8E-02	1,341	1.8E-01
	Total	**296.92**	**218.32**	**11.27**	**10.93**	**11.79**	**0.28**	**30,128**	**3.93**	**0.87**	**30,482**	**3.99**

HAP Emission Factors [6]

HAP*	lb/MMBtu	g/HP-hr
Benzene	7.76E-04	8.96E-04
Toluene	2.81E-04	3.24E-04
Xylenes	1.93E-04	2.23E-04
Formaldehyde	7.89E-05	9.11E-05
Acetaldehyde	2.52E-05	2.91E-05
Acrolein	7.88E-06	9.09E-06
Naphthalene	1.30E-04	1.50E-04
Total PAH	2.12E-04	2.45E-04
Diesel-PM_{10}	5.73E-02	6.61E-02

*HAP = Hazardous Air Pollutant
PAH = Polycylic Aromatic Hydrocarbons

1. Horsepower ratings are based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventori* es, ICF International, April 2009, Table 3-10.
2. Load factors are based on U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-3.
3. U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-8 (assumes the use of Category 1, Tier 2 engines).
4. Corrected per U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Table 3-9 (assumes the use of only ULSD fuel).
5. $PM_{2.5}$ = 0.97 x PM_{10} per U. S. Environmental Protection Agency *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* , ICF International, April 2009 Page 3-9
6. *Hazardous Air Pollutant (HAP) emission factors were totals from Tables 3.4-3 and 3.4-4; AP-42, Compilation of Emission Factors, U.S. Environmental Protection Agency, October 1996.*