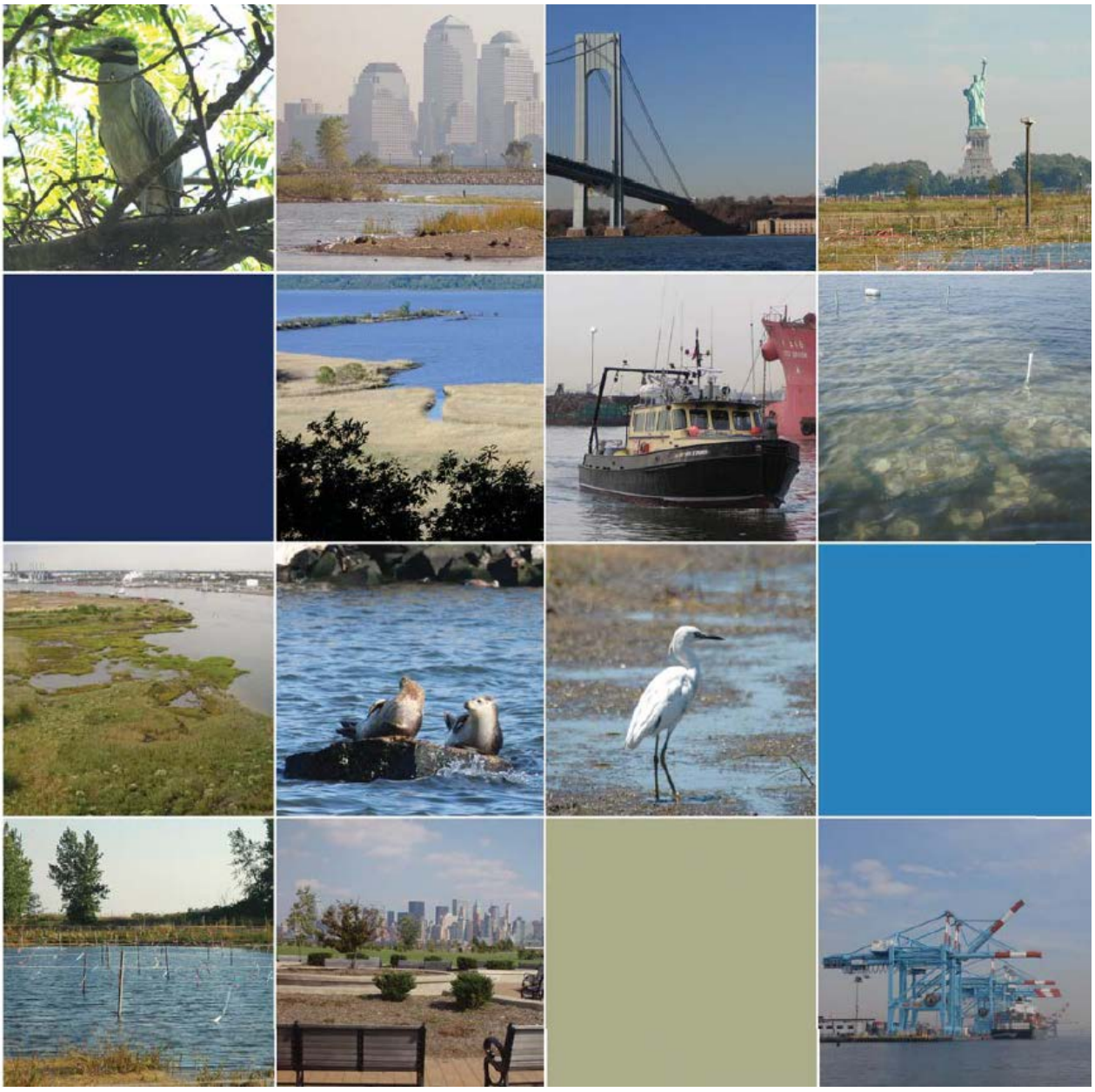
Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study

Appendix L
Cost Engineering Appendix

Draft Integrated Feasibility Report &
Environmental Assessment
February 2017

Prepared by the New York District,
U.S. Army Corps of Engineers



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Appendix L: Cost Engineering Appendix

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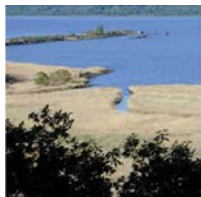

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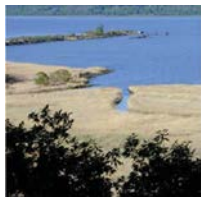
Acronyms and Abbreviations

HRE	Hudson-Raritan Estuary
ARA	Abbreviated Risk Analysis
MCACES	Micro-Computer Aided Cost Estimating System
NYCDEP	New York City Department of Environmental Protection
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers









Chapter 1: Introduction

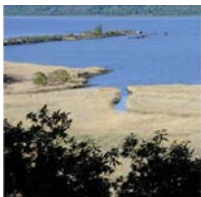
This appendix presents cost estimates that have been assembled for various and distinct portions of the Hudson-Raritan Estuary (HRE) Ecosystem Restoration Feasibility Study. A site specific discussion regarding cost, schedule, and risk is included within the Engineering Appendix. What follows is a discussion regarding the methodology used in estimate development. These cost estimates have been prepared as six (6) separate cost estimate packages which address the following study sites:

Table 1-1: Cost Estimate Packages

Cost Estimate Package	Eco-Restoration Type	Study Site Name
Jamaica Bay	Fish and Wildlife Facilities, Breakwaters and Seawalls	Dead Horse Bay
		Fresh Creek
		Hawtree Point
		Bayswater Point State Park
		Dubos Point
		Brant Point
	Jamaica Bay Marsh Islands: Bank Stabilization – excavation, backfilling, grading, marsh planting.	Stony Creek
		Duck Point
		Elders Point Center
		Pumpkin Patch West
		Pumpkin Patch East
Flushing Creek	Dredging, Invasive Species Removal, and Wetland Establishment	Flushing Creek, NYCDEP Site #DRG-FC
Bronx River	Debris Removal, Invasive Species Removal, Channel Modifications, Wetland Creation, Native Plantings, and Aquatic Habitat Improvements	River Park / West Farm Rapids Park
		Bronx Zoo and Dam
		Stone Mill Dam
		Shoelace Park
		Muskrat Cove
		Bronxville Lake
		Crestwood Lake
		Garth Woods/Harney Road
		Westchester County Center
Hackensack River	Debris and Fill Removal, Invasive Species Removal, Channel Modifications/Creation, Tidal Wetland Creation, Native Plantings, and Aquatic Habitat Improvements, Public Access	Metromedia Tract
		Meadowlark Marsh
Lower Passaic River	Debris Removal, Invasive Species Removal, Channel Modifications, Wetland Creation, Native Plantings, and Aquatic Habitat Improvements, Public Access	Oak Island Yards
		Kearny Point
		Essex County Branch Brook
		Dundee Island – Pulaski Park
		Clifton Dundee Canal Green Acres Purchase and Dundee Island Preserve





Cost Estimate Package	Eco-Restoration Type	Study Site Name
HRE Oyster Sites	Oyster Reef Restoration	Jamaica Bay
		Governors Island
		Bush Terminal
		Governors Island
		Naval Weapons Station Earle

Each cost package is composed of the following:

1) Jamaica Bay Shoreline Perimeter Sites updated cost estimates for a single alternative that were selected and approved as the Tentatively Selected Plan (TSP) at the Alternatives Formulation Briefing (AFB) held with HQUSACE in January 2010. Costs were originally prepared for each Jamaica Bay Alternative (one [1] to six [6] alternatives/site) in 2003 (USACE, 2003). These base costs were modified as implementation cost including Operation and Maintenance (0.5%), Monitoring (one [1] percent) and Interest During Construction rate of 4.875 percent) which were used for the cost effectiveness and incremental cost analysis (CE/ICA) to identify the TSP at each site. These original 2008 implementation cost estimates for the alternative are presented in the attachment to the Jamaica Bay cost package.
2) Flushing Creek costs for three (3) optimized alternatives that were developed for a previously recommended plan selected in 2007. The original cost estimates developed in 2007 were rough order of magnitude costs for a total of 17 different alternatives. The 2007 alternative costs are included as an attachment to the Flushing Creek cost package.
3) Bronx River includes costs for three (3) alternatives on each of the nine (9) sites. Note: cost for one (1) alternative for the Garth Woods site was prepared and combined with the Harney Road site.
4) Hackensack River costs for three (3) alternatives for each site; the Meadowlark Marsh site and the Metromedia Tract site.
5) Lower Passaic River costs for three (3) alternatives for each site (with the exception of Dundee Island – Pulaski Park). One alternative is presented for the Dundee Island – Pulaski Park site.
6) Jamaica Bay Marsh Islands cost package includes a single alternative with five (5) sites.
7) Oyster restoration costs for a single alternative for five (5) sites

For all sites, the following apply:

Price Levels: Costs were presented as current year (i.e. 2016) values without escalation. The preliminary cost estimates presented are First Costs only.

Monitoring: Monitoring costs are required by ER 1105-2-100 Sec. 3-5.b. (8). Implementation Guidance issued August 31, 2009 for Section 2039 of WRDA 2007 and that Monitoring can be cost shared for 10 years following construction completion. Costs were assumed to be 1% of construction costs.

Adaptive Management: Costs were assumed to be 3% of construction costs.

Contingencies: As stated in ER 1110-2-1302, the goal in contingency development is to identify the uncertainty associated with an item of work or task to an acceptable degree of confidence. Consideration must be given to the detail available at each stage of planning, design or construction for which a cost estimate is being prepared. Contingency may vary throughout the cost estimate and could constitute a significant portion of the overall costs when data or design details are unavailable. Final






contingency development and assessment of the potential for cost growth is included in the cost estimate. To develop the Total Project First Cost, contingencies developed in the Abbreviated Risk Analysis (ARA) were applied. The construction cost contingency developed per ARA for each cost estimate package is shown in Table 2.

Table 1-2: Contingency Factors used for Each Package

Cost Estimate Package	Contingency Factor
1. Jamaica Bay: Jamaica Bay Shoreline Sites	40.00%
2. Jamaica Bay: Jamaica Bay Marsh Islands	37.00% to 38.00%
3. Flushing Creek	30.00%
4. Bronx River	40.00%
5. Hackensack: Meadowlark Marsh	40.00%
6. Hackensack: Metromedia Tract	32.00%
7. Lower Passaic River	40.00%
8. HRE Oyster Sites	29.00%

Chapter 2: Detailed Cost Estimates

2.1 Cost Estimating Methodology and Cost Basis

2.1.1 Cost Estimating Methodology and Cost Basis – Jamaica Bay Shoreline Sites Cost Estimate Package

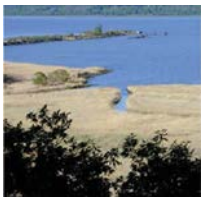
Conceptual first and implementation costs were prepared for one (1) to six (6) alternatives depending on the Jamaica Bay shoreline site prepared in 2008. Base costs (USACE 2003) were converted to implementation cost estimates which were then used for the CE/ICA evaluation to select the recommended plan which was approved at the 2010 AFB as the TSP. The fully funded cost estimates were subsequently developed and certified by the USACE Walla Walla Cost Engineering Mandatory Center of Expertise. The fully funded Micro-Computer Aided Cost Estimating System (MCACES) estimate prepared in 2008 for the TSP for each of the six (6) sites were updated to present costs in 2016$. The estimate update entailed a MCACES "Translation and Reprice" to the latest available MII Cost Book. The estimate update also entailed revisions to the labor, equipment, material, and subcontractor unit costs to an effective pricing date of April 2016. Select quantities were also updated to conform to the most recent conceptual design information.

2.1.2 Cost Estimating Methodology and Cost Basis – Jamaica Bay Marsh Islands Cost Estimate Package

The construction cost estimate for Jamaica Bay marsh islands was developed in MCACES, Second Generation (MII) using the appropriate Work Breakdown Structure (WBS) and based on current estimated quantities provided by the Hydraulics & Hydrology Engineers. The cost estimates were developed from these quantities using cost resources such as RSMeans, historical data from similar construction features, and MII Cost Libraries. The contingencies were developed based on input to the ARA (template provided by the Cost Mandatory Center of Expertise, MCX, Walla Walla District). These contingencies were applied to the construction cost estimates to develop the Total Project First Cost.





Costs are presented for the Jamaica Bay marsh islands as one (1) alternative and separately for the five (5) study sites.

2.1.3 Cost Estimating Methodology and Cost Basis – Flushing Creek Estimate Package

Flushing Creek costs were estimated for the original Flushing Creek 17 alternatives in 2007 using rough order of magnitude costs developed from prior USACE ecosystem restoration projects. These costs were used for the CE/ICA evaluation to select the recommended plan in 2007. The recommended alternative for the single site, was subsequently optimized preparing three (3) new alternatives in 2014 as part of the study. Cost estimates were prepared under the direction of New York City Department of Environmental Protection (NYCDEP) as Work In Kind. These estimates were not originally prepared in MCACES format. Cost estimating work was later undertaken to migrate the estimate into MCACES format, and to segregate costs based upon specific actions to be taken by NYCDEP and actions that are part of the TSP including:

1) Environmental Dredging actions and associated work to be conducted by NYCDEP at 100% non-federal cost; and
2) The three (3) proposed restoration alternatives that would be cost shared between NYCDEP and USACE.

2.1.4 Cost Estimating Methodology and Cost Basis – Bronx River Cost Estimate Package

The Bronx River Preliminary Cost Estimate Package includes a total of 28 distinct cost estimates. The 28 estimates address the ten (10) sites within the scope of the study, with three (3) alternatives presented for each site (except for Garth Woods). The Garth Woods site only had one alternative and was subsequently combined with Harney Road site. The Preliminary Cost Estimates were assembled as follows:

a) A comprehensive “Materials List” was prepared that tabulated all potential restoration measures proposed for the 28 scenarios.

b) Preliminary design drawings were developed for each alternative and quantity take-offs were prepared for each scenario. The quantity take-offs provided quantities for each of the applicable restoration measures that were tabulated on the “Materials List”.

c) A single preliminary Micro-Computer Aided Cost Estimating System (MCACES) MII estimate was then prepared. This MII estimate served as a “library” estimate in which a reasonable current unit price was calculated and documented for each of the restoration measures shown on the “Materials List.”

d) A preliminary estimate was then prepared for each of the 28 scenarios within an EXCEL workbook, with the cost for each site presented as a separate EXCEL worksheet. These preliminary estimates applied the current unit prices calculated within the MII “library” estimate against the quantities generated by the take-off.

e) Contingency was then applied to the preliminary estimates at the percentage determined through an ARA.

f) Costs were presented as current year (i.e. 2016) values without escalation.






g) The Preliminary Cost Estimates presented First Costs only.

2.1.5 Cost Estimating Methodology and Cost Basis – Hackensack Cost Estimate Package

The Hackensack River Preliminary Cost Estimate Package includes a total of six (6) distinct cost estimates. The six (6) estimates address the two (2) sites (Meadowlark Marsh and Metromedia Tract), with three (3) alternatives presented for each site. The USACE prepared the conceptual designs and quantities for the Metromedia Tract project site. The Preliminary Cost Estimates were assembled as follows:

a) A comprehensive “Materials List” was prepared for each restoration site based on the restoration activities at each site.

b) The construction cost estimate for the Metromedia Tract site was developed in MCACES, Second Generation (MII) using the appropriate Work Breakdown Structure (WBS) based on the current estimated quantities provided by the Hydraulic & Hydrology Engineers. The cost estimate was developed from these quantities using the cost resources such as RSMeans, historical data from similar construction features, and MII Cost Libraries. The contingencies were developed based on input to the ARA (template provided by the Cost Mandatory Center of Expertise, MCX, Walla Walla District). The contingencies were applied to the construction cost estimates to develop the Total Project First Cost.

c) Quantity take-offs for Metromedia Tract and Meadowlark Marsh were prepared for each design drawing. The quantity take-offs provided quantities for each of the applicable restoration measures that were tabulated on the “Materials List”.

d) Cost estimates developed by Louis Berger Group for their own recent projects were utilized for items on the Material list that were not contained within the Bronx River or Spring Creek South cost estimates.

e) For each restoration technique (i.e. Emergent Wetland - Low Marsh, Bank Stabilization, etc.), a total technique price was tabulated for the primary alternative quantity takeoffs, and developed into a unit price per SF, EACH, or LF for that restoration technique based on the most conservative scenario.

f) A preliminary estimate was prepared in EXCEL for each scenario at a given project site. These preliminary estimates applied the previously described current unit prices for each restoration technique. When the description of a restoration technique appeared similar for comparable project sites, but varied in cost, the higher unit price was utilized. When a restoration technique, based on the conceptual design varied, from site to site, a unit price for that particular restoration technique was calculated for each site as outlined previously.

g) Contingency was then applied to the preliminary estimates at the percentage determined through an ARA.

