# Atlantic Coast of Long Island
# Jones Inlet to East Rockaway Inlet
# Long Beach Island, New York
# Coastal Storm Risk Management Project

# HURRICANE SANDY LIMITED REEVALUATION REPORT

# Appendix C:

# Cost Engineering

**U.S. Army Corps of Engineers**
**New York District**

**February 2014**

# Appendix C – Cost Engineering

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## Introduction

This Appendix presents the detailed cost estimate and pertinent information for the recommended plan in the HSRR dated November 2013. The recommended plan primarily consists of dredging 4,720,000 CY of material from the borrow area approximately 2 miles from the shore, and extensive groin work (both new construction and rehabilitation of existing) along the shoreline, as well as shoreline structures, sand fencing, and dune grass placement. The project is assumed to go out for solicitation as 3 separate contracts:

- Contract 1 will consist of the construction of two new groins, the rehab of 2 existing groins at Point Lookout, rehab of 4 existing groins at Long Beach, and the rehab of the Point Lookout terminal groin.
- Contract 2 will consist of the construction of two new groins and the rehab of 11 existing groins at Long Beach.
- Contract 3 will consist of the dredging/beach fill, shoreline structures, and the dune grass plantings and sand fence.

The costs for the groin construction component of the project were developed by utilizing actual construction data from ongoing and historical jobsites for similar work, as well as soliciting vendor quotes for major material costs, which included each of the stone classes (armor, underlayer, core/bedding stone), steel sheet piling, and geotextile. The material and delivery price for the stone was based on truck-hauling to the site from quarries in central New York with construction utilizing land-based equipment. Equipment rates were updated with the latest MII Region 1 Equipment Book (2011 version), labor rates were updated using Davis-Bacon rates from the project area, and current fuel costs were used from the EIA website.

The beach fill cost was developed using CEDEP with a Generic Large Hopper dredge, with an average production rate of 429,000 cy per month and historical factors, which coincide with the project area. For initial construction, beach fill placement is required to be coordinated with groin construction in order to prevent wasting material placement. If beach fill is placed in the seaward area of the groin before starting groin construction, the material must be excavated out to place the stone once construction progresses that far out. Therefore, full beach sections are to be completed at the groin locations to once the groin construction is finished. The large hopper dredge is assumed to dredge the material, travel to a pump-out location, and pump the sand to shore using a booster pump. There it will be placed and graded by a shore crew consisting of bulldozers and loaders. The total unit price of $11.70/CY compares well with recent bid data for large hopper jobs in the area. References:

- Long Branch, Seabright to Manasquan Reach 3B, bid date 2 Aug 13. Large hopper, 3.3M CY. IGE price $11.88/CY, avg bid price $11.80/CY.
- Seabright, NJ CT Reach 2A, bid date 11 Jun 13. Large Hopper, 2.5M CY. IGE Price $12.46/CY, avg bid price $12.35/CY.

The dune grass, sand fence, and shoreline structures cost were developed with production rates obtained from a combination of the 2012 MII cost book, RS Means and pricing from websites and vendor quotes for some of the line items. This work will be completed after the beach fill work has been completed. Table C-1 shows the initial construction costs, or ‘project first costs.’

Costs for air mitigation (Clean Air Act) were developed by Environmental based on the tons of air emissions produced by the equipment on site. The equipment list and equipment hours for each piece of equipment in the MII estimate were sent to Environmental so that they could develop a tonnage quantity of air emissions for the whole project. An offset quote from a broker was received by Environmental at a current market price of $30-40/ton. That is how the $2M number was developed.

Costs for Cultural Resources were developed based off an ongoing contract at Long Beach for a Phase I investigation for possible shipwrecks. That contract cost is roughly $180K. If the Phase I investigation turns up a shipwreck, then a Phase II investigation for one wreck would be about $200K, based on the current NY/NJ Harbor project. This estimate assumes the possibility that 2 wrecks may be discovered. $180K + $200K + $200K = $580K, round up to $600K.

However, since these are project costs and not construction contract costs, these dollar amounts are assumed to be part of PED costs. Therefore, the $2.6M in additional costs have been added to the "Planning" PED cost, along with the 1% that was originally budgeted. The two folders originally containing these costs have been removed from the MII estimate.

Annualized costs are based on an economic project life of 50 years and an interest rate of 3-½%. The annual charges include the annualized first costs along with periodic nourishment every 5 years, major rehab costs, coastal monitoring, and dune/groin maintenance. These costs are shown in table C-2.

The periodic renourishment volume to be placed at 5-year cycles subsequent to commencement of construction and throughout the 50-year economic life is 1,770,000 CY per cycle. The renourishment beach fill is assumed to be placed in the same manner as the beach fill for the main contracts; with a large hopper dredge pumping the fill onto the shore, and a shore crew placing the material. Annualized renourishment costs are shown in Table C-4.

Major rehabilitation costs are for restoring the design profile due to significant storm events beyond those that were designed for in the renourishment cycle. The threshold at which major rehabilitation costs are incurred is based on the storm event that causes the erosion volume to exceed 15 cy/lf along the beach front. This is the average nourishment volume anticipated to be available at the midpoint of the renourishment cycle because the significant storm event has a 50% chance of occurring earlier or later than the cycle midpoint. Annualized major rehab costs are shown in Table C-5.

Coastal monitoring costs include semi-annual surveys over the 50-year project life and environmental monitoring over the first 5 years of the project. Annualized monitoring costs are shown in Table C-6.

# Table C-1 – Project First Cost

## Long Beach Island, NY

October 2013 Price Level

### Hurricane Sandy Limited Reevaluation Report Cost Estimate Summary

| Feat. Acct. | Description | Qty | UoM | Unit Price | Subtotal | Cont. % | Cont $$ | Total Cost |
|---|---|---|---|---|---|---|---|---|
| | **Contract 1** | | | | | | | |
| 01 | Lands & Damages | 1 | LS | $ 145,010 | $ 145,010 | 20.00% | $ 29,002 | $ 174,012 |
| | **Total Lands & Damages** | | | | **$ 145,010** | | **$ 29,002** | **$ 174,012** |
| 10 | Breakwater and Seawalls | | | | | | | |
| | Mobilization & Demobilization | 1 | LS | $ 1,630,490 | $ 1,630,490 | 21.80% | $ 355,473 | $ 1,985,962 |
| | Groin A Construction | | | | | | | |
| | Excavation | 9,000 | BCY | $ 10.07 | $ 90,599 | 21.80% | $ 19,752 | $ 110,351 |
| | Geotextile | 8,611 | SY | $ 26.55 | $ 228,649 | 21.80% | $ 49,849 | $ 278,498 |
| | Core/Bedding Stone | 16,900 | TON | $ 151.69 | $ 2,563,535 | 21.80% | $ 558,891 | $ 3,122,426 |
| | Class D Armor Stone | 9,900 | TON | $ 191.18 | $ 1,892,653 | 21.80% | $ 412,628 | $ 2,305,282 |
| | Class B/C Armor Stone | 17,900 | TON | $ 246.23 | $ 4,407,595 | 21.80% | $ 960,926 | $ 5,368,521 |
| | Groin B Construction | | | | | | | |
| | Excavation | 9,000 | BCY | $ 12.21 | $ 109,874 | 21.80% | $ 23,954 | $ 133,828 |
| | Geotextile | 7,278 | SY | $ 26.55 | $ 193,253 | 21.80% | $ 42,132 | $ 235,386 |
| | Core/Bedding Stone | 12,300 | TON | $ 151.69 | $ 1,865,768 | 21.80% | $ 406,767 | $ 2,272,535 |
| | Class D Armor Stone | 8,200 | TON | $ 191.18 | $ 1,567,652 | 21.80% | $ 341,773 | $ 1,909,425 |
| | Class B/C Armor Stone | 14,800 | TON | $ 246.31 | $ 3,645,369 | 21.80% | $ 794,748 | $ 4,440,118 |
| | Rehab Existing Groins | | | | | | | |
| | Class B/C Armor Stone | 10,800 | TON | $ 268.98 | $ 2,904,988 | 21.80% | $ 633,334 | $ 3,538,322 |
| | Point Lookout Terminal Groin Rehab | | | | | | | |
| | Steel Sheet Piling | 28,772 | SF | $ 66.72 | $ 1,919,730 | 21.80% | $ 418,532 | $ 2,338,261 |
| | Excavation | 2,600 | BCY | $ 12.21 | $ 31,741 | 21.80% | $ 6,920 | $ 38,661 |
| | Geotextile | 3,145 | SY | $ 26.55 | $ 83,509 | 21.80% | $ 18,206 | $ 101,716 |
| | Core/Bedding Stone | 3,906 | TON | $ 206.61 | $ 807,033 | 21.80% | $ 175,946 | $ 982,979 |
| | Class D Armor Stone | 5,700 | TON | $ 191.18 | $ 1,089,709 | 21.80% | $ 237,574 | $ 1,327,283 |
| | Class B/C Armor Stone | 13,700 | TON | $ 245.61 | $ 3,364,808 | 21.80% | $ 733,582 | $ 4,098,389 |
| | **Total Breakwaters & Seawalls** | | | | **$ 28,396,957** | | **$ 6,190,987** | **$ 34,587,944** |
| 30 | Engineering & Design | 1 | LS | $ 4,615,000 | $ 4,615,000 | 14.91% | $ 687,966 | $ 5,302,966 |
| 31 | Construction Management | 1 | LS | $ 2,172,000 | $ 2,172,000 | 14.91% | $ 323,784 | $ 2,495,784 |
| | **Total Contract #1** | | | | **$ 35,328,967** | | **$ 7,231,740** | **$ 42,560,706** |
| | **Contract 2** | | | | | | | |
| 01 | Lands & Damages | 1 | LS | $ - | $ - | 20.00% | $ - | $ - |
| | **Total Lands & Damages** | | | | **$ -** | | **$ -** | **$ -** |
| 10 | Breakwater and Seawalls | | | | | | | |
| | Mobilization & Demobilization | 1 | LS | $ 1,304,392 | $ 1,304,392 | 21.80% | $ 284,378 | $ 1,588,770 |
| | Groin C Construction | | | | | | | |
| | Excavation | 9,000 | BCY | $ 12.21 | $ 109,874 | 21.80% | $ 23,954 | $ 133,828 |
| | Geotextile | 5,333 | SY | $ 26.55 | $ 141,608 | 21.80% | $ 30,873 | $ 172,480 |
| | Core/Bedding Stone | 6,600 | TON | $ 151.69 | $ 1,001,144 | 21.80% | $ 218,265 | $ 1,219,409 |
| | Class D Armor Stone | 3,500 | TON | $ 191.18 | $ 669,120 | 21.80% | $ 145,879 | $ 814,999 |
| | Class B/C Armor Stone | 7,400 | TON | $ 247.90 | $ 1,834,488 | 21.80% | $ 399,947 | $ 2,234,435 |

