United States Army Corps of Engineers, Philadelphia District
Barnegat Inlet to Little Egg Inlet Coastal Storm Risk Management Project
DRAFT General Conformity Determination

The Philadelphia District, U.S. Army Corps of Engineers (USACE), initiated construction of the congressionally authorized Barnegat Inlet to Little Egg Inlet, Long Beach Island, New Jersey Federal Coastal Storm Risk Management Project, (LBI-CSRM) in 2007. The Federally designed and constructed project is located in Ocean County, New Jersey. The LBI-CSRM project provides for restoration and maintenance of the protective dune and berm along approximately 17 miles of Long Beach Island. The project also provides constructed dune crossings to maintain public access and public safety throughout the project area. The LBI-CSRM project is now scheduled to undergo periodic nourishment, which is anticipated to start construction during or after October 2023. This document represents the General Conformity Determination required under 40CFR§93.154. 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 the procedures under which this determination has been made with the New Jersey Department of Environmental Protection (NJDEP) and Region 2 of the U.S. Environmental Protection Agency (EPA). Relative to the National Ambient Air Quality Standards (NAAQS), the project area is within Ocean County, New Jersey which is currently classified as "marginal" nonattainment for the 2008 8-hour ozone standard, and "moderate" nonattainment for the 2015 8-hour ozone standard (40CFR§81.333). The ozone nonattainment county is part of the Ozone Transport Region. Ozone is controlled through the regulation of its precursor emissions, which include oxides of nitrogen (NO_x) 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 powered emission sources, such as dredging equipment and support vessels. The primary pollutant of concern with this type of equipment is NO_x, because VOCs are generated at significantly lower rates. The NO_x emissions associated with the project are estimated to total as much as 688 tons over calendar years 2023 and 2024, with emissions in each year depending on actual start date. Emission estimates are provided as Attachment A. The project exceeds the NO_x trigger level of 100 tons in any calendar year and as a result, the USACE is required to fully offset the NO_x emissions from this project. The project will not exceed the ozone related VOC trigger level of 100 tons (for areas in an ozone transport region) in any calendar year.

The USACE is committed to fully offsetting the NOx emissions generated because of the 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 completion of the project to provide the benefits for which the project is being undertaken.

The 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 option 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, 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 Surplus NOx Emission Offsets (SNEOs) generated under the Harbor Deepening Project (HDP) and/or subsequent projects for which SNEOs have been produced. As part of the mitigation of the HDP and later projects, USACE and the Port Authority of New York & New Jersey have developed emission reduction programs coordinated through the Regional Air Team (RAT). The RAT is comprised of the USACE, NYSDEC, NJDEP, US Environmental Protection Agency (EPA) Region 2, 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.
c. Development of a Marine Vessel Engine Repower Program (MVERP) which replaces older, higher emitting marine engines with cleaner engines, the delta in emissions being used to offset project emissions. The MVERP approach worked successfully for offsetting the HDP's construction emissions. The details of the MVERP, its implementation, and tracking would be coordinated with the RAT.
d. Use of Cross-State Air Pollution Rule (CSAPR) annual NO_x Allowances with a distance ratio applied to allowances, similar to the one used by stationary sources.

Due to the unpredictable nature of dredge-related construction, 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 NO_x using the options outlined above, as coordinated with the NJDEP, NYSDEC, and EPA, and coordinated through the RAT.

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To view the entire determination, with attachments, please see the District's website at: https://www.nap.usace.army.mil/Missions/Civil-Works/Public-Notices-Reports/ Comments may be submitted via e-mail to PDPA-NAP@usace.army.mil By rule [40CFR§93.156(b)], comments should be submitted within 30 days from this publication.

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 = hrs x LF x 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_x) 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 horsepower x 0.43 x 1,000 hours = 107,500 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 most pollutants than older engines. The 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_x emission factor of 9.5 g/hphr would be used to estimate emissions from this crane on the project by the following equation:

$$\frac{107{,}500 \text{ hphr} \times 9.5 \text{ g } NO_x/\text{hphr}}{453.59 \text{ g/lb} \times 2{,}000 \text{ lbs/ton}} = 1.1 \text{ tons of } NO_x$$

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. 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. Nonroad equipment NOx and other emission factors have been derived from EPA emission standards and documentation.