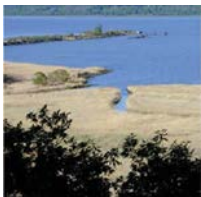
h) Costs were presented as current year (i.e. 2016) values without escalation.

i) The Preliminary Cost Estimates presented First Costs only.









A detailed description of the "Materials List" unit prices, restoration techniques, supporting documentation for the Bronx River sites, Spring Creek South sites, and Louis Berger' database are contained in the attachments.

2.1.6 Cost Estimating Methodology and Cost Basis – Lower Passaic Cost Estimate Package

The Lower Passaic River Preliminary Cost Estimate Package, includes a total of thirteen (13) distinct cost estimates. The thirteen (13) estimates address the five (5) sites, with three (3) alternatives presented for each site with the exception of Dundee Island – Pulaski Park. One alternative is presented for the Dundee Island – Pulaski Park site. The Preliminary Cost Estimates were assembled as follows:

a) A comprehensive "Materials List" was prepared for each restoration site based on the restoration activities at each site.

b) Using the preliminary design drawings developed by the study team, quantity take-offs were prepared for each scenario. The quantity take-offs provided quantities for each of the applicable restoration measures that were tabulated on the "Materials List".

c) Unit prices were derived from the Bronx River and Spring Creek South cost estimates. These estimates provided multiple restoration techniques, and designs for each item in the "Materials List". These unit prices did not contain additional contingencies between contract and project unit costs; therefore, the total project unit price for each "Materials List" was used.

d) Cost estimates developed by Louis Berger Group for their own recent projects were utilized for items on the "Materials list" that were not contained within the Bronx River or Spring Creek South cost estimates.

e) For each restoration technique (i.e. Emergent Wetland - Low, Bank Stabilization, etc.), a total technique price was tabulated for the primary alternative quantity takeoffs, and developed into a unit price per square foot (SF), EACH, or linear foot (LF) for that restoration technique based on the most conservative scenario.

   A preliminary estimate was prepared in EXCEL for each scenario at a given project site. These preliminary estimates applied the previously described current unit prices for each restoration technique. When the description of a restoration technique appeared similar for comparable project sites, but varied in cost, the higher unit price was utilized. When a restoration technique, based on the conceptual design varied, from site to site, a unit price for that particular restoration technique was calculated for each site as outlined previously.

f) Contingency was then applied to the preliminary estimates at the percentage determined through an ARA.

g) Costs were presented as current year (i.e. 2016) values without escalation.

h) The Preliminary Cost Estimates presented First Costs only.






A detailed description of the "Materials List" unit prices, restoration techniques, supporting documentation for the Bronx River sites, Spring Creek South site, and Louis Berger' database are contained in the attachments.

2.1.7 Cost Estimating Methodology and Cost Basis – HRE Oyster Sites Cost Estimate Package

The HRE Oyster Restoration sites Preliminary Cost Estimate Package includes six (6) oyster restoration sites within the study area. Note: Project sites were located near the existing pilot oyster restoration sites by project sponsors. The Preliminary Cost Estimates were assembled as follows:

a) A comprehensive "Materials List" was prepared that tabulated all potential restoration measures proposed at the sites.

b) Preliminary design drawings were developed for each site and quantity take-offs were prepared. The quantity take-offs provided quantities for each of the applicable restoration measures that were tabulated on the "Materials List".

c) A single preliminary Micro-Computer Aided Cost Estimating System (MCACES) MII estimate was then prepared. This MII estimate served as a "library" estimate in which a reasonable current unit price was calculated and documented for each of the restoration measures shown on the "Materials List." The unit costs for the non-standard items were developed using the vendor quotes and available information from past oyster restoration work from various agencies.

d) A preliminary estimate was then prepared for each site within an EXCEL workbook, with the cost for each site presented as a separate EXCEL worksheet. These preliminary estimates applied the current unit prices calculated within the MII "library" estimate against the quantities generated by the take-off.

e) Contingency was then applied to the preliminary estimates at the percentage determined through an ARA.

f) Costs were presented as current year (i.e. 2016) values without escalation.

g) The Preliminary Cost Estimates presented First Costs only.

2.2 First Costs

The first costs for each project site for the selected alternates were calculated based on the approach discussed in section 2.1 for individual planning region and its applicability to the site. The costs for HRE Planning regions are summarized below in section 2.2.1 to 2.2.6.

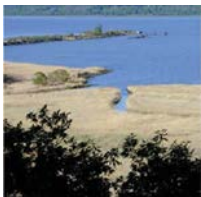
2.2.1 First Costs – Jamaica Bay Cost Estimate Package

Table 2-1: Jamaica Bay Shoreline Sites Cost Estimate Package

Bayswater Point State Park	$ 5,815,000
Dead Horse Bay	$ 82,769,000





Hawtree Point	$ 1,463,000
Brant Point	$ 7,480,000
Dubos Point	$ 9,560,000
Fresh Creek	$ 45,473,000
TOTAL FOR SIX (6) SITES	**$ 152,560,000**

2.2.2 First Costs- Jamaica Bay Marsh Islands Cost Estimate Package

Table 2-2: **Jamaica Bay Marsh Island Cost Estimate Package**

Stony Creek	$30,520,000
Duck Point	$27,780,000
Pumpkin Patch East	$37,950,000
Pumpkin Patch West	$20,040,000
Elders Point Center	$20,730,000
TOTAL FOR FIVE (5) SITES	**$137,020,000**

2.2.3 First Costs – Flushing Creek

Table 2-3: Flushing Creek Cost Estimate Package

	Alt A Cost	Alt B Cost	Alt C Cost
NYCDEP Complementary Activities (Dredging & Associated Work-Borne 100% by NYCDEP)	$ 14,200,000	$ 14,200,000	$ 14,200,000
Ecosystem Restoration & Associated Work (cost shared)	$ 5,900,000	$ 17,500,000	$ 20,000,000

2.2.4 First Costs – Bronx River Cost Estimate Package

Table 2-4: Bronx River Cost Estimate Package

	Alt A Cost	Alt B Cost	Alt C Cost
River Park / West Farm Rapids Park	$ 4,050,000	$ 4,000,000	$ 2,510,000
Stone Mill Dam	$ 720,000	$ 650,000	$ 490,000
Bronx Zoo and Dam	$ 6,340,000	$ 4,950,000	$ 3,850,000
Shoelace Park	$ 25,010,000	$ 18,610,000	$ 8,850,000
Muskrat Cove	$ 7,840,000	$ 8,050,000	$ 4,090,000






	Alt A Cost	Alt B Cost	Alt C Cost
Westchester	$ 24,560,000	$ 14,520,000	$ 13,490,000
Bronxville Lake	$ 21,210,000	$ 14,530,000	$ 13,150,000
Crestwood Lake	$ 27,610,000	$ 14,000,000	$ 12,610,000
Garth Woods*	$ 380,000	$ 380,000	$ 380,000
Harney Road*	$ 6,820,000	$ 6,110,000	$ 3,370,000
TOTAL FOR TEN (10) SITES	**$ 124,540,000**	**$ 85,800,000**	**$ 62,790,000**

*Garth Woods/Harney Road have been combined as a single site.

2.2.5 First Costs – Lower Passaic River Cost Estimate Package

Table 2-5: Lower Passaic River Cost Estimate Package

	Alt A Cost	Alt B Cost	Alt C Cost
Kearny Point	$ 81,650,000	$ 75,520,000	$ 57,790,000
Oak Island Yards	$ 29,640,000	$ 29,960,000	$ 28,160,000
Essex County Branch Brook	$ 74,690,000	$ 74,390,000	$ 21,890,000
Dundee Island Park	$ 2,720,000	-	-
Clifton Dundee Canal	$ 11,950,000	$ 10,750,000	$ 9,530,000
TOTAL FOR FIVE (5) SITES	**$ 192,240,000**	**$ 181,430,000**	**$ 111,470,000**

2.2.6 First Costs – Hackensack River Cost Estimate Package

Table 2-6: Hackensack River Cost Estimate Package

	Alt A Cost	Alt B Cost	Alt C Cost
Meadowlark Marsh	$ 63,700,000	$ 56,400,000	$ 41,660,000
Metromedia Tract	$ 32,510,000	$ 49,800,000	$ 36,600,000
TOTAL FOR TWO (2) SITES	**$ 96,210,000**	**$ 96,200,000**	**$ 78,260,000**

2.2.7 First Costs – HRE Oyster Sites Cost Estimate Package

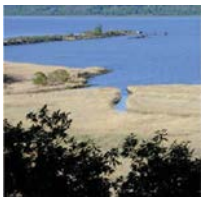
Table 2-7: HRE Oyster Sites Cost Estimate Package

Bush Terminal	$ 32,950,000
Governors Island	$ 4,880,000
Jamaica Bay	$ 810,000









Naval Weapons Station Earle	$ 7,420,000
Soundview Park	$ 760,000
TOTAL FOR FIVE (5) SITES	**$ 46,820,000**

Chapter 3: Operation and Maintenance

3.1 General

The cost was developed for all activities associated with the operation and maintenance efforts. The cost for this account includes the operation and maintenance costs through the project life cycle. This account also includes all the in-house labor based upon work-hour requirements, material and facility costs, travel, and overhead.

Chapter 4: Planning, Engineering and Design

The cost was developed for all activities associated with the planning, engineering and design effort. The cost for this account includes the preparation of Design Documentation Reports, plans, and specifications for each site and engineering support during construction through project completion. This account also includes all the in-house labor based upon work-hour requirements, material and facility costs, travel, and overhead.

4.1 General

The general construction sequence for the restoration sites will be as follows:

1. Mobilization
2. Installation of construction fence and staging features
3. Vector pest control, if necessary
4. Installation of soil erosion and sediment control features
5. Installation of temporary work access road
6. Site clearing, including removal of existing vegetation where applicable
7. Excavation and grading where applicable
8. Installation of shoreline stabilization structures where applicable
9. Installation of herbivory fencing
10. Planting and seeding
11. Installation of site amenities
12. Demobilization

General construction procedures for MCACES items such as mobilization, demobilization and construction of temporary site access road are described below. Some items, such as soil erosion and sediment control features, have been grouped together to follow the general construction sequence. Construction procedures for site specific features, such as shoreline stabilization structures and hydraulically placed fill, are detailed in the site descriptions that following the general descriptions.

Mobilization and Demobilization: Mobilization of the site includes the establishment of the support facilities within the construction staging area, as well as the mobilization of the support facilities (i.e., office trailers, storage trailers, small tools, etc.) and heavy equipment for construction operations. Connecting electric power and telephone service to the trailers will also be completed under this item.






Demobilization will include removal of the support facilities from the site, as well as the demobilization of the heavy equipment. This cost was estimated at 3 percent of the total construction cost.

Construction Fence and Staging Features: Temporary chain link fence will be erected around the site perimeters where necessary, as well as at the staging area for security. Temporary signs bearing project information will be posted.

Vector pest control: Vector pest control includes removal of rodents at the site prior to construction, as well as muskrat and mosquito control throughout the duration of the project.

Soil Erosion and Sediment Control: Soil erosion and sediment control devices include silt fence, sediment traps, straw bales, and anti-tracking pads. These will be furnished and installed at the commencement of site operations and maintained throughout the construction period. Devices will be installed per the approved soil erosion and sediment control plans and maintained accordingly.

Temporary Work Access Road: The number and lengths of temporary work access roads vary by site based on site geometry and conditions, but the general materials and installation are the same. Certain sites have individual access issues that are addressed with separate access features; these are described under the site-specific descriptions.

Work under the temporary work access road item includes constructing the access road(s) by leveling the road footprint, installing filter fabric for stabilization, and then placing and compacting 12-inch aggregate. Removal of the filter fabric and aggregate at the completion of the project is included, as well as either the restoration of the footprint area to existing conditions or establishment of the area as part of a new habitat(s) at the site.

Clearing Site: Clearing the site will involve the application of herbicide to help in the eradication of the existing vegetation where necessary. The herbicide will be applied from the ground using spray equipment mounted on all-terrain vehicles. After the herbicide has been applied and allowed to penetrate into the root zone for a minimum of 45 days, vegetation will be removed. Clearing the site will also include the felling, chipping, and stump removal of existing trees that are within excavation and grading zones and clearing any trash on the site.

Any debris from clearing operations, including vegetation or trash, will be removed from the site and disposed of at a licensed disposal or recycling facility in accordance with all federal, state, and city laws and regulations.

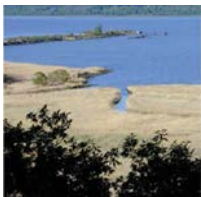
Unclassified Excavation: The unclassified excavation item includes earthwork, both wet and dry, as well as grading for earthwork dry. It is important that the elevational gradient established from open water (i.e. tidal channels, bay and stream channels) to low and high marsh, and emergent wetlands, gradually transitions so that the wetland vegetation occupies a gentle slope of increasing elevation. Therefore at low tide and during the nominal flow, mudflat areas and edge of wetlands will be exposed along the edges of the interface of the low marsh/emergent wetland and openwater; at high tide, the marsh areas and wetlands will be flooded at varying depths, depending on elevations.

Wet excavation will occur in the creation of channels, and low and high marsh habitats, as well as for the installation of the shoreline stabilization structures, where elevations are lower and will be inundated by the tide. As the sites are along the shoreline, it will be inefficient and costly to attempt to dewater the sites. Therefore, the wet excavation schedule will consider tidal cycles and all work will be performed









"in the dry," that is during periods of low tide. (Note that it may not be possible to perform excavation for some shoreline stabilization structures "in the dry" due to their locations. Soil erosion and sediment control measures, such as localized floating turbidity barriers, may need to be employed in these instances.) Wet excavation will likely require the use of specialized equipment outfitted for work in wet soils, and/or the adapting of standard construction equipment and construction methods for work on soft soils. Equipment may include: hydraulic excavators outfitted with long reach booms; low ground pressure off-road hauling equipment; low ground pressure dozers; low ground pressure utility vehicles; and the use of crane mats to support excavators and assist them in moving across wet areas of the site. Dry excavation will occur in the coastal dune, scrub/shrub, and meadow, as well as maritime forest habitats.

In general, excavation and grading for the proposed features and habitats includes the removal of existing substrates to proposed grades. For wet areas, fine grading is done at the time of excavation as the substrates are saturated and it is not advantageous to pass back over these areas. For dry areas, hydraulic excavators and dozers are used to first excavate the areas to approximate grades, and then dozers can go back over the areas to achieve final grades.

Over-excavation will be required in some habitat areas due to the necessity to place clean-sand fill or topsoil at depths ranging from 0.5 foot to 2 feet to provide for appropriate planting substrate. Fill requirements are discussed in detail under the applicable planting area items.

At this phase, it is assumed that the site's earthwork design is balanced and the all excavated materials will be used on site. Loading and on site hauling costs were included in all excavation items.

Planting - General: For all planting areas, before planting operations commence, planting zone elevations will be verified by the site engineer. Herbivory fence will be installed prior to planting. As with earthwork, the planting operations schedule will need to consider tidal cycles; all planting will need to be done "in the dry."

