



REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS  
WANAMAKER BUILDING, 100 PENN SQUARE EAST  
PHILADELPHIA, PENNSYLVANIA 19107-3391

CENAP-PL-E

United States Army Corps of Engineers, Philadelphia District  
DRAFT General Conformity Determination Notice

On October 30, 2012, New York State (DR-4085) and New Jersey State (DR-4086) declared Super Storm Sandy a Major Disaster. In response to the unprecedented breadth and scope of the damages sustained along the New York and New Jersey coastlines, the U.S. Congress passed Public Law (PL) 113-2 "Disaster Relief Appropriations Act 2013", also known as House Resolution (H.R.) 152-2 Title II which was signed into law on January 29, 2013. PL 113-2, which states "That the amounts... are designated by the Congress as being for an emergency requirement pursuant to section 251(b)(2)(A)(i) of the Balanced Budget and Emergency Deficit Control Act of 1985", provides funding for numerous projects to repair, restore and fortify the coastline in both states as a result of the continuing emergency as people and property along the coast remain in a vulnerable condition until the coastline is restored and fortified. To this end, New Jersey Governor Christie signed Executive Order No. 140 on September 25, 2013, which authorized the means for the State to acquire all lands outside the State's ownership needed to ensure the sustainability of its coastline, and improve safeguards to diminish the impacts of future storm events, including flood protection for coastal communities that were impacted by the storm. To protect the investments by the Federal, State, local governments and individuals to rebuild damaged sites, it is imperative that these emergency disaster relief projects proceed as expeditiously as possible.

There are a number of coastal projects that were previously proposed and authorized but unconstructed (ABU). The Great Egg Harbor Inlet to Townsends Inlet [WRDA 2007, Title 1, §1001 (30)] project is an ABU project that is anticipated to start construction after March 2014 and this document represents the General Conformity Determination required under 40CFR§93.154 by the United States Army Corps of Engineers (USACE). USACE is the lead Federal agency that will contract, oversee, approve, and fund the project's work, and thus is responsible for making the General Conformity determination for this project.

USACE has coordinated this determination with the New Jersey Department of Environmental Protection (NJDEP) [see NJDEP letter provided as Attachment A]. The Philadelphia-Wilmington-Atlantic City/Pennsylvania-New Jersey-Maryland-Delaware nonattainment area is currently classified as "marginal" nonattainment for the 2008 8-hour ozone standard. Ozone is controlled through the regulation of its precursor emissions, which include oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOCs).

The equipment associated with this project that is evaluated under General Conformity (40CFR§93.153) includes direct and indirect nonroad diesel sources, such as dredging equipment and land based earth-moving equipment. The primary precursor of concern with this type of equipment is NO<sub>x</sub>, as VOCs are generated at a significantly lower rate. The NO<sub>x</sub> emissions associated with the project are estimated to range from 451 to 338 tons per calendar year from 2014 and 2015 respectively (see emissions estimates provided as Attachment B). The project exceeds the NO<sub>x</sub> trigger level of 100 tons in any calendar year and as a result, the USACE is required to fully offset the emissions of this project. The project does not exceed the VOC trigger level of 50 tons in any calendar year.

USACE is committed to fully offsetting the emissions generated as a result of the disaster relief coastal work associated with this project. USACE recognizes that the feasibility and cost-effectiveness of each offset option is influenced by whether the emission reductions can be achieved without introducing delay to the construction schedule that would prevent timely disaster relief.