# Long Beach Island, NY

October 2013 Price Level

## Hurricane Sandy Limited Reevaluation Report Cost Estimate Summary

| Feat. Acct. | Description | Qty | UoM | Unit Price | Subtotal | Cont. % | Cont $$ | Total Cost |
|---|---|---|---|---|---|---|---|---|
| | Groin D Construction | | | | | | | |
| | Excavation | 9,000 | BCY | $ 12.21 | $ 109,874 | 21.80% | $ 23,954 | $ 133,828 |
| | Geotextile | 4,889 | SY | $ 26.55 | $ 129,818 | 21.80% | $ 28,302 | $ 158,120 |
| | Core/Bedding Stone | 6,100 | TON | $ 151.69 | $ 925,300 | 21.80% | $ 201,730 | $ 1,127,030 |
| | Class D Armor Stone | 3,200 | TON | $ 191.18 | $ 611,767 | 21.80% | $ 133,375 | $ 745,142 |
| | Class B/C Armor Stone | 6,800 | TON | $ 247.89 | $ 1,685,662 | 21.80% | $ 367,501 | $ 2,053,163 |
| | Rehab Existing Groins | | | | | | | |
| | Class B/C Armor Stone | 19,800 | TON | $ 268.98 | $ 5,325,812 | 21.80% | $ 1,161,112 | $ 6,486,923 |
| | **Total Breakwaters & Seawalls** | | | | **$ 13,848,857** | | **$ 3,019,271** | **$ 16,868,127** |
| 30 | Engineering & Design | 1 | LS | $ 3,185,237 | $ 3,185,237 | 14.91% | $ 474,829 | $ 3,660,066 |
| 31 | Construction Management | 1 | LS | $ 1,149,875 | $ 1,149,875 | 14.91% | $ 171,414 | $ 1,321,289 |
| | **Total Contract #2 (WITHOUT Deferred Groins)** | | | | **$ 18,183,968** | | **$ 3,665,514** | **$ 21,849,482** |
| | **Groins E & F (Deferred)** | | | | | | | |
| | Excavation | 18,000 | BCY | $ 12.21 | $ 219,748 | 21.80% | $ 47,908 | $ 267,656 |
| | Geotextile | 10,667 | SY | $ 26.55 | $ 283,233 | 21.80% | $ 61,749 | $ 344,982 |
| | Core/Bedding Stone | 13,200 | TON | $ 151.69 | $ 2,002,288 | 21.80% | $ 436,531 | $ 2,438,818 |
| | Class D Armor Stone | 7,000 | TON | $ 191.18 | $ 1,338,240 | 21.80% | $ 291,757 | $ 1,629,997 |
| | Class B/C Armor Stone | 14,800 | TON | $ 247.90 | $ 3,668,976 | 21.80% | $ 799,895 | $ 4,468,871 |
| 30 | Engineering & Design | 1 | LS | $ 286,763 | $ 286,763 | 14.91% | $ 42,748 | $ 329,511 |
| 31 | Construction Management | 1 | LS | $ 539,125 | $ 539,125 | 14.91% | $ 80,368 | $ 619,494 |
| | **Total Contract #2 (WITH Deferred Groins)** | | | | **$ 26,522,340** | | **$ 5,426,471** | **$ 31,948,811** |
| | **Contract 3** | | | | | | | |
| 01 | Lands & Damages | 1 | LS | $ - | $ - | 20.00% | $ - | $ - |
| | **Total Lands & Damages** | | | | **$ -** | | **$ -** | **$ -** |
| 17 | Beach Replenishment | | | | | | | |
| | Mobilization and Demobilization | 1 | LS | $ 4,014,646 | $ 4,014,646 | 21.80% | $ 875,257 | $ 4,889,903 |
| | Hydraulic Beach Fill | 4,720,000 | CY | $ 11.70 | $ 55,217,482 | 21.80% | $ 12,038,288 | $ 67,255,769 |
| | Shoreline Structures | 1 | LS | $ 7,410,126 | $ 7,410,126 | 21.80% | $ 1,615,525 | $ 9,025,651 |
| | Sand Fence | 75,000 | LF | $ 5 | $ 359,059 | 21.80% | $ 78,281 | $ 437,340 |
| | Dune Grass | 34 | ACR | $ 19,404 | $ 659,743 | 21.80% | $ 143,835 | $ 803,578 |
| | **Total Beach Repleneishment** | | | | **$ 67,661,056** | | **$ 14,751,185** | **$ 82,412,240** |
| 30 | Engineering & Design | 1 | LS | $ 13,597,000 | $ 13,597,000 | 14.91% | $ 2,026,930 | $ 15,623,930 |
| 31 | Construction Management | 1 | LS | $ 4,639,000 | $ 4,639,000 | 14.91% | $ 691,544 | $ 5,330,544 |
| | **Total Contract #3** | | | | **$ 85,897,056** | | **$ 17,469,658** | **$ 103,366,714** |
| | **Total First Cost (WITHOUT deferred groins)** | | | | **$ 139,409,991** | | **$ 28,366,912** | **$ 167,776,903** |
| | **Total First Cost (WITH deferred groins)** | | | | **$ 147,748,363** | | **$ 30,127,869** | **$ 177,876,232** |

## Table C-2 – Annualized Cost

# Long Beach Island, NY

## Annualized Cost Summary

| | | |
|---|---|---|
| **First Cost** (a) | $ | 177,876,000 |
| **Investment Cost** | | |
| Interest During Construction (b) | $ | 9,162,000 |
| **Total Investment Cost:** | $ | 187,038,000 |
| **Annual Costs** | | |
| Annualized Investment Cost (c) | $ | 6,546,000 |
| Annualized Scheduled Renourishment (d) | $ | 6,178,000 |
| Annualized Major Rehab Cost (e) | $ | 380,000 |
| Annual Dune & Groin Maintenance Cost (f) | $ | 453,000 |
| Annual Coastal Monitoring Cost | $ | 381,000 |
| **Total Annual Cost*** | **$** | **13,938,000** |

*October 2013 Price Level

(a) Total first cost without sunk PED costs ($1.8M).

(b) Based on 3 construction contracts: 29,19 and 25 months of construction @ 3.5% (IDC E&D, RE and Sunk costs calculated separately and included in this total)

(c) I = 3.50% and n = 50 yrs

(d) From Renourishment Cost Table

(e) From Annualized Major Rehabilitation Cost Table

(f) Based 0.5% of initial new groin, groin extension and groin rehabilitation costs from First Cost table on TPCS Plus annualized dune and beach maintenance cost estimated (by the City) to be $100,000 (Long Beach) + $50,000 (Town of Hempstead).

## Table C-3 – Renourishment Cost

# Long Beach Island, NY

Long Beach Periodic Nourishment Costs
Recommended Plan

| | | | | |
|---|---|---|---|---|
| (Per Renourishment) | 1,770,000 CY @ $11.70/CY | | $ | 20,706,600 |
| | Mob & Demob | | $ | 4,014,600 |
| | Subtotal | | $ | 24,722,000 |
| | Contingency | 21.59% | $ | 5,338,000 |
| | E&D (incl. Contingency of 14.91%) | | $ | 2,273,000 |
| | Construction Management (incl. Contingency of 14.91%) | | $ | 2,209,000 |
| | Total Cost Per Operation | | $ | 34,542,000 |
| | Federal Cost Share: | 65% | $ | 22,452,300 |
| | Non-Federal Cost Share | 35% | $ | 12,089,700 |

| YEAR | FUTURE WORK | PRESENT WORTH FACTOR | PRESENT WORTH |
|---|---|---|---|
| 0 | $0 | 1.00000 | $0 |
| 5 | $34,542,000 | 0.84197 | $29,083,437 |
| 10 | $34,542,000 | 0.70892 | $24,487,474 |
| 15 | $34,542,000 | 0.59689 | $20,617,796 |
| 20 | $34,542,000 | 0.50257 | $17,359,631 |
| 25 | $34,542,000 | 0.42315 | $14,616,343 |
| 30 | $34,542,000 | 0.35628 | $12,306,569 |
| 35 | $34,542,000 | 0.29998 | $10,361,801 |
| 40 | $34,542,000 | 0.25257 | $8,724,358 |
| 45 | $34,542,000 | 0.21266 | $7,345,675 |
| SUM OF PRESENT WORTHS | $310,878,000 | | $144,903,084 |
| | | | |
| **TOTAL ANNUAL COST** | | | **$6,178,000** |
| Interest Rate | 3.50% | | |
| n=50 years | 50 | | |