Maintenance of planting areas during construction and a one-year plant guarantee are built into the unit costs for the plants. Maintenance will include preventing the intrusion of weeds and other undesired vegetation, watering, and backfilling (by hand) settled areas for the duration of construction. The one-year plant guarantee will be conditional of at least 85 percent survival of the planted contract quantity. In addition, the overall planting item costs include the services of a restoration specialist to assist with the final determination of plant area elevations, selection of plant and seed species, and to be on-site during planting operations to ensure adherence to correct planting and seeding methods and make any modifications as conditions warrant.

Low Marsh Planting: Low marsh plants will be grass plugs/peat pots planted at 3-foot centers at a density of 4,840 plants per acre. At this phase, it is assumed that the species planted will be *Spartina alterniflora* (smooth cordgrass). Plant stock will be nursery-grown and all plant materials are included in the price for this item. The planting window for low marsh planting will be from April 15th to June 15th.

Prior to placement of the plugs/peat pots in the planting hole, a 6-month controlled release fertilizer will be placed in the bottom of the planting hole at the rate of 30 grams per plant. The plants will then be placed at the appropriate depth with the root system oriented downward. While the plant is in this position, the soil around the plant will be firmly tamped into place by hand.






Herbivory fencing is incorporated into the cost for low marsh planting. It includes the installation of four-foot high waterfowl barrier around the salt marsh areas to be planted, prior to planting, to discourage waterfowl from grazing on newly planted vegetation. The fencing will be placed to create maximum 50-foot-by-50-foot cells erected on wood posts at 10-foot spacing. Nylon twine will be strung across the tops of the cells from the perimeter stakes to the interior stakes with gaps no greater than 5 feet between strands. Reflective mylar tape will then be tied to the top of each stake, as well as along the top of the fence fabric and along the interior nylon twine. Costs also include a weekly inspection of the fence condition and any necessary repairs for the project duration.

Clean-sand fill is also built into the cost of low marsh planting. The clean sand will be placed atop finished grades to a depth of 6 inches over the entire low marsh planting area to provide for suitable planting substrate for the low marsh plants. The sand will be spread by a bulldozer or other acceptable grading equipment and methods, and then compacted by the movement of the spreading/grading equipment over the layer before a successive layer is constructed. Fill will be free from refuse, foreign materials, roots, hard soil, stiff clay, cobbles, and material deleterious to plant growth. The cost of trucking the material to the site is included in the unit price of the material.

High Marsh Planting: High marsh plants will include both grass plugs/peat pots and gallon-container shrubs. Plugs/peat pots will be planted at 2-foot centers at a density of 10,890 plants per acre. Gallon container shrubs will be planted at a density of 100 plants per acre. At this phase, it is assumed that the species planted will be *Spartina patens* (saltmeadow cordgrass) for plugs/peat pots and *Baccharis halimfolia* (groundsel bush), *Iva frutescens* (marsh elder), and *Myrica pensylvanica* (northern bayberry) for shrubs. Plants will be intermixed and planted in a staggered formation as directed by the restoration specialist. Plant stock will be nursery grown and all plant materials are included in the price for this item. Shrubs will be inoculated with mycorrhizae fungi either at the nursery or on site at the time of planting. The planting window for plugs/peat pots is from April 15th to June 15th; for shrubs, it is April 1st to May 30th.

For plugs/peat pots, prior to placement of the plant in the planting hole, a 6-month controlled release fertilizer will be placed in the bottom of the planting hole at the rate of 30 grams per plant. The plants will then be placed at the appropriate depth with the root system oriented downward. While the plant is in this position, the soil around the plant will be firmly tamped into place by hand.

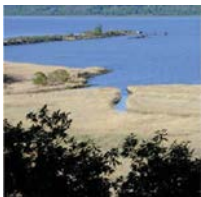
For shrubs, plant pits will be dug approximately 4 inches wider than the stock size. Prior to placement of the plant in the planting hole, a 4-ounce scoop of 6-month controlled release fertilizer will be placed in the bottom of the planting hole. The shrubs will be planted 1 inch higher than grown in the nursery and the backfill soil will be placed around the rootmass to form a raised mound around the plant.

Clean sand fill is built in to the cost of high marsh planting. The clean sand will be placed atop finished grades to a depth of 6 inches over the entire high marsh planting area to provide for suitable planting substrate for the high marsh plants. The sand will be spread by a bulldozer or other acceptable grading equipment and methods, then compacted by the movement of the spreading/grading equipment over the layer before a successive layer is constructed. Fill will be free from refuse, foreign materials, roots, hard soil, stiff clay, cobbles, and material deleterious to plant growth. The cost of trucking the material to the site is included in the unit price of the material.

Coastal Dune Planting: Coastal dune plants will include both grass plugs and gallon-container shrubs. Plugs will be planted at 3-foot centers at a density of 4,840 plants per acre. Gallon container shrubs will be planted at 8-foot centers at a density of 680 plants per acre. At this phase, it is assumed that the





species planted will be *Ammophila breviligulata* (American beachgrass) for plugs and *Baccharis halimfolia* (groundsel bush), *Iva frutescens* (marsh elder), and *Myrica pensylvanica* (northern bayberry) for shrubs. Plants will be intermixed and planted in a staggered formation as directed by the restoration specialist. Plant stock will be nursery grown and all plant materials are included in the price for this item. Shrubs will be inoculated with mycorrhizae fungi either at the nursery or on-site at the time of planting. The planting window for plugs is from April 15th to June 15th; for shrubs, it is April 1st to May 30th.

For plugs, prior to placement of the plant in the planting hole, a 6-month controlled release fertilizer will be placed in the bottom of the planting hole at the rate of 30 grams per plant. The plants will then be placed at the appropriate depth with the root system oriented downward. While the plant is in this position, the soil around the plant will be firmly tamped into place by hand.

For shrubs, plant pits will be dug approximately 4 inches wider than the stock size. Prior to placement of the plant in the planting hole, a 4-ounce scoop of 6-month controlled release fertilizer will be placed in the bottom of the planting hole. The shrubs will be planted 1 inch higher than grown in the nursery and the backfill soil will be placed around the rootmass to form a raised mound around the plant.

Clean-sand fill is built in to the cost of coastal dune planting. The clean sand will be placed atop finished grades to a depth of 2 feet over the entire coastal dune planting area to provide for suitable planting substrate for the dune plants. The sand will be placed in successive horizontal layers not over 6 inches in depth extending across the entire area of fill. The sand will be spread by a bulldozer or other acceptable grading equipment and methods, then compacted by the movement of the spreading/grading equipment over the layer before a successive layer is constructed. Fill will be free from refuse, foreign materials, roots, hard soil, stiff clay, cobbles, and material deleterious to plant growth. The cost of trucking the material to the site is included in the unit price of the material.

Weeding and watering is incorporated into the cost of coastal dune planting. It includes watering and weeding the planting area post-planting, and as needed for the duration of construction.

Coastal & Inland Scrub/Shrub Planting: Coastal scrub/shrub plants will include grass plugs, forbs, 1- to 4-foot whip shrubs, and gallon-container shrubs. Plugs will be planted at 3-foot centers at a density of 4,840 plants per acre. Forbs will be planted at 30-foot centers at a density of 1,452 plants per acre. Whip and gallon container shrubs will be planted at 8-foot centers at a density of 680 plants per acre. At this phase, it is assumed that the species planted will be *Ammophila breviligulata* (American beachgrass) for plugs and *Baccharis halimfolia* (groundsel bush), *Iva frutescens* (marsh elder), and *Myrica pensylvanica* (northern bayberry) for shrubs. Forb and whip species will be decided upon in the next phase of the project. Plants will be intermixed and planted in a staggered formation as directed by the restoration specialist. Plant stock will be nursery-grown and all plant materials are included in the price for this item. Shrubs will be inoculated with mycorrhizae fungi either at the nursery or on-site at the time of planting. The planting window for plugs and forbs is from April 15th to June 15th; for shrubs, it is April 1st to May 30th.

For grass plugs and forbs, prior to placement of the plant in the planting hole, a 6-month controlled release fertilizer will be placed in the bottom of the planting hole at the rate of 30 grams per plant. The plants will then be placed at the appropriate depth with the root system oriented downward. While the plant is in this position, the soil around the plant will be firmly tamped into place by hand.






For shrubs (whips and containers), plant pits will be dug approximately 4 inches wider than the stock size. Prior to placement of the plant in the planting hole, a 4-ounce scoop of 6-month controlled release fertilizer will be placed in the bottom of the planting hole. The shrubs will be planted 1 inch higher than grown in the nursery and the backfill soil will be placed around the rootmass to form a raised mound around the plant.

The scrub/shrub planting also includes seeding of the area with a warm season/grassland native seed mix. The method will be hydroseeding with fertilizer and straw mulch (wood cellulose fiber mulch may be substituted). Seed rate will be 10-15 pounds per acre of pure live seed; fertilizer will be a 6-month controlled release at 200 pounds per acre; and mulch will be 200 pounds (dry weight) per acre. The seeding window is from May 1st to May 31st.

The clean-sand fill/topsoil fill is built in to the cost of coastal scrub/shrub planting. The clean sand will be placed atop finished grades to a depth of 1.5 feet over the entire scrub/shrub planting area to provide for suitable planting substrate for the scrub/shrub plants. The sand will be placed in successive horizontal layers not over 6 inches in depth extending across the entire area of fill. The sand will be spread by a bulldozer or other acceptable grading equipment and methods, then compacted by the movement of the spreading/grading equipment over the layer before a successive layer is constructed. Fill will be free from refuse, foreign materials, roots, hard soil, stiff clay, cobbles, and material deleterious to plant growth. The cost of trucking the material to the site is included in the unit price of the material.

Weeding and watering is incorporated into the cost of coastal scrub/shrub planting. It includes watering and weeding the planting area post-planting, and as needed for the duration of construction.

Coastal Meadow: Coastal meadow plants will include forbs and gallon-container shrubs. Forbs will be planted at 30-foot centers at a density of 1,452 plants per acre. Gallon container shrubs will be planted at 8-foot centers at a density of 680 plants per acre. At this phase, it is assumed that the species planted will be *Baccharis halimfolia* (groundsel bush), *Iva frutescens* (marsh elder), and *Myrica pensylvanica* (northern bayberry) for shrubs. The forb species will be decided upon in the next phase of the project. Plants will be intermixed and planted in a staggered formation as directed by the restoration specialist. Plant stock will be nursery-grown and all plant materials are included in the price for this item. Shrubs will be inoculated with mycorrhizae fungi either at the nursery or on-site at the time of planting. The planting window for forbs is from April 15th to June 15th; for shrubs, it is April 1st to May 30th.

For forbs, prior to placement of the plant in the planting hole, a 6-month controlled release fertilizer will be placed in the bottom of the planting hole at the rate of 30 grams per plant. The plants will then be placed at the appropriate depth with the root system oriented downward. While the plant is in this position, the soil around the plant will be firmly tamped into place by hand.

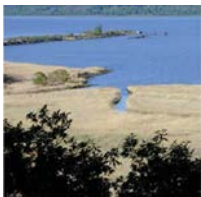
For shrubs, plant pits will be dug approximately 4 inches wider than the stock size. Prior to placement of the plant in the planting hole, a 4-ounce scoop of 6-month controlled release fertilizer will be placed in the bottom of the planting hole. The shrubs will be planted 1 inch higher than grown in the nursery and the backfill soil will be placed around the rootmass to form a raised mound around the plant.

Coastal meadow planting also includes seeding of the area with a warm season/grassland native seed mix. The method will be hydroseeding with fertilizer and straw mulch (wood cellulose fiber mulch may be substituted). Seed rate will be 10-15 pounds per acre of pure live seed; fertilizer will be a 6-month









controlled release at 200 pounds per acre; and mulch will be 200 pounds (dry weight) per acre. The seeding window is from May 1st to May 31st.

The clean-sand fill is built-in to the cost of coastal meadow planting. The clean sand will be placed atop finished grades to a depth of 2 feet over the entire coastal meadow planting area to provide for suitable planting substrate for the meadow plants. The sand will be placed in successive horizontal layers not over 6 inches in depth extending across the entire area of fill. The sand will be spread by a bulldozer or other acceptable grading equipment and methods, then compacted by the movement of the spreading/grading equipment over the layer before a successive layer is constructed. Fill will be free from refuse, foreign materials, roots, hard soil, stiff clay, cobbles, and material deleterious to plant growth. The cost of trucking the material to the site is included in the unit price of the material.

Weeding and watering is incorporated into the cost of coastal meadow planting. It includes watering and weeding the planting area post-planting, and as needed for the duration of construction.

Maritime Forest (Forested Wetlands/Native Tree) Planting: Maritime forest plants will include quart-container ferns/forbs, gallon-container shrubs, ball & burlap canopy trees, 1- to 4-foot whip canopy trees, 5- to 6-foot whip canopy trees, and gallon container understory trees. Ferns/forbs will be planted at 3-foot centers at a density of 4,840 plants per acre. All trees types will be planted at 10-foot centers at a density of 435 plants per acre. Plants will be intermixed and planted in a staggered formation as directed by the restoration specialist. Plant stock will be nursery-grown and all plant materials are included in the price for this item. Shrubs will be inoculated with mycorrhizae fungi either at the nursery or on-site at the time of planting. The planting window for ferns/forbs is from April 15th to June 15th; for shrubs and trees, it is April 1st to May 30th.

Plant pits will be dug approximately 4 inches wider than the stock size. Prior to placement of the plant in the planting hole, a 6-month controlled release fertilizer will be placed in the bottom of the planting hole (amount varies by plant type and will be determined by the restoration specialist). The plants will be planted 1 inch higher than grown in the nursery and the backfill soil will be placed around the rootmass to form a raised mound around the plant.

Maritime forest planting also includes seeding of the area with a warm season/grassland native seed mix. The method will be hydroseeding with fertilizer and straw mulch (wood cellulose fiber mulch may be substituted). Seed rate will be 10-15 pounds per acre of pure live seed; fertilizer will be a 6-month controlled release at 200 pounds per acre; and mulch will be 200 pounds (dry weight) per acre. The seeding window is from May 1st to May 31st.

Topsoil is built-in to the cost of maritime forest planting. Topsoil will be placed atop finished grades to a depth of 6 inches over the entire maritime forest planting area to provide for suitable planting substrate for the forest plants. The topsoil will be spread by a bulldozer or another acceptable grading equipment. Then the topsoil will be compacted by the movement of the spreading/grading equipment over the layer before a successive layer is constructed. Topsoil will be free from refuse, foreign materials, roots, hard soil, stiff clay, cobbles, and material deleterious to plant growth. The cost of trucking the material to the site is included in the unit price of the material.

Weeding and watering is incorporated into the cost of maritime forest planting. It includes watering and weeding the planting area post-planting, and as needed for the duration of construction.






Site Amenities: Site amenities include perimeter boulders, concrete bollards, and permanent project information/interpretive signs. Boulders, approximately 1.5 feet in diameter, will be placed every 5 feet along the landside of a site's boundary to prevent vehicular traffic from entering the sites, negating the need for unaesthetic chain link fence. Removable 8-inch diameter steel pipe bollards will also be placed at entrances or ends of adjacent streets to further discourage vehicular traffic. The bollards will be concrete filled and painted, total of eight (8) feet long with 4 feet buried. Permanent project signs and interpretive signs describing the habitat functions and wildlife will be posted on steel rail posts.

Construction durations can be found in the Attachments of this Cost Estimate Appendix.

Chapter 5: Construction Management

The cost was developed for all construction management activities from pre-award requirements through final contract closeout. This cost includes the in-house labor based upon work-hour requirements, materials, facility costs, support contracts, travel and overhead. The cost was developed based on the input from the construction division in accordance with the Civil Works Breakdown Structure (CWBS) and includes, but is not limited to, anticipated items such as the salaries of the resident engineer and staff, surveyors, inspectors, drafters, clerical, and custodial personnel; operation, maintenance and fixed charges for transportation and for other field equipment; field supplies; construction management, general construction supervision; and project office administration, distributive cost of area office and general overhead charged to the project.