USACE will demonstrate conformity with the New Jersey State Implementation Plan by utilizing the emission offset options listed below. The demonstration can consist of any combination of options, and is not required to include all or any single options to meet conformity. The options for meeting general conformity requirements include the following:

- a. Emission reductions from project and/or non-project related sources in an appropriately close vicinity to the project location. In assessing the potential impact of this offset option on the construction schedule, USACE recognizes the possibility of lengthening the time period in which offsets can be generated as appropriate and allowable under the general conformity rule (40CFR§93.163 and §93.165).
- b. Use of a portion of the Department of Defense Joint Base McGuire and Lakehurst State Implementation Plan emissions budget, as determined by the NJDEP, and in coordination with the United States Environmental Protection Agency (EPA).
- c. Use of Clean Air Interstate Rule (CAIR) ozone season NO<sub>x</sub> Allowances with a distance ratio applied to allowances, similar to the one used by stationary sources found at N.J.A.C 7:27-18.5(c) Table 2.
- d. Use of Surplus NO<sub>x</sub> Emission Offsets (SNEOs) generated under the Harbor Deepening Project (HDP). As part of the mitigation of the HDP, USACE and the Port Authority of New York & New Jersey developed emission reduction programs coordinated through the Regional Air Team (RAT). The RAT is comprised of the USACE, NJDEP, EPA, New York State Department of Environmental Conservation, and other stakeholders. SNEOs will be applied in concurrence with the agreed upon SNEO Protocols to ensure the offsets are real, surplus, and not double counted.

Due to unpredictable nature of dredge-related construction and the preliminary estimates of sand required to restore the integrity of the coastlines, the project emissions will be monitored as appropriate and regularly reported to the RAT to assist the USACE in ensuring that the project is fully offset.

In summary, USACE will achieve conformity for NOx using the options outlined above, as coordinated with the NJDEP and coordinated through the RAT.

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Date

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John C. Becking, P.E.  
Lieutenant Colonel, Corps of Engineers  
District Engineer

## **Attachment A**

Bob Martin, Commissioner, NJDEP Letter to Colonel Paul E. Owen, P.E.,  
Commander New York District, USACE and Lieutenant Colonel John C.  
Becking, PE., Commander Philadelphia District, USACE  
November 4, 2013



## State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

OFFICE OF THE COMMISSIONER

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CHRIS CHRISTIE  
*Governor*

KIM GUADAGNO  
*Lt. Governor*

BOB MARTIN  
*Commissioner*

November 4, 2013

Colonel Paul E. Owen, P.E  
Commander-NY District  
U.S. Army Corps of Engineers  
26 Federal Plaza  
New York, NY 10278

Lieutenant Colonel John C. Becking, P.E (Chris)  
Commander-Philadelphia District  
U.S. Army Corps of Engineers  
Wanamaker Building  
100 Penn Square East  
Philadelphia, PA 19107-3390

Re: Clean Air Act and Superstorm Sandy Coastal Restoration and Repair Projects

Dear Colonel Owen and Colonel Becking:

The purpose of this letter is to assist the United States Army Corps of Engineers (USACE) in complying with the requirements of the Clean Air Act as USACE performs coastal restoration and repair projects in New Jersey.

Superstorm Sandy significantly diminished the protective value of New Jersey's beach and dune system, leaving New Jersey coastal communities vulnerable to damage from future storms. The New Jersey Department of Environmental Protection has been working with your Districts to ensure that federal emergency coastal restoration and repair projects start as quickly as possible.

Emissions of oxides of nitrogen (NO<sub>x</sub>) for several of the Authorized but Unconstructed beach and dune repair/restoration projects will be greater than 100 tons/calendar year. As a result, USACE must demonstrate that those projects meet the so-called "General Conformity" requirements of the Clean Air Act. Under the General Conformity rule, federal agencies must work with state governments in a nonattainment area (such as New Jersey) with the goal of ensuring that federal actions conform to the air quality plans established by the state.

USACE must demonstrate compliance for the following projects:

1. Sea Bright to Ocean Township Beach Erosion Control Project (Elberon to Loch Arbour)
2. Manasquan Inlet to Barnegat Inlet
3. Barnegat Inlet to Little Egg Harbor Inlet (Long Beach Island)
4. Brigantine Inlet to Great Egg Harbor Inlet (Absecon Island)
5. Great Egg Harbor Inlet to Townsends Inlet

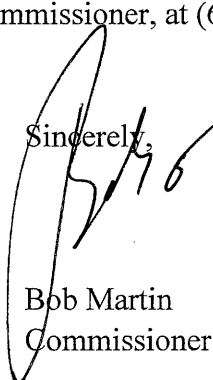
NJDEP does not have the authority to exempt USACE from General Conformity requirements.

