

APPENDIX I

AIR QUALITY AND GREENHOUSE GAS CALCULATIONS

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APPENDIX I

AIR QUALITY AND GREENHOUSE GAS CALCULATIONS

Part 1

Alternative B1/B2, C1/C2, D1/D2 Construction:

Subsequent Construction

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Table 1. Air Quality Emissions Summary

Emission Sources	ROG	CO	NOX	PM10 (exhaust)	PM2.5 (exhaust)	PM10 (Total)	PM2.5 (Total)
<b>Average Daily Emissions (lbs/day)*</b>							
Alt B	2.89	25.98	29.36	1.29	1.19	14.62	5.84
Alt C	2.75	23.37	27.88	1.25	1.16	7.85	1.99
Alt D	3.31	30.68	32.56	1.39	1.29	16.45	6.58
<b>Total Tons</b>							
Alt B	0.60	5.43	6.14	0.27	0.25	3.06	1.22
Alt C	0.55	4.63	5.52	0.25	0.23	1.55	0.39
Alt D	0.62	5.74	6.09	0.25	0.24	3.08	1.23
<b>Total Tons/Year</b>							
Alt B	0.38	3.43	3.88	0.17	0.16	1.93	0.77
Alt C	0.34	2.92	3.49	0.16	0.15	0.98	0.25
Alt D	0.39	3.62	3.85	0.16	0.15	1.94	0.78
<b>Total Construction Emissions</b>							
Alt B Average Daily Emissions* (lbs/day)	2.89	25.98	29.36	1.29	1.19	14.62	5.84
Alt C Average Daily Emissions* (lbs/day)	2.75	23.37	27.88	1.25	1.16	7.85	1.99
Alt D Average Daily Emissions* (lbs/day)	3.31	30.68	32.56	1.39	1.29	16.45	6.58
Thresholds of Significance	54	-	54	82	54	BMPs	BMPs
Exceeds Thresholds	No	-	No	No	No	-	-

Notes:

\*Average Daily Emissions are calculated based on the following construction durations with 22 working days per month: Alt B 19 months; Alt C 18 months; and Alt D 17 months. Detailed modeling outputs provided in Attachment A.

ROG = reactive organic gases; NOX = oxides of nitrogen; PM10 = particulate matter with aerodynamic diameter less than 10 microns; PM2.5 = particulate matter with aerodynamic diameter less than 2.5 microns; lbs/day = pounds per day; BAAQMD = Bay Area Air Quality Management District

Table 2. Project – GHG Construction Emissions

<b>Emissions Source</b>	<b>Proposed Project (MTCO<sub>2</sub>e)</b>
<b>Alt B</b>	
Total Construction Emissions	665.75
Amortized Construction Emissions*	22.19
<b>Alt C</b>	
Total Construction Emissions	634.68
Amortized Construction Emissions*	21.16
<b>Alt D</b>	
Total Construction Emissions	694.12
Amortized Construction Emissions*	23.14

Note:

\* Construction emissions were amortized over the lifetime of the project (assumed to be 30 years) for comparison with thresholds.

Detailed modeling outputs provided in Attachment A.

Table 3. Construction

**Alt B**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
<b>2018</b>	<b>0.60</b>	<b>6.14</b>	<b>5.43</b>	<b>0.01</b>	<b>2.79</b>	<b>0.27</b>	<b>3.06</b>	<b>0.97</b>	<b>0.25</b>	<b>1.22</b>	<b>0.00</b>	<b>662.88</b>	<b>662.88</b>	<b>0.14</b>	<b>0.00</b>	<b>665.75</b>
<b>Total</b>	<b>0.60</b>	<b>6.14</b>	<b>5.43</b>	<b>0.01</b>	<b>2.79</b>	<b>0.27</b>	<b>3.06</b>	<b>0.97</b>	<b>0.25</b>	<b>1.22</b>	<b>0.00</b>	<b>662.88</b>	<b>662.88</b>	<b>0.14</b>	<b>0.00</b>	<b>665.75</b>

**Alt C**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
<b>2018</b>	<b>0.55</b>	<b>5.52</b>	<b>4.63</b>	<b>0.01</b>	<b>1.31</b>	<b>0.25</b>	<b>1.55</b>	<b>0.16</b>	<b>0.23</b>	<b>0.39</b>	<b>0.00</b>	<b>632.02</b>	<b>632.02</b>	<b>0.13</b>	<b>0.00</b>	<b>634.68</b>
<b>Total</b>	<b>0.55</b>	<b>5.52</b>	<b>4.63</b>	<b>0.01</b>	<b>1.31</b>	<b>0.25</b>	<b>1.55</b>	<b>0.16</b>	<b>0.23</b>	<b>0.39</b>	<b>0.00</b>	<b>632.02</b>	<b>632.02</b>	<b>0.13</b>	<b>0.00</b>	<b>634.68</b>

**Alt D**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
<b>2018</b>	<b>0.62</b>	<b>6.09</b>	<b>5.74</b>	<b>0.01</b>	<b>2.82</b>	<b>0.26</b>	<b>3.08</b>	<b>0.99</b>	<b>0.24</b>	<b>1.23</b>	<b>0.00</b>	<b>691.35</b>	<b>691.35</b>	<b>0.13</b>	<b>0.00</b>	<b>694.12</b>
<b>Total</b>	<b>0.62</b>	<b>6.09</b>	<b>5.74</b>	<b>0.01</b>	<b>2.82</b>	<b>0.26</b>	<b>3.08</b>	<b>0.99</b>	<b>0.24</b>	<b>1.23</b>	<b>0.00</b>	<b>691.35</b>	<b>691.35</b>	<b>0.13</b>	<b>0.00</b>	<b>694.12</b>

### Carbon Sequestration

Carbon sequestration rate (g carbon/year) = [(sequestration rate, g C/m<sup>2</sup>yr)\*(proposed project area, m<sup>2</sup>)]-  
(fossil fuel emissions, grams carbon/year)

Sequestration rate 79 g C/m<sup>2</sup>-yr (Callaway et al. 2012)

Area conversion factor 4046.86 m<sup>2</sup>/acre

Mass conversion factor 907185 g/ton

Table 4. Carbon Sequestration

Pond Cluster	Alternative	Area (acres)	Carbon sequestration rate (g carbon/year)	Carbon sequestration rate (ton carbon/year)
Eden Landing	B	2,270	7.26E+08	800
Eden Landing	C	1,375	4.40E+08	485
Eden Landing	D (Low End Estimate)	1,375	4.40E+08	485
Eden Landing	D (High End Estimate)	2,270	7.26E+08	800

Note: Carbon sequestration rate calculated does not include fossil fuel emissions from operation and maintenance. Values presented are for gross carbon sequestration potential of the pond cluster.

Carbon sequestration potential calculated for the ponds that would become tidal marsh. Assumed tidal marsh ponds by alternative are as follows:

Alt B: ALL 11 of them.

Alt C: Bay Ponds only (E1, E2, E4, E7)

Alt D: Bay Ponds only (E1, E2, E4, E7) in the initial 10-20 years (Low End Estimate), with the potential to restore marsh in the remaining 7 ponds after (High End Estimate).

Table 1-2 Phase 2 Eden Landing Pond Complex Acreage

Pond	Acres
E1	290
E2	680
E4	190
E5	165
E6	200
E7	215
E1C	150
E2C	30
E4C	175
E5C	95
E6C	80
<b>Total Area</b>	<b>2,270</b>



APPENDIX I

AIR QUALITY AND GREENHOUSE GAS CALCULATIONS

Part 2

Alternative B1/B2, C1/C2, D1/D2 Construction:

Dredged Material Placement

Subsequent Construction

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Table 1. Construction Emissions Summary – Alternative B

Construction Phase/Emissions Source	Diesel					Metric Tons CO <sub>2</sub> e
	Emissions (lbs)					
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	
<b>Mobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Site Preparation</b>	1007.59	7970.74	6812.21	315.13	293.92	694.19
<b>Dredged Material Placement</b>	21741.62	293247.11	95310.39	7050.04	6989.67	21582.75
<b>Decommissioning</b>	475.43	3602.96	2906.48	130.57	120.14	290.75
<b>Demobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Restoration Project</b>	129.13	1364.39	1256.68	63.11	58.07	86.37
<b>Total Project</b>	23387.30	306426.46	106500.69	7565.90	7468.29	22676.54
<b>Average Emissions (lbs)</b>	<b>48.08</b>	<b>629.91</b>	<b>218.93</b>	<b>15.55</b>	<b>15.35</b>	
<b>486</b>						
Amortized GHG Emissions						453.53

Construction Phase/Emissions Source	Electric					Metric Tons CO <sub>2</sub> e
	Emissions (lbs/day)					
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	
<b>Mobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Site Preparation</b>	1007.59	7970.74	6812.21	315.13	293.92	694.19
<b>Dredged Material Placement</b>	2433.34	19324.13	16238.38	755.40	695.03	10330.17
<b>Decommissioning</b>	578.27	4500.08	3471.10	164.23	151.12	351.30
<b>Demobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Restoration Project</b>	129.13	1364.39	1256.68	63.11	58.07	86.37
<b>Total Project</b>	4181.85	33400.60	27993.30	1304.92	1204.62	11484.51
<b>Average Daily Emissions (lbs/day)</b>	<b>8.60</b>	<b>68.66</b>	<b>57.54</b>	<b>2.68</b>	<b>2.48</b>	
Amortized GHG Emissions						229.69

Table 2. Construction Emissions Summary – Alternative C

Construction Phase/Emissions Source	Diesel					Metric Tons CO <sub>2</sub> e
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	
Mobilization	16.76	120.63	107.47	3.53	3.25	11.24
Site Preparation	976.32	7694.33	6394.07	300.08	279.33	647.01
Dredged Material Placement	17119.26	230494.97	74900.70	5538.20	5490.80	16967.30
Decommissioning	468.99	3541.31	2793.59	127.74	117.54	276.96
Demobilization	16.76	120.63	107.47	3.53	3.25	11.24
Restoration Project	69.84	737.89	679.63	34.13	31.41	46.71
<b>Total Project</b>	<b>18667.92</b>	<b>242709.75</b>	<b>84982.92</b>	<b>6007.21</b>	<b>5925.57</b>	<b>17960.47</b>
<b>Average Emissions (lbs)</b>	<b>46.33</b>	<b>602.38</b>	<b>210.92</b>	<b>14.91</b>	<b>14.71</b>	
<b>403</b>						
Amortized GHG Emissions						359.21

Construction Phase/Emissions Source	Electric					Metric Tons CO <sub>2</sub> e
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	
Mobilization	16.76	120.63	107.47	3.53	3.25	11.24
Site Preparation	976.32	7694.33	6394.07	300.08	279.33	647.01
Dredged Material Placement	1950.51	15298.76	12781.06	593.08	545.68	8127.18
Decommissioning	571.58	4437.13	3346.66	161.38	148.49	335.30
Demobilization	16.76	120.63	107.47	3.53	3.25	11.24
Restoration Project	69.84	737.89	679.63	34.13	31.41	46.71
<b>Total Project</b>	<b>3601.77</b>	<b>28409.37</b>	<b>23416.36</b>	<b>1095.72</b>	<b>1011.40</b>	<b>9178.70</b>
<b>Average Daily Emissions (lbs/day)</b>	<b>8.94</b>	<b>70.51</b>	<b>58.12</b>	<b>2.72</b>	<b>2.51</b>	
Amortized GHG Emissions						305.96

Table 3. Construction Emissions Summary – Alternative D

Construction Phase/Emissions Source	Diesel					Metric Tons CO <sub>2</sub> e
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	
Mobilization	16.57	119.59	98.23	3.51	3.23	9.48
Site Preparation	1021.13	8198.86	6196.22	325.54	303.49	564.77
Dredged Material Placement	21780.52	293993.29	94076.33	7076.07	7014.67	21320.57
Decommissioning	469.66	3572.26	2633.42	130.02	119.63	238.58
Demobilization	16.57	119.59	98.23	3.51	3.23	9.48
Restoration Project	124.62	1326.57	1142.32	61.65	56.72	67.66
<b>Total Project</b>	<b>23429.07</b>	<b>307330.18</b>	<b>104244.75</b>	<b>7600.29</b>	<b>7500.98</b>	<b>22210.53</b>
<b>Average Emissions (lbs)</b>	<b>48.13</b>	<b>631.35</b>	<b>214.15</b>	<b>15.61</b>	<b>15.41</b>	
<b>487</b>						
Amortized GHG Emissions						444.21

Construction Phase/Emissions Source	Electric					Metric Tons CO <sub>2</sub> e
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	
Mobilization	16.57	119.59	98.23	3.51	3.23	9.48
Site Preparation	1021.13	8198.86	6196.22	325.54	303.49	564.77
Dredged Material Placement	2430.90	19483.94	14835.06	767.95	706.56	10043.90
Decommissioning	572.26	4468.08	3186.49	163.65	150.59	296.92
Demobilization	16.57	119.59	98.23	3.51	3.23	9.48
Restoration Project	124.62	1326.57	1142.32	61.65	56.72	67.66
<b>Total Project</b>	<b>4182.05</b>	<b>33716.65</b>	<b>25556.55</b>	<b>1325.81</b>	<b>1223.82</b>	<b>10992.21</b>
<b>Average Daily Emissions (lbs/day)</b>	<b>8.59</b>	<b>69.26</b>	<b>52.50</b>	<b>2.72</b>	<b>2.51</b>	
Amortized GHG Emissions						366.41