Chapter 6: Cost Sharing and Total Project Costs

Table 6-1 presents the total first costs for each site recommended in the TSP broken down by federal and non-federal contributions. Upon approval of the FR/EA, project partnership agreements would be executed between the USACE and the non-federal sponsor.

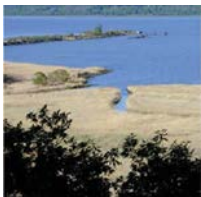
Table 6-1: Cost Allocation, Sponsors and Total First Costs for TSP

Planning Region	Restoration Site	Federal Cost (65%)	Non-Federal Cost (35%)	Total Cost ($)	Non-Federal Sponsor
Jamaica Bay	Dead Horse Bay	53,799,850	28,969,150	82,769,000	NYCDEP, NYC Parks, NYSDEC
	Fresh Creek	29,557,450	15,915,550	45,473,000	NYCDEP, NYC Parks, NYSDEC
	Hawtree Point	950,950	512,050	1,463,000	NYCDEP, NYC Parks, NYSDEC
	Bayswater Point State Park	3,779,750	2,035,250	5,815,000	NYS Department of Parks and Recreation
	Dubos Point	6,214,000	3,346,000	9,560,000	NYCDEP, NYC Parks, NYSDEC
	Brant Point	4,862,000	2,618,000	7,480,000	NYCDEP, NYC Parks, NYSDEC
	Stony Creek	19,838,000	10,682,000	30,520,000	NYSDEC, NYCDEP
	Duck Point	18,057,000	9,723,000	27,780,000	NYSDEC, NYCDEP
	Elders Point Center	13,474,500	7,255,500	20,730,000	NYSDEC, NYCDEP









Planning Region	Restoration Site	Federal Cost (65%)	Non-Federal Cost (35%)	Total Cost ($)	Non-Federal Sponsor
	Pumpkin Patch-West	13,026,000	7,014,000	20,040,000	NYSDEC, NYCDEP
	Pumpkin Patch-East	24,667,500	13,282,500	37,950,000	NYSDEC, NYCDEP
	Oyster Restoration: Jamaica Bay- Head of Bay	533,000	287,000	820,000	NYCDEP
Harlem River, East River, and Western Long Island Sound	Flushing Creek	3,835,000	2,065,000	5.900,000	NYCDEP
	River Park/West Farm Rapids Park	2,600,000	1,400,000	4,000,000	NYCDEP, NYC Parks
	Bronx Zoo and Dam	2,502,500	1,347,500	3,850,000	NYCDEP, NYC Parks
	Stone Mill Dam	468,000	252,000	720,000	NYCDEP, NYC Parks
	Shoelace Park	16,256,500	8,753,500	25,010,000	NYCDEP, NYC Parks
	Muskrat Cove	5,096,000	2,744,000	7,840,000	NYCDEP, NYC Parks
	Bronxville Lake	10,094,500	5,435,500	15,530,000	Westchester County Planning
	Crestwood Lake	17,946,500	9,663,500	27,610,000	Westchester County Planning
	Garth Woods/ Harney Road	4,680,000	2,520,000	7,200,000	Westchester County Planning
	Westchester County Center	9,438,000	5,082,000	14,520,000	Westchester County Planning
	Oyster Restoration: Soundview Park	494,000	266,000	760,000	NY/NJ Baykeeper, Hudson River Foundation
Newark Bay, Hackensack River and Passaic River	Deferred Site: Oak Island Yards	19,266,000	10,374,000	29,640,000	NJDEP
	Deferred Site: Kearny Point	37,563,500	20,226,500	57,790,000	NJDEP
	Metromedia Tract	21,131,500	11,378,500	32,510,000	NJSEA, NJDEP
	Meadowlark Marsh	27,079,000	14,581,000	41,660,000	NJSEA, NJDEP
	Essex County Branch Brook Park	14,228,500	7,661,500	21,890,000	NJDEP
	Dundee Island Park	1,768,000	952,000	2,720,000	NJDEP
	Clifton Dundee Canal Green Acres	7,767,500	4,182,500	11,950,000	NJDEP
Upper Bay	Oyster Restoration: Bush Terminal	21,417,500	11,532,500	32,950,000	NY Harbor Foundation/School
	Oyster Restoration: Governors Island	3,172,000	1,708,000	4,880,000	
Lower Bay	Oyster Restoration: Naval Weapons Station Earle	4,823,000	2,597,000	7,420,000	NY/NJ Baykeeper





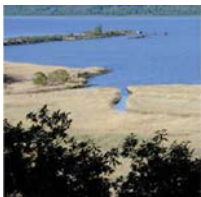

Table 6-2 shows the total cost of construction by planning region.

Table 6-2: Total Cost by Planning Region (FY 2016).

Planning Region	Total Cost
Jamaica Bay	$291,090,000
Harlem River, East River, and Western Long Island Sound	$107,040,000
Newark Bay, Hackensack River, and Lower Passaic River	$198,160,000
Lower Bay	$7,420,000
Upper Bay	$37,830,000
Total	**$641,540,000**





Attachments

COST ESTIMATE PACKAGE	STUDY SITE NAME	CONSTRUCTION SCHEDULE
Jamaica Bay	Dead Horse Bay	36 months
	Fresh Creek	36 months
	Hawtree Point	36 months
	Bayswater State Park	36 months
	Dubos Point	36 months
	Brant Point	36 months
	Stony Creek	36 months
	Duck Point	36 months
	Elders Center	36 months
	Pumpkin Patch West	36 months
	Pumpkin Patch East	36 months
Flushing Creek	Flushing Creek, NYCDEP Site #DRG-FC	23 months
Bronx River	River Park / West Farm Rapids Park	9.5 months
	Bronx Zoo and Dam	11 months
	Stone Mill Dam	8 months
	Shoelace Park	13.5 months
	Muskrat Cove	10.5 months
	Bronxville Lake	12.5 months
	Crestwood Lake	12.5 months
	Garth Woods/Harney Road	9.5 months
	Westchester County Center	12.5 months
Hackensack River	Metromedia Tract	33.5 months
	Meadowlark Marsh	33.5 months
Lower Passaic River	Oak island Yards	22.5 months
	Kearny Point	24 months
	First River Branch Brook	24 months
	Dundee Island – Pulaski Park	20.5 months
	Clifton Dundee Canal Green Acres Purchase and Dundee Island Preserve	24 months
HRE Oyster Sites	Jamaica Bay	1.5 months
	Governors Island	8.5 months
	Bush Terminal	15.5 months
	Governors Island	8.5 months
	Naval Weapons Station Earle	12 months
	Soundview Park	2.5 months

Attachment A
Jamaica Bay 2016 Cost Estimate Package Supporting Documents

Jamaica Bay Ecosystem Project
2016 Cost Estimate Update
Summary Tabulation

	Cost
Bayswater State Park	$ 5,815,000
Dead Horse Bay	$ 82,769,000
Hawtree Point	$ 1,463,000
Brant Point	$ 7,480,000
Dubos Point	$ 9,560,000
Fresh Creek	$ 45,473,000
TOTAL FOR SIX (6) SITES	$ 152,560,000

Jamaica Bay Ecosystem Project
Bayswater State Park
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost *
RESTORATION MEASURE			
ACCOUNT 06 - Fish and Wildlife Facilities	1 LS		$ 1,832,573
ACCOUNT 10- Breakwaters and Seawalls	1 LS		$ 1,410,063
SUBTOTAL - CONSTRUCTION COST (2016$)			$ 3,242,636
MONITORING			$ 32,426
ADAPTIVE MANAGEMENT			$ 97,279
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 664,740
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 291,837
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			$ 4,335,719
Contingency Restoration Measures (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 1,297,054
Contingency Monitoring and Adaptive Management (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 51,882
Contingency Account 01 (per Jamaica Bay - 2010 FR/EA)		20.00%	$ 1,360
Contingency Account 30 (per Jamaica Bay - 2010 FR/EA)		15.00%	$ 99,711
Contingency Account 31 (per Jamaica Bay - 2010 FR/EA)		10.00%	$ 29,184
Escalation to Construction Midpoint (EXCLUDED)			
TOTAL COST (2016$)			$ 5,814,910
SAY (2016$)			$ 5,815,000

Jamaica Bay Ecosystem Project
Dead Horse Bay
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost *
RESTORATION MEASURE			
ACCOUNT 06 - Fish and Wildlife Facilities	1 LS		$ 46,215,502
ACCOUNT 10- Breakwaters and Seawalls	1 LS		$ -
SUBTOTAL - CONSTRUCTION COST (2016$)			$ 46,215,502
MONITORING			$ 462,155
ADAPTIVE MANAGEMENT			$ 1,386,465
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 9,474,178
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 4,159,395
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			$ 61,704,495
Contingency Restoration Measures (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 18,486,201
Contingency Monitoring and Adaptive Management (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 739,448
Contingency Account 01 (per Jamaica Bay - 2010 FR/EA)		20.00%	$ 1,360
Contingency Account 30 (per Jamaica Bay - 2010 FR/EA)		15.00%	$ 1,421,127
Contingency Account 301(per Jamaica Bay - 2010 FR/EA)		10.00%	$ 415,940
Escalation to Construction Midpoint (EXCLUDED)			
TOTAL COST (2016$)			$ 82,768,570
SAY (2016$)			$ 82,769,000

Jamaica Bay Ecosystem Project
Hawtree Point
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost *
RESTORATION MEASURE			
ACCOUNT 06 - Fish and Wildlife Facilities	1 LS		$ 812,242
ACCOUNT 10- Breakwaters and Seawalls	1 LS		$ -
SUBTOTAL - CONSTRUCTION COST (2016$)			$ 812,242
MONITORING			$ 8,122
ADAPTIVE MANAGEMENT			$ 24,367
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 166,510
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 73,102
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			$ 1,091,143
Contingency Restoration Measures (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 324,897
Contingency Monitoring and Adaptive Management (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 12,996
Contingency Account 01 (per Jamaica Bay - 2010 FR/EA)		20.00%	$ 1,360
Contingency Account 30 (per Jamaica Bay - 2010 FR/EA)		15.00%	$ 24,976
Contingency Account 31 (per Jamaica Bay - 2010 FR/EA)		10.00%	$ 7,310
Escalation to Construction Midpoint (EXCLUDED)			
TOTAL COST (2016$)			$ 1,462,682
SAY (2016$)			$ 1,463,000

Jamaica Bay Ecosystem Project
Brant Point
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost *
RESTORATION MEASURE			
ACCOUNT 06 - Fish and Wildlife Facilities	1 LS		$ 3,150,696
ACCOUNT 10- Breakwaters and Seawalls	1 LS		$ 1,021,892
SUBTOTAL - CONSTRUCTION COST (2016$)			$ 4,172,588
MONITORING			$ 41,726
ADAPTIVE MANAGEMENT			$ 125,178
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 855,381
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 375,533
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			$ 5,577,205
Contingency Restoration Measures (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 1,669,035
Contingency Monitoring and Adaptive Management (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 66,761
Contingency Account 01 (per Jamaica Bay - 2010 FR/EA)		20.00%	$ 1,360
Contingency Account 30 (per Jamaica Bay - 2010 FR/EA)		15.00%	$ 128,307
Contingency Account 31 (per Jamaica Bay - 2010 FR/EA)		10.00%	$ 37,553
Escalation to Construction Midpoint (EXCLUDED)			
TOTAL COST (2016$)			$ 7,480,222
SAY (2016$)			$ 7,480,000

Jamaica Bay Ecosystem Project
Dubos Point
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost *
RESTORATION MEASURE			
ACCOUNT 06 - Fish and Wildlife Facilities	1 LS		$ 2,334,905
ACCOUNT 10- Breakwaters and Seawalls	1 LS		$ 2,998,883
SUBTOTAL - CONSTRUCTION COST (2016$)			$ 5,333,788
MONITORING			$ 53,338
ADAPTIVE MANAGEMENT			$ 160,014
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 1,093,427
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 480,041
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			$ 7,127,407
Contingency Restoration Measures (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 2,133,515
Contingency Monitoring and Adaptive Management (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 85,341
Contingency Account 01 (per Jamaica Bay - 2010 FR/EA)		20.00%	$ 1,360
Contingency Account 30 (per Jamaica Bay - 2010 FR/EA)		15.00%	$ 164,014
Contingency Account 31 (per Jamaica Bay - 2010 FR/EA)		10.00%	$ 48,004
Escalation to Construction Midpoint (EXCLUDED)			
TOTAL COST (2016$)			$ 9,559,641
SAY (2016$)			$ 9,560,000

Jamaica Bay Ecosystem Project
Fresh Creek
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost *
RESTORATION MEASURE			
ACCOUNT 06 - Fish and Wildlife Facilities	1 LS		$ 25,388,720
ACCOUNT 10- Breakwaters and Seawalls	1 LS		$ -
SUBTOTAL - CONSTRUCTION COST (2016$)			$ 25,388,720
MONITORING			$ 253,887
ADAPTIVE MANAGEMENT			$ 761,662
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 5,204,688
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 2,284,985
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			$ 33,900,741
Contingency Restoration Measures (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 10,155,488
Contingency Monitoring and Adaptive Management (per Jamaica Bay - 2010 FR/EA)		40.00%	$ 406,220
Contingency Account 01 (per Jamaica Bay - 2010 FR/EA)		20.00%	$ 1,360
Contingency Account 30 (per Jamaica Bay - 2010 FR/EA)		15.00%	$ 780,703
Contingency Account 31 (per Jamaica Bay - 2010 FR/EA)		10.00%	$ 228,498
Escalation to Construction Midpoint (EXCLUDED)			
TOTAL COST (2016$)			$ 45,473,010
SAY (2016$)			$ 45,473,000

Attachment A-1
Jamaica Bay 2003 Cost Estimate Package Supporting Documents

US Army Corps
of Engineers
New York District

CONCEPTUAL PLAN REPORT
PRELIMINARY PLANNING COST ESTIMATES

FINAL

DECEMBER, 2003

Prepared For:

New York District, U.S. Army Corps of Engineers
26 Federal Plaza
New York, New York 10278-0090

Prepared by:

Barry A. Vittor & Associates, Inc.
656 Aaron Court, Building 6
Kingston, New York 12401

Environmental Concern Inc.
410 S. Second Street
Denton, Maryland 21629

JAMAICA BAY PERIMETER SITES
IMPLEMENTATION COST ESTIMATES

Implementation cost estimates for the six (6) Jamaica Bay Perimeter Sites were calculated using the base costs presented in *Conceptual Plan Report Preliminary Planning Cost Estimates* (USACE, 2003) and updated to FY08 price levels. The base construction and management costs were expanded to calculate implementation costs for use in the Cost Effectiveness/Incremental Cost Analysis (CE/ICA) by including:

- Real Estate (nominal $1 because all sites are on public park land
- Operations and Maintenance (estimated at 0.5% of the base cost per alternative)
- Monitoring (estimated at 1% of the base cost per alternative); and
- Interest during Construction (IDC) using a discount rate of 4.875%. [1]

The base and implementation costs (FY08 price levels) used to identify the Tentatively Selected Plan (TSP) are presented in Table below.

Alt No	Alternative Description	Base Cost ($1000)	Implementation Cost ($1000)
	Dead Horse Bay No Action	0	0
1	Dead Horse Bay Fringe Marsh	$22,769	$23,615
2	Dead Horse Bay (1) + Trash removal	$25,259	$26,197
3	Dead Horse Bay Tidal Creek	$30,723	$31,864
4	Dead Horse Bay (3) + Trash removal	$33,635	$34,885
	Fresh Creek No Action	0	0
1	Fresh Creek Tidal Marsh	$4,929	$5,057
2	Fresh Creek (1) + channel filling	$5,098	$5,231
3	Fresh Creek (1) + Basin head filling	$8,175	$8,388
4	Fresh Creek (1) + Basin filling to Jamaica Bay	$8,050	$8,259
5	Fresh Creek (4) + Detention Basin	$10,575	$10,850
	Hawtree Point No Action	0	0
1	Hawtree Point Coastal Dune restoration	$321	$327
	Bayswater State Park No Action	0	$0
1	Bayswater Tidal Channel with coastal dunes	$971	$1,007
2	Bayswater Tidal Channel with tidal pool	$2,417	$2,507
3	Bayswater Tidal Channel with T groin protection	$3,617	$3,751
	Dubos Point No Action	0	0
1	Dubos Point Tidal Channel	$1,437	$1,464
2	Dubos Point (1) + limited toe protection	$2,151	$2,192
3	Dubos Point (1) + continuous toe protection	$2,865	$2,919
	Brant Point No Action	0	0
1	Brant Point Tidal Marsh	$2,044	$2,091
2	Brant Point (1) with shore protection	$3,559	$3,641

[1] In accordance with policy (at the time of the preliminary report development), the preliminary report used an older discount rate (4 7/8%) to describe the evaluation of alternatives, to be updated to the current rate for presenting the tentatively selected plan (TSP).