Due to the extraordinary nature of the emergency created by Sandy and the ongoing threat to health and safety that would arise from any delay in undertaking these projects, all compliance options should be jointly considered, including invoking the emergency exemption in the Conformity Rules at 40 C.F.R. § 93.153(e), and seeking a Presidential exemption under section 118(b) of the Clean Air Act.

Alternatively, the USACE may comply with General Conformity for the projects by purchasing ozone season NO<sub>x</sub> allowances created pursuant to the federal Clean Air Interstate Rule (CAIR) (an emissions program created by the United States Environmental Protection Agency to reduce emissions from power generation facilities). The Department requests that USACE give greater weight to allowances from facilities close to New Jersey in its purchases. See N.J.A.C 7:27-18.5(c) Table 2. USACE may also use Surplus NO<sub>x</sub> emission Offsets (SNEOs) that were generated by USACE and others as part of the New York - New Jersey Harbor Deepening Project. Further, the Department of Defense may be willing to reallocate to USACE emissions from its emissions budget for Joint Base McGuire and Lakehurst.

Coastal restoration and repair projects will enhance the sustainability of New Jersey's coastline and diminish the impacts of future storms. I would like to acknowledge the coordinated effort between USACE and the Department's staff to identify opportunities for these projects to meet their regulatory obligations and move forward in a timely manner. I appreciate your time and attention to this matter. Should you have any further questions or need for assistance, please do not hesitate to contact Jane Kozinski, Assistant Commissioner, at (609) 292-2795.

Sincerely,



Bob Martin  
Commissioner

c: Jane Kozinski, Assistant Commissioner, NJDEP  
Chris Salmi, Assistant Director, Division of Air Quality, NJDEP

## **Attachment B**

General Conformity Related Emission Estimates



US Army Corps of Engineers – Philadelphia District  
Great Egg Harbor Inlet to Townsends Inlet ABU Project  
General Conformity Related Emission Estimates

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Emissions have been estimated using project planning information developed by the Philadelphia District, consisting of anticipated equipment types and estimates of the horsepower and operating hours of the diesel engines powering the equipment. In addition to this planning information, conservative factors have been used to represent the average level of engine load of operating engines (load factors) and the average emissions of typical engines used to power the equipment (emission factors). The basic emission estimating equation is the following:

$$E = \text{hrs} \times \text{LF} \times \text{EF}$$

Where:

**E** = Emissions per period of time such as a year or the entire project.

**hrs** = Number of operating hours in the period of time (e.g., hours per year, hours per project).

**LF** = Load factor, an estimate of the average percentage of full load an engine is run at in its usual operating mode.

**EF** = Emission factor, an estimate of the amount of a pollutant (such as NO<sub>x</sub>) that an engine emits while performing a defined amount of work.

In these estimates, the emission factors are in units of grams of pollutant per horsepower hour (g/hphr). For each piece of equipment, the number of horsepower hours (hphr) is calculated by multiplying the engine's horsepower by the load factor assigned to the type of equipment and the number of hours that piece of equipment is anticipated to work during the year or during the project. For example, a crane with a 250-horsepower engine would have a load factor of 0.43 (meaning on average the crane's engine operates at 43% of its maximum rated power output). If the crane were anticipated to operate 1,000 hours during the course of the project, the horsepower hours would be calculated by:

$$250 \text{ horsepower} \times 0.43 \times 1,000 \text{ hours} = 107,500 \text{ hphr}$$