As noted above, the emission factors have been chosen to be moderately conservative so as not to underestimate project emissions. Equipment turnover by the time the project is undertaken will likely result in newer equipment performing the work than assumed in this analysis, meaning the emissions presented in this analysis are likely higher than will actually occur.

The following pages summarize the estimated emissions in sum for the project including the anticipated equipment and engine information developed by the Philadelpia District, the load factors and emission factors as discussed above, and the estimated emissions for the project.

USACE - Philadelphia District
Barnegat Inlet to Little Egg Inlet Coastal Storm Risk Management Project
Estimated NOx and VOC Emissions - summary
20 June 2023
DRAFT

General Conformity Related Emission Summary

Estimated Emissions, tons per year							
Pollutant	**Scenario 1**				**Scenario 2**		
	2023	**2024**	**Total**		**2023**	**2024**	**Total**
NO_x	227.1	461.1	688.1		210.8	428.0	638.9
VOC	5.1	10.3	15.4		5.5	11.2	16.7

Scenario 1 - Work to be performed with a single hopper dredge
Scenario 2 - Work to be performed with a hopper dredge and a pipeline (cutter suction) dredge

USACE - Philadelphia District
Barnegat Inlet to Little Egg Inlet Coastal Storm Risk Management Project
Estimated NOx and VOC Emissions - scenario 1 - single hopper dredge
20 June 2023

Project:	**FY23 Barnegat to Little Egg**
Mob/Demob duration (days):*	30
Volume (CY) base + options:	5,250,000
Estimated production rate (CY/day):*	10,448
Percent Effective Time (EWT):*	76%
	*based on W912BU-15-C-0007 recorded data
	Dredge data based on hypothetical dredges similar to equipment used in the area

General Conformity Related Emission Summary		**NOx**	**VOC**
33%	Estimated emissions during CY2023	227.1	5.1
67%	Estimated emissions during CY2024	461.1	10.3
	Estimated total emissions	**688.1**	**15.4**

Equipment		**# of Engines**	**HP**	**Load Factor (LF)**	**Operating Days**	**Hrs/Day**	**Total Hours**	**hp-hr**	**Emission Factors (g/hp-hr)**		**Emissions (tons)**	
									NOx	**VOC**	**NOx**	**VOC**
Water equipment												
Mob/Demob												
Hopper Dredge, propulsion	Port Main Engine	1	2,150	0.66	3.0	24	72	102,168	9.70	0.07	1.09	0.01
Hopper Dredge, propulsion	STBD Main Engine	1	2,150	0.66	3.0	24	72	102,168	9.70	0.07	1.09	0.01
Hopper Dredge, auxiliary	Port Generator	1	800	0.40	3.0	24	72	23,040	7.50	0.56	0.19	0.01
Hopper Dredge, auxiliary	STBD Generator	1	800	0.40	3.0	24	72	23,040	7.50	0.56	0.19	0.01
Hopper Dredge, pumps	Port Dredge Pump	1	2,100	0.80	0	0	0	0	7.50	0.07	0.00	0.00
Hopper Dredge, pumps	STBD Dredge Pump	1	2,100	0.80	0	0	0	0	7.50	0.07	0.00	0.00
Hopper Dredge, pumps	Port Jet Pump	1	500	0.80	0	0	0	0	7.50	0.07	0.00	0.00
Hopper Dredge, pumps	STBD Jet Pump	1	500	0.80	0	0	0	0	7.50	0.07	0.00	0.00
Hopper Dredge, propulsion	Bow Thruster	1	500	0.66	0	24	0	0	9.70	0.07	0.00	0.00
							0.00	0.00				
PIPELINE DREDGE, PRIME ENGINE		0	9,000	0.66	0.0	0	0	0	4.90	0.20	0.00	0.00
PIPELINE DREDGE, ELECTRIC GENERATOR		0	830	0.40	0.0	24	0	0	7.50	0.20	0.00	0.00
PIPELINE DREDGE, DREDGE PUMP		0	7,200	0.80	0.0	0	0	0	7.50	0.20	0.00	0.00
WORK TUG, PRIMARY		1	4,000	0.69	30.0	24	720	1,987,200	9.70	0.37	21.25	0.81
WORK TUG, SECONDARY Electric		1	50	0.40	30.0	24	720	14,400	7.50	0.20	0.12	0.00
SURVEY BOAT, SHORE		1	210	0.50	30.0	24	720	75,600	9.70	0.37	0.81	0.03
SURVEY BOAT, SHORE, SECONDARY Electric		1	40	0.40	30.0	24	720	11,520	7.50	0.20	0.10	0.00
DERRICK, PRIMARY		1	200	0.4	30.0	24	720	57,600	7.50	0.20	0.48	0.01
DERRICK, SECONDARY Electric		1	40	0.20	30.0	24	720	5,760	7.50	0.20	0.05	0.00
TENDER TUG, PROPULSION		1	4,000	0.69	30.0	24	720	1,987,200	9.70	0.37	21.25	0.81
TENDER TUG, SECONDARY		1	50	0.40	30.0	24	720	14,400	7.50	0.20	0.12	0.00
SUVEY BOAT, OFFSHORE		1	500	0.5	30.0	24	720	180,000	9.70	0.20	1.92	0.04
SUVEY BOAT, OFFSHORE, SECONDARY Electric		1	40	0.40	30.0	24	720	11,520	7.50	0.20	0.10	0.00