# Table C-4 – Major Rehab Cost

## Long Beach Island, NY

Long Beach Major Rehabilitation Costs
Recommended Plan
Distance: 35,250 LF

| Return Interval (yrs) | Frequency | Frequency Interval | Permanent Loss Factor | Erosion Volume (cy/ft) | Emergency Fill (cy/ft) | Emergency Fill Cost ($/ft) | Average Emergency Fill Cost ($) | Annual Emergency Fill Cost ($) | Annual Emergency Fill Cost ($/ft) |
|---|---|---|---|---|---|---|---|---|---|
| 20.00 | 0.050 | | 0.22 | 15.00 | 3.30 | $115.50 | | | |
| | | 0.030 | | | | | $4,983,733 | $149,512 | $4.24 |
| 50.00 | 0.020 | | 0.27 | 17.70 | 4.78 | $167.27 | | | |
| | | 0.010 | | | | | $6,999,064 | $69,991 | $1.99 |
| 100.00 | 0.010 | | 0.33 | 19.90 | 6.57 | $229.85 | | | |
| | | 0.005 | | | | | $9,208,093 | $46,040 | $1.31 |
| 200.00 | 0.005 | | 0.38 | 22.00 | 8.36 | $292.60 | | | |
| | | | | | | **Subtotal Annualized Emergency Fill Cost** | | **$266,000** | **$7.53** |
| | | | | | | **Subtotal Emergency Fill (every 5 year total):** | | **$1,330,000** | |
| | | | | | | **Construction Contingency:** | | **$287,000** | |
| | | | | | | **E&D (Incl. Contingency):** | | **$122,000** | |
| | | | | | | **S&A (Incl. Contingency):** | | **$160,000** | |
| | | | | | | **Total Emergency Fill Cost (every 5 year total):** | | **$1,899,000** | |
| | | | | | | **Total Emergency Fill for Project (9 Cycles):** | | **$17,091,000** | |
| Notes: | | | | | | **Total Annualized Emergency Fill Cost:** | | **$380,000** | |

Loss Factor: This is the percent of eroded volume permanently lost to the profile. The factors are based on experience at Ocean City, Md.
Erosion Volume: Maximum erosion volume landward of a given profile position computed from SBEACH (50,100 and 200 year storms extraploated from northeasters)
Emergency Fill Cost: Based on for trucked sand (cy) = $35

## Table C-5 – Monitoring Cost

### Long Beach Island, NY

### Long Beach Coastal Monitoring Costs

| YEAR | FUTURE WORTH (Incl Contingency) | PRESENT WORTH FACTOR | PRESENT WORTH |
|---|---|---|---|
| 1 | $814,650 | 0.96618 | $787,101 |
| 2 | $492,440 | 0.93351 | $459,698 |
| 3 | $492,440 | 0.90194 | $444,153 |
| 4 | $492,440 | 0.87144 | $429,133 |
| 5 | $924,080 | 0.84197 | $778,051 |
| 6 | $249,260 | 0.81350 | $202,773 |
| 7 | $322,210 | 0.78599 | $253,254 |
| 8 | $249,260 | 0.75941 | $189,291 |
| 9 | $322,210 | 0.73373 | $236,415 |
| 10 | $407,330 | 0.70892 | $288,764 |
| 11 | $322,210 | 0.68495 | $220,696 |
| 12 | $249,260 | 0.66178 | $164,956 |
| 13 | $322,210 | 0.63940 | $206,022 |
| 14 | $249,260 | 0.61778 | $153,988 |
| 15 | $571,470 | 0.59689 | $341,105 |
| 16 | $249,260 | 0.57671 | $143,750 |
| 17 | $322,210 | 0.55720 | $179,537 |
| 18 | $249,260 | 0.53836 | $134,192 |
| 19 | $322,210 | 0.52016 | $167,599 |
| 20 | $407,330 | 0.50257 | $204,710 |
| 21 | $322,210 | 0.48557 | $156,456 |
| 22 | $249,260 | 0.46915 | $116,940 |
| 23 | $322,210 | 0.45329 | $146,053 |
| 24 | $249,260 | 0.43796 | $109,165 |
| 25 | $480,280 | 0.42315 | $203,229 |
| 26 | $249,260 | 0.40884 | $101,907 |
| 27 | $322,210 | 0.39501 | $127,277 |
| 28 | $249,260 | 0.38165 | $95,131 |
| 29 | $322,210 | 0.36875 | $118,814 |
| 30 | $498,520 | 0.35628 | $177,612 |
| 31 | $322,210 | 0.34423 | $110,914 |
| 32 | $249,260 | 0.33259 | $82,901 |
| 33 | $322,210 | 0.32134 | $103,540 |
| 34 | $249,260 | 0.31048 | $77,389 |
| 35 | $480,280 | 0.29998 | $144,073 |
| 36 | $249,260 | 0.28983 | $72,244 |
| 37 | $322,210 | 0.28003 | $90,229 |
| 38 | $249,260 | 0.27056 | $67,440 |
| 39 | $322,210 | 0.26141 | $84,230 |
| 40 | $407,330 | 0.25257 | $102,880 |
| 41 | $322,210 | 0.24403 | $78,629 |
| 42 | $249,260 | 0.23578 | $58,770 |
| 43 | $322,210 | 0.22781 | $73,401 |
| 44 | $249,260 | 0.22010 | $54,863 |
| 45 | $571,470 | 0.21266 | $121,528 |
| 46 | $249,260 | 0.20547 | $51,215 |
| 47 | $322,210 | 0.19852 | $63,965 |
| 48 | $249,260 | 0.19181 | $47,810 |
| 49 | $322,210 | 0.18532 | $59,712 |
| 50 | $249,260 | 0.17905 | $44,631 |
| Contingency %: | 21.59% | | |
| Sum of Present Worths: | $17,576,000 | | $8,928,140 |
| **TOTAL ANNUAL COST** | | | **$381,000** |

## Long Beach Island, NY

# Long Beach Coastal Monitoring Costs - Breakdown

| | BEACH PROFILES | SEDIMENT SAMPLES | AERIALS | WAVE GAUGES | DATA ANALYSIS (REPORT) | BORROW AREA MONITORING | TOTAL |
|---|---|---|---|---|---|---|---|
| Year 1 | $205,000 | $80,000 | $120,000 | $190,000 | $75,000 | | $670,000 |
| Year 2 | $205,000 | | $60,000 | $140,000 | | | $405,000 |
| Year 3 | $205,000 | | $60,000 | $140,000 | | | $405,000 |
| Year 4 | $205,000 | | $60,000 | $140,000 | | | $405,000 |
| Year 5 | $205,000 | $40,000 | $60,000 | $140,000 | $75,000 | $240,000 | $760,000 |
| Year 6 | $205,000 | | | | | | $205,000 |
| Year 7 | $205,000 | | $60,000 | | | | $265,000 |
| Year 8 | $205,000 | | | | | | $205,000 |
| Year 9 | $205,000 | | $60,000 | | | | $265,000 |
| Year 10 | $205,000 | $40,000 | | | | $90,000 | $335,000 |
| Year 11 | $205,000 | | $60,000 | | | | $265,000 |
| Year 12 | $205,000 | | | | | | $205,000 |
| Year 13 | $205,000 | | $60,000 | | | | $265,000 |
| Year 14 | $205,000 | | | | | | $205,000 |
| Year 15 | $205,000 | $40,000 | $60,000 | | $75,000 | $90,000 | $470,000 |
| Year 16 | $205,000 | | | | | | $205,000 |
| Year 17 | $205,000 | | $60,000 | | | | $265,000 |
| Year 18 | $205,000 | | | | | | $205,000 |
| Year 19 | $205,000 | | $60,000 | | | | $265,000 |
| Year 20 | $205,000 | $40,000 | | | | $90,000 | $335,000 |
| Year 21 | $205,000 | | $60,000 | | | | $265,000 |
| Year 22 | $205,000 | | | | | | $205,000 |
| Year 23 | $205,000 | | $60,000 | | | | $265,000 |
| Year 24 | $205,000 | | | | | | $205,000 |
| Year 25 | $205,000 | $40,000 | $60,000 | | | $90,000 | $395,000 |
| Year 26 | $205,000 | | | | | | $205,000 |
| Year 27 | $205,000 | | $60,000 | | | | $265,000 |
| Year 28 | $205,000 | | | | | | $205,000 |
| Year 29 | $205,000 | | $60,000 | | | | $265,000 |
| Year 30 | $205,000 | $40,000 | | | $75,000 | $90,000 | $410,000 |
| Year 31 | $205,000 | | $60,000 | | | | $265,000 |
| Year 32 | $205,000 | | | | | | $205,000 |
| Year 33 | $205,000 | | $60,000 | | | | $265,000 |
| Year 34 | $205,000 | | | | | | $205,000 |
| Year 35 | $205,000 | $40,000 | $60,000 | | | $90,000 | $395,000 |
| Year 36 | $205,000 | | | | | | $205,000 |
| Year 37 | $205,000 | | $60,000 | | | | $265,000 |
| Year 38 | $205,000 | | | | | | $205,000 |
| Year 39 | $205,000 | | $60,000 | | | | $265,000 |
| Year 40 | $205,000 | $40,000 | | | | $90,000 | $335,000 |
| Year 41 | $205,000 | | $60,000 | | | | $265,000 |
| Year 42 | $205,000 | | | | | | $205,000 |
| Year 43 | $205,000 | | $60,000 | | | | $265,000 |
| Year 44 | $205,000 | | | | | | $205,000 |
| Year 45 | $205,000 | $40,000 | $60,000 | | $75,000 | $90,000 | $470,000 |
| Year 46 | $205,000 | | | | | | $205,000 |
| Year 47 | $205,000 | | $60,000 | | | | $265,000 |
| Year 48 | $205,000 | | | | | | $205,000 |
| Year 49 | $205,000 | | $60,000 | | | | $265,000 |
| Year 50 | $205,000 | | | | | | $205,000 |