The emissions from diesel engines vary with the age of an engine and, most importantly, with when it was built. Newer engines of a given size and function typically emit lower levels of pollutants than older engines. The NO<sub>x</sub> emission factors used in these calculations assume that the equipment pre-dates most emission control requirements (known as Tier 0 engines in most cases), to provide a reasonable "upper bound" to the emission estimates. If newer engines are actually used in the work, then emissions will be lower than estimated for the same amount of work. In the example of the crane engine, a NO<sub>x</sub> emission factor of 9.5 g/hphr would be used to estimate emissions from this crane on the project by the following equation:

$$\frac{107,500 \text{ hphr} \times 9.5 \text{ g NO}_x/\text{hphr}}{453.59 \text{ g/lb} \times 2,000 \text{ lbs/ton}} = 1.1 \text{ tons of NO}_x$$





*US Army Corps of Engineers – Philadelphia District  
Great Egg Harbor Inlet to Townsends Inlet ABU Project  
General Conformity Related Emission Estimates*

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As noted above, information on the equipment types, horsepower, and hours of operation associated with the project have been obtained from the project's plans and represent current best estimates of the equipment and work that will be required. Load factors have been obtained from various sources depending on the type of equipment. Marine engine load factors are primarily from a document associated with the New York and New Jersey Harbor Deepening Project (HDP): "Marine and Land-Based Mobile Source Emission Estimates for the Consolidated Schedule of 50-Foot Deepening Project, January 2004," and from EPA's 1998 Regulatory Impact Analysis (RIA): "EPA Regulatory Impact Analysis: Control of Commercial Marine Vessels." Land-side nonroad equipment load factors are from the documentation for EPA's NONROAD emission estimating model, "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, EPA420-P-04-005, April 2004."

Emission factors have also been sourced from a variety of documents and other sources depending on engine type and pollutant. The NO<sub>x</sub> emission factors for marine engines have been developed primarily from EPA documentation for the Category 1 and 2 standards (RIA, "Control of Emission from Marine Engines, November 1999) and are consistent with emission factors used in documenting emissions from the HDP, while the VOC emission factors for marine engines are from the 2010 "Multi-Facility Emissions Inventory" which represent the range of marine engines operating in the New Jersey harbor and coastal region in terms of age and regulatory tier level. Nonroad equipment NO<sub>x</sub> emission factors have been derived from EPA emission standards and documentation, while the nonroad VOC emission factors have been based on EPA's Diesel Emissions Quantifier (DEQ, accessed at: [www.epa.gov/cleandiesel/quantifier/](http://www.epa.gov/cleandiesel/quantifier/)), run for moderately old equipment (model year 1995). On-road vehicle emission factors have also been developed from the DEQ, assuming a mixture of Class 8, Class 6, and Class 5 (the smallest covered by the DEQ) on-road trucks.

As noted above, the emission factors have been chosen to be moderately conservative so as not to underestimate project emissions. Actual project emissions will be estimated and tracked during the course of the project and will be based on the characteristics and operating hours of the specific equipment chosen by the contractor to do the work.

The following pages summarize the estimated emissions of pollutants relevant to General Conformity, NO<sub>x</sub> and VOC, in sum for the project and by calendar year based on the schedule information also presented (in terms of operating months per year). Following this summary information are project details including the anticipated equipment and engine information developed by the Philadelphia District, the load factors and emission factors as discussed above, and the estimated emissions for the project by piece of equipment.

U.S. Army Corps of Engineers  
 NAP - ABU Sandy-Related Projects  
 General Conformity Related Emission Estimates  
 DRAFT

1-Nov-13

Summary of emissions estimated using NAP-provided equipment and activity data

Project	Total Emissions	
	NOx (tons)	VOC (tons)
Great Egg Harbor Inlet to Townsends Inlet	788.6	19.0
<b>Total all projects</b>	<b>788.6</b>	<b>19.0</b>