Equipment Scenario 1		# of Engines	HP	Load Factor (LF)	Operating Days	Hrs/Day	Total Hours	hp-hr	Emission Factors (g/hp-hr) NOx	Emission Factors (g/hp-hr) VOC	Emissions (tons) NOx	Emissions (tons) VOC
Beach Replenishment												
Hopper Dredge, propulsion	Dodge Island - Port Main Engine	1	2,150	0.66	502.5	18.14	9,117	12,937,238	9.70	0.07	138.33	1.00
Hopper Dredge, propulsion	Dodge Island - STBD Main Engine	1	2,150	0.66	502.5	18.14	9,117	12,937,238	9.70	0.07	138.33	1.00
Hopper Dredge, auxiliary	Dodge Island - Port Generator	1	800	0.40	502.5	18.14	9,117	2,917,489	7.50	0.56	24.12	1.79
Hopper Dredge, auxiliary	Dodge Island - STBD Generator	1	800	0.40	502.5	18.14	9,117	2,917,489	7.50	0.56	24.12	1.79
Hopper Dredge, pumps	Dodge Island - Port Dredge Pump	1	2,100	0.80	502.5	4.54	2,279	3,829,204	7.50	0.07	31.66	0.30
Hopper Dredge, pumps	Dodge Island - STBD Dredge Pur	1	2,100	0.80	502.5	4.54	2,279	3,829,204	7.50	0.07	31.66	0.30
Hopper Dredge, pumps	Dodge Island - Port Jet Pump	1	500	0.80	502.5	4.54	2,279	911,715	7.50	0.07	7.54	0.07
Hopper Dredge, pumps	Dodge Island - STBD Jet Pump	1	500	0.80	502.5	4.54	2,279	911,715	7.50	0.07	7.54	0.07
Hopper Dredge, propulsion	Dodge Island - Bow Thruster	1	500	0.66	502.5	1.81	912	300,866	9.70	0.07	3.22	0.02
PIPELINE DREDGE, PRIME ENGINE		0	9,000	0.66	502.5	18.14	0	0	4.90	0.20	0.00	0.00
PIPELINE DREDGE, ELECTRIC GENERATOR		0	830	0.40	502.5	18.14	0	0	7.50	0.20	0.00	0.00
PIPELINE DREDGE, DREDGE PUMP		0	7,200	0.80	502.5	18.14	0	0	7.50	0.20	0.00	0.00
WORK TUG, PRIMARY		0	4,000	0.69	502.5	18.144	0	0	9.70	0.37	0.00	0.00
WORK TUG, SECONDARY Electric		0	50	0.40	502.5	18.144	0	0	7.50	0.20	0.00	0.00
SURVEY BOAT, SHORE		1	210	0.50	502.5	18.144	9,117	957,301	9.70	0.37	10.24	0.39
SURVEY BOAT, SHORE, SECONDARY Electric		1	40	0.40	502.5	18.144	9,117	145,874	7.50	0.20	1.21	0.03