Table 4. Emission Factors

Equipment Type	Year	Low HP	High HP	TOG (g/bhp-hr)	ROG (g/bhp-hr)	CO (g/bhp-hr)	NOX (g/bhp-hr)	SO2 (g/bhp-hr)	PM10 (g/bhp-hr)	PM2.5 (g/bhp-hr)	CO2 (g/bhp-hr)	CH4 (g/bhp-hr)
Aerial Lifts	2019	6	15	0.204518	0.1719	3.11451	3.07945	0.0054	0.0417	0.0384	536.7427	0.1698
Aerial Lifts	2019	16	25	0.204518	0.1719	3.11451	3.07945	0.0054	0.0417	0.0384	536.7427	0.1698
Aerial Lifts	2019	26	50	0.204518	0.1719	3.11451	3.07945	0.0054	0.0417	0.0384	536.7427	0.1698
Aerial Lifts	2019	51	120	0.14071	0.1182	3.17254	1.97658	0.0049	0.0485	0.0446	482.6056	0.1527
Aerial Lifts	2019	251	500	0.077988	0.0655	0.94139	0.63586	0.0049	0.0089	0.0082	482.5446	0.1527
Aerial Lifts	2019	501	750	28.429	0.212	1.023	2.117	0.005	0.064	0.064	568.299	0.019
Air Compressors	2019	6	15	1.951	0.748	3.562	4.647	0.008	0.241	0.241	568.299	0.067
Air Compressors	2019	16	25	4.106	0.787	2.501	4.596	0.007	0.222	0.222	568.299	0.071
Air Compressors	2019	26	50	9.076	1.129	5.283	4.546	0.007	0.287	0.287	568.299	0.101
Air Compressors	2019	51	120	9.123	0.538	3.718	3.706	0.006	0.26	0.26	568.299	0.048
Air Compressors	2019	121	175	12.833	0.401	3.204	2.874	0.006	0.15	0.15	568.299	0.036
Air Compressors	2019	176	250	14.416	0.304	1.132	2.469	0.006	0.078	0.078	568.299	0.027
Air Compressors	2019	251	500	24.559	0.293	1.086	2.193	0.005	0.075	0.075	568.299	0.026
Air Compressors	2019	501	750	38.104	0.294	1.086	2.247	0.005	0.076	0.076	568.299	0.026
Air Compressors	2019	751	1000	56.984	0.324	1.182	4.073	0.005	0.102	0.102	568.299	0.029
Bore/Drill Rigs	2019	6	15	0.858717	0.7216	4.49723	4.71795	0.0055	0.3025	0.2783	545.293	0.1725
Bore/Drill Rigs	2019	16	25	0.858717	0.7216	4.49723	4.71795	0.0055	0.3025	0.2783	545.293	0.1725
Bore/Drill Rigs	2019	26	50	0.858717	0.7216	4.49723	4.71795	0.0055	0.3025	0.2783	545.293	0.1725
Bore/Drill Rigs	2019	51	120	0.317934	0.2672	3.33202	3.32102	0.0048	0.1802	0.1658	472.4527	0.1495
Bore/Drill Rigs	2019	121	175	0.215784	0.1813	2.95563	2.01775	0.0049	0.0876	0.0806	487.3552	0.1542
Bore/Drill Rigs	2019	176	250	0.170614	0.1434	1.06058	1.8943	0.0048	0.0537	0.0494	475.7896	0.1505
Bore/Drill Rigs	2019	251	500	0.153732	0.1292	1.03449	1.55098	0.0048	0.0479	0.0441	477.0462	0.1509
Bore/Drill Rigs	2019	501	750	0.138617	0.1165	0.97074	1.44865	0.0049	0.0478	0.044	481.8363	0.1524
Bore/Drill Rigs	2019	751	1000	0.153944	0.1294	0.98342	3.04139	0.0049	0.0609	0.056	482.3593	0.1526
Cement and Mortar Mixers	2019	6	15	1.075	0.661	3.469	4.142	0.008	0.162	0.162	568.299	0.059
Cement and Mortar Mixers	2019	16	25	3.321	0.735	2.417	4.469	0.007	0.196	0.196	568.299	0.066
Concrete/Industrial Saws	2019	16	25	1.532	0.685	2.339	4.332	0.007	0.161	0.161	568.299	0.061
Concrete/Industrial Saws	2019	26	50	3.686	0.899	4.645	4.338	0.007	0.242	0.242	568.299	0.081
Concrete/Industrial Saws	2019	51	120	4.463	0.443	3.55	3.441	0.006	0.22	0.22	568.3	0.04
Concrete/Industrial Saws	2019	121	175	7.177	0.33	3.072	2.618	0.006	0.128	0.128	568.299	0.029
Cranes	2019	26	50	2.434147	2.0454	7.24465	5.95197	0.0053	0.6148	0.5657	529.4626	0.1675

Equipment Type	Year	Low HP	High HP	TOG (g/bhp-hr)	ROG (g/bhp-hr)	CO (g/bhp-hr)	NOX (g/bhp-hr)	SO2 (g/bhp-hr)	PM10 (g/bhp-hr)	PM2.5 (g/bhp-hr)	CO2 (g/bhp-hr)	CH4 (g/bhp-hr)
Cranes	2019	51	120	0.955908	0.8032	4.26491	6.95786	0.0048	0.5005	0.4604	480.3251	0.152
Cranes	2019	121	175	0.675554	0.5677	3.5982	5.94857	0.0049	0.3177	0.2923	485.1817	0.1535
Cranes	2019	176	250	0.50769	0.4266	1.94079	5.0842	0.0049	0.2155	0.1983	483.4616	0.153
Cranes	2019	251	500	0.415431	0.3491	2.96893	4.29654	0.0049	0.173	0.1592	483.1422	0.1529
Cranes	2019	501	750	0.299943	0.252	1.44568	3.42803	0.0049	0.1238	0.1139	481.1192	0.1522
Cranes	2019	1001	9999	0.205078	0.1723	0.9912	2.34854	0.0049	0.0595	0.0547	482.5446	0.1527
Crawler Tractors	2019	26	50	2.648469	2.2254	7.58896	5.85476	0.0053	0.6404	0.5892	525.9767	0.1664
Crawler Tractors	2019	51	120	0.901167	0.7572	4.08842	6.39347	0.0049	0.5347	0.4919	486.9909	0.1541
Crawler Tractors	2019	121	175	0.615173	0.5169	3.37886	5.38191	0.0049	0.2996	0.2756	481.6222	0.1524
Crawler Tractors	2019	176	250	0.45175	0.3796	1.60445	4.9721	0.0049	0.1875	0.1725	483.4489	0.153
Crawler Tractors	2019	251	500	0.37933	0.3187	2.21938	3.93412	0.0049	0.1528	0.1406	485.8645	0.1537
Crawler Tractors	2019	501	750	0.316919	0.2663	1.35585	3.34253	0.0049	0.123	0.1132	483.3879	0.1529
Crawler Tractors	2019	751	1000	0.547243	0.4598	2.02037	7.21215	0.0049	0.2106	0.1938	486.2545	0.1538
Crushing/Proc. Equipment	2019	26	50	2.798	1.064	5.316	4.495	0.007	0.269	0.269	568.299	0.096
Crushing/Proc. Equipment	2019	51	120	2.577	0.519	3.739	3.544	0.006	0.241	0.241	568.299	0.046
Crushing/Proc. Equipment	2019	121	175	3.938	0.394	3.233	2.7	0.006	0.141	0.141	568.299	0.035
Crushing/Proc. Equipment	2019	176	250	4.451	0.304	1.134	2.3	0.006	0.074	0.074	568.299	0.027
Crushing/Proc. Equipment	2019	251	500	6.592	0.295	1.087	2.046	0.005	0.071	0.071	568.299	0.026
Crushing/Proc. Equipment	2019	501	750	10.352	0.294	1.085	2.085	0.005	0.071	0.071	568.299	0.026
Crushing/Proc. Equipment	2019	1001	9999	26.978	0.345	1.173	3.927	0.005	0.098	0.098	568.299	0.031
Dumpers/Tenders	2019	16	25	0.82	0.686	2.339	4.341	0.007	0.167	0.167	568.299	0.061
Excavators	2019	16	25	0.75855	0.6374	4.59698	4.19867	0.0054	0.2503	0.2303	536.9132	0.1699
Excavators	2019	26	50	0.75855	0.6374	4.59698	4.19867	0.0054	0.2503	0.2303	536.9132	0.1699
Excavators	2019	51	120	0.386598	0.3248	3.52421	3.36874	0.0048	0.2107	0.1938	478.2452	0.1513
Excavators	2019	121	175	0.293021	0.2462	3.08163	2.53264	0.0049	0.1221	0.1124	482.6838	0.1527
Excavators	2019	176	250	0.220917	0.1856	1.12671	2.24187	0.0049	0.068	0.0625	482.2503	0.1526
Excavators	2019	251	500	0.192898	0.1621	1.1135	1.77986	0.0049	0.0578	0.0532	481.2361	0.1523
Excavators	2019	501	750	0.209677	0.1762	1.17289	1.98661	0.0048	0.0671	0.0618	479.2876	0.1516
Forklifts	2019	26	50	1.480074	1.2437	5.88034	4.86189	0.0054	0.4009	0.3688	537.1608	0.17
Forklifts	2019	51	120	0.606336	0.5095	3.80391	4.54965	0.0049	0.3525	0.3243	482.0069	0.1525
Forklifts	2019	121	175	0.454984	0.3823	3.28831	3.86458	0.0049	0.2102	0.1934	482.5975	0.1527
Forklifts	2019	176	250	0.445406	0.3743	1.6773	4.2498	0.0049	0.1753	0.1613	483.8438	0.1531

Equipment Type	Year	Low HP	High HP	TOG (g/bhp-hr)	ROG (g/bhp-hr)	CO (g/bhp-hr)	NOX (g/bhp-hr)	SO2 (g/bhp-hr)	PM10 (g/bhp-hr)	PM2.5 (g/bhp-hr)	CO2 (g/bhp-hr)	CH4 (g/bhp-hr)
Forklifts	2019	251	500	0.31829	0.2675	1.814	2.75148	0.0049	0.112	0.103	484.1399	0.1532
Generator Sets	2019	6	15	1.758	0.662	3.562	4.617	0.008	0.224	0.224	568.299	0.059
Generator Sets	2019	16	25	3.356	0.731	2.501	4.596	0.007	0.214	0.214	568.299	0.066
Generator Sets	2019	26	50	6.208	0.779	4.076	4.215	0.007	0.222	0.222	568.299	0.07
Generator Sets	2019	51	120	8.233	0.405	3.396	3.446	0.006	0.206	0.206	568.299	0.036
Generator Sets	2019	121	175	10.727	0.29	2.929	2.669	0.006	0.118	0.118	568.299	0.026
Generator Sets	2019	176	250	11.695	0.211	1.036	2.285	0.006	0.064	0.064	568.299	0.019
Generator Sets	2019	251	500	17.492	0.199	1.015	2.056	0.005	0.062	0.062	568.299	0.018
Generator Sets	2019	501	750	28.675	0.202	1.015	2.104	0.005	0.062	0.062	568.299	0.018
Generator Sets	2019	1001	9999	71.228	0.261	1.103	3.829	0.005	0.087	0.087	568.299	0.023
Graders	2019	26	50	3.11378	2.6164	8.27912	5.94463	0.005	0.7367	0.6778	503.7509	0.1594
Graders	2019	51	120	1.228249	1.0321	4.6424	8.1592	0.0048	0.6653	0.612	479.9011	0.1518
Graders	2019	121	175	0.724541	0.6088	3.65586	6.01354	0.0049	0.3365	0.3096	489.0419	0.1547
Graders	2019	176	250	0.428358	0.3599	1.35927	4.86575	0.0049	0.1562	0.1437	486.3288	0.1539
Graders	2019	251	500	0.384059	0.3227	1.52849	3.21794	0.0049	0.1244	0.1145	482.5879	0.1527
Graders	2019	501	750	13.635	0.335	1.255	2.276	0.005	0.08	0.08	568.299	0.03
Off-Highway Tractors	2019	51	120	0.562974	0.4731	3.79465	4.42145	0.0049	0.3311	0.3046	484.2693	0.1532
Off-Highway Tractors	2019	121	175	0.350048	0.2941	3.21895	3.20755	0.0049	0.1586	0.1459	483.4306	0.153
Off-Highway Tractors	2019	176	250	0.283777	0.2385	1.21832	2.9142	0.0049	0.0976	0.0898	481.2751	0.1523
Off-Highway Tractors	2019	501	750	0.244248	0.2052	1.12934	2.17682	0.0049	0.082	0.0754	482.3091	0.1526
Off-Highway Tractors	2019	751	1000	0.166166	0.1396	1.00978	2.37757	0.0049	0.0616	0.0567	482.5446	0.1527
Off-Highway Trucks	2019	121	175	0.38382	0.3225	3.32598	2.82463	0.0049	0.1494	0.1375	480.3623	0.152
Off-Highway Trucks	2019	176	250	0.365362	0.307	1.46079	2.98481	0.0049	0.119	0.1095	480.1703	0.1519
Off-Highway Trucks	2019	251	500	0.313575	0.2635	1.48346	2.66851	0.0049	0.097	0.0893	485.3832	0.1536
Off-Highway Trucks	2019	501	750	0.389037	0.3269	2.04129	3.32044	0.0049	0.1286	0.1183	483.2182	0.1529
Off-Highway Trucks	2019	751	1000	0.351304	0.2952	1.3561	4.76495	0.0049	0.1242	0.1142	480.3479	0.152
Other Construction Equipment	2019	6	15	1.370834	1.1519	5.54123	5.20338	0.0054	0.4374	0.4024	539.7349	0.1708
Other Construction Equipment	2019	16	25	1.370834	1.1519	5.54123	5.20338	0.0054	0.4374	0.4024	539.7349	0.1708
Other Construction Equipment	2019	26	50	1.370834	1.1519	5.54123	5.20338	0.0054	0.4374	0.4024	539.7349	0.1708
Other Construction Equipment	2019	51	120	0.655004	0.5504	3.7535	5.04831	0.0049	0.3789	0.3486	482.2177	0.1526
Other Construction Equipment	2019	121	175	0.490382	0.4121	3.25619	4.4331	0.0049	0.2335	0.2148	480.4518	0.152
Other Construction Equipment	2019	251	500	0.277883	0.2335	1.66739	2.85547	0.0049	0.1026	0.0944	485.4127	0.1536