Project	Cubic yards	Estimated In-State Emissions, tons per year					
		2013	2014	2015	2016	2017	2018
<b>NOx</b>							
Great Egg Harbor Inlet to Townsends Inlet	4,077,000	0.0	450.6	338.0	0.0	0.0	0.0
<b>VOC</b>							
Great Egg Harbor Inlet to Townsends Inlet	4,077,000	0.0	10.9	8.1	0.0	0.0	0.0

Schedule Start and End by month:

Project	Total months	Calendar months of operation					
		2013	2014	2015	2016	2017	2018
Great Egg Harbor Inlet to Townsends Inlet	14		May	June			

Months per year:

Project	Total months	Operating months per year					
		2013	2014	2015	2016	2017	2018
Great Egg Harbor Inlet to Townsends Inlet	14		8	6			

Months per ozone season (the ozone season is 1 May - 30 Sept each year):

Project	Total O <sub>3</sub> Season Months	Operating months per ozone season					
		2013	2014	2015	2016	2017	2018
Great Egg Harbor Inlet to Townsends Inlet	7		5	2			

Project summary based on initial information provided by NAP

Project	Million hphrs (NAP est.)	Initial NAP Estimates	
		Tons NOx	Cubic yards
Great Egg Harbor Inlet to Townsends Inlet - Ocean City	32.4		1,577,000
Great Egg Harbor Inlet to Townsends Inlet - Ludlam Island	46.8		2,500,000
horsespower-hours (hphrs)			4,077,000