DERRICK, PRIMARY		1	200	0.4	502.5	18.144	9,117	729,372	7.50	0.20	6.03	0.16
DERRICK, SECONDARY Electric		1	40	0.20	502.5	18.144	9,117	72,937	7.50	0.20	0.60	0.02
TENDER TUG, PROPULSION		1	1,000	0.69	502.5	18.144	9,117	6,290,835	9.70	0.37	67.26	2.57
TENDER TUG, SECONDARY		1	50	0.40	502.5	18.144	9,117	182,343	7.50	0.20	1.51	0.04
SURVEY BOAT, OFFSHORE		1	500	0.5	502.5	18.144	9,117	2,279,288	9.70	0.20	24.37	0.49
SURVEY BOAT, OFFSHORE, SECONDARY		1	40	0.40	502.5	18.144	9,117	145,874	7.50	0.20	1.21	0.03
Land equipment (assumes tier 2 engines)												
Mob/Demob												
TRUCK TRAILER, LOWBOY, 75 TON, 3 AXLE (ADD TOWING TRUCK)		4	310	0.59	30.0	8.00	960	175,584	10.72	0.66	2.07	0.13
TRUCK, HIGHWAY, 55,000 LBS (24,948KG) GVW, 6X4, 3 AXLE		1	310	0.59	30.0	8.00	240	43,896	10.72	0.66	0.52	0.03
LOADER/BACKHOE, WHEEL, 0.80 CY FRONT END BUCKET, 9.8' DEPTH OF HOE		1	78	0.59	30.0	8.00	240	11,045	9.50	1.30	0.12	0.02
TRUCK, HIGHWAY, CONVENTIONAL, 8,600 LBS (3,901KG)GVW, 4X2, 2 AXLE		4	135	0.59	30.0	8.00	960	76,464	10.33	0.54	0.87	0.05
Beach replenishment												
TRUCK, HIGHWAY, 8,600 GVW, 4X4 (SUBURBAN)		4	135	0.59	502.5	18.14	36,469	2,904,725	10.33	0.54	33.08	1.73
TRACTOR ATTACHMENTS, BLADE, UNIVERSAL, HYDRAULIC, FOR D9, 21.40 CY		0	0	0	502.5	18.14	0	0	4.90	1.30	0.00	0.00
TRACTOR, CRAWLER (DOZER), 410 HP, POWERSHIFT, W/17.7 CY SEMI-U BLADE		3	410	0.59	502.5	18.14	27,351	6,616,317	9.50	0.19	69.28	1.39
LOADER, FRONT END, WHEEL, INTEGRATED TOOL CARRIER, 1.75 CY (1.3 M3)		2	90	0.59	502.5	18.14	18,234	968,242	9.50	0.19	10.14	0.20
LOADER/BACKHOE, WHEEL, 0.80 CY FRONT END BUCKET, 9.8' DEPTH OF HOE		1	78	0.59	502.5	18.14	9,117	419,571	9.50	0.19	4.39	0.09
Project totals								**68,107,441**			**688.1**	**15.44**