Attachment B
Jamaica Bay Marsh Islands Cost Estimate Package
Supporting Documents

HRE Jamaica Bay Marsh Islands
Alternative Site Analysis Cost Matrix

		Elders Center Total		Pumpkin East Total		Pumpkin West Total		Duck Point Total		Stony Creek Total		TOTAL
BANK STABILIZATION												
ACCOUNT 16 - BANK STABILIZATION		**$ 12,307,240**		**$ 21,604,511**		**$ 11,813,335**		**$ 15,757,957**		**$ 17,618,490**		**$ 79,101,533**
SUBTOTAL - CONSTRUCTION COST (2016$)		**$ 12,307,240**		**$ 21,604,511**		**$ 11,813,335**		**$ 15,757,957**		**$ 17,618,490**		**$ 79,101,533**
MONITORING		$ 123,072		$ 216,045		$ 118,133		$ 157,580		$ 176,185		$ 791,015
ADAPTIVE MANAGEMENT		$ 369,217		$ 648,135		$ 354,400		$ 472,739		$ 528,555		$ 2,373,046
ACCOUNT 01 - REAL ESTATE		$ 6,800		$ 6,800		$ 6,800		$ 6,800		$ 6,800		$ 34,000
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 1,107,652		$ 3,240,677		$ 1,181,334		$ 2,442,483		$ 2,290,404		$ 10,262,549
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 1,107,652		$ 1,944,406		$ 1,063,200		$ 1,418,216		$ 1,585,664		$ 7,119,138
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		**$ 15,014,832**		**$ 27,653,774**		**$ 14,530,403**		**$ 20,248,974**		**$ 22,199,298**		**$ 99,647,281**
Contingency (per results of ARA analysis)	38.05%	$ 5,713,584	37.24%	$ 10,297,347	37.91%	$ 5,508,673	37.17%	$ 7,526,968	37.50%	$ 8,324,764	37.52%	$ 37,371,338
TOTAL COST (2016$)		**$ 20,728,416**		**$ 37,951,121**		**$ 20,039,076**		**$ 27,775,943**		**$ 30,524,062**		**$ 137,018,618**
SAY (2016$)		**$ 20,730,000**		**$ 37,950,000**		**$ 20,040,000**		**$ 27,780,000**		**$ 30,520,000**		**$ 137,020,000**

Abbreviated Risk Analysis

Project Name & Location: **Jamaica Bay Marsh Islands, New York**
Project Development Stage/Alternative: **Feasibility (Alternatives)**
Risk Category: **Moderate Risk: Typical Project Construction Type**

District: **New York District**
Alternative: **Elders Center**
Meeting Date: **4/28/2016**

Total Estimated Construction Contract Cost = **$ 12,307,240**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	16 BANK STABILIZATION		$ 12,307,240		41.49%	$ 5,106,307	$ 17,413,547
2			$ -		0.00%	$ -	$ -
3			$ -		0.00%	$ -	$ -
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	**$ -**	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 3,015,274		20.64%	$ 622,338	$ 3,637,611
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 1,107,652		25.01%	$ 277,056	$ 1,384,708
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 12,307,240	41.49%	$ 5,106,307	$ 17,413,547	
Total Planning, Engineering & Design	$ 3,015,274	20.64%	$ 622,338	$ 3,637,611	
Total Construction Management	$ 1,107,652	25.01%	$ 277,056	$ 1,384,708	
Total	**$ 16,430,165**	**37%**	**$ 6,005,702**	**$ 22,435,866**	
			Base	**50%**	**80%**
Range Estimate ($000's)			$16,430k	$20,034k	$22,436k

* 50% based on base is at 50% CL.

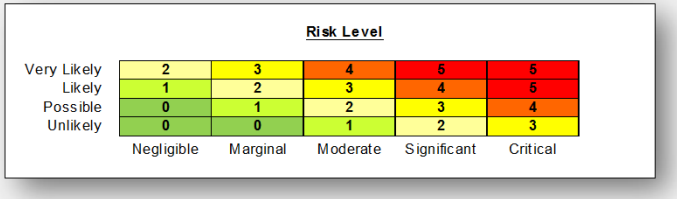
Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

Jamaica Bay Marsh Islands, New York Elders Center

Feasibility (Alternatives)

Abbreviated Risk Analysis

Meeting Date: 28-Apr-16



Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Scope Growth				**Maximum Project Growth**		**60%**
PS-1	16 BANK STABILIZATION	Scope growth, i.e.; additional features, Changes in site conditions since field surveys, Location of existing utilities	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth.	Significant	Possible	3
PS-2				Negligible	Unlikely	0
PS-3				Negligible	Unlikely	0
PS-12	Remaining Construction Items			Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
PS-14	Construction Management	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
Acquisition Strategy				**Maximum Project Growth**		**40%**
AS-1	16 BANK STABILIZATION	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes a 13% allowance for JOOH, and a 10% allowance for profit.	Moderate	Possible	2
AS-2				Moderate	Possible	2
AS-3				Moderate	Possible	2
AS-12	Remaining Construction Items			Negligible	Unlikely	0

AS-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
AS-14	Construction Management	• Contracting plan firmly established? • 8a or small business likely?	Construction office may need to provide extra attention to the small business contractor as the firm may or may not be familiar with USACE requirements.	Moderate	Possible	2
Construction Elements				**Maximum Project Growth**		**30%**
CON-1	16 BANK STABILIZATION	Difficulties with site access.	It is unclear if the planned project features will fully address the intent of the project.	Marginal	Likely	2
CON-2	0			Marginal	Likely	2
CON-3				Negligible	Unlikely	0
CON-12	Remaining Construction Items			Negligible	Unlikely	0
CON-13	Planning, Engineering, & Design	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
CON-14	Construction Management	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
Quantities for Current Scope				**Maximum Project Growth**		**20%**
Q-1	16 BANK STABILIZATION	Quantities are based on plan dimensions taken from GIS concept plans, with assumptions regarding depths and widths where necessary.	Quantities are not based on specific topographic/bathymetric data. Limited precision of GIS data increases the uncertainty of quantity calculations. These computations will change during the final design phases once more detailed information is collected.	Moderate	Likely	3
Q-2				Marginal	Likely	2
Q-3				Marginal	Likely	2
Q-12	Remaining Construction Items			Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
Q-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**75%**
FE-1	16 BANK STABILIZATION	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0

FE-2				Negligible	Unlikely	0
FE-3				Negligible	Unlikely	0
FE-12	Remaining Construction Items			Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
FE-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**35%**
EST-1	16 BANK STABILIZATION	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders.	Marginal	Likely	2
EST-2				Marginal	Likely	2
EST-3				Marginal	Likely	2
EST-12	Remaining Construction Items			Negligible	Unlikely	0
EST-13	Planning, Engineering, & Design	• Changes or modifications during construction	This cost is for project design. It is highly unlikely that Modification will be excuted for this project	Marginal	Unlikely	0
EST-14	Construction Management		No major concerns	Marginal	Unlikely	0
External Project Risks				**Maximum Project Growth**		**40%**
EX-1	16 BANK STABILIZATION	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-2				Moderate	Possible	2
EX-3				Moderate	Possible	2
EX-12	Remaining Construction Items			Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	• Political influences, lack of support, obstacles?	Project delays due to lack of political support can cause schedule delays. No concerns for E&D	Negligible	Possible	0
EX-14	Construction Management		No concerns.	Negligible	Unlikely	0

Abbreviated Risk Analysis

Project Name & Location: **Jamaica Bay Marsh Islands, New York**
Project Development Stage/Alternative: **Feasibility (Alternatives)**
Risk Category: **Moderate Risk: Typical Project Construction Type**

District: **New York District**
Alternative: **Pumpkin East**
Meeting Date: **4/28/2016**

Total Estimated Construction Contract Cost = **$ 21,604,511**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	16 BANK STABILIZATION		$ 21,604,511		41.49%	$ 8,963,771	$ 30,568,282
2			$ -		0.00%	$ -	$ -
3			$ -		0.00%	$ -	$ -
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	$ -	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 5,293,105		20.64%	$ 1,092,471	$ 6,385,576
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 1,944,406		25.01%	$ 486,353	$ 2,430,759
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 21,604,511	41.49%	$ 8,963,771	$ 30,568,282	
Total Planning, Engineering & Design	$ 5,293,105	20.64%	$ 1,092,471	$ 6,385,576	
Total Construction Management	$ 1,944,406	25.01%	$ 486,353	$ 2,430,759	
Total	**$ 28,842,022**	**37%**	**$ 10,542,595**	**$ 39,384,618**	
			Base	**50%**	**80%**
Range Estimate ($000's)			$28,842k	$35,168k	$39,385k

* 50% based on base is at 50% CL.

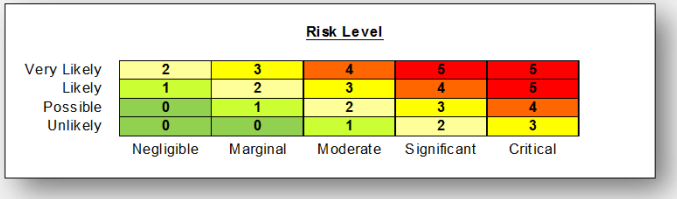
Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

Jamaica Bay Marsh Islands, New York Pumpkin East

Feasibility (Alternatives)

Abbreviated Risk Analysis

Meeting Date: 28-Apr-16



Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Scope Growth				**Maximum Project Growth**		**60%**
PS-1	16 BANK STABILIZATION	Scope growth, i.e.; additional features, Changes in site conditions since field surveys, Location of existing utilities	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth.	Significant	Possible	3
PS-2				Negligible	Unlikely	0
PS-3				Negligible	Unlikely	0
PS-12	Remaining Construction Items			Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
PS-14	Construction Management	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
Acquisition Strategy				**Maximum Project Growth**		**40%**
AS-1	16 BANK STABILIZATION	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes a 13% allowance for JOOH, and a 10% allowance for profit.	Moderate	Possible	2
AS-2				Negligible	Unlikely	0
AS-3				Negligible	Unlikely	0
AS-12	Remaining Construction Items			Negligible	Unlikely	0

AS-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
AS-14	Construction Management	• Contracting plan firmly established? • 8a or small business likely?	Construction office may need to provide extra attention to the small business contractor as the firm may or may not be familiar with USACE requirements.	Moderate	Possible	2
Construction Elements				**Maximum Project Growth**		**30%**
CON-1	16 BANK STABILIZATION	Difficulties with site access.	It is unclear if the planned project features will fully address the intent of the project.	Marginal	Likely	2
CON-2				Negligible	Unlikely	0
CON-3				Negligible	Unlikely	0
CON-12	Remaining Construction Items			Negligible	Unlikely	0
CON-13	Planning, Engineering, & Design	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
CON-14	Construction Management	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
Quantities for Current Scope				**Maximum Project Growth**		**20%**
Q-1	16 BANK STABILIZATION	Quantities are based on plan dimensions taken from GIS concept plans, with assumptions regarding depths and widths where necessary.	Quantities are not based on specific topographic/bathymetric data. Limited precision of GIS data increases the uncertainty of quantity calculations. These computations will change during the final design phases once more detailed information is collected.	Moderate	Likely	3
Q-2				Negligible	Unlikely	0
Q-3				Negligible	Unlikely	0
Q-12	Remaining Construction Items			Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
Q-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**75%**
FE-1	16 BANK STABILIZATION	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0

FE-2				Negligible	Unlikely	0
FE-3				Negligible	Unlikely	0
FE-12	Remaining Construction Items			Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
FE-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**35%**
EST-1	16 BANK STABILIZATION	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders.	Marginal	Likely	2
EST-2				Negligible	Unlikely	0
EST-3				Negligible	Unlikely	0
EST-12	Remaining Construction Items			Negligible	Unlikely	0
EST-13	Planning, Engineering, & Design	• Changes or modifications during construction	This cost is for project design. It is highly unlikely that Modification will be excuted for this project	Negligible	Unlikely	0
EST-14	Construction Management		No major concerns	Negligible	Unlikely	0
External Project Risks				**Maximum Project Growth**		**40%**
EX-1	16 BANK STABILIZATION	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-2				Negligible	Unlikely	0
EX-3				Negligible	Unlikely	0
EX-12	Remaining Construction Items			Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	• Political influences, lack of support, obstacles?	Project delays due to lack of political support can cause schedule delays. No concerns for E&D	Negligible	Possible	0
EX-14	Construction Management		No concerns.	Negligible	Possible	0

Abbreviated Risk Analysis

Project Name & Location: **Jamaica Bay Marsh Islands, New York**
Project Development Stage/Alternative: **Feasibility (Alternatives)**
Risk Category: **Moderate Risk: Typical Project Construction Type**

District: **New York District**
Alternative: **Pumpkin West**
Meeting Date: **4/28/2016**

Total Estimated Construction Contract Cost = **$ 11,813,335**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	16 BANK STABILIZATION		$ 11,813,335		41.49%	$ 4,901,385	$ 16,714,721
2			$ -		0.00%	$ -	$ -
3			$ -		0.00%	$ -	$ -
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	$ -	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 2,894,267		20.64%	$ 597,363	$ 3,491,630
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 1,063,200		25.01%	$ 265,938	$ 1,329,138
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 11,813,335	41.49%	$ 4,901,385	$ 16,714,721	
Total Planning, Engineering & Design	$ 2,894,267	20.64%	$ 597,363	$ 3,491,630	
Total Construction Management	$ 1,063,200	25.01%	$ 265,938	$ 1,329,138	
Total	**$ 15,770,803**	**37%**	**$ 5,764,686**	**$ 21,535,488**	
			Base	**50%**	**80%**
Range Estimate ($000's)			$15,771k	$19,229k	$21,535k

* 50% based on base is at 50% CL.