U.S. Army Corps of Engineers  
 NAP - ABU Sandy-Related Projects  
 Conformity Related Emission Estimates  
 Great Egg Harbor Inlet to Townsends Inlet - Ocean City  
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Equipment/Engine Category	Type	Task	# of Engines	HP	Total Hours	LF	Emission factors		Emissions	
							NOx (g/hphr or g/mi)	VOC	NOx (tons)	VOC
<b>Marine</b>										
Work tug, propulsion engine	Ocean tow - propulsion	Mob/Demob	1	1,000	64	0.69	9.70	0.37	0.47	0.02
Work tug, secondary	Ocean tow - auxiliary	Mob/Demob	1	50	64	0.40	7.50	0.20	0.01	0.00
Work tug, propulsion engine	Ocean tow - propulsion	Mob/Demob	1	1,000	888	0.69	9.70	0.37	6.55	0.25
Work tug, secondary	Ocean tow - auxiliary	Mob/Demob	1	50	888	0.40	7.50	0.20	0.15	0.00
Towing vessel	Ocean tow - propulsion	Mob/Demob	1	4,000	888	0.69	9.70	0.37	26.21	1.00
Crew tug, propulsion engine	Crewboat propulsion	Mob/Demob	1	100	64	0.50	9.70	0.37	0.03	0.001
Crew tug, secondary	Crewboat auxiliary	Mob/Demob	1	40	64	0.40	7.50	0.20	0.01	0.000
Derrick barge, prime engine	Dredge auxiliary	Mob/Demob	1	200	64	0.40	7.50	0.20	0.04	0.001
Derrick barge, auxiliary	Mob/Demob	Mob/Demob	1	40	64	0.40	7.50	0.20	0.01	0.000
<b>Land-side, nonroad</b>										
Pile Hammer, 69,898 FT-LBS	Drilling rig	Mob/Demob	1	119	32	0.43	9.50	0.19	0.02	0.000
Crane, Mech., Crwlr., Lifting 100T	Crane	Mob/Demob	1	265	32	0.43	9.50	0.19	0.04	0.001
<b>Land-side, onroad</b>										
TRK, (Suburban), 4x4, 2-axle	Truck, small	Mob/Demob	1	285	48	1.0	10.33	0.54	0.02	0.001
TRK, HYW, 8,600 4x2, 3/4T-Pkup	Truck, small	Mob/Demob	1	130	104	1.0	10.33	0.54	0.04	0.002
TRK, HYW, 55,000 GVW	Truck, large	Mob/Demob	1	310	96	1.0	10.72	0.67	0.04	0.002
<b>Mob/Demob subtotal</b>									<b>33.6</b>	<b>1.3</b>
<b>Marine</b>										
Hydraulic Pipeline Dredge - Main Pump	Hydraulic Pipeline Dredge - Main Pump	Beachfill	1	9,000	2,244	0.80	9.70	0.20	172.76	3.56
Hydraulic Pipeline Dredge - Secondary	Hydraulic Pipeline Dredge - Secondary	Beachfill	1	830	2,244	0.43	7.50	0.20	6.62	0.18
Hydraulic Pipeline Dredge - El. Generator	Hydraulic Pipeline Dredge - El. Generator	Beachfill	1	3,310	2,244	0.43	7.50	0.20	26.41	0.70
Tugboat, prime engine	Ocean tow - propulsion	Beachfill	1	1,000	2,244	0.69	9.70	0.37	16.56	0.63
Tugboat, 2nd engine	Ocean tow - auxiliary	Beachfill	1	50	2,244	0.40	7.50	0.20	0.37	0.01
Crew/survey boat, prime engine	Crewboat propulsion	Beachfill	1	100	2,244	0.50	9.70	0.37	1.20	0.05
Crew/survey boat, 2nd engine	Crewboat auxiliary	Beachfill	1	40	2,244	0.40	7.50	0.20	0.30	0.01
Derrick barge, prime engine	Dredge auxiliary	Beachfill	1	200	2,244	0.40	7.50	0.20	1.48	0.04
Derrick barge, 2nd engine	Dredge auxiliary	Beachfill	1	40	2,244	0.40	7.50	0.20	0.30	0.01
Floating booster pump, prime engine	Booster pump	Beachfill	1	5,200	2,244	0.43	9.50	0.20	52.54	1.11
Floating booster pump, 2nd engine	Booster pump	Beachfill	1	200	2,244	0.43	9.50	0.20	2.02	0.04
<b>Land-side, nonroad</b>										
Pile Hammer, 69,898 FT-LBS	Drilling rig	Beachfill	1	119	32	0.43	9.50	0.19	0.02	0.000
Crane, Mech., Crwlr., Lifting 100T	Crane	Beachfill	1	265	32	0.43	9.50	0.19	0.04	0.001
Drill, Hydraulic Auger 14" Dia, 30' Depth	Drilling rig	Beachfill	1	58	167	0.43	9.50	0.19	0.04	0.001
LD, FE, WH 0.8 CY Bkt	Rubber tired loader	Beachfill	1	67	225	0.59	9.50	0.19	0.09	0.002
<b>Land-side, onroad</b>										
TRK, (Suburban), 4x4, 2-axle	Truck, small	Beachfill	1	285	48	1.0	10.33	0.54	0.02	0.001
TRK, HWY, 4x4, 2-axle, 3/4 ton pickup	Truck, small	Beachfill	1	130	1,300	1.0	10.33	0.54	0.52	0.027
TRK, HYW, 25,000 GVW	Truck, medium	Beachfill	1	210	167	1.0	8.16	0.76	0.05	0.005
TRK, HYW, 45,000 GVW	Truck, large	Beachfill	1	230	62	1.0	10.72	0.67	0.03	0.002
TRK, HYW, 8,600 4x2, 3/4T-Pkup	Truck, small	Beachfill	1	130	947	1.0	10.33	0.54	0.38	0.020
TRK, HYW, 55,000 GVW	Truck, large	Beachfill	1	310	96	1.0	10.72	0.67	0.04	0.002
<b>Beachfill subtotal</b>									<b>281.8</b>	<b>6.4</b>
<b>Land-side, nonroad</b>										
Dozer crawler, D-9H	Dozer	Shore Crew	1	410	1,272	0.59	9.50	0.19	3.22	0.06
LD, FE, WH 1.75 CY Bkt, Tool Carrier	Rubber tired loader	Shore Crew	1	95	1,272	0.59	9.50	0.19	0.75	0.01
Truck (Suburban), 4x4, 2-axle	Truck, small	Shore Crew	1	285	1,080	1.0	10.33	0.54	0.43	0.02
<b>Shore Crew subtotal</b>									<b>4.4</b>	<b>0.1</b>
<b>Total project emissions</b>									<b>319.8</b>	<b>7.8</b>

On-road estimates based on hours, assumed average speed listed below, and g/mile emission factors.