NOTES:

INTEREST = 3.500%
PROJ.LIFE = 50
CAPITAL RECOVERY FACTOR = 0.04263

## Table C-6 – Cost Apportionment

| Long Beach Island, NY<br>Cost Apportionment | | | |
|---|---|---|---|
| Cost-Sharing | Federal Share | Non-Federal Share | Total |
| **Project First Costs** | | | |
| Cash Contribution | $ 177,702,000 | $ - | $ 177,702,000 |
| Real Estate Lands & Damages | $ 174,000 | $ - | $ 174,000 |
| TOTAL FIRST COST | $ 177,876,000 | $ - | $ 177,876,000 |
| **Continuing Construction First Cost** | | | |
| Scheduled Beach Renourishment (a) | $ 202,071,000 | $ 108,807,000 | $ 310,878,000 |
| Emergency Beach Fill (b) | $ 11,109,000 | $ 5,982,000 | $ 17,091,000 |
| Coastal Monitoring (c) | $ 11,424,000 | $ 6,152,000 | $ 17,576,000 |
| **SUBTOTAL CONTINUING CONSTRUCTION COST** | **$ 224,604,000** | **$ 120,941,000** | **$ 345,545,000** |
| **TOTAL CUMULATIVE CONSTRUCTION COST (d)** | **$ 402,480,000** | **$ 120,941,000** | **$ 523,421,000** |
| Annual Beach & Groin Maintenance Cost | $ - | $ 453,000 | $ 453,000 |
| **TOTAL ANNUAL O&M COSTS** | **$ -** | **$ 453,000** | **$ 453,000** |

* October 2013 Price Level

** Shared based on 65% Federal and 35% non-Federal for construction and renourishment

(a) Beach Renourishment = $34,542,000 every 5-year cycle for 9 cycles

(b) Emergency Beach Fill = $1,899,000 every 5-year cycle for 9 cycles

(c) Coastal Monitoring Varies yearly and is broken dow in the Coastal Monitoring Cost Table

(d) Cumulative Costs include Total First Cost and Cumulative Construction

# Total Project Cost Summary

PROJECT: Long Beach Island, NY
PROJECT NO: -
LOCATION: Long Beach Island, NY
DISTRICT: NAN New York
PREPARED: 2/3/2014
POC: CHIEF, COST ENGINEERING, Mukesh Kumar

This Estimate reflects the scope and schedule in report; Long Beach NY HSLRR

| Civil Works Work Breakdown Structure | | ESTIMATED COST | | | | PROJECT FIRST COST (Constant Dollar Basis) | | | | TOTAL PROJECT COST (FULLY FUNDED) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Program Year (Budget EC): 2014 | | | | | | | | |
| | | | | | | Effective Price Level Date: 1 OCT 13 | | | | | | | | |
| WBS NUMBER | Civil Works Feature & Sub-Feature Description | COST ($K) | CNTG ($K) | CNTG (%) | TOTAL ($K) | ESC (%) | COST ($K) | CNTG ($K) | TOTAL ($K) | Spent Thru: 1-Oct-13 ($K) | | COST ($K) | CNTG ($K) | FULL ($K) |
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
| 10 | BREAKWATER & SEAWALLS | $49,758 | $10,848 | 21.80% | $60,606 | 0.0% | $49,758 | $10,848 | $60,606 | $0 | | $51,533 | $11,235 | $62,768 |
| 17 | BEACH REPLENISHMENT | $67,661 | $14,751 | 21.80% | $82,412 | 0.0% | $67,661 | $14,751 | $82,412 | $0 | | $71,546 | $15,598 | $87,144 |
| | **CONSTRUCTION ESTIMATE TOTALS:** | $117,419 | $25,599 | 21.80% | $143,019 | | $117,419 | $25,599 | $143,019 | | | $123,078 | $26,833 | $149,912 |
| 01 | LANDS AND DAMAGES | $145 | $29 | 20.00% | $174 | 0.0% | $145 | $29 | $174 | $0 | | $148 | $30 | $177 |
| 30 | PLANNING, ENGINEERING & DESIGN | $21,684 | $3,232 | 14.91% | $24,916 | 0.0% | $21,684 | $3,232 | $24,916 | $1,800 | | $23,316 | $3,476 | $28,591 |
| 31 | CONSTRUCTION MANAGEMENT | $8,500 | $1,267 | 14.91% | $9,767 | 0.0% | $8,500 | $1,267 | $9,767 | $0 | | $8,909 | $1,328 | $10,238 |
| | | $147,748 | $30,128 | | $177,876 | | $147,748 | $30,128 | $177,876 | $1,800 | | **$155,451** | **$31,666** | **$188,918** |
| 17 | BEACH REPLENISHMENT (Renourishme | $248,923 | $53,746 | 21.59% | $302,669 | 0.0% | $248,923 | $53,746 | $302,669 | $0 | | $442,602 | $95,564 | $538,166 |
| | **CONSTRUCTION ESTIMATE TOTALS:** | $248,923 | $53,746 | 21.59% | $302,669 | | $248,923 | $53,746 | $302,669 | | | $442,602 | $95,564 | $538,166 |
| 30 | PLANNING, ENGINEERING & DESIGN (Renourishme | $18,756 | $2,799 | 14.92% | $21,555 | 0.0% | $18,756 | $2,799 | $21,555 | $0 | | $119,764 | $17,873 | $137,637 |
| 31 | CONSTRUCTION MANAGEMENT (Renourishme | $18,549 | $2,772 | 14.94% | $21,321 | 0.0% | $18,549 | $2,772 | $21,321 | $0 | | $33,126 | $4,950 | $38,077 |
| | **PROJECT COST TOTALS:** | $286,228 | $59,317 | | $345,545 | | $286,228 | $59,317 | $345,545 | $0 | | **$595,492** | **$118,387** | **$713,880** |

| | | | | |
|---|---|---|---|---|
| **Mandatory by Regulation** | CHIEF, COST ENGINEERING, Mukesh Kumar | | | |
| | | ESTIMATED FEDERAL COST: | **100%** | **$188,918** |
| **Mandatory by Regulation** | PROJECT MANAGER, Ron Pinzon | ESTIMATED NON-FEDERAL COST: | **0%** | **$0** |
| **Mandatory by Regulation** | CHIEF, REAL ESTATE, Noreen Dresser | **ESTIMATED TOTAL PROJECT COST:** | | **$188,918** |
| | CHIEF, PLANNING,Frank Santomauro | ESTIMATED FEDERAL COST: | **65%** | **$464,022** |
| | | ESTIMATED NON-FEDERAL COST: | **35%** | **$249,858** |
| | CHIEF, ENGINEERING, Arthur Connolly | **ESTIMATED RENOURISHMENT TOTAL PROJECT COST:** | | **$713,880** |
| | CHIEF, OPERATIONS, Tom Creamer | | | |
| | CHIEF, CONSTRUCTION, Gerald Byrne | | | |
| | CHIEF, CONTRACTING,Frank Cashman | | | |
| | CHIEF, PM-PB, Anthony Ciorra | | | |
| | CHIEF, DPM, Joseph Seebode | | | |

# Total Project Cost Summary (cont.)

****** CONTRACT COST SUMMARY ******

PROJECT: Long Beach Island, NY
LOCATION: Long Beach Island, NY
This Estimate reflects the scope and schedule in report; Long Beach NY HSLRR