Equipment Type	Year	Low HP	High HP	TOG (g/bhp-hr)	ROG (g/bhp-hr)	CO (g/bhp-hr)	NOX (g/bhp-hr)	SO2 (g/bhp-hr)	PM10 (g/bhp-hr)	PM2.5 (g/bhp-hr)	CO2 (g/bhp-hr)	CH4 (g/bhp-hr)
Other General Industrial Equipment	2019	6	15	1.240314	1.0422	5.66186	4.80683	0.0054	0.3737	0.3438	537.8689	0.1702
Other General Industrial Equipment	2019	16	25	1.240314	1.0422	5.66186	4.80683	0.0054	0.3737	0.3438	537.8689	0.1702
Other General Industrial Equipment	2019	26	50	1.240314	1.0422	5.66186	4.80683	0.0054	0.3737	0.3438	537.8689	0.1702
Other General Industrial Equipment	2019	51	120	0.594634	0.4997	3.82128	4.49674	0.0048	0.3429	0.3155	480.4442	0.152
Other General Industrial Equipment	2019	121	175	0.359068	0.3017	3.24129	2.99891	0.0049	0.1565	0.144	482.3357	0.1526
Other General Industrial Equipment	2019	176	250	0.307665	0.2585	1.29893	3.01996	0.0049	0.1058	0.0973	483.7392	0.153
Other General Industrial Equipment	2019	251	500	0.283854	0.2385	1.56115	2.57531	0.0049	0.0923	0.0849	483.4385	0.153
Other General Industrial Equipment	2019	501	750	0.236758	0.1989	1.47441	2.11518	0.0049	0.0758	0.0697	483.9852	0.1531
Other General Industrial Equipment	2019	751	1000	0.31421	0.264	1.07573	4.83364	0.0049	0.1172	0.1079	482.5446	0.1527
Other Material Handling Equipment	2019	26	50	1.5177	1.2753	6.13945	5.17904	0.0054	0.4519	0.4158	535.3468	0.1694
Other Material Handling Equipment	2019	51	120	0.428699	0.3602	3.63634	3.56573	0.0049	0.2307	0.2123	484.1126	0.1532
Other Material Handling Equipment	2019	121	175	0.332757	0.2796	3.1852	2.77369	0.0049	0.1388	0.1277	482.7131	0.1527
Other Material Handling Equipment	2019	176	250	0.357063	0.3	1.34052	3.81716	0.0049	0.1231	0.1133	481.9594	0.1525
Other Material Handling Equipment	2019	251	500	0.346245	0.2909	1.61951	3.37078	0.0049	0.1278	0.1175	480.7483	0.1521
Other Material Handling Equipment	2019	1001	9999	0.226018	0.1899	1.03609	3.58277	0.0049	0.0763	0.0702	482.5446	0.1527
Pavers	2019	16	25	1.687019	1.4176	5.65687	4.91634	0.0054	0.4361	0.4012	538.3246	0.1703
Pavers	2019	26	50	1.687019	1.4176	5.65687	4.91634	0.0054	0.4361	0.4012	538.3246	0.1703
Pavers	2019	51	120	0.589904	0.4957	3.62215	4.67048	0.0048	0.3455	0.3178	480.2509	0.1519
Pavers	2019	121	175	0.355588	0.2988	3.01323	3.24473	0.0049	0.1589	0.1462	483.3938	0.1529

Equipment Type	Year	Low HP	High HP	TOG (g/bhp-hr)	ROG (g/bhp-hr)	CO (g/bhp-hr)	NOX (g/bhp-hr)	SO2 (g/bhp-hr)	PM10 (g/bhp-hr)	PM2.5 (g/bhp-hr)	CO2 (g/bhp-hr)	CH4 (g/bhp-hr)
Pavers	2019	176	250	0.222293	0.1868	1.03181	3.11084	0.0049	0.0842	0.0774	483.5743	0.153
Pavers	2019	251	500	0.198123	0.1665	0.98586	2.26992	0.0048	0.081	0.0746	476.9707	0.1509
Paving Equipment	2019	16	25	0.838543	0.7046	4.40798	4.23779	0.0054	0.2697	0.2481	531.8612	0.1683
Paving Equipment	2019	26	50	0.838543	0.7046	4.40798	4.23779	0.0054	0.2697	0.2481	531.8612	0.1683
Paving Equipment	2019	51	120	0.50594	0.4251	3.59849	4.04152	0.0049	0.2808	0.2584	484.387	0.1533
Paving Equipment	2019	121	175	0.302373	0.2541	3.0109	2.6924	0.0049	0.1336	0.1229	481.2251	0.1523
Paving Equipment	2019	176	250	0.286526	0.2408	1.24449	3.25106	0.0049	0.1116	0.1027	482.6441	0.1527
Plate Compactors	2019	6	15	0.79	0.661	3.469	4.142	0.008	0.161	0.161	568.299	0.059
Pressure Washers	2019	6	15	1.824	0.662	3.562	4.617	0.008	0.224	0.224	568.299	0.059
Pressure Washers	2019	16	25	2.947	0.731	2.501	4.596	0.007	0.214	0.214	568.299	0.066
Pressure Washers	2019	26	50	4.585	0.569	3.457	4.053	0.007	0.184	0.184	568.299	0.051
Pressure Washers	2019	51	120	4.575	0.337	3.24	3.295	0.006	0.174	0.174	568.299	0.03
Pressure Washers	2019	121	175	18.102	0.28	2.907	2.67	0.006	0.117	0.117	568.299	0.025
Pressure Washers	2019	176	250	8.005	0.098	0.986	0.265	0.006	0.009	0.009	568.299	0.008
Pumps	2019	6	15	1.63	0.748	3.562	4.647	0.008	0.241	0.241	568.3	0.067
Pumps	2019	16	25	4.503	0.787	2.501	4.596	0.007	0.222	0.222	568.3	0.071
Pumps	2019	26	50	8.56	0.849	4.284	4.269	0.007	0.235	0.235	568.299	0.076
Pumps	2019	51	120	9.812	0.429	3.449	3.497	0.006	0.217	0.217	568.299	0.038
Pumps	2019	121	175	12.706	0.309	2.974	2.711	0.006	0.124	0.124	568.299	0.027
Pumps	2019	176	250	13.378	0.226	1.052	2.323	0.006	0.067	0.067	568.299	0.02
Pumps	2019	251	500	21.711	0.214	1.027	2.084	0.005	0.064	0.064	568.3	0.019
Pumps	2019	501	750	36.35	0.217	1.027	2.133	0.005	0.065	0.065	568.299	0.019
Pumps	2019	1001	9999	108.825	0.273	1.118	3.873	0.005	0.089	0.089	568.299	0.024
Rollers	2019	6	15	1.156606	0.9719	4.77841	4.64491	0.0054	0.3493	0.3213	537.546	0.1701
Rollers	2019	16	25	1.156606	0.9719	4.77841	4.64491	0.0054	0.3493	0.3213	537.546	0.1701
Rollers	2019	26	50	1.156606	0.9719	4.77841	4.64491	0.0054	0.3493	0.3213	537.546	0.1701
Rollers	2019	51	120	0.502836	0.4225	3.55726	4.17949	0.0049	0.2748	0.2528	484.3362	0.1532
Rollers	2019	121	175	0.27475	0.2309	2.93251	2.69941	0.0049	0.1239	0.114	482.4531	0.1526
Rollers	2019	176	250	0.250477	0.2105	1.24854	2.88327	0.0049	0.0918	0.0844	483.7769	0.1531
Rollers	2019	251	500	0.278634	0.2341	2.10142	2.90839	0.005	0.1109	0.102	489.9774	0.155
Rough Terrain Forklifts	2019	26	50	1.200779	1.009	4.67405	4.55745	0.0054	0.3277	0.3015	537.3287	0.17
Rough Terrain Forklifts	2019	51	120	0.240277	0.2019	3.25848	2.6222	0.0049	0.1168	0.1075	483.3105	0.1529

Equipment Type	Year	Low HP	High HP	TOG (g/bhp-hr)	ROG (g/bhp-hr)	CO (g/bhp-hr)	NOX (g/bhp-hr)	SO2 (g/bhp-hr)	PM10 (g/bhp-hr)	PM2.5 (g/bhp-hr)	CO2 (g/bhp-hr)	CH4 (g/bhp-hr)
Rough Terrain Forklifts	2019	121	175	0.177689	0.1493	2.84092	2.05752	0.0049	0.0753	0.0693	482.1188	0.1525
Rough Terrain Forklifts	2019	176	250	0.130153	0.1094	0.97423	1.63905	0.0049	0.0364	0.0335	483.0882	0.1528
Rough Terrain Forklifts	2019	251	500	0.138302	0.1162	0.95034	1.96109	0.0048	0.0429	0.0395	477.2539	0.151
Rubber Tired Dozers	2019	121	175	0.90312	0.7589	3.94854	7.52037	0.0049	0.4326	0.398	483.5585	0.153
Rubber Tired Dozers	2019	176	250	0.774882	0.6511	2.45855	6.92923	0.0049	0.3379	0.3108	485.172	0.1535
Rubber Tired Dozers	2019	251	500	0.680848	0.5721	4.74309	6.14335	0.0049	0.2828	0.2602	490.383	0.1552
Rubber Tired Dozers	2019	501	750	0.541107	0.4547	2.59814	6.12249	0.0049	0.2181	0.2007	483.5786	0.153
Rubber Tired Dozers	2019	751	1000	8.196	0.547	2.281	5.528	0.005	0.171	0.171	568.299	0.049
Rubber Tired Loaders	2019	16	25	1.906195	1.6017	6.97769	5.43193	0.0054	0.5176	0.4762	536.2254	0.1697
Rubber Tired Loaders	2019	26	50	1.906195	1.6017	6.97769	5.43193	0.0054	0.5176	0.4762	536.2254	0.1697
Rubber Tired Loaders	2019	51	120	0.707701	0.5947	3.97887	5.00611	0.0048	0.402	0.3698	475.8636	0.1506
Rubber Tired Loaders	2019	121	175	0.482139	0.4051	3.38084	3.85918	0.0049	0.2133	0.1962	481.7364	0.1524
Rubber Tired Loaders	2019	176	250	0.368194	0.3094	1.30248	3.74452	0.0048	0.1255	0.1155	480.0997	0.1519
Rubber Tired Loaders	2019	251	500	0.363843	0.3057	1.7248	3.28755	0.0048	0.1227	0.1129	477.0415	0.1509
Rubber Tired Loaders	2019	501	750	0.348958	0.2932	1.45157	3.01875	0.0048	0.1184	0.109	471.1874	0.1491
Rubber Tired Loaders	2019	751	1000	0.384887	0.3234	1.20834	5.45926	0.0049	0.1462	0.1345	480.523	0.152
Scrapers	2019	51	120	0.854498	0.718	4.19661	6.84136	0.005	0.5255	0.4834	494.1	0.1563
Scrapers	2019	121	175	0.606989	0.51	3.53297	5.26356	0.0049	0.2833	0.2606	489.2546	0.1548
Scrapers	2019	176	250	0.596624	0.5013	2.23321	5.83102	0.0048	0.2567	0.2361	479.0317	0.1516
Scrapers	2019	251	500	0.40804	0.3429	2.59466	4.15646	0.0049	0.1629	0.1498	482.7319	0.1527
Scrapers	2019	501	750	0.329384	0.2768	1.82903	3.43103	0.0049	0.1232	0.1133	482.5963	0.1527
Signal Boards	2019	6	15	1.04	0.661	3.47	4.142	0.008	0.161	0.161	568.299	0.059
Signal Boards	2019	26	50	8.189	0.887	4.538	4.272	0.007	0.236	0.236	568.3	0.08
Signal Boards	2019	51	120	8.938	0.437	3.519	3.41	0.006	0.216	0.216	568.299	0.039
Signal Boards	2019	121	175	12.677	0.321	3.043	2.601	0.006	0.125	0.125	568.299	0.029
Signal Boards	2019	176	250	15.682	0.291	1.292	2.676	0.007	0.08	0.08	686.695	0.026
Skid Steer Loaders	2019	16	25	0.531282	0.4464	3.73957	3.75009	0.0054	0.1536	0.1413	539.2667	0.1706
Skid Steer Loaders	2019	26	50	0.531282	0.4464	3.73957	3.75009	0.0054	0.1536	0.1413	539.2667	0.1706
Skid Steer Loaders	2019	51	120	0.2373	0.1994	3.27736	2.65586	0.0049	0.1217	0.1119	482.3844	0.1526
Surfacing Equipment	2019	26	50	0.765383	0.6431	4.0998	4.41999	0.0055	0.2503	0.2303	547.0462	0.1731
Surfacing Equipment	2019	51	120	0.42278	0.3553	3.44856	3.82306	0.0049	0.2256	0.2076	484.0757	0.1532
Surfacing Equipment	2019	121	175	0.425034	0.3571	2.97177	4.23866	0.0048	0.2036	0.1873	479.6717	0.1518