Assumed average on-road speed: 35 miles per hour

U.S. Army Corps of Engineers  
NAP - ABU Sandy-Related Projects  
Conformity Related Emission Estimates  
Great Egg Harbor Inlet to Townsends Inlet - Ludlam Island  
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Equipment/Engine Category	Type	Task	# of Engines	HP	Total Hours	LF	Emission factors		Emissions	
							NOx (g/hphr or g/mi)	VOC	NOx (tons)	VOC (tons)
<b>Marine</b>										
Work tug, propulsion engine	Ocean tow - propulsion	Mob/Demob	1	1,000	72	0.69	9.70	0.37	0.53	0.020
Work tug, secondary	Ocean tow - auxiliary	Mob/Demob	1	50	72	0.40	7.50	0.20	0.01	0.000
Work tug, propulsion engine	Ocean tow - propulsion	Mob/Demob	1	1,000	890.4	0.69	9.70	0.37	6.57	0.251
Work tug, secondary	Ocean tow - auxiliary	Mob/Demob	1	50	890.4	0.40	7.50	0.20	0.15	0.004
Towing vessel	Ocean tow - propulsion	Mob/Demob	1	4,000	890.4	0.69	9.70	0.37	26.28	1.002
Crew tug, propulsion engine	Crewboat propulsion	Mob/Demob	1	100	72	0.50	9.70	0.37	0.04	0.001
Crew tug, secondary	Crewboat auxiliary	Mob/Demob	1	40	72	0.40	7.50	0.20	0.01	0.000
Derrick barge, prime engine	Dredge auxiliary	Mob/Demob	1	200	72	0.40	7.50	0.20	0.05	0.001
Derrick barge, auxiliary	Dredge auxiliary	Mob/Demob	1	40	72	0.40	7.50	0.20	0.01	0.000
<b>Land-side, nonroad</b>										
Pile Hammer, 69,898 FT-LBS	Drilling rig	Mob/Demob	1	119	32	0.43	9.50	0.19	0.02	0.000
Crane, Mech., Crwlr., Lifting 100T	Crane	Mob/Demob	1	265	32	0.43	9.50	0.19	0.04	0.001
<b>Land-side, onroad</b>										
TRK, (Suburban), 4x4, 2-axle	Truck, small	Mob/Demob	1	285	48	1.0	10.33	0.54	0.02	0.001
TRK, HYW, 8,600 4x2, 3/4T-Pkup	Truck, small	Mob/Demob	1	130	104	1.0	10.33	0.54	0.04	0.002
TRK, HYW, 55,000 GVW	Truck, large	Mob/Demob	1	310	96	1.0	10.72	0.67	0.04	0.002
<b>Mob/Demob subtotal</b>									<b>33.8</b>	<b>1.3</b>
<b>Marine</b>										
Hydraulic Pipeline Dredge - Main Pump	Hydraulic Pipeline Dredge - Mair Beachfill		1	9,000	3,600	0.80	9.70	0.20	277.15	5.71
Hydraulic Pipeline Dredge - Secondary	Hydraulic Pipeline Dredge - Seco Beachfill		1	830	3,600	0.43	7.50	0.20	10.62	0.28
Hydraulic Pipeline Dredge - El. Generator	Hydraulic Pipeline Dredge - El. CBeachfill		1	3,310	3,600	0.43	7.50	0.20	42.36	1.13
Tugboat, prime engine	Ocean tow - propulsion	Beachfill	1	1,000	3,600	0.69	9.70	0.37	26.56	1.01
Tugboat, 2nd engine	Ocean tow - auxiliary	Beachfill	1	50	3,600	0.40	7.50	0.20	0.60	0.02