DISTRICT: NAN New York PREPARED: 2/3/2014
POC: CHIEF, COST ENGINEERING, Mukesh Kumar

| Civil Works Work Breakdown Structure | | ESTIMATED COST | | | | PROJECT FIRST COST (Constant Dollar Basis) | | | | TOTAL PROJECT COST (FULLY FUNDED) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Estimate Prepared: 2/3/2014<br>Effective Price Level: 41548 | | | | Program Year (Budget EC): 2014<br>Effective Price Level Date: 1 OCT 13 | | | | | | | | |
| | | | | RISK BASED | | | | | | | | | | |
| WBS | Civil Works | COST | CNTG | CNTG | TOTAL | ESC | COST | CNTG | TOTAL | Mid-Point | INFLATED | COST | CNTG | FULL |
| NUMBER | Feature & Sub-Feature Description | ($K) | ($K) | (%) | ($K) | (%) | ($K) | ($K) | ($K) | Date | (%) | ($K) | ($K) | ($K) |
| *A* | *B* | *C* | *D* | *E* | *F* | *G* | *H* | *I* | *J* | *P* | *L* | *M* | *N* | *O* |
| | **Contract #1** | | | | | | | | | | | | | |
| **10** | BREAKWATER & SEAWALLS | $28,397 | $6,191 | 21.80% | $34,588 | 0.0% | $28,397 | $6,191 | $34,588 | 2016Q1 | 3.8% | $29,467 | $6,424 | $35,892 |
| | **CONSTRUCTION ESTIMATE TOTALS:** | $28,397 | $6,191 | 21.80% | **$34,588** | | $28,397 | $6,191 | $34,588 | | | $29,467 | $6,424 | $35,892 |
| **01** | LANDS AND DAMAGES | $145 | $29 | 20.00% | $174 | 0.0% | $145 | $29 | $174 | 2015Q1 | 1.8% | $148 | $30 | $177 |
| **30** | PLANNING, ENGINEERING & DESIGN | | | | | | | | | | | | | |
| *2.50%* | Project Management | $710 | $106 | 14.91% | $816 | 0.0% | $710 | $106 | $816 | 2015Q1 | 3.7% | $736 | $110 | $846 |
| *1.00%* | Planning & Environmental Compliance | $284 | $42 | 14.91% | $326 | 0.0% | $284 | $42 | $326 | 2015Q1 | 3.7% | $294 | $44 | $338 |
| *7.75%* | Engineering & Design | $2,201 | $328 | 14.91% | $2,529 | 0.0% | $2,201 | $328 | $2,529 | 2015Q1 | 3.7% | $2,282 | $340 | $2,622 |
| *1.00%* | Reviews, ATRs, IEPRs, VE | $284 | $42 | 14.91% | $326 | 0.0% | $284 | $42 | $326 | 2015Q1 | 3.7% | $294 | $44 | $338 |
| *0.25%* | Life Cycle Updates (cost, schedule, risks) | $71 | $11 | 14.91% | $82 | 0.0% | $71 | $11 | $82 | 2015Q1 | 3.7% | $74 | $11 | $85 |
| *0.25%* | Contracting & Reprographics | $71 | $11 | 14.91% | $82 | 0.0% | $71 | $11 | $82 | 2015Q1 | 3.7% | $74 | $11 | $85 |
| *1.50%* | Engineering During Construction | $426 | $64 | 14.91% | $490 | 0.0% | $426 | $64 | $490 | 2016Q1 | 8.0% | $460 | $69 | $529 |
| *1.00%* | Planning During Construction | $284 | $42 | 14.91% | $326 | 0.0% | $284 | $42 | $326 | 2016Q1 | 8.0% | $307 | $46 | $352 |
| *1.00%* | Project Operations | $284 | $42 | 14.91% | $326 | 0.0% | $284 | $42 | $326 | 2015Q1 | 3.7% | $294 | $44 | $338 |
| **31** | CONSTRUCTION MANAGEMENT | | | | | | | | | | | | | |
| *7.65%* | Construction Management | $2,172 | $324 | 14.91% | $2,496 | 0.0% | $2,172 | $324 | $2,496 | 2016Q1 | 3.8% | $2,255 | $336 | $2,592 |
| *0.00%* | Project Operation: | $0 | $0 | 14.91% | $0 | 0.0% | $0 | $0 | $0 | 0 | 0.0% | $0 | $0 | $0 |
| *0.00%* | Project Management | $0 | $0 | 14.91% | $0 | 0.0% | $0 | $0 | $0 | 0 | 0.0% | $0 | $0 | $0 |
| | **CONTRACT COST TOTALS:** | $35,329 | $7,232 | | **$42,561** | | $35,329 | $7,232 | $42,561 | | | $36,685 | $7,508 | **$44,193** |

# Total Project Cost Summary (cont.)

****** CONTRACT COST SUMMARY ******

PROJECT: Long Beach Island, NY
LOCATION: Long Beach Island, NY
This Estimate reflects the scope and schedule in report; Long Beach NY HSLRR

DISTRICT: NAN New York PREPARED: 2/3/2014
POC: CHIEF, COST ENGINEERING, Mukesh Kumar

| Civil Works Work Breakdown Structure | | ESTIMATED COST | | | | PROJECT FIRST COST (Constant Dollar Basis) | | | | TOTAL PROJECT COST (FULLY FUNDED) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Estimate Prepared: | | | 2/3/2014 | Program Year (Budget EC): | | | 2014 | | | | | |
| | | Effective Price Level: | | | 41548 | Effective Price Level Date: | | | 1 OCT 13 | | | | | |
| WBS NUMBER | Civil Works Feature & Sub-Feature Description | COST ($K) | CNTG ($K) | CNTG (%) | TOTAL ($K) | ESC (%) | COST ($K) | CNTG ($K) | TOTAL ($K) | Mid-Point Date | INFLATED (%) | COST ($K) | CNTG ($K) | FULL ($K) |
| *A* | *B* | *C* | *D* | *E* | *F* | *G* | *H* | *I* | *J* | *P* | *L* | *M* | *N* | *O* |
| | **Contract #2** | | | | | | | | | | | | | |
| **10** | BREAKWATER & SEAWALLS | $21,361 | $4,657 | 21.80% | $26,018 | 0.0% | $21,361 | $4,657 | $26,018 | 2015Q4 | 3.3% | $22,065 | $4,811 | $26,876 |
| | **CONSTRUCTION ESTIMATE TOTALS:** | $21,361 | $4,657 | 21.80% | **$26,018** | | $21,361 | $4,657 | $26,018 | | | $22,065 | $4,811 | $26,876 |
| **01** | LANDS AND DAMAGES | $0 | $0 | 20.00% | $0 | 0.0% | $0 | $0 | $0 | 0 | 0.0% | $0 | $0 | $0 |
| **30** | PLANNING, ENGINEERING & DESIGN | | | | | | | | | | | | | |
| *2.50%* | Project Management | $534 | $80 | 14.91% | $614 | 0.0% | $534 | $80 | $614 | 2015Q1 | 3.7% | $554 | $83 | $636 |
| *1.00%* | Planning & Environmental Compliance | $214 | $32 | 14.91% | $246 | 0.0% | $214 | $32 | $246 | 2015Q1 | 3.7% | $222 | $33 | $255 |
| *7.75%* | Engineering & Design | $1,656 | $247 | 14.91% | $1,903 | 0.0% | $1,656 | $247 | $1,903 | 2015Q1 | 3.7% | $1,717 | $256 | $1,972 |
| *1.00%* | Reviews, ATRs, IEPRs, VE | $214 | $32 | 14.91% | $246 | 0.0% | $214 | $32 | $246 | 2015Q1 | 3.7% | $222 | $33 | $255 |
| *0.25%* | Life Cycle Updates (cost, schedule, risks) | $53 | $8 | 14.91% | $61 | 0.0% | $53 | $8 | $61 | 2015Q1 | 3.7% | $55 | $8 | $63 |
| *0.25%* | Contracting & Reprographics | $53 | $8 | 14.91% | $61 | 0.0% | $53 | $8 | $61 | 2015Q1 | 3.7% | $55 | $8 | $63 |
| *1.50%* | Engineering During Construction | $320 | $48 | 14.91% | $368 | 0.0% | $320 | $48 | $368 | 2015Q4 | 6.9% | $342 | $51 | $393 |
| *1.00%* | Planning During Construction | $214 | $32 | 14.91% | $246 | 0.0% | $214 | $32 | $246 | 2015Q4 | 6.9% | $229 | $34 | $263 |
| *1.00%* | Project Operations | $214 | $32 | 14.91% | $246 | 0.0% | $214 | $32 | $246 | 2015Q1 | 3.7% | $222 | $33 | $255 |
| **31** | CONSTRUCTION MANAGEMENT | | | | | | | | | | | | | |
| *7.91%* | Construction Management | $1,689 | $252 | 14.91% | $1,941 | 0.0% | $1,689 | $252 | $1,941 | 2015Q4 | 3.4% | $1,746 | $260 | $2,006 |
| *0.00%* | Project Operation: | $0 | $0 | 14.91% | $0 | 0.0% | $0 | $0 | $0 | 0 | 0.0% | $0 | $0 | $0 |
| *0.00%* | Project Management | $0 | $0 | 14.91% | $0 | 0.0% | $0 | $0 | $0 | 0 | 0.0% | $0 | $0 | $0 |
| | **CONTRACT COST TOTALS:** | $26,522 | $5,426 | | **$31,949** | | $26,522 | $5,426 | $31,949 | | | $27,427 | $5,610 | **$33,037** |

# Total Project Cost Summary (cont.)

****** CONTRACT COST SUMMARY ******

PROJECT: Long Beach Island, NY
LOCATION: Long Beach Island, NY
This Estimate reflects the scope and schedule in report; Long Beach NY HSLRR