USACE - Philadelphia District
Barnegat Inlet to Little Egg Inlet Coastal Storm Risk Management Project
Estimated NOx and VOC Emissions - scenario 2, hopper dredge and cutter suction dredge
20 June 2023

Project:	**FY23 Barnegat to Little Egg**		
Mob/Demob duration (days):*	30		
		Hopper dredge	Pipeline dredge
Volume (CY) base + options:		3,150,000	2,100,000
Estimated production rate (CY/day):*		10,448	17,414
Percent Effective Time (EWT):*	76%		
	*based on W912BU-15-C-0007 recorded data		
	Dredge data based on hypothetical dredges similar to equipment used in the area		

General Conformity Related Emission Summary		**NOx**	**VOC**
33%	Estimated emissions during CY2023	210.8	5.5
67%	Estimated emissions during CY2024	428.0	11.2
	Estimated total emissions	**638.9**	**16.7**

Hopper dredge % of volume	60%
Pipeline dredge % of volume	40%

Equipment		**# of Engines**	**HP**	**Load Factor (LF)**	**Operating Days**	**Hrs/Day**	**Total Hours**	**hp-hr**	**Emission Factors (g/hp-hr)**		**Emissions (tons)**	
									NOx	**VOC**	**NOx**	**VOC**
Water equipment												
Mob/Demob												
Hopper Dredge, propulsion	Port Main Engine	1	2,150	0.66	3.0	24	72	102,168	9.70	0.07	1.09	0.01
Hopper Dredge, propulsion	STBD Main Engine	1	2,150	0.66	3.0	24	72	102,168	9.70	0.07	1.09	0.01
Hopper Dredge, auxiliary	Port Generator	1	800	0.40	3.0	24	72	23,040	7.50	0.56	0.19	0.01
Hopper Dredge, auxiliary	STBD Generator	1	800	0.40	3.0	24	72	23,040	7.50	0.56	0.19	0.01
Hopper Dredge, pumps	Port Dredge Pump	1	2,100	0.80	0	0	0	0	7.50	0.07	0.00	0.00
Hopper Dredge, pumps	STBD Dredge Pump	1	2,100	0.80	0	0	0	0	7.50	0.07	0.00	0.00
Hopper Dredge, pumps	Port Jet Pump	1	500	0.80	0	0	0	0	7.50	0.07	0.00	0.00
Hopper Dredge, pumps	STBD Jet Pump	1	500	0.80	0	0	0	0	7.50	0.07	0.00	0.00
Hopper Dredge, propulsion	Bow Thruster	1	500	0.66	0	0	0	0	9.70	0.07	0.00	0.00
PIPELINE DREDGE, PRIME ENGINE		1	9,000	0.66	0.0	0	0	0	4.90	0.20	0.00	0.00
PIPELINE DREDGE, ELECTRIC GENERATOR		1	830	0.40	3.0	24	72	23,904	7.50	0.20	0.20	0.01
PIPELINE DREDGE, DREDGE PUMP		1	7,200	0.80	0.0	0	0	0	7.50	0.20	0.00	0.00
WORK TUG, PRIMARY		1	4,000	0.69	30.0	24	720	1,987,200	9.70	0.37	21.25	0.81
WORK TUG, SECONDARY Electric		1	50	0.40	30.0	24	720	14,400	7.50	0.20	0.12	0.00
SURVEY BOAT, SHORE		1	210	0.50	30.0	24	720	75,600	9.70	0.37	0.81	0.03
SURVEY BOAT, SHORE, SECONDARY Electric		1	40	0.40	30.0	24	720	11,520	7.50	0.20	0.10	0.00
DERRICK, PRIMARY		1	200	0.4	30.0	24	720	57,600	7.50	0.20	0.48	0.01
DERRICK, SECONDARY Electric		1	40	0.20	30.0	24	720	5,760	7.50	0.20	0.05	0.00
TENDER TUG, PROPULSION		1	4,000	0.69	30.0	24	720	1,987,200	9.70	0.37	21.25	0.81
TENDER TUG, SECONDARY		1	50	0.40	30.0	24	720	14,400	7.50	0.20	0.12	0.00
SUVEY BOAT, OFFSHORE		1	500	0.5	30.0	24	720	180,000	9.70	0.20	1.92	0.04
SUVEY BOAT, OFFSHORE, SECONDARY Electric		1	40	0.40	30.0	24	720	11,520	7.50	0.20	0.10	0.00