Equipment Type	Year	Low HP	High HP	TOG (g/bhp-hr)	ROG (g/bhp-hr)	CO (g/bhp-hr)	NOX (g/bhp-hr)	SO2 (g/bhp-hr)	PM10 (g/bhp-hr)	PM2.5 (g/bhp-hr)	CO2 (g/bhp-hr)	CH4 (g/bhp-hr)
Surfacing Equipment	2019	176	250	0.257694	0.2165	1.21576	3.39993	0.0049	0.1007	0.0927	486.8417	0.154
Surfacing Equipment	2019	251	500	0.173135	0.1455	1.2143	1.89944	0.0049	0.0681	0.0626	481.8965	0.1525
Surfacing Equipment	2019	501	750	0.168821	0.1419	0.99372	2.17879	0.0049	0.0763	0.0702	480.166	0.1519
Sweepers/Scrubbers	2019	6	15	1.703052	1.431	6.26782	5.22487	0.0054	0.4912	0.4519	537.0023	0.1699
Sweepers/Scrubbers	2019	16	25	1.703052	1.431	6.26782	5.22487	0.0054	0.4912	0.4519	537.0023	0.1699
Sweepers/Scrubbers	2019	26	50	1.703052	1.431	6.26782	5.22487	0.0054	0.4912	0.4519	537.0023	0.1699
Sweepers/Scrubbers	2019	51	120	0.654062	0.5496	3.84602	4.77259	0.0049	0.3872	0.3563	484.6516	0.1533
Sweepers/Scrubbers	2019	121	175	0.62277	0.5233	3.4491	5.30082	0.0049	0.2772	0.255	483.6359	0.153
Sweepers/Scrubbers	2019	176	250	0.279258	0.2347	1.23013	2.86598	0.0049	0.0989	0.091	480.5735	0.152
Tractors/Loaders/Backhoes	2019	16	25	1.095082	0.9202	5.20327	4.60928	0.0053	0.33	0.3036	527.6843	0.167
Tractors/Loaders/Backhoes	2019	26	50	1.095082	0.9202	5.20327	4.60928	0.0053	0.33	0.3036	527.6843	0.167
Tractors/Loaders/Backhoes	2019	51	120	0.437701	0.3678	3.63777	3.69257	0.0049	0.2465	0.2268	485.8548	0.1537
Tractors/Loaders/Backhoes	2019	121	175	0.321856	0.2704	3.12158	2.78412	0.0048	0.1401	0.1289	477.9151	0.1512
Tractors/Loaders/Backhoes	2019	176	250	0.291458	0.2449	1.22027	3.14683	0.0049	0.102	0.0938	481.4206	0.1523
Tractors/Loaders/Backhoes	2019	251	500	0.245176	0.206	1.38918	2.34458	0.0048	0.0816	0.0751	479.0826	0.1516
Tractors/Loaders/Backhoes	2019	501	750	0.311873	0.2621	1.6025	3.12046	0.0048	0.1168	0.1074	478.9216	0.1515
Trenchers	2019	6	15	1.136688	0.9551	4.89183	4.78464	0.0054	0.3767	0.3466	539.1037	0.1706
Trenchers	2019	16	25	1.136688	0.9551	4.89183	4.78464	0.0054	0.3767	0.3466	539.1037	0.1706
Trenchers	2019	26	50	1.136688	0.9551	4.89183	4.78464	0.0054	0.3767	0.3466	539.1037	0.1706
Trenchers	2019	51	120	0.751452	0.6314	3.83677	5.69508	0.0049	0.4306	0.3961	485.3635	0.1536
Trenchers	2019	121	175	0.547248	0.4598	3.34151	4.95976	0.0048	0.2547	0.2343	478.1294	0.1513
Trenchers	2019	176	250	0.481784	0.4048	1.81019	5.04653	0.0049	0.2032	0.187	484.1167	0.1532
Trenchers	2019	251	500	0.302803	0.2544	1.98689	3.12824	0.0049	0.1181	0.1086	482.1648	0.1526
Trenchers	2019	501	750	0.09296	0.0781	0.95644	0.70662	0.0049	0.0152	0.014	484.5422	0.1533
Welders	2019	6	15	1.877	0.748	3.562	4.647	0.008	0.241	0.241	568.299	0.067
Welders	2019	16	25	3.592	0.787	2.501	4.596	0.007	0.222	0.222	568.299	0.071
Welders	2019	26	50	11.071	1.055	4.95	4.449	0.007	0.273	0.273	568.299	0.095
Welders	2019	51	120	8.032	0.503	3.623	3.648	0.006	0.25	0.25	568.299	0.045
Welders	2019	121	175	14.693	0.37	3.122	2.832	0.006	0.143	0.143	568.3	0.033
Welders	2019	176	250	13.284	0.276	1.104	2.432	0.006	0.075	0.075	568.299	0.024
Welders	2019	251	500	17.937	0.264	1.065	2.163	0.005	0.072	0.072	568.3	0.023

Table 5. Offroad Factors

Equipment Type	Year	Low HP	High HP	TOG (g/bhp-hr)	ROG (g/bhp-hr)	CO (g/bhp-hr)	NOX (g/bhp-hr)	SO2 (g/bhp-hr)	PM10 (g/bhp-hr)	PM2.5 (g/bhp-hr)	CO2 (g/bhp-hr)	CH4 (g/bhp-hr)
Rubber Tired Dozers	2019	251	500	0.680848	0.5721	4.74309	6.14335	0.0049	0.2828	0.2602	490.383	0.1552
Excavators	2019	121	175	0.293021	0.2462	3.08163	2.53264	0.0049	0.1221	0.1124	482.6838	0.1527
Plate Compactors	2019	6	15	0.79	0.661	3.469	4.142	0.008	0.161	0.161	568.299	0.059
Cranes	2019	176	250	0.50769	0.4266	1.94079	5.0842	0.0049	0.2155	0.1983	483.4616	0.153
Off-Highway Trucks	2019	251	500	0.313575	0.2635	1.48346	2.66851	0.0049	0.097	0.0893	485.3832	0.1536
Other Construction Equipment	2019	121	175	0.490382	0.4121	3.25619	4.4331	0.0049	0.2335	0.2148	480.4518	0.152
Pumps	2019	51	120	9.812	0.429	3.449	3.497	0.006	0.217	0.217	568.299	0.038
Generator Sets	2019	51	120	8.233	0.405	3.396	3.446	0.006	0.206	0.206	568.299	0.036
Tractors/Loaders/Backhoes	2019	501	750	0.311873	0.2621	1.6025	3.12046	0.0048	0.1168	0.1074	478.9216	0.1515
Pumps >1001 and <9999	2019	1001	9999	108.825	0.273	1.118	3.873	0.005	0.089	0.089	568.299	0.024

	Low HP	High HP	ROG (g/bhp-hr)	CO (g/bhp-hr)	NOX (g/bhp-hr)	PM10 (g/bhp-hr)	PM2.5 (g/bhp-hr)
Tier 3	25	49	0.29	4.1	4.63	0.28	0.28
Tier 3	50	74	0.12	3.7	2.74	0.192	0.192
Tier 3	75	119	0.12	3.7	2.74	0.192	0.192
Tier 3	120	174	0.12	3.7	2.32	0.112	0.112
Tier 3	175	299	0.12	2.6	2.32	0.088	0.088
Tier 3	300	599	0.12	2.6	2.32	0.088	0.088
Tier 3	600	750	0.12	2.6	2.32	0.088	0.088
Tier 3	751	2000	0.12	2.6	2.32	0.088	0.088
Tier 4 Interim	25	49	0.12	4.1	4.55	0.128	0.128
Tier 4 Interim	50	74	0.12	3.7	2.74	0.112	0.112
Tier 4 Interim	75	119	0.11	3.7	2.14	0.008	0.008

Tier 4 Interim	120	174	0.06	3.7	2.15	0.008	0.008
Tier 4 Interim	175	299	0.08	2.6	1.29	0.008	0.008
Tier 4 Interim	300	599	0.08	2.6	1.29	0.008	0.008
Tier 4 Interim	600	750	0.08	2.6	1.29	0.008	0.008
Tier 4 Interim	751	2000	0.12	2.6	2.24	0.048	0.048
Tier 4	25	49	0.12	4.1	2.75	0.008	0.008
Tier 4	50	74	0.12	3.7	2.74	0.008	0.008
Tier 4	75	119	0.06	3.7	0.26	0.008	0.008
Tier 4	120	174	0.06	3.7	0.26	0.008	0.008
Tier 4	175	299	0.06	2.2	0.26	0.008	0.008
Tier 4	300	599	0.06	2.2	0.26	0.008	0.008
Tier 4	600	750	0.06	2.2	0.26	0.008	0.008
Tier 4	751	2000	0.06	2.6	2.24	0.016	0.016

**Table 6. Cal EE Mod. Equipment**

<b>Equipment Type</b>	<b>HP</b>	<b>Load Factor</b>
Aerial Lifts	63	0.31
Air Compressors	78	0.48
Bore/Drill Rigs	206	0.5
Cement and Mortar Mixers	9	0.56
Concrete/Industrial Saws	81	0.73
Cranes	226	0.29
Crawler Tractors	208	0.43
Crushing/Proc. Equipment	85	0.78
Dumpers/Tenders	16	0.38
Excavators	163	0.38
Forklifts	89	0.2
Generator Sets	84	0.74
Graders	175	0.41
Off-Highway Tractors	123	0.44
Off-Highway Trucks	400	0.38
Other Construction Equipment	172	0.42
Other General Industrial Equipment	88	0.34
Other Material Handling Equipment	167	0.4
Pavers	126	0.42
Paving Equipment	131	0.36
Plate Compactors	8	0.43
Pressure Washers	13	0.3
Pumps	84	0.74
Rollers	81	0.38
Rough Terrain Forklifts	100	0.4
Rubber Tired Dozers	255	0.4
Rubber Tired Loaders	200	0.36
Scrapers	362	0.48
Signal Boards	6	0.82
Skid Steer Loaders	65	0.37
Surfacing Equipment	254	0.3
Sweepers/Scrubbers	64	0.46
Tractors/Loaders/Backhoes	98	0.37
Trenchers	81	0.5
Welders	46	0.45

Table 7. Alameda County 2019 On-Road Emission Factors

Veh_Class	Fuel	Mdlyr	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	Percent VMT	Trips (trips/day)
LDA	GAS	Aggregated	Aggregated	630179.0709	23135044.8	69.96%	3978067.902
LDA	DSL	Aggregated	Aggregated	3135.399386	109528.6651	0.33%	19192.99895
LDT1	GAS	Aggregated	Aggregated	71734.58614	2657830.829	8.04%	434719.7607
LDT1	DSL	Aggregated	Aggregated	101.6956373	3791.303837	0.01%	579.147129
LDT2	GAS	Aggregated	Aggregated	182086.4394	7158606.203	21.65%	1144840.468
LDT2	DSL	Aggregated	Aggregated	90.6234226	3567.077353	0.01%	558.2269126
<b>Total</b>				887327.8149	33068368.88		5577958.504
<b>Average</b>							
Veh_Class	Fuel	Mdlyr	Speed	Population	VMT	Trips	
T7 tractor	DSL	Aggregated	Aggregated	3808.477731	617782.042		0

Veh_Class	ROG_RUNEX (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUNEX (gms/mile)	PM2_5_RUNEX (gms/mile)
LDA	0.016637189	0.80358625	0.083541126	340.5888828	0.001765757	0.001636861
LDA	0.024529409	0.152328328	0.446035267	355.3985725	0.017213743	0.015836645
LDT1	0.048779122	2.083021626	0.234843306	393.179958	0.003438173	0.003186006
LDT1	0.044211868	0.215668141	0.506244265	359.66517	0.035622524	0.032772721
LDT2	0.02252008	1.118412005	0.140442609	463.7144236	0.001740389	0.001612612
LDT2	0.028100152	0.160580945	0.48394342	355.9157639	0.019345996	0.017798317
<b>Total</b>						
<b>Average</b>	0.020524619	0.972278645	0.109312136	371.5228102	0.001951628	0.001808467
Veh_Class	ROG_RUNEX	CO_RUNEX	NOX_RUNEX	CO2_RUNEX	PM10_RUNEX	PM2_5_RUNEX
T7 tractor	0.226618154	1.024496709	5.340895989	1734.197307	0.079514364	0.073153215



**Table 8. Equipment Barge**

<b>Assumptions</b>		
Main Generator Engine	300	bhp
	223.7	kW
Aux Generator Engines	0	bhp
	0.0	kW
Number	1.0	

**Emissions (pounds per hour)**

Activity	Number of Construction Days	Time (hours per day)	ROG	NOx	CO	PM10	PM2.5	CO2e*
Emissions Per Hour	1.00	1.00	0.20	1.47	1.01	0.04	0.04	151.94

\*To account for N2O and CH4 emissions, an extra 5% was added to the CO2 emissions.

**Main Engine - 2018 Average Emission Factors (g/bhp-hr)**

	ROG	NOx	CO	PM10	PM2.5	CO2	Fuel
300 hp	0.68	5.21	3.38	0.17	0.16	652	184.16

Note: CO2 emission factor in g/kWh  
Source: ARB Harborcraft Emission Inventory Database

CO2 emissions factor from Port of Long Beach. 2011 Emissions Inventory. Available at <http://www.polb.com/environment/air/emissions.asp>.

**Auxiliary Engine - 2018 Average Emission Factors (g/bhp-hr)**

	ROG	NOx	CO	PM10	PM2.5	CO2	Fuel
3300 hp	0.81	3.54	5.21	0.16	0.15	652	184.16

Note: CO2 emission factor in g/kWh  
 Source: ARB Harborcraft Emission Inventory Database

CO2 emissions factor from Port of Long Beach. 2011 Emissions Inventory. Available at <http://www.polb.com/environment/air/emissions.asp>.

**Load Factor**

Engine	Load factor
Propulsion	0.45
Auxiliary	0.43

Source: ARB. Appendix B. Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

Calendar Years	Horsepower Range	Model Years	NOx	PM
2007+	All	2011+	0.948	0.852

Source: ARB, Appendix B. Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

**Table 9. Work Tug**

Assumptions		
Main Generator Engine	1000	bhp
	745.7	kW
Aux Generator Engines	50	bhp
	37.3	kW
Number	1.0	

**Emissions (pounds per hour)**

Activity	Number of Construction Days	Time (hours per day)	ROG	NOx	CO	PM10	PM2.5	CO2e*
Emissions Per Hour	1.00	1.00	0.70	5.03	3.36	0.18	0.17	530.65

\*To account for N2O and CH4 emissions, an extra 5% was added to the CO2 emissions.

#### Main Engine - 2018 Average Emission Factors (g/bhp-hr)

	ROG	NOx	CO	PM10	PM2.5	CO2	Fuel
1000 hp	0.60	5.16	3.11	0.20	0.18	652	184.16

Note: CO2 emission factor in g/kWh

Source: ARB Harborcraft Emission Inventory Database

CO2 emissions factor from Port of Long Beach. 2011 Emissions Inventory. Available at <http://www.polb.com/environment/air/emissions.asp>.

#### Auxiliary Engine - 2018 Average Emission Factors (g/bhp-hr)

	ROG	NOx	CO	PM10	PM2.5	CO2	Fuel
50 hp	2.14	4.09	5.72	0.34	0.31	652	184.16

Note: CO2 emission factor in g/kWh

Source: ARB Harborcraft Emission Inventory Database

CO2 emissions factor from Port of Long Beach. 2011 Emissions Inventory. Available at <http://www.polb.com/environment/air/emissions.asp>.

#### Load Factor

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Engine	Load factor
Propulsion	0.45
Auxiliary	0.43

Source: ARB, Appendix B. Emissions Estimation  
Methodology for Commercial Harbor Craft  
Operating in California

Calendar Years	Horsepower Range	Model Years	NOx	PM
2007+	All	2011+	0.948	0.852

Source: ARB, Appendix B. Emissions Estimation  
Methodology for Commercial Harbor Craft  
Operating in California

**Table 10. Cable Reel Barge**

Assumptions		
Main Generator Engine	240	bhp
	179.0	kW
Aux Generator Engines	0	bhp
	0.0	kW
Number	1.0	

**Emissions (pounds per hour)**

Activity	Number of Construction Days	Time (hours per day)	ROG	NOx	CO	PM10	PM2.5	CO2e*
SO-6 2012	1.00	1.00	0.16	1.18	0.80	0.03	0.03	121.55

\*To account for N2O and CH4 emissions, an extra 5% was added to the CO2 emissions.