DISTRICT: NAN New York PREPARED: 2/3/2014
POC: CHIEF, COST ENGINEERING, Mukesh Kumar

| Civil Works Work Breakdown Structure | | ESTIMATED COST | | | | PROJECT FIRST COST (Constant Dollar Basis) | | | | TOTAL PROJECT COST (FULLY FUNDED) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Estimate Prepared: | | | 2/3/2014 | Program Year (Budget EC): | | | 2014 | | | | | |
| | | Effective Price Level: | | | 41548 | Effective Price Level Date: | | | 1 OCT 13 | | | | | |
| WBS NUMBER | Civil Works Feature & Sub-Feature Description | COST ($K) | CNTG ($K) | CNTG (%) | TOTAL ($K) | ESC (%) | COST ($K) | CNTG ($K) | TOTAL ($K) | Mid-Point Date | INFLATED (%) | COST ($K) | CNTG ($K) | FULL ($K) |
| *A* | *B* | *C* | *D* | *E* | *F* | *G* | *H* | *I* | *J* | *P* | *L* | *M* | *N* | *O* |
| | **Contract #3** | | | | | | | | | | | | | |
| **17** | BEACH REPLENISHMENT | $67,661 | $14,751 | 21.80% | $82,412 | 0.0% | $67,661 | $14,751 | $82,412 | 2017Q1 | 5.7% | $71,546 | $15,598 | $87,144 |
| | | | | | | | $0 | | | | | | | |
| | **CONSTRUCTION ESTIMATE TOTALS:** | $67,661 | $14,751 | 21.80% | **$82,412** | | $67,661 | $14,751 | $82,412 | | | $71,546 | $15,598 | $87,144 |
| **01** | LANDS AND DAMAGES | $0 | $0 | 20.00% | $0 | 0.0% | $0 | $0 | $0 | 0 | 0.0% | $0 | $0 | $0 |
| | | | **Taylor Canfield:** Includes $600K for Cultural Resources and $2M for Clean Air Act. | | | | | | | | | | | |
| **30** | PLANNING, ENGINEERING & DESIGN | | | | | | | | | | | | | |
| *2.50%* | Project Management | $1,692 | $252 | 14.91% | $1,944 | 0.0% | $1,692 | $252 | $1,944 | 2016Q1 | 8.0% | $1,828 | $272 | $2,100 |
| *1.00%* | Planning & Environmental Compliance | $677 | $101 | 14.91% | $778 | 0.0% | $677 | $101 | $778 | 2016Q1 | 8.0% | $731 | $109 | $840 |
| *7.75%* | Engineering & Design | $5,244 | $782 | 14.91% | $6,026 | 0.0% | $5,244 | $782 | $6,026 | 2016Q1 | 8.0% | $5,664 | $844 | $6,509 |
| *1.00%* | Reviews, ATRs, IEPRs, VE | $677 | $101 | 14.91% | $778 | 0.0% | $677 | $101 | $778 | 2016Q1 | 8.0% | $731 | $109 | $840 |
| *0.25%* | Life Cycle Updates (cost, schedule, risks) | $169 | $25 | 14.91% | $194 | 0.0% | $169 | $25 | $194 | 2016Q1 | 8.0% | $183 | $27 | $210 |
| *0.25%* | Contracting & Reprographics | $169 | $25 | 14.91% | $194 | 0.0% | $169 | $25 | $194 | 2016Q1 | 8.0% | $183 | $27 | $210 |
| *1.50%* | Engineering During Construction | $1,015 | $151 | 14.91% | $1,166 | 0.0% | $1,015 | $151 | $1,166 | 2017Q1 | 12.6% | $1,143 | $170 | $1,314 |
| *1.00%* | Planning During Construction | $3,277 | $489 | 14.91% | $3,766 | 0.0% | $3,277 | $489 | $3,766 | 2017Q1 | 12.6% | $3,691 | $550 | $4,241 |
| *1.00%* | Project Operations | $677 | $101 | 14.91% | $778 | 0.0% | $677 | $101 | $778 | 2016Q1 | 8.0% | $731 | $109 | $840 |
| **31** | CONSTRUCTION MANAGEMENT | | | | | | | | | | | | | |
| *6.86%* | Construction Management | $4,639 | $692 | 14.91% | $5,331 | 0.0% | $4,639 | $692 | $5,331 | 2017Q1 | 5.8% | $4,908 | $732 | $5,640 |
| *0.00%* | Project Operation: | $0 | $0 | 14.91% | $0 | 0.0% | $0 | $0 | $0 | 0 | 0.0% | $0 | $0 | $0 |
| *0.00%* | Project Management | $0 | $0 | 14.91% | $0 | 0.0% | $0 | $0 | $0 | 0 | 0.0% | $0 | $0 | $0 |
| | **CONTRACT COST TOTALS:** | $85,897 | $17,470 | | **$103,367** | | $85,897 | $17,470 | $103,367 | | | $91,339 | $18,549 | **$109,887** |

# Total Project Cost Summary (cont.)

****** CONTRACT COST SUMMARY ******

PROJECT: Long Beach Island, NY
LOCATION: Long Beach Island, NY
This Estimate reflects the scope and schedule in report; Long Beach NY HSLRR

DISTRICT: NAN New York PREPARED: 2/3/2014
POC: CHIEF, COST ENGINEERING, Mukesh Kumar

| Civil Works Work Breakdown Structure | | | ESTIMATED COST | | | | PROJECT FIRST COST (Constant Dollar Basis) | | | | TOTAL PROJECT COST (FULLY FUNDED) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Estimate Prepared: 2/3/2014<br>Effective Price Level: 41548 | | | | Program Year (Budget EC): 2014<br>Effective Price Level Date: 1 OCT 13 | | | | | | | | |
| WBS NUMBER | Civil Works Feature & Sub-Feature Description | | COST ($K) | CNTG ($K) | CNTG (%) | TOTAL ($K) | ESC (%) | COST ($K) | CNTG ($K) | TOTAL ($K) | Mid-Point Date | INFLATED (%) | COST ($K) | CNTG ($K) | FULL ($K) |
| *A* | *B* | | *C* | *D* | *E* | *F* | *G* | *H* | *I* | *J* | *P* | *L* | *M* | *N* | *O* |
| | **Renourishment Activities** | **Year** | | | | | | | | | | | | | |
| **17** | BEACH REPLENISHMENT | Yr 5 | $29,972 | $6,471 | 21.59% | $36,443 | 0.0% | $29,972 | $6,471 | $36,443 | 2023Q2 | 18.9% | $35,651 | $7,697 | $43,349 |
| **17** | BEACH REPLENISHMENT | Yr 10 | $27,462 | $5,930 | 21.59% | $33,392 | 0.0% | $27,462 | $5,930 | $33,392 | 2028Q2 | 30.7% | $35,889 | $7,750 | $43,639 |
| **17** | BEACH REPLENISHMENT | Yr 15 | $27,327 | $5,900 | 21.59% | $33,227 | 0.0% | $27,327 | $5,900 | $33,227 | 2033Q2 | 43.6% | $39,237 | $8,471 | $47,708 |
| **17** | BEACH REPLENISHMENT | Yr 20 | $27,387 | $5,913 | 21.59% | $33,300 | 0.0% | $27,387 | $5,913 | $33,300 | 2038Q2 | 57.8% | $43,204 | $9,328 | $52,531 |
| **17** | BEACH REPLENISHMENT | Yr 25 | $27,402 | $5,917 | 21.59% | $33,319 | 0.0% | $27,402 | $5,917 | $33,319 | 2043Q2 | 73.3% | $47,493 | $10,255 | $57,748 |
| **17** | BEACH REPLENISHMENT | Yr 30 | $27,387 | $5,913 | 21.59% | $33,300 | 0.0% | $27,387 | $5,913 | $33,300 | 2048Q2 | 90.4% | $52,151 | $11,260 | $63,410 |
| **17** | BEACH REPLENISHMENT | Yr 35 | $27,327 | $5,900 | 21.59% | $33,227 | 0.0% | $27,327 | $5,900 | $33,227 | 2053Q2 | 109.2% | $57,171 | $12,344 | $69,515 |
| **17** | BEACH REPLENISHMENT | Yr 40 | $27,462 | $5,930 | 21.59% | $33,392 | 0.0% | $27,462 | $5,930 | $33,392 | 2058Q2 | 129.9% | $63,123 | $13,630 | $76,754 |
| **17** | BEACH REPLENISHMENT | Yr 45 | $27,197 | $5,872 | 21.59% | $33,069 | 0.0% | $27,197 | $5,872 | $33,069 | 2063Q2 | 152.5% | $68,683 | $14,829 | $83,512 |
| | **CONSTRUCTION ESTIMATE TOTALS:** | | $248,923 | $53,746 | 21.59% | **$302,669** | | $248,923 | $53,746 | **$302,669** | | | $442,602 | $95,564 | **$538,166** |
| **30** | PLANNING, ENGINEERING & DESIGN | | | | | | | | | | | | | | |
| *8.00%* | PED Costs - 8% of Renourish/Major Rehab Only | Yr 5 | $2,084 | $311 | 14.91% | $2,395 | 0.0% | $2,084 | $311 | $2,395 | 2022Q4 | 43.8% | $2,996 | $447 | $3,443 |
| *8.00%* | PED Costs - 8% of Renourish/Major Rehab Only | Yr 10 | $2,084 | $311 | 14.91% | $2,395 | 0.0% | $2,084 | $311 | $2,395 | 2027Q4 | 80.5% | $3,762 | $561 | $4,324 |
| *8.00%* | PED Costs - 8% of Renourish/Major Rehab Only | Yr 15 | $2,084 | $311 | 14.91% | $2,395 | 0.0% | $2,084 | $311 | $2,395 | 2032Q4 | 131.9% | $4,832 | $721 | $5,553 |
| *8.00%* | PED Costs - 8% of Renourish/Major Rehab Only | Yr 20 | $2,084 | $311 | 14.91% | $2,395 | 0.0% | $2,084 | $311 | $2,395 | 2037Q4 | 205.2% | $6,361 | $949 | $7,310 |
| *8.00%* | PED Costs - 8% of Renourish/Major Rehab Only | Yr 25 | $2,084 | $311 | 14.91% | $2,395 | 0.0% | $2,084 | $311 | $2,395 | 2042Q4 | 312.3% | $8,593 | $1,282 | $9,876 |
| *8.00%* | PED Costs - 8% of Renourish/Major Rehab Only | Yr 30 | $2,084 | $311 | 14.91% | $2,395 | 0.0% | $2,084 | $311 | $2,395 | 2047Q4 | 473.0% | $11,941 | $1,782 | $13,723 |
| *8.00%* | PED Costs - 8% of Renourish/Major Rehab Only | Yr 35 | $2,084 | $311 | 14.91% | $2,395 | 0.0% | $2,084 | $311 | $2,395 | 2052Q4 | 720.8% | $17,105 | $2,553 | $19,658 |
| *8.00%* | PED Costs - 8% of Renourish/Major Rehab Only | Yr 40 | $2,084 | $311 | 14.91% | $2,395 | 0.0% | $2,084 | $311 | $2,395 | 2057Q4 | 1114.5% | $25,311 | $3,777 | $29,088 |
| *8.00%* | PED Costs - 8% of Renourish/Major Rehab Only | Yr 45 | $2,084 | $311 | 14.91% | $2,395 | 0.0% | $2,084 | $311 | $2,395 | 2062Q4 | 1764.8% | $38,862 | $5,799 | $44,661 |
| **31** | CONSTRUCTION MANAGEMENT | | | | | | | | | | | | | | |
| *7.77%* | S&A Costs - Calc'd on Renourish/Major Rehab ONLY | Yr 5 | $2,061 | $308 | 14.91% | $2,369 | 0.0% | $2,061 | $308 | $2,369 | 2023Q2 | 19.0% | $2,453 | $367 | $2,820 |
| *7.47%* | S&A Costs - Calc'd on Renourish/Major Rehab ONLY | Yr 10 | $2,061 | $308 | 14.91% | $2,369 | 0.0% | $2,061 | $308 | $2,369 | 2028Q2 | 30.8% | $2,695 | $403 | $3,098 |
| *7.47%* | S&A Costs - Calc'd on Renourish/Major Rehab ONLY | Yr 15 | $2,061 | $308 | 14.91% | $2,369 | 0.0% | $2,061 | $308 | $2,369 | 2033Q2 | 43.7% | $2,961 | $443 | $3,404 |
| *7.47%* | S&A Costs - Calc'd on Renourish/Major Rehab ONLY | Yr 20 | $2,061 | $308 | 14.91% | $2,369 | 0.0% | $2,061 | $308 | $2,369 | 2038Q2 | 57.8% | $3,253 | $486 | $3,739 |
| *7.47%* | S&A Costs - Calc'd on Renourish/Major Rehab ONLY | Yr 25 | $2,061 | $308 | 14.91% | $2,369 | 0.0% | $2,061 | $308 | $2,369 | 2043Q2 | 73.4% | $3,574 | $534 | $4,108 |
| *7.47%* | S&A Costs - Calc'd on Renourish/Major Rehab ONLY | Yr 30 | $2,061 | $308 | 14.91% | $2,369 | 0.0% | $2,061 | $308 | $2,369 | 2048Q2 | 90.5% | $3,927 | $587 | $4,514 |
| *7.47%* | S&A Costs - Calc'd on Renourish/Major Rehab ONLY | Yr 35 | $2,061 | $308 | 14.91% | $2,369 | 0.0% | $2,061 | $308 | $2,369 | 2053Q2 | 109.3% | $4,314 | $645 | $4,959 |
| *7.47%* | S&A Costs - Calc'd on Renourish/Major Rehab ONLY | Yr 40 | $2,061 | $308 | 14.91% | $2,369 | 0.0% | $2,061 | $308 | $2,369 | 2058Q2 | 130.0% | $4,740 | $708 | $5,449 |
| *7.47%* | S&A Costs - Calc'd on Renourish/Major Rehab ONLY | Yr 45 | $2,061 | $308 | 14.91% | $2,369 | 0.0% | $2,061 | $308 | $2,369 | 2063Q2 | 152.7% | $5,208 | $778 | $5,986 |
| | **CONTRACT COST TOTALS:** | | $286,228 | $59,317 | | **$345,545** | | $286,228 | $59,317 | **$345,545** | | | $595,492 | $118,387 | **$713,880** |