Crew/survey boat, prime engine	Crewboat propulsion	Beachfill	1	100	3,600	0.50	9.70	0.37	1.92	0.07
Crew/survey boat, 2nd engine	Crewboat auxiliary	Beachfill	1	40	3,600	0.40	7.50	0.20	0.48	0.01
Derrick barge, prime engine	Dredge auxiliary	Beachfill	1	200	3,600	0.40	7.50	0.20	2.38	0.06
Derrick barge, 2nd engine	Dredge auxiliary	Beachfill	1	40	3,600	0.40	7.50	0.20	0.48	0.01
Floating booster pump, prime engine	Booster pump	Beachfill	1	5,200	2,556	0.43	9.50	0.20	59.85	1.26
Floating booster pump, 2nd engine	Booster pump	Beachfill	1	200	2,556	0.43	9.50	0.20	2.30	0.05
<b>Land-side, nonroad</b>										
Pile Hammer, 69,898 FT-LBS	Drilling rig	Beachfill	1	119	48	0.43	9.50	0.19	0.03	0.001
Crane, Hyd, rough terrain, 15T/49' Boom	Crane	Beachfill	1	152	22	0.43	9.50	0.19	0.02	0.000
Crane, Mech., Crwlr., Drag/Clam 60T/2.5CY	Crane	Beachfill	1	150	22	0.43	9.50	0.19	0.01	0.000
Crane, Mech., Crwlr., Lifting 100T	Crane	Beachfill	1	265	48	0.43	9.50	0.19	0.06	0.001
Drill, Hydraulic Auger 14" Dia, 30' Depth	Drilling rig	Beachfill	1	58	957	0.43	9.50	0.19	0.25	0.005
LD, FE, WH 0.8 CY Bkt	Rubber tired loader	Beachfill	1	67	921	0.59	9.50	0.19	0.38	0.008
<b>Land-side, onroad</b>										
TRK, (Suburban), 4x4, 2-axle	Truck, small	Beachfill	1	285	48	1.0	10.33	0.54	0.02	0.001
TRK, HWY, 4x4, 2-axle, 3/4 ton pickup	Truck, small	Beachfill	1	130	2,344	1.0	10.33	0.54	0.93	0.048
TRK, HYW, 25,000 GVW	Truck, medium	Beachfill	1	210	957	1.0	8.16	0.76	0.30	0.028
TRK, HYW, 45,000 GVW	Truck, large	Beachfill	1	230	302	1.0	10.72	0.67	0.12	0.008
TRK, HYW, 8,600 4x2, 3/4T-Pkup	Truck, small	Beachfill	1	130	2,600	1.0	10.33	0.54	1.04	0.054
TRK, HYW, 55,000 GVW	Truck, large	Beachfill	1	310	104	1.0	10.72	0.67	0.04	0.003
<b>Beachfill subtotal</b>									<b>427.9</b>	<b>9.8</b>
<b>Land-side, nonroad</b>										
Dozer crawler, D-9H	Dozer	Shore Crew	1	410	2048	0.59	9.50	0.19	5.19	0.10
LD, FE, WH 1.75 CY Bkt, Tool Carrier	Rubber tired loader	Shore Crew	1	95	2048	0.59	9.50	0.19	1.20	0.02
Truck (Suburban), 4x4, 2-axle	Truck, small	Shore Crew	1	285	1736	1.0	10.33	0.54	0.69	0.04
<b>Shore Crew subtotal</b>									<b>7.1</b>	<b>0.2</b>
<b>Total project emissions</b>									<b>468.8</b>	<b>11.2</b>
On-road estimates based on hours, assumed average speed listed below, and g/mile emission factors.										
Assumed average on-road speed: 35 miles per hour										