**Main Engine - 2018 Average Emission Factors (g/bhp-hr)**

	ROG	NOx	CO	PM10	PM2.5	CO2	Fuel

240 hp	0.68	5.21	3.38	0.17	0.16	652	184.16
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Note: CO2 emission factor in g/kWh

Source: ARB Harborcraft Emission Inventory Database

CO2 emissions factor from Port of Long Beach. 2011 Emissions Inventory. Available at <http://www.polb.com/environment/air/emissions.asp>.

### Load Factor

Engine	Load factor
Propulsion	0.45
Auxiliary	0.43

Source: ARB. Appendix B. Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

Calendar Years	Horsepower Range	Model Years	NOx	PM
2007+	All	2011+	0.948	0.852

Source: ARB, Appendix B. Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

Estimated Travel Time	Offshore Placement	Miles	Miles Per Hour	Total Hours
Loaded Barge	SO-6 2012	0.76	0.82	0.924
	SO-6 2001	1.14	0.82	1.386

Note: Assumes average travel speed consistent with information provided by Moffett and Nichol that includes idling and loading/unloading activities.

Total One-Way Trips	8
Construction Days	4
Trips per Day	2

Table 11. Barge Emission Factors

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
1	- Implies 25-50 hp	1	50	1987	MY1987HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
2	- Implies 25-50 hp	1	50	1988	MY1988HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
3	- Implies 25-50 hp	1	50	1989	MY1989HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
4	- Implies 25-50 hp	1	50	1990	MY1990HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
5	- Implies 25-50 hp	1	50	1991	MY1991HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
6	- Implies 25-50 hp	1	50	1992	MY1992HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
7	- Implies 25-50 hp	1	50	1993	MY1993HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
8	- Implies 25-50 hp	1	50	1994	MY1994HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
9	- Implies 25-50 hp	1	50	1995	MY1995HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
10	- Implies 25-50 hp	1	50	1996	MY1996HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
11	- Implies 25-50 hp	1	50	1997	MY1997HP1	1.84	3.65	8.142	0.722	2.1896	5.15	6.9	0.638	184.158502
12	- Implies 25-50 hp	1	50	1998	MY1998HP1	1.8	3.65	8.142	0.722	2.142	5.15	6.9	0.638	184.158502
13	- Implies 25-50 hp	1	50	1999	MY1999HP1	1.8	3.65	8.142	0.722	2.142	5.15	6.9	0.638	184.158502
14	- Implies 25-50 hp	1	50	2000	MY2000HP1	1.8	3.65	7.31	0.722	2.142	5.15	6.9	0.638	184.158502
15	- Implies 25-50 hp	1	50	2001	MY2001HP1	1.8	3.65	7.31	0.722	2.142	5.15	6.9	0.638	184.158502
16	- Implies 25-50 hp	1	50	2002	MY2002HP1	1.8	3.65	7.31	0.722	2.142	5.15	6.9	0.638	184.158502
17	- Implies 25-50 hp	1	50	2003	MY2003HP1	1.8	3.65	7.31	0.722	2.142	5.15	6.9	0.638	184.158502
18	- Implies 25-50 hp	1	50	2004	MY2004HP1	1.8	3.65	7.31	0.722	2.142	5.15	6.9	0.638	184.158502
19	- Implies 25-50 hp	1	50	2005	MY2005HP1	1.8	3.73	5.32	0.3	2.142	3.73	5.32	0.3	184.158502
20	- Implies 25-50 hp	1	50	2006	MY2006HP1	1.8	3.73	5.32	0.3	2.142	3.73	5.32	0.3	184.158502
21	- Implies 25-50 hp	1	50	2007	MY2007HP1	1.8	3.73	5.32	0.3	2.142	3.73	5.32	0.3	184.158502
22	- Implies 25-50 hp	1	50	2008	MY2008HP1	1.8	3.73	5.32	0.3	2.142	3.73	5.32	0.3	184.158502
23	- Implies 25-50 hp	1	50	2009	MY2009HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
24	- Implies 25-50 hp	1	50	2010	MY2010HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
25	- Implies 25-50 hp	1	50	2011	MY2011HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
26	- Implies 25-50 hp	1	50	2012	MY2012HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
27	- Implies 25-50 hp	1	50	2013	MY2013HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
28	- Implies 25-50 hp	1	50	2014	MY2014HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
29	- Implies 25-50 hp	1	50	2015	MY2015HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
30	- Implies 25-50 hp	1	50	2016	MY2016HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
31	- Implies 25-50 hp	1	50	2017	MY2017HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
32	- Implies 25-50 hp	1	50	2018	MY2018HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
33	- Implies 25-50 hp	1	50	2019	MY2019HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
34	- Implies 25-50 hp	1	50	2020	MY2020HP1	1.8	3.73	5.32	0.22	2.142	3.73	5.32	0.22	184.158502
35	- Implies 51-120 hp	2	120	1987	MY1987HP2	1.44	3.504	15.34	0.798	1.7136	4.944	13	0.706	184.158502
36	- Implies 51-120 hp	2	120	1988	MY1988HP2	1.44	3.504	15.34	0.798	1.7136	4.944	13	0.706	184.158502
37	- Implies 51-120 hp	2	120	1989	MY1989HP2	1.44	3.504	15.34	0.798	1.7136	4.944	13	0.706	184.158502
38	- Implies 51-120 hp	2	120	1990	MY1990HP2	1.44	3.504	15.34	0.798	1.7136	4.944	13	0.706	184.158502
39	- Implies 51-120 hp	2	120	1991	MY1991HP2	1.44	3.504	15.34	0.798	1.7136	4.944	13	0.706	184.158502
40	- Implies 51-120 hp	2	120	1992	MY1992HP2	1.44	3.504	15.34	0.798	1.7136	4.944	13	0.706	184.158502
41	- Implies 51-120 hp	2	120	1993	MY1993HP2	1.44	3.504	15.34	0.798	1.7136	4.944	13	0.706	184.158502
42	- Implies 51-120 hp	2	120	1994	MY1994HP2	1.44	3.504	15.34	0.798	1.7136	4.944	13	0.706	184.158502
43	- Implies 51-120 hp	2	120	1995	MY1995HP2	1.44	3.504	15.34	0.798	1.7136	4.944	13	0.706	184.158502
44	- Implies 51-120 hp	2	120	1996	MY1996HP2	1.44	3.504	15.34	0.798	1.7136	4.944	13	0.706	184.158502
45	- Implies 51-120 hp	2	120	1997	MY1997HP2	0.99	2.548	10.325	0.656	1.1781	3.595	8.75	0.58	184.158502
46	- Implies 51-120 hp	2	120	1998	MY1998HP2	0.99	2.548	10.325	0.656	1.1781	3.595	8.75	0.58	184.158502
47	- Implies 51-120 hp	2	120	1999	MY1999HP2	0.99	2.548	10.325	0.656	1.1781	3.595	8.75	0.58	184.158502
48	- Implies 51-120 hp	2	120	2000	MY2000HP2	0.99	2.548	7.31	0.656	1.1781	3.595	7.31	0.58	184.158502
49	- Implies 51-120 hp	2	120	2001	MY2001HP2	0.99	2.548	7.31	0.656	1.1781	3.595	7.31	0.58	184.158502
50	- Implies 51-120 hp	2	120	2002	MY2002HP2	0.99	2.548	7.31	0.656	1.1781	3.595	7.31	0.58	184.158502
51	- Implies 51-120 hp	2	120	2003	MY2003HP2	0.99	2.548	7.31	0.656	1.1781	3.595	7.31	0.58	184.158502
52	- Implies 51-120 hp	2	120	2004	MY2004HP2	0.99	2.548	7.31	0.656	1.1781	3.595	7.31	0.58	184.158502
53	- Implies 51-120 hp	2	120	2005	MY2005HP2	0.99	3.73	5.32	0.3	1.1781	3.73	5.32	0.3	184.158502
54	- Implies 51-120 hp	2	120	2006	MY2006HP2	0.99	3.73	5.32	0.3	1.1781	3.73	5.32	0.3	184.158502
55	- Implies 51-120 hp	2	120	2007	MY2007HP2	0.99	3.73	5.32	0.3	1.1781	3.73	5.32	0.3	184.158502
56	- Implies 51-120 hp	2	120	2008	MY2008HP2	0.99	3.73	5.32	0.3	1.1781	3.73	5.32	0.3	184.158502
57	- Implies 51-120 hp	2	120	2009	MY2009HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
58	- Implies 51-120 hp	2	120	2010	MY2010HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
59	- Implies 51-120 hp	2	120	2011	MY2011HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
60	- Implies 51-120 hp	2	120	2012	MY2012HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
61	- Implies 51-120 hp	2	120	2013	MY2013HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
62	- Implies 51-120 hp	2	120	2014	MY2014HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
63	- Implies 51-120 hp	2	120	2015	MY2015HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
64	- Implies 51-120 hp	2	120	2016	MY2016HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
65	- Implies 51-120 hp	2	120	2017	MY2017HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
66	- Implies 51-120 hp	2	120	2018	MY2018HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
67	- Implies 51-120 hp	2	120	2019	MY2019HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502



ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
68	- Implies 51-120 hp	2	120	2020	MY2020HP2	0.99	3.73	5.32	0.22	1.1781	3.73	5.32	0.22	184.158502
69	- Implies 121-175 hp	3	175	1969	MY1969HP3	1.32	3.212	16.52	0.732	1.5708	4.532	14	0.647	184.158502
70	- Implies 121-175 hp	3	175	1970	MY1970HP3	1.32	3.212	16.52	0.732	1.5708	4.532	14	0.647	184.158502
71	- Implies 121-175 hp	3	175	1971	MY1971HP3	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
72	- Implies 121-175 hp	3	175	1972	MY1972HP3	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
73	- Implies 121-175 hp	3	175	1973	MY1973HP3	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
74	- Implies 121-175 hp	3	175	1974	MY1974HP3	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
75	- Implies 121-175 hp	3	175	1975	MY1975HP3	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
76	- Implies 121-175 hp	3	175	1976	MY1976HP3	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
77	- Implies 121-175 hp	3	175	1977	MY1977HP3	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
78	- Implies 121-175 hp	3	175	1978	MY1978HP3	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
79	- Implies 121-175 hp	3	175	1979	MY1979HP3	1	3.212	14.16	0.523	1.19	4.532	12	0.462	184.158502
80	- Implies 121-175 hp	3	175	1980	MY1980HP3	1	3.212	14.16	0.523	1.19	4.532	12	0.462	184.158502
81	- Implies 121-175 hp	3	175	1981	MY1981HP3	1	3.212	14.16	0.523	1.19	4.532	12	0.462	184.158502
82	- Implies 121-175 hp	3	175	1982	MY1982HP3	1	3.212	14.16	0.523	1.19	4.532	12	0.462	184.158502
83	- Implies 121-175 hp	3	175	1983	MY1983HP3	1	3.212	14.16	0.523	1.19	4.532	12	0.462	184.158502
84	- Implies 121-175 hp	3	175	1984	MY1984HP3	0.94	3.139	12.98	0.523	1.1186	4.429	11	0.462	184.158502
85	- Implies 121-175 hp	3	175	1985	MY1985HP3	0.94	3.139	12.98	0.523	1.1186	4.429	11	0.462	184.158502
86	- Implies 121-175 hp	3	175	1986	MY1986HP3	0.94	3.139	12.98	0.523	1.1186	4.429	11	0.462	184.158502
87	- Implies 121-175 hp	3	175	1987	MY1987HP3	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
88	- Implies 121-175 hp	3	175	1988	MY1988HP3	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
89	- Implies 121-175 hp	3	175	1989	MY1989HP3	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
90	- Implies 121-175 hp	3	175	1990	MY1990HP3	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
91	- Implies 121-175 hp	3	175	1991	MY1991HP3	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
92	- Implies 121-175 hp	3	175	1992	MY1992HP3	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
93	- Implies 121-175 hp	3	175	1993	MY1993HP3	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
94	- Implies 121-175 hp	3	175	1994	MY1994HP3	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
95	- Implies 121-175 hp	3	175	1995	MY1995HP3	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
96	- Implies 121-175 hp	3	175	1996	MY1996HP3	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
97	- Implies 121-175 hp	3	175	1997	MY1997HP3	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
98	- Implies 121-175 hp	3	175	1998	MY1998HP3	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
99	- Implies 121-175 hp	3	175	1999	MY1999HP3	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
100	- Implies 121-175 hp	3	175	2000	MY2000HP3	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
101	- Implies 121-175 hp	3	175	2001	MY2001HP3	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
102	- Implies 121-175 hp	3	175	2002	MY2002HP3	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
103	- Implies 121-175 hp	3	175	2003	MY2003HP3	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
104	- Implies 121-175 hp	3	175	2004	MY2004HP3	0.68	3.73	5.1015	0.22	0.8092	3.73	5.102	0.22	184.158502
105	- Implies 121-175 hp	3	175	2005	MY2005HP3	0.68	3.73	5.1015	0.22	0.8092	3.73	5.102	0.22	184.158502
106	- Implies 121-175 hp	3	175	2006	MY2006HP3	0.68	3.73	5.1015	0.22	0.8092	3.73	5.102	0.22	184.158502
107	- Implies 121-175 hp	3	175	2007	MY2007HP3	0.68	3.73	5.1015	0.22	0.8092	3.73	5.102	0.22	184.158502
108	- Implies 121-175 hp	3	175	2008	MY2008HP3	0.68	3.73	5.1015	0.22	0.8092	3.73	5.102	0.22	184.158502
109	- Implies 121-175 hp	3	175	2009	MY2009HP3	0.68	3.73	5.1015	0.22	0.8092	3.73	5.102	0.22	184.158502
110	- Implies 121-175 hp	3	175	2010	MY2010HP3	0.68	3.73	5.1015	0.22	0.8092	3.73	5.102	0.22	184.158502
111	- Implies 121-175 hp	3	175	2011	MY2011HP3	0.68	3.73	5.1015	0.22	0.8092	3.73	5.102	0.22	184.158502
112	- Implies 121-175 hp	3	175	2012	MY2012HP3	0.68	3.73	5.1015	0.22	0.8092	3.73	5.102	0.22	184.158502
113	- Implies 121-175 hp	3	175	2013	MY2013HP3	0.68	3.73	3.8	0.09	0.8092	3.73	3.8	0.09	184.158502
114	- Implies 121-175 hp	3	175	2014	MY2014HP3	0.68	3.73	3.8	0.09	0.8092	3.73	3.8	0.09	184.158502
115	- Implies 121-175 hp	3	175	2015	MY2015HP3	0.68	3.73	3.8	0.09	0.8092	3.73	3.8	0.09	184.158502
116	- Implies 121-175 hp	3	175	2016	MY2016HP3	0.68	3.73	3.8	0.09	0.8092	3.73	3.8	0.09	184.158502
117	- Implies 121-175 hp	3	175	2017	MY2017HP3	0.68	3.73	3.8	0.09	0.8092	3.73	3.8	0.09	184.158502
118	- Implies 121-175 hp	3	175	2018	MY2018HP3	0.68	3.73	3.8	0.09	0.8092	3.73	3.8	0.09	184.158502
119	- Implies 121-175 hp	3	175	2019	MY2019HP3	0.68	3.73	3.8	0.09	0.8092	3.73	3.8	0.09	184.158502
120	- Implies 121-175 hp	3	175	2020	MY2020HP3	0.68	3.73	3.8	0.09	0.8092	3.73	3.8	0.09	184.158502
121	- Implies 176-250 hp	4	250	1969	MY1969HP4	1.32	3.212	16.52	0.732	1.5708	4.532	14	0.647	184.158502
122	- Implies 176-250 hp	4	250	1970	MY1970HP4	1.32	3.212	16.52	0.732	1.5708	4.532	14	0.647	184.158502
123	- Implies 176-250 hp	4	250	1971	MY1971HP4	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
124	- Implies 176-250 hp	4	250	1972	MY1972HP4	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
125	- Implies 176-250 hp	4	250	1973	MY1973HP4	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
126	- Implies 176-250 hp	4	250	1974	MY1974HP4	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
127	- Implies 176-250 hp	4	250	1975	MY1975HP4	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
128	- Implies 176-250 hp	4	250	1976	MY1976HP4	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
129	- Implies 176-250 hp	4	250	1977	MY1977HP4	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
130	- Implies 176-250 hp	4	250	1978	MY1978HP4	1.1	3.212	15.34	0.627	1.309	4.532	13	0.554	184.158502
131	- Implies 176-250 hp	4	250	1979	MY1979HP4	1	3.212	14.16	0.523	1.19	4.532	12	0.462	184.158502
132	- Implies 176-250 hp	4	250	1980	MY1980HP4	1	3.212	14.16	0.523	1.19	4.532	12	0.462	184.158502
133	- Implies 176-250 hp	4	250	1981	MY1981HP4	1	3.212	14.16	0.523	1.19	4.532	12	0.462	184.158502
134	- Implies 176-250 hp	4	250	1982	MY1982HP4	1	3.212	14.16	0.523	1.19	4.532	12	0.462	184.158502
135	- Implies 176-250 hp	4	250	1983	MY1983HP4	1	3.212	14.16	0.523	1.19	4.532	12	0.462	184.158502
136	- Implies 176-250 hp	4	250	1984	MY1984HP4	0.94	3.139	12.98	0.523	1.1186	4.429	11	0.462	184.158502
137	- Implies 176-250 hp	4	250	1985	MY1985HP4	0.94	3.139	12.98	0.523	1.1186	4.429	11	0.462	184.158502