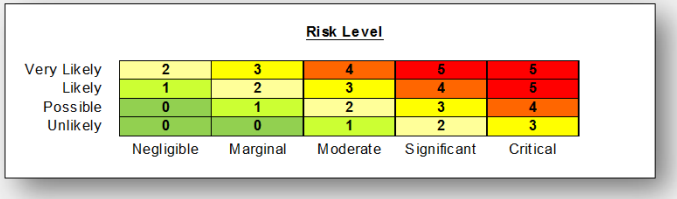
Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

Jamaica Bay Marsh Islands, New York Pumpkin West

Feasibility (Alternatives)

Abbreviated Risk Analysis

Meeting Date: 28-Apr-16



Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Scope Growth				**Maximum Project Growth**		**60%**
PS-1	16 BANK STABILIZATION	Scope growth, i.e.; additional features, Changes in site conditions since field surveys, Location of existing utilities	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth.	Significant	Possible	3
PS-2				Negligible	Unlikely	0
PS-3				Negligible	Unlikely	0
PS-12	Remaining Construction Items			Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
PS-14	Construction Management	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
Acquisition Strategy				**Maximum Project Growth**		**40%**
AS-1	16 BANK STABILIZATION	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes a 13% allowance for JOOH, and a 10% allowance for profit.	Moderate	Possible	2
AS-2				Negligible	Unlikely	0
AS-3				Negligible	Unlikely	0
AS-12	Remaining Construction Items			Negligible	Unlikely	0

AS-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
AS-14	Construction Management	• Contracting plan firmly established? • 8a or small business likely?	Construction office may need to provide extra attention to the small business contractor as the firm may or may not be familiar with USACE requirements.	Moderate	Possible	2
Construction Elements				**Maximum Project Growth**		**30%**
CON-1	16 BANK STABILIZATION	Difficulties with site access.	It is unclear if the planned project features will fully address the intent of the project.	Marginal	Likely	2
CON-2				Negligible	Unlikely	0
CON-3				Negligible	Unlikely	0
CON-12	Remaining Construction Items			Negligible	Unlikely	0
CON-13	Planning, Engineering, & Design	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
CON-14	Construction Management	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
Quantities for Current Scope				**Maximum Project Growth**		**20%**
Q-1	16 BANK STABILIZATION	Quantities are based on plan dimensions taken from GIS concept plans, with assumptions regarding depths and widths where necessary.	Quantities are not based on specific topographic/bathymetric data. Limited precision of GIS data increases the uncertainty of quantity calculations. These computations will change during the final design phases once more detailed information is collected.	Moderate	Likely	3
Q-2				Negligible	Unlikely	0
Q-3				Negligible	Unlikely	0
Q-12	Remaining Construction Items			Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
Q-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**75%**
FE-1	16 BANK STABILIZATION	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0

FE-2				Negligible	Unlikely	0
FE-3				Negligible	Unlikely	0
FE-12	Remaining Construction Items			Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
FE-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**35%**
EST-1	16 BANK STABILIZATION	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders.	Marginal	Likely	2
EST-2				Negligible	Unlikely	0
EST-3				Negligible	Unlikely	0
EST-12	Remaining Construction Items			Negligible	Unlikely	0
EST-13	Planning, Engineering, & Design	• Changes or modifications during construction	This cost is for project design. It is highly unlikely that Modification will be excuted for this project	Marginal	Unlikely	0
EST-14	Construction Management		No major concerns	Marginal	Unlikely	0
External Project Risks				**Maximum Project Growth**		**40%**
EX-1	16 BANK STABILIZATION	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-2				Negligible	Unlikely	0
EX-3				Negligible	Unlikely	0
EX-12	Remaining Construction Items			Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	• Political influences, lack of support, obstacles?	Project delays due to lack of political support can cause schedule delays. No concerns for E&D	Negligible	Possible	0
EX-14	Construction Management		No concerns.	Negligible	Unlikely	0

Abbreviated Risk Analysis

Project Name & Location: **Jamaica Bay Marsh Islands, New York**
Project Development Stage/Alternative: **Feasibility (Alternatives)**
Risk Category: **Moderate Risk: Typical Project Construction Type**

District: **New York District**
Alternative: **Duck Point**
Meeting Date: **4/28/2016**

Total Estimated Construction Contract Cost = **$ 15,757,957**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	16 BANK STABILIZATION	Sitework	$ 15,757,957		41.49%	$ 6,538,019	$ 22,295,976
2			$ -		0.00%	$ -	$ -
3			$ -		0.00%	$ -	$ -
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	**$ -**	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 3,860,699		20.64%	$ 796,829	$ 4,657,529
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 1,418,216		25.01%	$ 354,738	$ 1,772,954
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 15,757,957	41.49%	$ 6,538,019	$ 22,295,976	
Total Planning, Engineering & Design	$ 3,860,699	20.64%	$ 796,829	$ 4,657,529	
Total Construction Management	$ 1,418,216	25.01%	$ 354,738	$ 1,772,954	
Total	**$ 21,036,872**	**37%**	**$ 7,689,587**	**$ 28,726,459**	
		Base	**50%**	**80%**	
Range Estimate ($000's)		$21,037k	$25,650k	$28,726k	

* 50% based on base is at 50% CL.

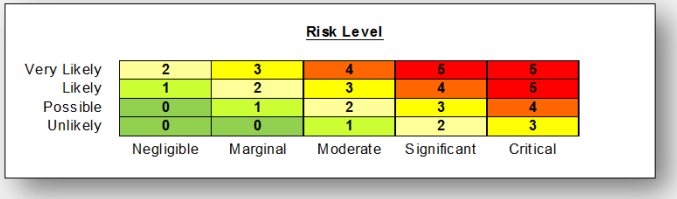
Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

Jamaica Bay Marsh Islands, New York Duck Point

Feasibility (Alternatives)

Abbreviated Risk Analysis

Meeting Date: 28-Apr-16



Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Scope Growth				**Maximum Project Growth**		**60%**
PS-1	16 BANK STABILIZATION	Scope growth, i.e.; additional features, Changes in site conditions since field surveys, Location of existing utilities	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth.	Significant	Possible	3
PS-2				Negligible	Unlikely	0
PS-3				Negligible	Unlikely	0
PS-12	Remaining Construction Items			Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
PS-14	Construction Management	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
Acquisition Strategy				**Maximum Project Growth**		**40%**
AS-1	16 BANK STABILIZATION	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes a 13% allowance for JOOH, and a 10% allowance for profit.	Moderate	Possible	2
AS-2				Negligible	Unlikely	0
AS-3				Negligible	Unlikely	0
AS-12	Remaining Construction Items			Negligible	Unlikely	0

AS-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
AS-14	Construction Management	• Contracting plan firmly established? • 8a or small business likely?	Construction office may need to provide extra attention to the small business contractor as the firm may or may not be familiar with USACE requirements.	Moderate	Possible	2
Construction Elements				**Maximum Project Growth**		**30%**
CON-1	16 BANK STABILIZATION	Difficulties with site access.	It is unclear if the planned project features will fully address the intent of the project.	Marginal	Likely	2
CON-2				Negligible	Unlikely	0
CON-3				Negligible	Unlikely	0
CON-12	Remaining Construction Items			Negligible	Unlikely	0
CON-13	Planning, Engineering, & Design	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
CON-14	Construction Management	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
Quantities for Current Scope				**Maximum Project Growth**		**20%**
Q-1	16 BANK STABILIZATION	Quantities are based on plan dimensions taken from GIS concept plans, with assumptions regarding depths and widths where necessary.	Quantities are not based on specific topographic/bathymetric data. Limited precision of GIS data increases the uncertainty of quantity calculations. These computations will change during the final design phases once more detailed information is collected.	Moderate	Likely	3
Q-2				Negligible	Unlikely	0
Q-3				Negligible	Unlikely	0
Q-12	Remaining Construction Items			Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
Q-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**75%**
FE-1	16 BANK STABILIZATION	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0

FE-2				Negligible	Unlikely	0
FE-3				Negligible	Unlikely	0
FE-12	Remaining Construction Items			Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
FE-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**35%**
EST-1	16 BANK STABILIZATION	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders.	Marginal	Likely	2
EST-2				Negligible	Unlikely	0
EST-3				Negligible	Unlikely	0
EST-12	Remaining Construction Items			Negligible	Unlikely	0
EST-13	Planning, Engineering, & Design	• Changes or modifications during construction	This cost is for project design. It is highly unlikely that Modification will be excuted for this project	Marginal	Unlikely	0
EST-14	Construction Management		No major concerns	Marginal	Unlikely	0
External Project Risks				**Maximum Project Growth**		**40%**
EX-1	16 BANK STABILIZATION	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-2				Negligible	Unlikely	0
EX-3				Negligible	Unlikely	0
EX-12	Remaining Construction Items			Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	• Political influences, lack of support, obstacles?	Project delays due to lack of political support can cause schedule delays. No concerns for E&D	Negligible	Possible	0
EX-14	Construction Management		No concerns.	Negligible	Unlikely	0

Abbreviated Risk Analysis

Project Name & Location: **Jamaica Bay Marsh Islands, New York**
Project Development Stage/Alternative: **Feasibility (Alternatives)**
Risk Category: **Moderate Risk: Typical Project Construction Type**

District: **New York District**
Alternative: **Stony Creek**
Meeting Date: **4/28/2016**

Total Estimated Construction Contract Cost = **$ 17,618,490**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	16 BANK STABILIZATION		$ 17,618,490		41.49%	$ 7,309,960	$ 24,928,450
2			$ -		0.00%	$ -	$ -
3			$ -		0.00%	$ -	$ -
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	$ -	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 4,316,530		20.64%	$ 890,911	$ 5,207,441
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 1,585,664		25.01%	$ 396,622	$ 1,982,286
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 17,618,490	41.49%	$ 7,309,960	$ 24,928,450	
Total Planning, Engineering & Design	$ 4,316,530	20.64%	$ 890,911	$ 5,207,441	
Total Construction Management	$ 1,585,664	25.01%	$ 396,622	$ 1,982,286	
Total	**$ 23,520,685**	**37%**	**$ 8,597,492**	**$ 32,118,177**	
			Base	**50%**	**80%**
Range Estimate ($000's)			$23,521k	$28,679k	$32,118k

* 50% based on base is at 50% CL.

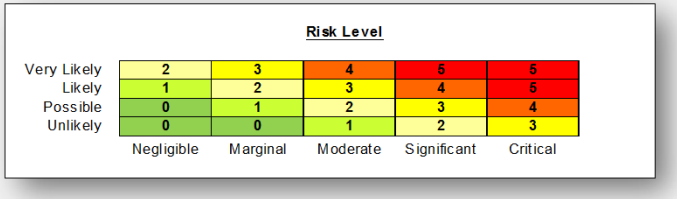
Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

Jamaica Bay Marsh Islands, New York Stony Creek

Feasibility (Alternatives)

Abbreviated Risk Analysis

Meeting Date: 28-Apr-16



Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Scope Growth				**Maximum Project Growth**		**60%**
PS-1	16 BANK STABILIZATION	Scope growth, i.e.; additional features, Changes in site conditions since field surveys, Location of existing utilities	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth.	Significant	Possible	3
PS-2				Negligible	Unlikely	0
PS-3				Negligible	Unlikely	0
PS-12	Remaining Construction Items			Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
PS-14	Construction Management	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
Acquisition Strategy				**Maximum Project Growth**		**40%**
AS-1	16 BANK STABILIZATION	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes a 13% allowance for JOOH, and a 10% allowance for profit.	Moderate	Possible	2
AS-2				Negligible	Unlikely	0
AS-3				Negligible	Unlikely	0
AS-12	Remaining Construction Items			Negligible	Unlikely	0

AS-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
AS-14	Construction Management	• Contracting plan firmly established? • 8a or small business likely?	Construction office may need to provide extra attention to the small business contractor as the firm may or may not be familiar with USACE requirements.	Moderate	Possible	2
Construction Elements				**Maximum Project Growth**		**30%**
CON-1	16 BANK STABILIZATION	Difficulties with site access.	It is unclear if the planned project features will fully address the intent of the project.	Marginal	Likely	2
CON-2				Negligible	Unlikely	0
CON-3				Negligible	Unlikely	0
CON-12	Remaining Construction Items			Negligible	Unlikely	0
CON-13	Planning, Engineering, & Design	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
CON-14	Construction Management	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
Quantities for Current Scope				**Maximum Project Growth**		**20%**
Q-1	16 BANK STABILIZATION	Quantities are based on plan dimensions taken from GIS concept plans, with assumptions regarding depths and widths where necessary.	Quantities are not based on specific topographic/bathymetric data. Limited precision of GIS data increases the uncertainty of quantity calculations. These computations will change during the final design phases once more detailed information is collected.	Moderate	Likely	3
Q-2				Negligible	Unlikely	0
Q-3				Negligible	Unlikely	0
Q-12	Remaining Construction Items			Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
Q-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**75%**
FE-1	16 BANK STABILIZATION	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0

FE-2	0			Negligible	Unlikely	0
FE-3				Negligible	Unlikely	0
FE-12	Remaining Construction Items			Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
FE-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**35%**
EST-1	16 BANK STABILIZATION	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders.	Marginal	Likely	2
EST-2	0			Negligible	Unlikely	0
EST-3				Negligible	Unlikely	0
EST-12	Remaining Construction Items			Negligible	Unlikely	0
EST-13	Planning, Engineering, & Design	• Changes or modifications during construction	This cost is for project design. It is highly unlikely that Modification will be excuted for this project	Marginal	Unlikely	0
EST-14	Construction Management		No major concerns	Marginal	Unlikely	0
External Project Risks				**Maximum Project Growth**		**40%**
EX-1	16 BANK STABILIZATION	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-2				Negligible	Unlikely	0
EX-3				Negligible	Unlikely	0
EX-12	Remaining Construction Items			Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	• Political influences, lack of support, obstacles?	Project delays due to lack of political support can cause schedule delays. No concerns for E&D	Negligible	Possible	0
EX-14	Construction Management		No concerns.	Negligible	Unlikely	0

Attachment C
Flushing Creek Cost Estimate Package Supporting Documents

Citywide Dredging Engineering Design Contract Services
Alternative Analysis Cost Matrices
Flushing Creek
Summary Tabulation (Updated October 21, 2016)

	Alt A Cost	Alt B Cost	Alt C Cost
Flushing Creek	$ 5,900,000	$ 17,500,000	$ 20,000,000
TOTAL	**$ 5,900,000**	**$ 17,500,000**	**$ 20,000,000**

Citywide Dredging Engineering Design Contract Services
Contract CSO-DRDG
Flushing Creek
Alternative Analysis Cost Matrix