# Abbreviated Risk Analysis (ARA) Results

**Abbreviated Risk Analysis**

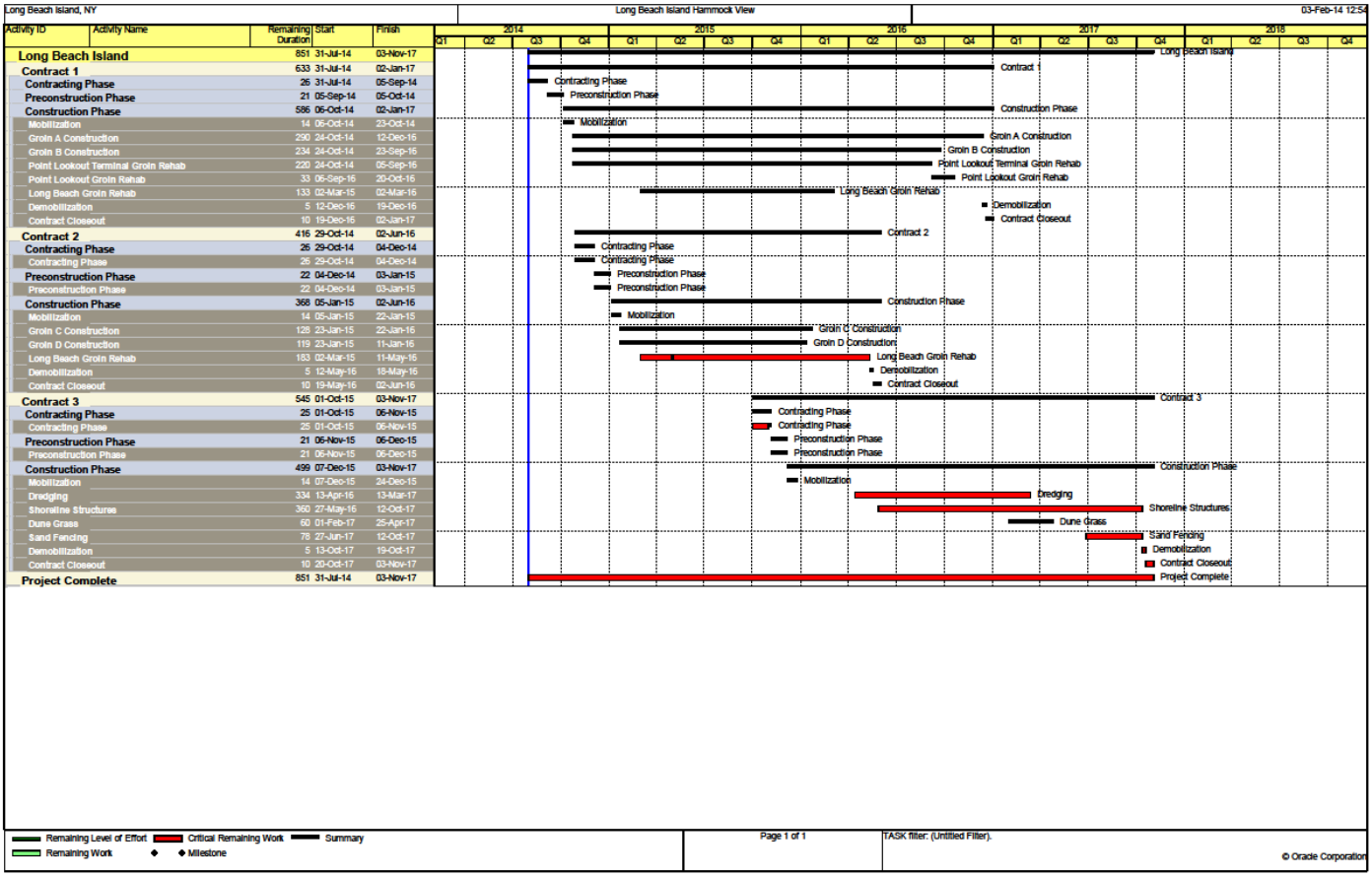
Project (less than $40M): **Long Beach, NY**
Project Development Stage: **Feasibility (Recommended Plan)**
Risk Category: **Moderate Risk: Typical Project or Possible Life Safety**

Total Construction Contract Cost = **$ 117,419,353**

| | CWWBS | Feature of Work | Contract Cost | | % Contingency | $ Contingency | Total |
|---|---|---|---|---|---|---|---|
| | 01 LANDS AND DAMAGES | Real Estate | **$ 145,010** | | **20.00%** | $ 29,002 | $ 174,012.00 |
| 1 | 17 BEACH REPLENISHMENT | **Mobilization and Demobilization** | **$ 4,014,646** | | 13.38% | $ 537,319 | $ 4,551,965.15 |
| 2 | 17 BEACH REPLENISHMENT | **Dredging From Borrow area** | **$ 39,931,200** | | 21.59% | $ 8,620,922 | $ 48,552,121.54 |
| 3 | 17 BEACH REPLENISHMENT | **Shore Crew** | **$ 13,026,351** | | 17.44% | $ 2,272,246 | $ 15,298,596.52 |
| 4 | 10 BREAKWATERS AND SEAWALLS | **Core/Bedding Stone** | **$ 9,165,067** | | 24.80% | $ 2,273,264 | $ 11,438,331.50 |
| 5 | 10 BREAKWATERS AND SEAWALLS | **Class D Armor Stone** | **$ 7,169,141** | | 24.80% | $ 1,778,203 | $ 8,947,344.18 |
| 6 | 10 BREAKWATERS AND SEAWALLS | **Class B/C Armor Stone** | **$ 26,837,698** | | 24.80% | $ 6,656,708 | $ 33,494,405.71 |
| 7 | 10 BREAKWATERS AND SEAWALLS | **Steel Sheet Piling** | **$ 1,919,730** | | 16.28% | $ 312,612 | $ 2,232,341.23 |
| 8 | 17 BEACH REPLENISHMENT | **Timber Pedestrian Dune Walkovers - ADA** | **$ 3,411,557** | | 13.20% | $ 450,412 | $ 3,861,968.09 |
| 12 | | **Remaining Construction Items** | **$ 11,943,963** | *11.3%* | 22.32% | $ 2,666,150 | $ 14,610,112.62 |
| 13 | 30 PLANNING, ENGINEERING, AND DESIGN | **Planning, Engineering, & Design** | **$ 21,684,000** | | 14.91% | $ 3,232,473 | $ 24,916,473.40 |
| 14 | 31 CONSTRUCTION MANAGEMENT | **Construction Management** | **$ 8,500,000** | | 14.91% | $ 1,267,110 | $ 9,767,110.49 |