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
138	- Implies 176-250 hp	4	250	1986	MY1986HP4	0.94	3.139	12.98	0.523	1.1186	4.429	11	0.462	184.158502
139	- Implies 176-250 hp	4	250	1987	MY1987HP4	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
140	- Implies 176-250 hp	4	250	1988	MY1988HP4	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
141	- Implies 176-250 hp	4	250	1989	MY1989HP4	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
142	- Implies 176-250 hp	4	250	1990	MY1990HP4	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
143	- Implies 176-250 hp	4	250	1991	MY1991HP4	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
144	- Implies 176-250 hp	4	250	1992	MY1992HP4	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
145	- Implies 176-250 hp	4	250	1993	MY1993HP4	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
146	- Implies 176-250 hp	4	250	1994	MY1994HP4	0.88	3.066	12.98	0.523	1.0472	4.326	11	0.462	184.158502
147	- Implies 176-250 hp	4	250	1995	MY1995HP4	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
148	- Implies 176-250 hp	4	250	1996	MY1996HP4	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
149	- Implies 176-250 hp	4	250	1997	MY1997HP4	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
150	- Implies 176-250 hp	4	250	1998	MY1998HP4	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
151	- Implies 176-250 hp	4	250	1999	MY1999HP4	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
152	- Implies 176-250 hp	4	250	2000	MY2000HP4	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
153	- Implies 176-250 hp	4	250	2001	MY2001HP4	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
154	- Implies 176-250 hp	4	250	2002	MY2002HP4	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
155	- Implies 176-250 hp	4	250	2003	MY2003HP4	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
156	- Implies 176-250 hp	4	250	2004	MY2004HP4	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
157	- Implies 176-250 hp	4	250	2005	MY2005HP4	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
158	- Implies 176-250 hp	4	250	2006	MY2006HP4	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
159	- Implies 176-250 hp	4	250	2007	MY2007HP4	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
160	- Implies 176-250 hp	4	250	2008	MY2008HP4	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
161	- Implies 176-250 hp	4	250	2009	MY2009HP4	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
162	- Implies 176-250 hp	4	250	2010	MY2010HP4	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
163	- Implies 176-250 hp	4	250	2011	MY2011HP4	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
164	- Implies 176-250 hp	4	250	2012	MY2012HP4	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
165	- Implies 176-250 hp	4	250	2013	MY2013HP4	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
166	- Implies 176-250 hp	4	250	2014	MY2014HP4	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
167	- Implies 176-250 hp	4	250	2015	MY2015HP4	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
168	- Implies 176-250 hp	4	250	2016	MY2016HP4	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
169	- Implies 176-250 hp	4	250	2017	MY2017HP4	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
170	- Implies 176-250 hp	4	250	2018	MY2018HP4	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
171	- Implies 176-250 hp	4	250	2019	MY2019HP4	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
172	- Implies 176-250 hp	4	250	2020	MY2020HP4	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
173	- Implies 251-500 hp	5	500	1969	MY1969HP5	1.26	3.066	16.52	0.703	1.4994	4.326	14	0.622	184.158502
174	- Implies 251-500 hp	5	500	1970	MY1970HP5	1.26	3.066	16.52	0.703	1.4994	4.326	14	0.622	184.158502
175	- Implies 251-500 hp	5	500	1971	MY1971HP5	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
176	- Implies 251-500 hp	5	500	1972	MY1972HP5	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
177	- Implies 251-500 hp	5	500	1973	MY1973HP5	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
178	- Implies 251-500 hp	5	500	1974	MY1974HP5	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
179	- Implies 251-500 hp	5	500	1975	MY1975HP5	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
180	- Implies 251-500 hp	5	500	1976	MY1976HP5	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
181	- Implies 251-500 hp	5	500	1977	MY1977HP5	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
182	- Implies 251-500 hp	5	500	1978	MY1978HP5	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
183	- Implies 251-500 hp	5	500	1979	MY1979HP5	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
184	- Implies 251-500 hp	5	500	1980	MY1980HP5	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
185	- Implies 251-500 hp	5	500	1981	MY1981HP5	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
186	- Implies 251-500 hp	5	500	1982	MY1982HP5	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
187	- Implies 251-500 hp	5	500	1983	MY1983HP5	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
188	- Implies 251-500 hp	5	500	1984	MY1984HP5	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
189	- Implies 251-500 hp	5	500	1985	MY1985HP5	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
190	- Implies 251-500 hp	5	500	1986	MY1986HP5	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
191	- Implies 251-500 hp	5	500	1987	MY1987HP5	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
192	- Implies 251-500 hp	5	500	1988	MY1988HP5	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
193	- Implies 251-500 hp	5	500	1989	MY1989HP5	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
194	- Implies 251-500 hp	5	500	1990	MY1990HP5	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
195	- Implies 251-500 hp	5	500	1991	MY1991HP5	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
196	- Implies 251-500 hp	5	500	1992	MY1992HP5	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
197	- Implies 251-500 hp	5	500	1993	MY1993HP5	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
198	- Implies 251-500 hp	5	500	1994	MY1994HP5	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
199	- Implies 251-500 hp	5	500	1995	MY1995HP5	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
200	- Implies 251-500 hp	5	500	1996	MY1996HP5	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
201	- Implies 251-500 hp	5	500	1997	MY1997HP5	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
202	- Implies 251-500 hp	5	500	1998	MY1998HP5	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
203	- Implies 251-500 hp	5	500	1999	MY1999HP5	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
204	- Implies 251-500 hp	5	500	2000	MY2000HP5	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
205	- Implies 251-500 hp	5	500	2001	MY2001HP5	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
206	- Implies 251-500 hp	5	500	2002	MY2002HP5	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
207	- Implies 251-500 hp	5	500	2003	MY2003HP5	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
208	- Implies 251-500 hp	5	500	2004	MY2004HP5	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
209	- Implies 251-500 hp	5	500	2005	MY2005HP5	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
210	- Implies 251-500 hp	5	500	2006	MY2006HP5	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
211	- Implies 251-500 hp	5	500	2007	MY2007HP5	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
212	- Implies 251-500 hp	5	500	2008	MY2008HP5	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
213	- Implies 251-500 hp	5	500	2009	MY2009HP5	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
214	- Implies 251-500 hp	5	500	2010	MY2010HP5	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
215	- Implies 251-500 hp	5	500	2011	MY2011HP5	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
216	- Implies 251-500 hp	5	500	2012	MY2012HP5	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
217	- Implies 251-500 hp	5	500	2013	MY2013HP5	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
218	- Implies 251-500 hp	5	500	2014	MY2014HP5	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
219	- Implies 251-500 hp	5	500	2015	MY2015HP5	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
220	- Implies 251-500 hp	5	500	2016	MY2016HP5	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
221	- Implies 251-500 hp	5	500	2017	MY2017HP5	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
222	- Implies 251-500 hp	5	500	2018	MY2018HP5	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
223	- Implies 251-500 hp	5	500	2019	MY2019HP5	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
224	- Implies 251-500 hp	5	500	2020	MY2020HP5	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
225	- Implies 501-750 hp	6	750	1969	MY1969HP6	1.26	3.066	16.52	0.703	1.4994	4.326	14	0.622	184.158502
226	- Implies 501-750 hp	6	750	1970	MY1970HP6	1.26	3.066	16.52	0.703	1.4994	4.326	14	0.622	184.158502
227	- Implies 501-750 hp	6	750	1971	MY1971HP6	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
228	- Implies 501-750 hp	6	750	1972	MY1972HP6	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
229	- Implies 501-750 hp	6	750	1973	MY1973HP6	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
230	- Implies 501-750 hp	6	750	1974	MY1974HP6	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
231	- Implies 501-750 hp	6	750	1975	MY1975HP6	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
232	- Implies 501-750 hp	6	750	1976	MY1976HP6	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
233	- Implies 501-750 hp	6	750	1977	MY1977HP6	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
234	- Implies 501-750 hp	6	750	1978	MY1978HP6	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
235	- Implies 501-750 hp	6	750	1979	MY1979HP6	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
236	- Implies 501-750 hp	6	750	1980	MY1980HP6	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
237	- Implies 501-750 hp	6	750	1981	MY1981HP6	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
238	- Implies 501-750 hp	6	750	1982	MY1982HP6	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
239	- Implies 501-750 hp	6	750	1983	MY1983HP6	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
240	- Implies 501-750 hp	6	750	1984	MY1984HP6	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
241	- Implies 501-750 hp	6	750	1985	MY1985HP6	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
242	- Implies 501-750 hp	6	750	1986	MY1986HP6	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
243	- Implies 501-750 hp	6	750	1987	MY1987HP6	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
244	- Implies 501-750 hp	6	750	1988	MY1988HP6	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
245	- Implies 501-750 hp	6	750	1989	MY1989HP6	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
246	- Implies 501-750 hp	6	750	1990	MY1990HP6	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
247	- Implies 501-750 hp	6	750	1991	MY1991HP6	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
248	- Implies 501-750 hp	6	750	1992	MY1992HP6	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
249	- Implies 501-750 hp	6	750	1993	MY1993HP6	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
250	- Implies 501-750 hp	6	750	1994	MY1994HP6	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
251	- Implies 501-750 hp	6	750	1995	MY1995HP6	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
252	- Implies 501-750 hp	6	750	1996	MY1996HP6	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
253	- Implies 501-750 hp	6	750	1997	MY1997HP6	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
254	- Implies 501-750 hp	6	750	1998	MY1998HP6	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
255	- Implies 501-750 hp	6	750	1999	MY1999HP6	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
256	- Implies 501-750 hp	6	750	2000	MY2000HP6	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
257	- Implies 501-750 hp	6	750	2001	MY2001HP6	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
258	- Implies 501-750 hp	6	750	2002	MY2002HP6	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
259	- Implies 501-750 hp	6	750	2003	MY2003HP6	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
260	- Implies 501-750 hp	6	750	2004	MY2004HP6	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
261	- Implies 501-750 hp	6	750	2005	MY2005HP6	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
262	- Implies 501-750 hp	6	750	2006	MY2006HP6	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
263	- Implies 501-750 hp	6	750	2007	MY2007HP6	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
264	- Implies 501-750 hp	6	750	2008	MY2008HP6	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
265	- Implies 501-750 hp	6	750	2009	MY2009HP6	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
266	- Implies 501-750 hp	6	750	2010	MY2010HP6	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
267	- Implies 501-750 hp	6	750	2011	MY2011HP6	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
268	- Implies 501-750 hp	6	750	2012	MY2012HP6	0.68	3.73	5.1015	0.15	0.8092	3.73	5.102	0.15	184.158502
269	- Implies 501-750 hp	6	750	2013	MY2013HP6	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
270	- Implies 501-750 hp	6	750	2014	MY2014HP6	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
271	- Implies 501-750 hp	6	750	2015	MY2015HP6	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
272	- Implies 501-750 hp	6	750	2016	MY2016HP6	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
273	- Implies 501-750 hp	6	750	2017	MY2017HP6	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
274	- Implies 501-750 hp	6	750	2018	MY2018HP6	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
275	- Implies 501-750 hp	6	750	2019	MY2019HP6	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
276	- Implies 501-750 hp	6	750	2020	MY2020HP6	0.68	3.73	3.99	0.08	0.8092	3.73	3.99	0.08	184.158502
277	- Implies 751-1900 hp	7	1900	1969	MY1969HP7	1.26	3.066	16.52	0.703	1.4994	4.326	14	0.622	184.158502