		Alt A Cost			Alt B Cost			Alt C Cost		
		Total	DEP Dredging	Restoration	Total	DEP Dredging	Restoration	Total	DEP Dredging	Restoration
ACCOUNT 16: BANK STABILIZATION										
TASK 01 - MOBILIZATION & DEMOBILIZATION		$ 1,020,776	$ 1,020,776		$ 1,020,776	$ 1,020,776		$ 1,020,776	$ 1,020,776	
TASK 12 - SUPERVISION & ENGINEERING		$ 1,591,046		$ 1,591,046	$ 1,591,046		$ 1,591,046	$ 1,591,046		$ 1,591,046
TASK 02 - MECH DREDGE / HYDRAULIC TRANSPORT		$ 767,880	$ 767,880		$ 767,880	$ 767,880		$ 853,200	$ 767,880	$ 85,320
TASK 03 - TOWING/DECANT WATER		$ 1,389,420	$ 1,389,420		$ 1,389,420	$ 1,389,420		$ 1,543,800	$ 1,389,420	$ 154,380
TASK 04 - DEWATER/AMEND/DISPOSAL		$ 7,426,080	$ 7,426,080		$ 7,426,080	$ 7,426,080		$ 8,251,200	$ 7,426,080	$ 825,120
TASK 05 - DEBRIS/TRASH DISPOSAL		$ 36,225	$ 36,225		$ 36,225	$ 36,225		$ 36,225	$ 36,225	$ -
TASK 13.01 - MOBE & DEMOBE FOR WETLAND ESTABLISHMENT		$ 32,603		$ 32,603	$ 32,603		$ 32,603	$ 32,603		$ 32,603
TASK 13.02 - STAGING AREA		$ 4,285		$ 4,285	$ 4,285		$ 4,285	$ 4,285		$ 4,285
TASK 13.03 - SILT FENCE		$ 2,910		$ 2,910	$ 2,910		$ 2,910	$ 2,910		$ 2,910
TASK 13.04 - CLEARING & GRUBBING		$ 23,184		$ 23,184	$ 106,260		$ 106,260	$ 109,158		$ 109,158
TASK 13.05 - PHRAGMITES REMOVAL		$ 14,490		$ 14,490	$ 66,413		$ 66,413	$ 68,224		$ 68,224
TASK 13.06 - FINE GRADING WETLAND		$ 23,653		$ 23,653	$ 41,191		$ 41,191	$ 44,298		$ 44,298
TASK 13.07 - CLEAN SOIL FOR OVER-EXCAVATION		$ 72,480		$ 72,480	$ 72,480		$ 72,480	$ 72,480		$ 72,480
TASK 13.XX - UPLAND AREA PRESERVATION (NO COST MEASURE)		$ -		$ -	$ -		$ -	$ -		$ -
TASK 13.08 - LANDSCAPING/PLANTING -MARITIME FOREST		$ -		$ -	$ 220,719		$ 220,719	$ 223,327		$ 223,327
TASK 13.XX - LANDSCAPING/PLANTING -BRACKISH MARSH		$ -		$ -	$ -		$ -	$ -		$ -
TASK 13.09 - LANDSCAPING/PLANTING - HIGH SALT MARSH		$ -		$ -	$ 26,565		$ 26,565	$ 24,754		$ 24,754
TASK 13.10 - LANDSCAPING/PLANTING - LOW SALT MARSH		$ 130,516		$ 130,516	$ 202,964		$ 202,964	$ 221,767		$ 221,767
TASK 13.11 - GOOSE EXCLUSION FENCING		$ 17,668		$ 17,668	$ 30,770		$ 30,770	$ 33,090		$ 33,090
TASK 13.12 - SUPERVISION OF WETLAND ESTABLISHMENT		$ 74,382		$ 74,382	$ 74,382		$ 74,382	$ 74,382		$ 74,382
TASK 06 - SAND BLANKET		$ 1,296,819		$ 1,296,819	$ 3,132,765		$ 3,132,765	$ 3,477,612		$ 3,477,612
TASK 07 - WICK DRAINS		$ -		$ -	$ 1,208,880		$ 1,208,880	$ 1,208,880		$ 1,208,880
TASK 08 - LIGHTWEIGHT AGGREGATE		$ -		$ -	$ 1,495,953		$ 1,495,953	$ 1,495,953		$ 1,495,953
TASK 09 - #67 STONE		$ -		$ -	$ 397,360		$ 397,360	$ 397,360		$ 397,360
TASK 10 - GEOGRID AND GEOTEXTILE		$ -		$ -	$ 306,832		$ 306,832	$ 306,832		$ 306,832
TASK 11 - EXCAVATE SURCHARGE		$ -		$ -	$ 825,720		$ 825,720	$ 825,720		$ 825,720
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		**$ 13,924,417**		**$ 3,284,036**	**$ 8,249,051**		**$ 9,840,097**	**$ 8,623,635**		**$ 11,279,501**
SUBTOTAL - CONSTRUCTION COST (2014$)		**$ 13,924,417**	**$ 10,640,381**	**$ 3,284,036**	**$ 20,480,478**	**$ 10,640,381**	**$ 9,840,097**	**$ 21,919,882**	**$ 10,640,381**	**$ 11,279,501**
MONITORING		$ 32,840	n/a	$ 32,840	$ 98,401	n/a	$ 98,401	$ 112,795	n/a	$ 112,795
ADAPTIVE MANAGEMENT		$ 98,521	n/a	$ 98,521	$ 295,203	n/a	$ 295,203	$ 338,385	n/a	$ 338,385
ACCOUNT 01 - REAL ESTATE		$ 6,800	n/a	$ 6,800	$ 6,800	n/a	$ 6,800	$ 6,800	n/a	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 673,227	n/a	$ 673,227	$ 2,017,220	n/a	$ 2,017,220	$ 2,312,298	n/a	$ 2,312,298
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 295,563	n/a	$ 295,563	$ 885,609	n/a	$ 885,609	$ 1,015,155	n/a	$ 1,015,155
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		**$ 15,031,369**	**$ 10,640,381**	**$ 4,390,988**	**$ 23,783,711**	**$ 10,640,381**	**$ 13,143,330**	**$ 25,705,315**	**$ 10,640,381**	**$ 15,064,934**
Contingency	30.00%	$ 4,509,411	$ 3,192,114	$ 1,317,296	$ 7,135,113	$ 3,192,114	$ 3,942,999	$ 7,711,595	$ 3,192,114	$ 4,519,480
Bond		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Escalation to 2016$	2.02%	$ 394,724	$ 279,416	$ 115,307	$ 624,560	$ 279,416	$ 345,144	$ 675,022	$ 279,416	$ 395,605
TOTAL COST (2016$)		**$ 19,935,503**	**$ 14,111,912**	**$ 5,823,592**	**$ 31,543,384**	**$ 14,111,912**	**$ 17,431,473**	**$ 34,091,931**	**$ 14,111,912**	**$ 19,980,020**
SAY (2016$)		**$ 20,000,000**	**$ 14,200,000**	**$ 5,900,000**	**$ 31,600,000**	**$ 14,200,000**	**$ 17,500,000**	**$ 34,100,000**	**$ 14,200,000**	**$ 20,000,000**

Attachment D
Bronx River Cost Estimate Package Supporting Documents

Bronx River Ecosystem Restoration Feasibility Study
Alternative Analysis Cost Matrices
Summary Tabulation (Updated October 18, 2016)

	Alt A Cost	Alt B Cost	Alt C Cost
River Park / West Farm Rapids Park	$ 4,050,000	$ 4,000,000	$ 2,510,000
Stone Mill Dam	$ 720,000	$ 650,000	$ 490,000
Bronx Zoo and Dam	$ 6,340,000	$ 4,950,000	$ 3,850,000
Shoelace Park	$ 25,010,000	$ 18,610,000	$ 8,850,000
Muskrat Cove	$ 7,840,000	$ 8,050,000	$ 4,090,000
Westchester	$ 24,560,000	$ 14,520,000	$ 13,490,000
Bronxville Lake	$ 21,210,000	$ 14,530,000	$ 13,150,000
Crestwood Lake	$ 27,610,000	$ 14,000,000	$ 12,610,000
Garth Woods	$ 380,000	$ 380,000	$ 380,000
Harney Road	$ 6,820,000	$ 6,110,000	$ 3,370,000
TOTAL FOR TEN (10) SITES	$ 124,540,000	$ 85,800,000	$ 62,790,000

River Park / West Farm Rapids Park
Alternative Analysis Cost Matrix (Updated May 4, 2016)

	Contingency	Alt A Cost	Alt B Cost	Alt C Cost
ACCOUNT 16: BANK STABILIZATION				
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 109,996	$ 109,996	$ 201,992
SHORELINE SOFTENING		$ 851,214	$ 851,214	$ 186,012
SELECT NATIVE PLANTINGS		$ 244,459	$ 244,459	$ 244,459
EMERGENT WETLAND CREATION		$ 77,929	$ 77,929	$ -
CHANNEL MOD WITH INSTREAM STRUCTURES		$ 107,069	$ -	$ -
BED RESTORATION		$ 319,576	$ 414,389	$ 319,576
DEBRIS REMOVAL		$ 53,888	$ 37,728	$ 37,728
ACCESS - REMOVE/ REPLACE FENCES OR GATES		$ 12,997	$ 12,997	$ 12,997
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 63,162	$ 63,162	$ 63,162
E&S - CONSTRUCTION ENTRANCES		$ 11,153	$ 11,153	$ 11,153
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 7,503	$ 7,503	$ 7,503
E&S - STREAM DIVERSIONS		$ 140,272	$ 140,272	$ 140,272
E&S - DEWATERING		$ 151,400	$ 151,400	$ 100,933
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		$ 2,150,617	$ 2,122,200	$ 1,325,786
ACCOUNT 14: RECREATION FACILITIES				
PROPOSED PATH		$ 10,651	$ 10,651	$ 10,651
SUBTOTAL - ACCOUNT 14: RECREATION FACILITIES		$ 10,651	$ 10,651	$ 10,651
SUBTOTAL - CONSTRUCTION COST W/O O & M (2016$)		$ 2,161,268	$ 2,132,851	$ 1,336,437
MONITORING		$ 21,613	$ 21,329	$ 13,364
ADAPTIVE MANAGEMENT		$ 64,838	$ 63,986	$ 40,093
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 443,060	$ 437,234	$ 273,970
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 194,514	$ 191,957	$ 120,279
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		$ 2,892,092	$ 2,854,156	$ 1,790,943
Contingency (per results of ARA analysis)	40.00%	$ 1,156,837	$ 1,141,662	$ 716,377
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		$ 4,048,929	$ 3,995,818	$ 2,507,320
SAY (2016$)		$ 4,050,000	$ 4,000,000	$ 2,510,000

Stone Mill Dam
Alternative Analysis Cost Matrix (Updated May 4, 2016)

	Contingency	Alt A Cost	Alt B Cost	Alt C Cost
ACCOUNT 16: BANK STABILIZATION				
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 2,667	$ -	$ -
SELECT NATIVE PLANTINGS		$ 11,443	$ 11,443	$ -
BED RESTORATION		$ -	$ -	$ 78,180
ACCESS - REMOVE/ REPLACE FENCES OR GATES		$ 6,498	$ 6,498	$ 6,498
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 87,120	$ 87,120	$ 87,120
E&S - CONSTRUCTION ENTRANCES		$ 5,576	$ 5,576	$ 5,576
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 5,627	$ 5,627	$ 5,627
E&S - STREAM DIVERSIONS		$ 20,781	$ 20,781	$ 22,166
E&S - DEWATERING		$ 75,700	$ 75,700	$ 50,467
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		$ 14,110	$ 11,443	$ 255,636
ACCOUNT 06: FISH AND WILDLIFE FACILITIES				
FISH ATTRACTOR		$ 35,207	$ -	$ -
FISH LADDER		$ 129,490	$ 129,490	$ -
SUBTOTAL - ACCOUNT 06: FISH AND WILDLIFE FACILITIES		$ 164,697	$ 129,490	$ -
SUBTOTAL - CONSTRUCTION COST (2016$)		$ 380,110	$ 342,236	$ 255,636
MONITORING		$ 3,801	$ 3,422	$ 2,556
ADAPTIVE MANAGEMENT		$ 11,403	$ 10,267	$ 7,669
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 77,923	$ 70,158	$ 52,405
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 34,210	$ 30,801	$ 23,007
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		$ 514,247	$ 463,685	$ 348,074
Contingency (per results of ARA analysis)	40.00%	$ 205,699	$ 185,474	$ 139,229
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		$ 719,946	$ 649,159	$ 487,303
SAY (2016$)		$ 720,000	$ 650,000	$ 490,000

Bronx Zoo and Dam
Alternative Analysis Cost Matrix (Updated May 4, 2016)

	Contingency	Alt A Cost	Alt B Cost	Alt C Cost
ACCOUNT 16: BANK STABILIZATION				
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 149,738	$ 310,821	$ 398,228
SHORELINE SOFTENING		$ 130,642	$ 130,642	$ -
SELECT NATIVE PLANTINGS		$ 40,859	$ 40,859	$ 40,859
CHANNEL MOD WITH INSTREAM STRUCTURES		$ 155,366	$ 155,366	$ -
EMERGENT WETLAND CREATION		$ 1,874,561	$ 1,320,957	$ 1,017,910
DEBRIS REMOVAL		$ 9,515	$ 9,515	$ 9,515
FORESTED SCRUB/SHRUB WETLAND CREATION		$ 353,317	$ -	$ -
SEDIMENT LOAD REDUCTION		$ 12,125	$ 12,125	$ 12,125
ACCESS - REMOVE/ REPLACE FENCES OR GATES		$ 12,997	$ 12,997	$ 12,997
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 18,150	$ 18,150	$ 18,150
E&S - CONSTRUCTION ENTRANCES		$ 11,153	$ 11,153	$ 11,153
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 3,752	$ 3,752	$ 3,752
E&S - STREAM DIVERSIONS		$ 56,109	$ 56,109	$ 23,205
E&S - DEWATERING		$ 151,400	$ 151,400	$ 100,933
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		$ 2,979,684	$ 2,233,846	$ 1,648,828
ACCOUNT 06: FISH AND WILDLIFE FACILITIES				
FISH LADDER		$ 279,710	$ 279,710	$ 279,710
SUBTOTAL - ACCOUNT 06: FISH AND WILDLIFE FACILITIES		$ 279,710	$ 279,710	$ 279,710
ACCOUNT 14: RECREATION FACILITIES				
BOAT RAMP		$ 127,845	$ 127,845	$ 127,845
SUBTOTAL - ACCOUNT 14: RECREATION FACILITIES		$ 127,845	$ 127,845	$ 127,845
SUBTOTAL - CONSTRUCTION COST (2016$)		$ 3,387,240	$ 2,641,402	$ 2,056,383
MONITORING		$ 33,872	$ 26,414	$ 20,564
ADAPTIVE MANAGEMENT		$ 101,617	$ 79,242	$ 61,691
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 694,384	$ 541,487	$ 421,559
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 304,852	$ 237,726	$ 185,074
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		$ 4,528,765	$ 3,533,071	$ 2,752,072
Contingency (per results of ARA analysis)	40.00%	$ 1,811,506	$ 1,413,228	$ 1,100,829
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		$ 6,340,271	$ 4,946,300	$ 3,852,900
SAY (2016$)		$ 6,340,000	$ 4,950,000	$ 3,850,000

Shoelace Park
Alternative Analysis Cost Matrix (Updated May 4, 2016)

	Contingency	Alt A Cost	Alt B Cost	Alt C Cost
ACCOUNT 16: BANK STABILIZATION				
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 1,946,986	$ 1,946,986	$ 1,946,986
SHORELINE SOFTENING		$ 32,724	$ 32,724	$ -
SELECT NATIVE PLANTINGS		$ 2,355,488	$ 1,837,853	$ -
FORESTED SCRUB/SHRUB WETLAND CREATION		$ 3,579,110	$ -	$ -
BANK STABILIZATION		$ 119,950	$ 1,742,027	$ 1,716,016
SEDIMENT LOAD REDUCTION		$ 1,019,453	$ 1,019,453	$ 1,019,453
REALLIGN CHANNEL		$ 2,674,591	$ -	$ -
CHANNEL MOD WITH INSTREAM STRUCTURES		$ 1,200,326	$ 2,530,712	$ -
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 43,560	$ 43,560	$ 32,670
E&S - CONSTRUCTION ENTRANCES		$ 22,306	$ 22,306	$ 16,729
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 4,690	$ 4,690	$ -
E&S - STREAM DIVERSION FOR CHANNEL MODs		$ 227,206	$ 469,651	$ -
E&S - DEWATERING		$ 151,400	$ 302,800	$ -
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		$ 13,377,791	$ 9,952,761	$ 4,731,855
SUBTOTAL - CONSTRUCTION COST (2016$)		$ 13,377,791	$ 9,952,761	$ 4,731,855
MONITORING		$ 133,778	$ 99,528	$ 47,319
ADAPTIVE MANAGEMENT		$ 401,334	$ 298,583	$ 141,956
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 2,742,447	$ 2,040,316	$ 970,030
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 1,204,001	$ 895,749	$ 425,867
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		$ 17,866,151	$ 13,293,736	$ 6,323,826
Contingency (per results of ARA analysis)	40.00%	$ 7,146,460	$ 5,317,495	$ 2,529,530
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		$ 25,012,611	$ 18,611,231	$ 8,853,356
SAY (2016$)		$ 25,010,000	$ 18,610,000	$ 8,850,000

Muskrat Cove
Alternative Analysis Cost Matrix (Updated May 4, 2016)

	Contingency	Alt A Cost	Alt B Cost	Alt C Cost
ACCOUNT 16: BANK STABILIZATION				
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 271,143	$ 271,143	$ 418,137
20% INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 1,191,501	$ 1,191,501	$ 1,191,501
SHORELINE SOFTENING		$ 1,654,330	$ 1,654,330	$ -
BANK STABILIZATION		$ 306,317	$ 306,317	$ 306,317
BED RESTORATION		$ -	$ 231,900	$ -
CHANNEL MOD WITH INSTREAM STRUCTURES		$ 161,935	$ 44,594	$ -
DEBRIS REMOVAL		$ 128,101	$ 128,101	$ 128,101
SEDIMENT BASIN		$ 9,183	$ 9,183	$ 9,183
SNAG REMOVAL		$ 14,754	$ 14,754	$ 14,754
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 87,120	$ 87,120	$ 87,120
E&S - CONSTRUCTION ENTRANCES		$ 22,306	$ 22,306	$ 22,306
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 6,096	$ 6,096	$ 6,096
E&S - STREAM DIVERSIONS		$ 185,644	$ 185,644	$ -
E&S - DEWATERING		$ 151,400	$ 151,400	$ -
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		$ 4,189,829	$ 4,304,389	$ 2,183,514
SUBTOTAL - CONSTRUCTION COST (2016$)		$ 4,189,829	$ 4,304,389	$ 2,183,514
MONITORING		$ 41,898	$ 43,044	$ 21,835
ADAPTIVE MANAGEMENT		$ 125,695	$ 129,132	$ 65,505
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 858,915	$ 882,400	$ 447,620
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 377,085	$ 387,395	$ 196,516
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		$ 5,600,221	$ 5,753,159	$ 2,921,792
Contingency (per results of ARA analysis)	40.00%	$ 2,240,089	$ 2,301,263	$ 1,168,717
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		$ 7,840,310	$ 8,054,422	$ 4,090,508
SAY (2016$)		$ 7,840,000	$ 8,050,000	$ 4,090,000