| **Totals** | | | | | |
|---|---|---|---|---|---|
| Real Estate | $ 145,010 | | 20.00% | $ 29,002 | $ 174,012.00 |
| Total Construction Estimate | $ 117,419,353 | | 21.77% | $ 25,567,834 | $ 142,987,187 |
| Total Planning, Engineering & Design | $ 21,684,000 | | 14.91% | $ 3,232,473 | $ 24,916,473 |
| Total Construction Management | $ 8,500,000 | | 14.91% | $ 1,267,110 | $ 9,767,110 |
| Total | $ 147,748,363 | | | $ 30,096,420 | $ 177,844,782 |

# Schedule


Long Beach Island, NY
Long Beach Island Hammock View
03-Feb-14 12:54
Activity ID
Activity Name
Remaining Duration
Start
Finish
2014
2015
2016
2017
2018
Q1 Q2 Q3 Q4
Long Beach Island 851 31-Jul-14 03-Nov-17
Contract 1 633 31-Jul-14 02-Jan-17
Contracting Phase 26 31-Jul-14 05-Sep-14
Preconstruction Phase 21 05-Sep-14 05-Oct-14
Construction Phase 586 06-Oct-14 02-Jan-17
Mobilization 14 06-Oct-14 23-Oct-14
Groin A Construction 290 24-Oct-14 12-Dec-15
Groin B Construction 234 24-Oct-14 23-Sep-15
Point Lookout Terminal Groin Rehab 220 24-Oct-14 05-Sep-15
Point Lookout Groin Rehab 33 06-Sep-16 20-Oct-16
Long Beach Groin Rehab 133 02-Mar-15 02-Mar-15
Demobilization 5 12-Dec-16 19-Dec-16
Contract Closeout 10 19-Dec-16 02-Jan-17
Contract 2 416 29-Oct-14 02-Jun-16
Contracting Phase 26 29-Oct-14 04-Dec-14
Contracting Phase 26 29-Oct-14 04-Dec-14
Preconstruction Phase 22 04-Dec-14 03-Jan-15
Preconstruction Phase 22 04-Dec-14 03-Jan-15
Construction Phase 368 05-Jan-15 02-Jun-16
Mobilization 14 05-Jan-15 22-Jan-15
Groin C Construction 128 23-Jan-15 22-Jan-16
Groin D Construction 119 23-Jan-15 11-Jan-16
Long Beach Groin Rehab 183 02-Mar-15 11-May-16
Demobilization 5 12-May-16 18-May-16
Contract Closeout 10 19-May-16 02-Jun-16
Contract 3 545 01-Oct-15 03-Nov-17
Contracting Phase 25 01-Oct-15 06-Nov-15
Contracting Phase 25 01-Oct-15 06-Nov-15
Preconstruction Phase 21 06-Nov-15 06-Dec-15
Preconstruction Phase 21 06-Nov-15 06-Dec-15
Construction Phase 499 07-Dec-15 03-Nov-17
Mobilization 14 07-Dec-15 24-Dec-15
Dredging 334 13-Apr-16 13-Mar-17
Shoreline Structures 360 27-May-16 12-Oct-17
Dune Grass 60 01-Feb-17 25-Apr-17
Sand Fencing 78 27-Jun-17 12-Oct-17
Demobilization 5 13-Oct-17 19-Oct-17
Contract Closeout 10 20-Oct-17 03-Nov-17
Project Complete 851 31-Jul-14 03-Nov-17
Remaining Level of Effort
Remaining Work
Critical Remaining Work
Milestone
Summary
Page 1 of 1
TASK filter: (Untitled Filter).
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# DQC Comments/Responses

**District Quality Control (DQC) Comments**

**Long Beach Island, New York**
**Hurricane and Storm Damage Reduction**
**Limited Reevaluation Report**

**By: Anthony Schiano**
**Date: 10-28-13**

**Responses by Taylor Canfield**
**Back checked by Anthony Schiano**

Cost appendix

Please include a table of contents. **– Will do.** **Done.**

Please include a write up of the project and how the costs were developed. Please see the example placed in the folder. V:\Long Beach NY LRR\2013 HSRR for DQC\Appendix C_Cost Egineering – **Will do.** **Done.**

Place the MII cost estimate printout at the end of the cost appendix. This information is actually not even necessary. **– Will do.** **Done**

Where are the results from the ARA? These should be included towards the back of the cost appendix. **Will include main 'Input & Results' printout from ARA.** **Done**

Where is the annualized cost table? **- Will include printout in the appendix. Was only shown in report initially.** **Done**

CEDEP

"PG 3" - % gross. I would consider a 25% loss instead of 20%. **– Will revise.** **Done**

Mobilization/Demobilization seems extremely high. Look at the intrasite mob/demob costs. This is extremely high as well, which may be contributing to the high overall cost. I would assume 2 days to mob/demob during an intrasite mob/demob. 1 day to mob and 1 to demob. **– Will revise.** Done

"PG 6" – pipeline used seems to low. The beach is approximately 6 miles long. Therefore I would assume the pipeline will be longer then the 6,000lf currently used. I would assume distance to the shore + shoreline pipe < 12,000lf of pipe. If the total pipeline needed is greater than 12,000lf, then an additional intrasite mob/demob will need to be considered. I see that two intrasite mob/demobs have been considered. **– Agreed. Will revise.** **Done**

MII

Contractor's Markups – Dredging prime contractor's bond seems high at 2%. 1% is more of a reasonable cost for bond for the magnitude of work associated with this job. **– Will revise.** **Done**

Air Mitigation – Where or how was this cost generated? Please state this in the notes field to explain. **– Will add notes in estimate; value was provided by Environmental on 8 Oct 13.** **Done**

Cultural Resource Preservation – Where or how was this cost generated? Please state this in the notes field to explain. **– Will add notes to estimate; value was provided by Environmental on 8 Oct 13.** **Done**

Project Properties – General – Budget year says 2013. Should it be 2014? **– Yes, should be 2014. Will revise.** **Done**

Project Properties – General – Esc and Eff pricing states July 1st 2013. Is this correct or was the pricing completed around the same time the estimate was prepared? **– Will revise; you are correct, pricing was completed with estimate.** **Done**

Project Properties – Equipment - Check your fuel costs, and adjust accordingly. To be conservative you may want to use the EIA fuel prices for all 3 gas input fields. **– Will revise.** **Done**

Rehab existing groins – Class B/C unit prices are higher than the unit prices for other Class B/C armor stone. Please review and adjust accordingly. **– Unit costs are higher for this feature because there is some work included to re-grade the existing stones on the groins to allow for a more ideal surface for the new stone to be placed on.** **Done**

Point Lookout Terminal Groin – Core/Bedding stone is higher than the other core/bedding stones for other groin works. Please review and adjust accordingly. **– There is some removal of existing bedding stone required at the Point Lookout Terminal Groin. This work is included in the same folder as the placement of the new stone, which inflates the unit price of the folder.** **Done**

ARA

Place a date for when the ARA meeting took place. **– Will revise.** **Done**

The TPCS shows a contingency of 22% for the 30 & 31 accounts. However the "Risk Register" shows that the 30 & 31 accounts have "no impact to cost" and no concerns. I would recommend revisiting the risks for these accounts to get a reasonable contingency. **– Agreed; will revise.** **Done**

The MII includes two separate accounts, 10 – breakwater & seawalls and 17 – beach replenishment. However the ARA just shows one account. Suggest breaking the ARA into two accounts and possible a couple of features under each account. **– Agreed; will revise.** **Done**

The PDT discussion for risk concerns for specialty fabrication or equipment does not seem to pertain to the features of work. I also do not see how there would be any risks associated with dredging based on this region and amount of dredging work completed in it. **– Agreed; will revise.** **Done**

PDT discussion for dredging is inaccurate. A booster pump is being assumed for the dredging process. **– Will revise.** **Done**

PDT and risks for the stone placement feature of work should be revisited. I assume that production rates for the groin work does not seem to be exact and some risks may be applied to these features of work. **– Agreed; will revise.** **Done**

TPCS

Suggest revising the 30 account costs. Currently you are utilizing 23% of the construction costs as your 30 account cost. Please discuss this with your technical manager (TM) to verify or adjust your percentage. **– Revisited with TM. PED costs were revised to 16%.** **Done**

Program Year Price Level is 2014Q4. This causes the midpoint of construction for the 01 and 30 accounts to generate a negative escalation. Please clarify and address accordingly. **– Will revise.** **Done**

40% contingency seems extremely high for the 01 account. Please verify this with real estate and address accordingly. **– RE has submitted revised costs with a 20% contingency.** **Done**