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
278	- Implies 751-1900 hp	7	1900	1970	MY1970HP7	1.26	3.066	16.52	0.703	1.4994	4.326	14	0.622	184.158502
279	- Implies 751-1900 hp	7	1900	1971	MY1971HP7	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
280	- Implies 751-1900 hp	7	1900	1972	MY1972HP7	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
281	- Implies 751-1900 hp	7	1900	1973	MY1973HP7	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
282	- Implies 751-1900 hp	7	1900	1974	MY1974HP7	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
283	- Implies 751-1900 hp	7	1900	1975	MY1975HP7	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
284	- Implies 751-1900 hp	7	1900	1976	MY1976HP7	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
285	- Implies 751-1900 hp	7	1900	1977	MY1977HP7	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
286	- Implies 751-1900 hp	7	1900	1978	MY1978HP7	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
287	- Implies 751-1900 hp	7	1900	1979	MY1979HP7	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
288	- Implies 751-1900 hp	7	1900	1980	MY1980HP7	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
289	- Implies 751-1900 hp	7	1900	1981	MY1981HP7	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
290	- Implies 751-1900 hp	7	1900	1982	MY1982HP7	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
291	- Implies 751-1900 hp	7	1900	1983	MY1983HP7	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
292	- Implies 751-1900 hp	7	1900	1984	MY1984HP7	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
293	- Implies 751-1900 hp	7	1900	1985	MY1985HP7	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
294	- Implies 751-1900 hp	7	1900	1986	MY1986HP7	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
295	- Implies 751-1900 hp	7	1900	1987	MY1987HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
296	- Implies 751-1900 hp	7	1900	1988	MY1988HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
297	- Implies 751-1900 hp	7	1900	1989	MY1989HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
298	- Implies 751-1900 hp	7	1900	1990	MY1990HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
299	- Implies 751-1900 hp	7	1900	1991	MY1991HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
300	- Implies 751-1900 hp	7	1900	1992	MY1992HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
301	- Implies 751-1900 hp	7	1900	1993	MY1993HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
302	- Implies 751-1900 hp	7	1900	1994	MY1994HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
303	- Implies 751-1900 hp	7	1900	1995	MY1995HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
304	- Implies 751-1900 hp	7	1900	1996	MY1996HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
305	- Implies 751-1900 hp	7	1900	1997	MY1997HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
306	- Implies 751-1900 hp	7	1900	1998	MY1998HP7	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
307	- Implies 751-1900 hp	7	1900	1999	MY1999HP7	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
308	- Implies 751-1900 hp	7	1900	2000	MY2000HP7	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
309	- Implies 751-1900 hp	7	1900	2001	MY2001HP7	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
310	- Implies 751-1900 hp	7	1900	2002	MY2002HP7	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
311	- Implies 751-1900 hp	7	1900	2003	MY2003HP7	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
312	- Implies 751-1900 hp	7	1900	2004	MY2004HP7	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
313	- Implies 751-1900 hp	7	1900	2005	MY2005HP7	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
314	- Implies 751-1900 hp	7	1900	2006	MY2006HP7	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
315	- Implies 751-1900 hp	7	1900	2007	MY2007HP7	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
316	- Implies 751-1900 hp	7	1900	2008	MY2008HP7	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
317	- Implies 751-1900 hp	7	1900	2009	MY2009HP7	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
318	- Implies 751-1900 hp	7	1900	2010	MY2010HP7	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
319	- Implies 751-1900 hp	7	1900	2011	MY2011HP7	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
320	- Implies 751-1900 hp	7	1900	2012	MY2012HP7	0.68	3.73	4.085	0.08	0.8092	3.73	4.085	0.08	184.158502
321	- Implies 751-1900 hp	7	1900	2013	MY2013HP7	0.68	3.73	4.085	0.08	0.8092	3.73	4.085	0.08	184.158502
322	- Implies 751-1900 hp	7	1900	2014	MY2014HP7	0.68	3.73	4.085	0.08	0.8092	3.73	4.085	0.08	184.158502
323	- Implies 751-1900 hp	7	1900	2015	MY2015HP7	0.68	3.73	4.085	0.08	0.8092	3.73	4.085	0.08	184.158502
324	- Implies 751-1900 hp	7	1900	2016	MY2016HP7	0.68	3.73	4.085	0.08	0.8092	3.73	4.085	0.08	184.158502
325	- Implies 751-1900 hp	7	1900	2017	MY2017HP7	0.177295	3.73	1.3	0.03	0.177295	3.73	1.3	0.03	184.158502
326	- Implies 751-1900 hp	7	1900	2018	MY2018HP7	0.177295	3.73	1.3	0.03	0.177295	3.73	1.3	0.03	184.158502
327	- Implies 751-1900 hp	7	1900	2019	MY2019HP7	0.177295	3.73	1.3	0.03	0.177295	3.73	1.3	0.03	184.158502
328	- Implies 751-1900 hp	7	1900	2020	MY2020HP7	0.177295	3.73	1.3	0.03	0.177295	3.73	1.3	0.03	184.158502
329	- Implies 1901-3300 hp	8	3300	1969	MY1969HP8	1.26	3.066	16.52	0.703	1.4994	4.326	14	0.622	184.158502
330	- Implies 1901-3300 hp	8	3300	1970	MY1970HP8	1.26	3.066	16.52	0.703	1.4994	4.326	14	0.622	184.158502
331	- Implies 1901-3300 hp	8	3300	1971	MY1971HP8	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
332	- Implies 1901-3300 hp	8	3300	1972	MY1972HP8	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
333	- Implies 1901-3300 hp	8	3300	1973	MY1973HP8	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
334	- Implies 1901-3300 hp	8	3300	1974	MY1974HP8	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
335	- Implies 1901-3300 hp	8	3300	1975	MY1975HP8	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
336	- Implies 1901-3300 hp	8	3300	1976	MY1976HP8	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
337	- Implies 1901-3300 hp	8	3300	1977	MY1977HP8	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
338	- Implies 1901-3300 hp	8	3300	1978	MY1978HP8	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
339	- Implies 1901-3300 hp	8	3300	1979	MY1979HP8	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
340	- Implies 1901-3300 hp	8	3300	1980	MY1980HP8	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
341	- Implies 1901-3300 hp	8	3300	1981	MY1981HP8	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
342	- Implies 1901-3300 hp	8	3300	1982	MY1982HP8	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
343	- Implies 1901-3300 hp	8	3300	1983	MY1983HP8	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
344	- Implies 1901-3300 hp	8	3300	1984	MY1984HP8	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
345	- Implies 1901-3300 hp	8	3300	1985	MY1985HP8	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
346	- Implies 1901-3300 hp	8	3300	1986	MY1986HP8	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
347	- Implies 1901-3300 hp	8	3300	1987	MY1987HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502



ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
348	- Implies 1901-3300 hp	8	3300	1988	MY1988HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
349	- Implies 1901-3300 hp	8	3300	1989	MY1989HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
350	- Implies 1901-3300 hp	8	3300	1990	MY1990HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
351	- Implies 1901-3300 hp	8	3300	1991	MY1991HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
352	- Implies 1901-3300 hp	8	3300	1992	MY1992HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
353	- Implies 1901-3300 hp	8	3300	1993	MY1993HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
354	- Implies 1901-3300 hp	8	3300	1994	MY1994HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
355	- Implies 1901-3300 hp	8	3300	1995	MY1995HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
356	- Implies 1901-3300 hp	8	3300	1996	MY1996HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
357	- Implies 1901-3300 hp	8	3300	1997	MY1997HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
358	- Implies 1901-3300 hp	8	3300	1998	MY1998HP8	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
359	- Implies 1901-3300 hp	8	3300	1999	MY1999HP8	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
360	- Implies 1901-3300 hp	8	3300	2000	MY2000HP8	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
361	- Implies 1901-3300 hp	8	3300	2001	MY2001HP8	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
362	- Implies 1901-3300 hp	8	3300	2002	MY2002HP8	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
363	- Implies 1901-3300 hp	8	3300	2003	MY2003HP8	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
364	- Implies 1901-3300 hp	8	3300	2004	MY2004HP8	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
365	- Implies 1901-3300 hp	8	3300	2005	MY2005HP8	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
366	- Implies 1901-3300 hp	8	3300	2006	MY2006HP8	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
367	- Implies 1901-3300 hp	8	3300	2007	MY2007HP8	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
368	- Implies 1901-3300 hp	8	3300	2008	MY2008HP8	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
369	- Implies 1901-3300 hp	8	3300	2009	MY2009HP8	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
370	- Implies 1901-3300 hp	8	3300	2010	MY2010HP8	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
371	- Implies 1901-3300 hp	8	3300	2011	MY2011HP8	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
372	- Implies 1901-3300 hp	8	3300	2012	MY2012HP8	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
373	- Implies 1901-3300 hp	8	3300	2013	MY2013HP8	0.68	3.73	4.37	0.1	0.8092	3.73	4.37	0.1	184.158502
374	- Implies 1901-3300 hp	8	3300	2014	MY2014HP8	0.68	3.73	4.37	0.1	0.8092	3.73	4.37	0.1	184.158502
375	- Implies 1901-3300 hp	8	3300	2015	MY2015HP8	0.68	3.73	4.37	0.1	0.8092	3.73	4.37	0.1	184.158502
376	- Implies 1901-3300 hp	8	3300	2016	MY2016HP8	0.177295	3.73	1.3	0.03	0.177295	3.73	1.3	0.03	184.158502
377	- Implies 1901-3300 hp	8	3300	2017	MY2017HP8	0.177295	3.73	1.3	0.03	0.177295	3.73	1.3	0.03	184.158502
378	- Implies 1901-3300 hp	8	3300	2018	MY2018HP8	0.177295	3.73	1.3	0.03	0.177295	3.73	1.3	0.03	184.158502
379	- Implies 1901-3300 hp	8	3300	2019	MY2019HP8	0.177295	3.73	1.3	0.03	0.177295	3.73	1.3	0.03	184.158502
380	- Implies 1901-3300 hp	8	3300	2020	MY2020HP8	0.177295	3.73	1.3	0.03	0.177295	3.73	1.3	0.03	184.158502
381	- Implies >3301-5000 hp	9	5000	1969	MY1969HP9	1.26	3.066	16.52	0.703	1.4994	4.326	14	0.622	184.158502
382	- Implies >3301-5000 hp	9	5000	1970	MY1970HP9	1.26	3.066	16.52	0.703	1.4994	4.326	14	0.622	184.158502

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
383	- Implies >3301-5000 hp	9	5000	1971	MY1971HP9	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
384	- Implies >3301-5000 hp	9	5000	1972	MY1972HP9	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
385	- Implies >3301-5000 hp	9	5000	1973	MY1973HP9	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
386	- Implies >3301-5000 hp	9	5000	1974	MY1974HP9	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
387	- Implies >3301-5000 hp	9	5000	1975	MY1975HP9	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
388	- Implies >3301-5000 hp	9	5000	1976	MY1976HP9	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
389	- Implies >3301-5000 hp	9	5000	1977	MY1977HP9	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
390	- Implies >3301-5000 hp	9	5000	1978	MY1978HP9	1.05	3.066	15.34	0.599	1.2495	4.326	13	0.529	184.158502
391	- Implies >3301-5000 hp	9	5000	1979	MY1979HP9	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
392	- Implies >3301-5000 hp	9	5000	1980	MY1980HP9	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
393	- Implies >3301-5000 hp	9	5000	1981	MY1981HP9	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
394	- Implies >3301-5000 hp	9	5000	1982	MY1982HP9	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
395	- Implies >3301-5000 hp	9	5000	1983	MY1983HP9	0.95	3.066	14.16	0.504	1.1305	4.326	12	0.445	184.158502
396	- Implies >3301-5000 hp	9	5000	1984	MY1984HP9	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
397	- Implies >3301-5000 hp	9	5000	1985	MY1985HP9	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
398	- Implies >3301-5000 hp	9	5000	1986	MY1986HP9	0.9	3.066	12.98	0.504	1.071	4.326	11	0.445	184.158502
399	- Implies >3301-5000 hp	9	5000	1987	MY1987HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
400	- Implies >3301-5000 hp	9	5000	1988	MY1988HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
401	- Implies >3301-5000 hp	9	5000	1989	MY1989HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
402	- Implies >3301-5000 hp	9	5000	1990	MY1990HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
403	- Implies >3301-5000 hp	9	5000	1991	MY1991HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
404	- Implies >3301-5000 hp	9	5000	1992	MY1992HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
405	- Implies >3301-5000 hp	9	5000	1993	MY1993HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
406	- Implies >3301-5000 hp	9	5000	1994	MY1994HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
407	- Implies >3301-5000 hp	9	5000	1995	MY1995HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
408	- Implies >3301-5000 hp	9	5000	1996	MY1996HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
409	- Implies >3301-5000 hp	9	5000	1997	MY1997HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
410	- Implies >3301-5000 hp	9	5000	1998	MY1998HP9	0.84	2.993	12.98	0.504	0.9996	4.223	11	0.445	184.158502
411	- Implies >3301-5000 hp	9	5000	1999	MY1999HP9	0.68	1.971	9.6406	0.361	0.8092	2.781	8.17	0.319	184.158502
412	- Implies >3301-5000 hp	9	5000	2000	MY2000HP9	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
413	- Implies >3301-5000 hp	9	5000	2001	MY2001HP9	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
414	- Implies >3301-5000 hp	9	5000	2002	MY2002HP9	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
415	- Implies >3301-5000 hp	9	5000	2003	MY2003HP9	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
416	- Implies >3301-5000 hp	9	5000	2004	MY2004HP9	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
417	- Implies >3301-5000 hp	9	5000	2005	MY2005HP9	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502