Equipment Scenario 2		# of Engines	HP	Load Factor (LF)	Operating Days	Hrs/Day	Total Hours	hp-hr	Emission Factors (g/hp-hr)		Emissions (tons)	
									NOx	VOC	NOx	VOC
Beach Replenishment												
Hopper Dredge, propulsion	Dodge Island - Port Main Engine	1	2,150	0.66	301.5	18.14	5,470	7,762,343	9.70	0.07	83.00	0.60
Hopper Dredge, propulsion	Dodge Island - STBD Main Engine	1	2,150	0.66	301.5	18.14	5,470	7,762,343	9.70	0.07	83.00	0.60
Hopper Dredge, auxiliary	Dodge Island - Port Generator	1	800	0.40	301.5	18.14	5,470	1,750,493	7.50	0.56	14.47	1.07
Hopper Dredge, auxiliary	Dodge Island - STBD Generator	1	800	0.40	301.5	18.14	5,470	1,750,493	7.50	0.56	14.47	1.07
Hopper Dredge, pumps	Dodge Island - Port Dredge Pump	1	2,100	0.80	301.5	4.54	1,368	2,297,522	7.50	0.07	18.99	0.18
Hopper Dredge, pumps	Dodge Island - STBD Dredge Pur	1	2,100	0.80	301.5	4.54	1,368	2,297,522	7.50	0.07	18.99	0.18
Hopper Dredge, pumps	Dodge Island - Port Jet Pump	1	500	0.80	301.5	4.54	1,368	547,029	7.50	0.07	4.52	0.04
Hopper Dredge, pumps	Dodge Island - STBD Jet Pump	1	500	0.80	301.5	4.54	1,368	547,029	7.50	0.07	4.52	0.04
Hopper Dredge, propulsion	Dodge Island - Bow Thruster	1	500	0.66	301.5	1.81	547	180,520	9.70	0.07	1.93	0.01
PIPELINE DREDGE, PRIME ENGINE		1	9,000	0.66	120.6	18.14	2,188	12,996,914	4.90	0.20	70.20	2.87
PIPELINE DREDGE, ELECTRIC GENERATOR		1	830	0.40	120.6	18.14	2,188	726,427	7.50	0.20	6.01	0.16
PIPELINE DREDGE, DREDGE PUMP (booster)		1	7,200	0.80	120.6	18.14	2,188	12,603,068	7.50	0.20	104.19	2.74
WORK TUG, PRIMARY		0	4,000	0.69	422.1	18.144	0	0	9.70	0.37	0.00	0.00
WORK TUG, SECONDARY Electric		0	50	0.40	422.1	18.144	0	0	0.00	0.00	0.00	0.00
SURVEY BOAT, SHORE		1	210	0.50	422.1	18.144	7,658	804,124	9.70	0.37	8.60	0.33
SURVEY BOAT, SHORE, SECONDARY Electric		1	40	0.40	422.1	18.144	7,658	122,533	0.00	0.00	0.00	0.00
DERRICK, PRIMARY		1	200	0.4	422.1	18.144	7,658	612,666	7.50	0.20	5.07	0.13
DERRICK, SECONDARY Electric		1	40	0.20	422.1	18.144	7,658	61,267	0.00	0.00	0.00	0.00
TENDER TUG, PROPULSION		1	1,000	0.69	422.1	18.144	7,658	5,284,243	9.70	0.37	56.50	2.16
TENDER TUG, SECONDARY		1	50	0.40	422.1	18.144	7,658	153,166	7.50	0.20	1.27	0.03
SURVEY BOAT, OFFSHORE		1	500	0.5	422.1	18.144	7,658	1,914,581	9.70	0.20	20.47	0.42
SURVEY BOAT, OFFSHORE, SECONDARY		1	40	0.40	422.1	18.144	7,658	122,533	0.00	0.00	0.00	0.00
Land equipment (assumes tier 2 engines)												
Mob/Demob												
TRUCK TRAILER, LOWBOY, 75 TON, 3 AXLE (ADD TOWING TRUCK)		4	310	0.59	30.0	8.00	960	175,584	10.72	0.66	2.07	0.13
TRUCK, HIGHWAY, 55,000 LBS (24,948KG) GVW, 6X4, 3 AXLE		1	310	0.59	30.0	8.00	240	43,896	10.72	0.66	0.52	0.03
LOADER/BACKHOE, WHEEL, 0.80 CY FRONT END BUCKET, 9.8' DEPTH OF HOE		1	78	0.59	30.0	8.00	240	11,045	9.50	1.30	0.12	0.02
TRUCK, HIGHWAY, CONVENTIONAL, 8,600 LBS (3,901KG)GVW, 4X2, 2 AXLE		4	135	0.59	30.0	8.00	960	76,464	10.33	0.54	0.87	0.05
Beach replenishment												
TRUCK, HIGHWAY, 8,600 GVW, 4X4 (SUBURBAN)		4	135	0.59	301.5	18.14	21,881	1,742,835	10.33	0.54	19.85	1.04
TRACTOR ATTACHMENTS, BLADE, UNIVERSAL, HYDRAULIC, FOR D9, 21.40 CY		0	0	0	301.5	18.14	0	0	4.90	1.30	0.00	0.00
TRACTOR, CRAWLER (DOZER), 410 HP, POWERSHIFT, W/17.7 CY SEMI-U BLADE		3	410	0.59	301.5	18.14	16,411	3,969,790	9.50	0.19	41.57	0.83
LOADER, FRONT END, WHEEL, INTEGRATED TOOL CARRIER, 1.75 CY (1.3 M3)		2	90	0.59	301.5	18.14	10,941	580,945	9.50	0.19	6.08	0.12
LOADER/BACKHOE, WHEEL, 0.80 CY FRONT END BUCKET, 9.8' DEPTH OF HOE		1	78	0.59	301.5	18.14	5,470	251,743	9.50	0.19	2.64	0.05
Project totals								**71,768,637**			**638.9**	**16.65**