ID	HP Range	HP Category	MaxHP	Model Year	MY HP Group	ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel
418	- Implies >3301-5000 hp	9	5000	2006	MY2006HP9	0.68	1.971	7.31	0.361	0.8092	2.781	7.31	0.319	184.158502
419	- Implies >3301-5000 hp	9	5000	2007	MY2007HP9	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
420	- Implies >3301-5000 hp	9	5000	2008	MY2008HP9	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
421	- Implies >3301-5000 hp	9	5000	2009	MY2009HP9	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
422	- Implies >3301-5000 hp	9	5000	2010	MY2010HP9	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
423	- Implies >3301-5000 hp	9	5000	2011	MY2011HP9	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
424	- Implies >3301-5000 hp	9	5000	2012	MY2012HP9	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
425	- Implies >3301-5000 hp	9	5000	2013	MY2013HP9	0.68	3.73	5.529	0.2	0.8092	3.73	5.529	0.2	184.158502
426	- Implies >3301-5000 hp	9	5000	2014	MY2014HP9	0.68	3.73	4.94	0.25	0.8092	3.75	4.94	0.25	184.158502
427	- Implies >3301-5000 hp	9	5000	2015	MY2015HP9	0.68	3.73	4.94	0.25	0.8092	3.75	4.94	0.25	184.158502
428	- Implies >3301-5000 hp	9	5000	2016	MY2016HP9	0.177295	3.73	1.3	0.03	0.177295	3.75	1.3	0.03	184.158502
429	- Implies >3301-5000 hp	9	5000	2017	MY2017HP9	0.177295	3.73	1.3	0.03	0.177295	3.75	1.3	0.03	184.158502
430	- Implies >3301-5000 hp	9	5000	2018	MY2018HP9	0.177295	3.73	1.3	0.03	0.177295	3.75	1.3	0.03	184.158502
431	- Implies >3301-5000 hp	9	5000	2019	MY2019HP9	0.177295	3.73	1.3	0.03	0.177295	3.75	1.3	0.03	184.158502
432	- Implies >3301-5000 hp	9	5000	2020	MY2020HP9	0.177295	3.73	1.3	0.03	0.177295	3.75	1.3	0.03	184.158502

Fleet Average

		ME ROG	ME CO	ME NOx	ME PM	AE ROG	AE CO	AE NOx	AE PM	Fuel	
2018 Avg. Emission Factors		50	1.80	3.71	5.82	0.36	2.14	4.09	5.72	0.34	184.16
500 hp 1000 hp	500	0.68	3.38	5.21	0.17	0.81	3.54	5.21	0.16	184.16	
	1000	0.60	3.11	5.16	0.20	0.71	3.40	5.16	0.19	184.16	
	3300	0.58	3.11	5.13	0.21	0.68	3.40	5.13	0.19	184.16	
	5000	0.58	3.11	5.25	0.23	0.68	3.40	5.25	0.21	184.16	
2020 Avg. Emission Factors		500	0.68	3.47	5.04	0.16	0.81	3.59	5.04	0.15	184.16
	1000	0.58	3.20	4.86	0.18	0.68	3.45	4.86	0.17	184.16	
	3300	0.55	3.20	4.83	0.19	0.65	3.45	4.83	0.18	184.16	
	5000	0.55	3.20	4.95	0.21	0.65	3.45	4.95	0.20	184.16	
Mitigated Emission Factors		Tier 2	0.39	4.17	0.16	0.39		4.17	0.16		

Table 12. Tier Emission Factors

	Low HP	High HP	ROG (g/bhp-hr)	CO (g/bhp-hr)	NOX (g/bhp-hr)	PM10 (g/bhp-hr)	PM2.5 (g/bhp-hr)
Tier 1	25	49	1.74	4.1	5.26	0.48	0.48
Tier 1	50	74	1.19	6.9	6.54	0.552	0.552
Tier 1	75	119	1.19	6.9	6.54	0.552	0.552
Tier 1	120	174	0.82	6.9	6.54	0.274	0.274
Tier 1	175	299	0.38	6.9	5.93	0.108	0.108
Tier 1	300	599	0.38	6.9	5.93	0.108	0.108
Tier 1	600	750	0.38	6.9	5.93	0.108	0.108
Tier 1	751	2000	0.38	6.9	5.93	0.108	0.108
Tier 2	25	49	0.29	4.1	4.63	0.28	0.28
Tier 2	50	74	0.23	3.7	4.75	0.192	0.192
Tier 2	75	119	0.23	3.7	4.75	0.192	0.192
Tier 2	120	174	0.19	3.7	4.17	0.128	0.128
Tier 2	175	299	0.12	2.6	4.15	0.088	0.088
Tier 2	300	599	0.12	2.6	3.79	0.088	0.088
Tier 2	600	750	0.12	2.6	3.79	0.088	0.088
Tier 2	751	2000	0.12	2.6	3.79	0.088	0.088
Tier 3	25	49	0.29	4.1	4.63	0.28	0.28
Tier 3	50	74	0.12	3.7	2.74	0.192	0.192
Tier 3	75	119	0.12	3.7	2.74	0.192	0.192
Tier 3	120	174	0.12	3.7	2.32	0.112	0.112
Tier 3	175	299	0.12	2.6	2.32	0.088	0.088
Tier 3	300	599	0.12	2.6	2.32	0.088	0.088
Tier 3	600	750	0.12	2.6	2.32	0.088	0.088
Tier 3	751	2000	0.12	2.6	2.32	0.088	0.088
Tier 4 Interim	25	49	0.12	4.1	4.55	0.128	0.128
Tier 4 Interim	50	74	0.12	3.7	2.74	0.112	0.112
Tier 4 Interim	75	119	0.11	3.7	2.14	0.008	0.008
Tier 4 Interim	120	174	0.06	3.7	2.15	0.008	0.008
Tier 4 Interim	175	299	0.08	2.6	1.29	0.008	0.008
Tier 4 Interim	300	599	0.08	2.6	1.29	0.008	0.008
Tier 4 Interim	600	750	0.08	2.6	1.29	0.008	0.008
Tier 4 Interim	751	2000	0.12	2.6	2.24	0.048	0.048
Tier 4	25	49	0.12	4.1	2.75	0.008	0.008
Tier 4	50	74	0.12	3.7	2.74	0.008	0.008
Tier 4	75	119	0.06	3.7	0.26	0.008	0.008
Tier 4	120	174	0.06	3.7	0.26	0.008	0.008
Tier 4	175	299	0.06	2.2	0.26	0.008	0.008
Tier 4	300	599	0.06	2.2	0.26	0.008	0.008
Tier 4	600	750	0.06	2.2	0.26	0.008	0.008
Tier 4	751	2000	0.06	2.6	2.24	0.016	0.016

APPENDIX I

AIR QUALITY AND GREENHOUSE GAS CALCULATIONS

Part 3

Alternative B1/B2, C1/C2, D1/D2 Mitigated Construction:

Dredged Material Placement

Subsequent Construction

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Table 1. Construction Emissions Summary – Alternative B

Construction Phase/Emissions Source	Diesel Emissions (lbs)					Metric Tons
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2e</sub>
<b>Mobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Site Preparation</b>	794.15	6023.25	7121.07	187.30	172.86	694.19
<b>Dredged Material Placement</b>	21245.39	287546.08	92846.11	6783.75	6745.28	21582.75
<b>Decommissioning</b>	437.42	3120.51	3003.00	108.19	99.64	290.75
<b>Demobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Restoration Project</b>	18.91	83.85	874.53	2.45	2.44	86.37
<b>Total Project</b>	22529.40	297014.97	104059.65	7088.75	7026.71	22676.54
<b>Average Daily Emissions (lbs/day)</b>	<b>46.31</b>	<b>610.56</b>	<b>213.91</b>	<b>14.57</b>	<b>14.44</b>	
<b>Average Annual Emissions (tons)</b>	<b>2.55</b>	<b>33.62</b>	<b>11.78</b>	<b>0.80</b>	<b>0.80</b>	
Amortized GHG Emissions						755.88
CEQA Construction Days	<b>486</b>					
NEPA Construction Months	<b>53</b>					

Construction Phase/Emissions Source	Electric Emissions (lbs/day)					Metric Tons
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2e</sub>
<b>Mobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Site Preparation</b>	794.15	6023.25	7121.07	187.30	172.86	694.19
<b>Dredged Material Placement</b>	1937.11	13623.10	13774.10	489.11	450.64	10330.17
<b>Decommissioning</b>	504.55	3577.21	3671.51	123.94	114.23	351.30
<b>Demobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Restoration Project</b>	18.91	83.85	874.53	2.45	2.44	86.37
<b>Total Project</b>	3288.24	23548.68	25656.15	809.86	746.66	11484.51
<b>Average Daily Emissions (lbs/day)</b>	<b>6.76</b>	<b>48.41</b>	<b>52.74</b>	<b>1.66</b>	<b>1.53</b>	
<b>Average Annual Emissions (tons)</b>	<b>0.37</b>	<b>2.67</b>	<b>2.90</b>	<b>0.09</b>	<b>0.08</b>	
Amortized GHG Emissions						382.82

Table 2. Construction Emissions Summary – Alternative C

<b>Diesel</b>						
<b>Construction Phase/Emissions Source</b>	<b>Emissions (lbs)</b>					<b>Metric Tons</b>
	<b>ROG</b>	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>CO<sub>2</sub>e</b>
<b>Mobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Site Preparation</b>	783.65	5876.08	6663.36	186.37	171.95	647.01
<b>Dredged Material Placement</b>	16770.01	226482.52	73166.31	5350.79	5318.80	16967.30
<b>Decommissioning</b>	435.15	3109.76	2876.26	107.92	99.38	276.96
<b>Demobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Restoration Project</b>	10.23	45.35	472.96	1.32	1.32	46.71
<b>Total Project</b>	18032.56	235754.97	83393.84	5653.46	5597.94	17960.47
<b>Average Daily Emissions (lbs/day)</b>	<b>44.75</b>	<b>585.12</b>	<b>206.97</b>	<b>14.03</b>	<b>13.89</b>	
<b>Average Annual Emissions (tons)</b>	<b>2.58</b>	<b>33.68</b>	<b>11.91</b>	<b>0.81</b>	<b>0.80</b>	
Amortized GHG Emissions						598.68
CEQA Construction Days	<b>403</b>					
NEPA Construction Months	<b>42</b>					

<b>Electric</b>						
<b>Construction Phase/Emissions Source</b>	<b>Emissions (lbs/day)</b>					<b>Metric Tons</b>
	<b>ROG</b>	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>CO<sub>2</sub>e</b>
<b>Mobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Site Preparation</b>	783.65	5876.08	6663.36	186.37	171.95	647.01
<b>Dredged Material Placement</b>	1601.26	11286.31	11046.67	405.66	373.68	8127.18
<b>Decommissioning</b>	502.03	3565.16	3533.22	123.65	113.95	335.30
<b>Demobilization</b>	16.76	120.63	107.47	3.53	3.25	11.24
<b>Restoration Project</b>	10.23	45.35	472.96	1.32	1.32	46.71
<b>Total Project</b>	2930.69	21014.16	21931.16	724.07	667.39	9178.70
<b>Average Daily Emissions (lbs/day)</b>	<b>7.27</b>	<b>52.15</b>	<b>54.43</b>	<b>1.80</b>	<b>1.66</b>	
<b>Average Annual Emissions (tons)</b>	<b>0.42</b>	<b>3.00</b>	<b>3.13</b>	<b>0.10</b>	<b>0.10</b>	
Amortized GHG Emissions						305.96



Table 3. Construction Emissions Summary – Alternative D

Construction Phase/Emissions Source	Diesel Emissions (lbs)					Metric Tons
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2e</sub>
Mobilization	16.57	119.59	98.23	3.51	3.23	9.48
Site Preparation	783.96	5971.71	6550.91	186.72	172.39	564.77
Dredged Material Placement	21256.12	287968.72	91472.20	6794.67	6756.42	21320.57
Decommissioning	431.66	3089.82	2729.94	107.64	99.13	238.58
Demobilization	16.57	119.59	98.23	3.51	3.23	9.48
Restoration Project	16.65	72.17	767.98	2.22	2.22	67.66
<b>Total Project</b>	<b>22521.53</b>	<b>297341.61</b>	<b>101717.48</b>	<b>7098.27</b>	<b>7036.62</b>	<b>22210.53</b>
<b>Average Daily Emissions (lbs/day)</b>	<b>46.27</b>	<b>610.83</b>	<b>208.96</b>	<b>14.58</b>	<b>14.46</b>	
<b>Average Annual Emissions (tons)</b>	<b>2.55</b>	<b>33.66</b>	<b>11.52</b>	<b>0.80</b>	<b>0.80</b>	
Amortized GHG Emissions						740.35
CEQA Construction Days	<b>487</b>					
NEPA Construction Months	<b>53</b>					

Construction Phase/Emissions Source	Electric Emissions (lbs/day)					Metric Tons
	ROG	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2e</sub>
Mobilization	16.57	119.59	98.23	3.51	3.23	9.48
Site Preparation	783.96	5971.71	6550.91	186.72	172.39	564.77
Dredged Material Placement	1906.51	13459.37	12230.92	486.56	448.30	10043.90
Decommissioning	498.54	3545.21	3386.90	123.37	113.70	296.92
Demobilization	16.57	119.59	98.23	3.51	3.23	9.48
Restoration Project	16.65	72.17	767.98	2.22	2.22	67.66
<b>Total Project</b>	<b>3238.79</b>	<b>23287.66</b>	<b>23133.17</b>	<b>805.89</b>	<b>743.07</b>	<b>10992.21</b>
<b>Average Daily Emissions (lbs/day)</b>	<b>6.65</b>	<b>47.84</b>	<b>47.52</b>	<b>1.66</b>	<b>1.53</b>	
<b>Average Annual Emissions (tons)</b>	<b>0.37</b>	<b>2.64</b>	<b>2.62</b>	<b>0.09</b>	<b>0.08</b>	
Amortized GHG Emissions						366.41