Westchester
Alternative Analysis Cost Matrix (Updated May 4, 2016)

	Contingency	Alt A Cost	Alt B Cost	Alt C Cost
ACCOUNT 16: BANK STABILIZATION				
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 142,443	$ 155,558	$ 155,558
SELECT NATIVE PLANTINGS		$ 1,436,400	$ 1,726,326	$ 1,726,326
EMERGENT WETLAND CREATION		$ 9,089,752	$ 5,003,258	$ 5,003,258
SEDIMENT BASIN		$ 168,517	$ 133,421	$ 133,421
CHANNEL MOD WITH INSTREAM STRUCTURES		$ -	$ 366,588	$ -
REALLIGN CHANNEL		$ 1,705,843	$ -	$ -
BANK STABILIZATION		$ -	$ 52,214	$ 66,052
DEBRIS REMOVAL		$ -	$ -	$ 7,483
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 58,080	$ 58,080	$ 58,080
E&S - CONSTRUCTION ENTRANCES		$ 22,306	$ 22,306	$ 22,306
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 3,752	$ 3,752	$ 3,752
E&S - STREAM DIVERSIONS		$ 304,788	$ 139,925	$ 10,391
E&S - DEWATERING		$ 201,867	$ 100,933	$ 25,233
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		$ 13,133,747	$ 7,762,361	$ 7,211,859
SUBTOTAL - CONSTRUCTION COST (2016$)		$ 13,133,747	$ 7,762,361	$ 7,211,859
MONITORING		$ 131,337	$ 77,624	$ 72,119
ADAPTIVE MANAGEMENT		$ 394,012	$ 232,871	$ 216,356
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 2,692,418	$ 1,591,284	$ 1,478,431
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 1,182,037	$ 698,612	$ 649,067
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		$ 17,540,352	$ 10,369,552	$ 9,634,632
Contingency (per results of ARA analysis)	40.00%	$ 7,016,141	$ 4,147,821	$ 3,853,853
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		$ 24,556,493	$ 14,517,373	$ 13,488,485
SAY (2016$)		$ 24,560,000	$ 14,520,000	$ 13,490,000

Bronxville Lake
Alternative Analysis Cost Matrix (Updated May 4, 2016)

	Contingency	Alt A Cost	Alt B Cost	Alt C Cost
ACCOUNT 16: BANK STABILIZATION				
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 15,730	$ 15,730	$ 15,730
SELECT NATIVE PLANTINGS		$ 581,831	$ 581,831	$ 581,831
REALLIGN CHANNEL		$ 1,099,805	$ 1,099,805	$ -
DREDGING		$ -	$ -	$ 4,271,323
EMERGENT WETLAND CREATION		$ 6,973,172	$ 1,120,494	$ 374,877
FORESTED SCRUB/SHRUB WETLAND CREATION		$ 1,234,788	$ 3,514,132	$ 689,096
SEDIMENT LOAD REDUCTION		$ 117,631	$ 117,631	$ 117,631
FOREBAY RESTORATION		$ 754,886	$ 754,886	$ 754,886
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 65,340	$ 65,340	$ 65,340
E&S - CONSTRUCTION ENTRANCES		$ 22,306	$ 22,306	$ 22,306
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 5,627	$ 5,627	$ 5,627
E&S - STREAM DIVERSIONS		$ 249,372	$ 249,372	$ 34,635
E&S - DEWATERING		$ 201,867	$ 201,867	$ 50,467
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		$ 11,322,353	$ 7,749,020	$ 6,983,749
ACCOUNT 06: FISH AND WILDLIFE FACILITIES				
WEIR MODIFICATION w/ FISH PASSAGE		$ 20,000	$ 20,000	$ -
FISH LADDER		$ -	$ -	$ 48,479
SUBTOTAL - ACCOUNT 06: FISH AND WILDLIFE FACILITIES		$ 20,000	$ 20,000	$ 48,479
SUBTOTAL - CONSTRUCTION COST (2016$)		$ 11,342,353	$ 7,769,020	$ 7,032,227
MONITORING		$ 113,424	$ 77,690	$ 70,322
ADAPTIVE MANAGEMENT		$ 340,271	$ 233,071	$ 210,967
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 2,325,182	$ 1,592,649	$ 1,441,607
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 1,020,812	$ 699,212	$ 632,900
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		$ 15,148,842	$ 10,378,441	$ 9,394,824
Contingency (per results of ARA analysis)	40.00%	$ 6,059,537	$ 4,151,377	$ 3,757,929
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		$ 21,208,379	$ 14,529,818	$ 13,152,753
SAY (2016$)		$ 21,210,000	$ 14,530,000	$ 13,150,000

Crestwood Lake
Alternative Analysis Cost Matrix (Updated May 4, 2016)

	Contingency	Alt A Cost	Alt B Cost	Alt C Cost
ACCOUNT 16: BANK STABILIZATION				
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 80,843	$ 80,843	$ 80,843
SELECT NATIVE PLANTINGS		$ 464,645	$ 464,645	$ 464,645
EMERGENT WETLAND CREATION		$ 9,089,273	$ 1,780,863	$ 614,457
FOREBAY RESTORATION		$ 3,365,862	$ 3,365,862	$ 3,365,862
REALLIGN CHANNEL		$ 1,060,799	$ -	$ -
BED RESTORATION		$ -	$ 1,086,120	$ -
DREDGING		$ -	$ -	$ 1,649,009
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 87,120	$ 87,120	$ 87,120
E&S - CONSTRUCTION ENTRANCES		$ 22,306	$ 22,306	$ 22,306
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 5,627	$ 5,627	$ 5,627
E&S - STREAM DIVERSIONS		$ 263,226	$ 263,226	$ 138,540
E&S - DEWATERING		$ 201,867	$ 201,867	$ 151,400
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		$ 14,641,568	$ 7,358,479	$ 6,579,810
ACCOUNT 06: FISH AND WILDLIFE FACILITIES				
WEIR MODIFICATION w/ FISH PASSAGE		$ 20,000	$ 20,000	$ -
FISH LADDER		$ -	$ -	$ 59,801
SUBTOTAL - ACCOUNT 06: FISH AND WILDLIFE FACILITIES		$ 20,000	$ 20,000	$ 59,801
ACCOUNT 14: RECREATION FACILITIES				
PROPOSED PATH		$ 106,594	$ 106,594	$ 103,794
SUBTOTAL - ACCOUNT 14: RECREATION FACILITIES		$ 106,594	$ 106,594	$ 103,794
SUBTOTAL - CONSTRUCTION COST (2016$)		$ 14,768,161	$ 7,485,073	$ 6,743,405
MONITORING		$ 147,682	$ 74,851	$ 67,434
ADAPTIVE MANAGEMENT		$ 443,045	$ 224,552	$ 202,302
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 3,027,473	$ 1,534,440	$ 1,382,398
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 1,329,135	$ 673,657	$ 606,906
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		$ 19,722,296	$ 9,999,373	$ 9,009,245
Contingency (per results of ARA analysis)	40.00%	$ 7,888,918	$ 3,999,749	$ 3,603,698
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		$ 27,611,214	$ 13,999,122	$ 12,612,944
SAY (2016$)		$ 27,610,000	$ 14,000,000	$ 12,610,000

Garth Woods
Alternative Analysis Cost Matrix (Updated May 4, 2016)

	Contingency	Alt A Cost	Alt B Cost	Alt C Cost
ACCOUNT 16: BANK STABILIZATION				
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 14,999	$ 14,999	$ 14,999
SELECT NATIVE PLANTINGS		$ 56,786	$ 56,786	$ 56,786
REALLIGN CHANNEL		$ -	$ -	$ -
EMERGENT WETLAND CREATION		$ -	$ -	$ -
FORESTED SCRUB/SHRUB WETLAND CREATION		$ 42,317	$ 42,317	$ 42,317
CHANNEL PLUG		$ -	$ -	$ -
FILL WITH SELECT NATIVE PLANTING		$ -	$ -	$ -
BANK STABILIZATION		$ -	$ -	$ -
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 72,600	$ 72,600	$ 72,600
E&S - CONSTRUCTION ENTRANCES		$ 5,576	$ 5,576	$ 5,576
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 5,627	$ 5,627	$ 5,627
E&S - STREAM DIVERSIONS		$ -	$ -	$ -
E&S - DEWATERING		$ -	$ -	$ -
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		$ 197,906	$ 197,906	$ 197,906
SUBTOTAL - CONSTRUCTION COST (2016$)		$ 197,906	$ 197,906	$ 197,906
MONITORING		$ 1,979	$ 1,979	$ 1,979
ADAPTIVE MANAGEMENT		$ 5,937	$ 5,937	$ 5,937
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 40,571	$ 40,571	$ 40,571
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 17,812	$ 17,812	$ 17,812
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		$ 271,005	$ 271,005	$ 271,005
Contingency (per results of ARA analysis)	40.00%	$ 108,402	$ 108,402	$ 108,402
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		$ 379,407	$ 379,407	$ 379,407
SAY (2016$)		$ 380,000	$ 380,000	$ 380,000

Harney Road
Alternative Analysis Cost Matrix (Updated May 4, 2016)

	Contingency	Alt A Cost	Alt B Cost	Alt C Cost
ACCOUNT 16: BANK STABILIZATION				
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 17,128	$ 17,128	$ 17,128
SELECT NATIVE PLANTINGS		$ 596,085	$ 596,085	$ 596,085
EMERGENT WETLAND CREATION		$ 1,505,129	$ 396,875	$ 395,743
CHANNEL MOD WITH INSTREAM STRUCTURES		$ 377,482	$ -	$ -
BED RESTORATION		$ -	$ 1,178,211	$ -
SEDIMENT LOAD REDUCTION		$ 16,009	$ 16,009	$ 16,009
SHORELINE SOFTENING		$ 69,595	$ -	$ -
FORESTED SCRUB/SHRUB WETLAND CREATION		$ 651,540	$ 651,540	$ 651,540
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 58,080	$ 58,080	$ 58,080
E&S - CONSTRUCTION ENTRANCES		$ 22,306	$ 22,306	$ 22,306
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 6,565	$ 6,565	$ 3,752
E&S - STREAM DIVERSIONS		$ 152,394	$ 152,394	$ -
E&S - DEWATERING		$ 151,400	$ 151,400	$ -
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		$ 3,623,712	$ 3,246,593	$ 1,760,642
ACCOUNT 06: FISH AND WILDLIFE FACILITIES				
WEIR MODIFICATION w/ FISH PASSAGE		$ 20,000	$ 20,000	$ -
FISH LADDER		$ -	$ -	$ 39,230
SUBTOTAL - ACCOUNT 06: FISH AND WILDLIFE FACILITIES		$ 20,000	$ 20,000	$ 39,230
SUBTOTAL - CONSTRUCTION COST (2016$)		$ 3,643,712	$ 3,266,593	$ 1,799,871
MONITORING		$ 36,437	$ 32,666	$ 17,999
ADAPTIVE MANAGEMENT		$ 109,311	$ 97,998	$ 53,996
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 746,961	$ 669,651	$ 368,974
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 327,934	$ 293,993	$ 161,988
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		$ 4,871,155	$ 4,367,701	$ 2,409,628
Contingency (per results of ARA analysis)	40.00%	$ 1,948,462	$ 1,747,080	$ 963,851
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		$ 6,819,617	$ 6,114,782	$ 3,373,479
SAY (2016$)		$ 6,820,000	$ 6,110,000	$ 3,370,000

Abbreviated Risk Analysis

Project Name & Location: **Bronx River Ecosystem Restoration Feasibility Study; Bronx**
Project Development Stage/Alternative: **Feasibility (Alternatives)**
Risk Category: **Moderate Risk: Typical Project Construction Type**

District: NYD
Alternative: Alt A
Meeting Date: 1/26/2016

NOTE: VALUES IS THIS ARA WERE UPDATED ON 5/4/2016 IN RESPONSE TO COMMENTS RECEIVED FROM NYD.

Total Estimated Construction Contract Cost = $ 66,582,117

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	16 BANK STABILIZATION		$ 65,832,620		49.58%	$ 32,642,632	$ 98,475,252
2	06 FISH AND WILDLIFE FACILITIES		$ 504,407		29.77%	$ 150,168	$ 654,576
3	14 RECREATION FACILITIES		$ 245,089		29.77%	$ 72,966	$ 318,055
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	**$ 0**	*0.0%*	7.00%	$ 0	$ 0
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 13,649,334		7.00%	$ 955,453	$ 14,604,787
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 5,992,391		7.00%	$ 419,467	$ 6,411,858
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

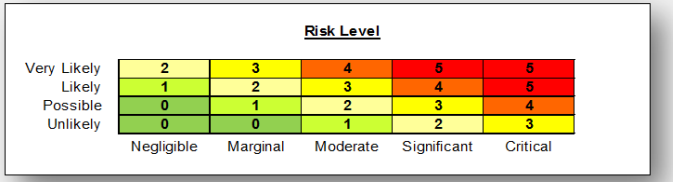
Totals					
Real Estate	$ -		0.00%	$ -	$ -
Total Construction Estimate	$ 66,582,117		49.36%	$ 32,865,767	$ 99,447,884
Total Planning, Engineering & Design	$ 13,649,334		7.00%	$ 955,453	$ 14,604,787
Total Construction Management	$ 5,992,391		7.00%	$ 419,467	$ 6,411,858
Total	**$ 86,223,842**		**40%**	**$ 34,240,687**	**$ 120,464,529**
			Base	**50%**	**80%**
	Range Estimate ($000's)		$86,224k	$106,769k	$120,465k

* 50% based on base is at 50% CL.

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

Bronx River Ecosystem Restoration Feasibility Study; Bronx & Westchester Counties, NY Alt A

Feasibility (Alternatives)
Abbreviated Risk Analysis
Meeting Date: 26-Jan-16



Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Scope Growth				Maximum Project Growth		60%
PS-1	16 BANK STABILIZATION	(1)- Assessment of existing conditions occurred during a single field visit during the summer of 2014. (2)- Location of existing utilities may result in additional project scope.	(1)- Changes may have occurred at the sites since summer 2014, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth.	Significant	Possible	3
PS-2	06 FISH AND WILDLIFE FACILITIES	(1)- Assessment of existing conditions occurred during a single field visit during the summer of 2014. (2)- Location of existing utilities may result in additional project scope.	(1)- Changes may have occurred at the sites since summer 2014, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth.	Marginal	Possible	1
PS-3	14 RECREATION FACILITIES	(1)- Assessment of existing conditions occurred during a single field visit during the summer of 2014. (2)- Location of existing utilities may result in additional project scope.	(1)- Changes may have occurred at the sites since summer 2014, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth.	Marginal	Possible	1
PS-12	Remaining Construction Items			Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design			Negligible	Unlikely	0
PS-14	Construction Management			Negligible	Unlikely	0
Acquisition Strategy				Maximum Project Growth		40%
AS-1	16 BANK STABILIZATION	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes a 20% allowance for JOOH, and a 10% allowance for profit. These are conservative alowances.	Moderate	Possible	2
AS-2	06 FISH AND WILDLIFE FACILITIES	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes a 20% allowance for JOOH, and a 10% allowance for profit. These are conservative alowances.	Moderate	Possible	2
AS-3	14 RECREATION FACILITIES	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes a 20% allowance for JOOH, and a 10% allowance for profit. These are conservative alowances.	Moderate	Possible	2
AS-12	Remaining Construction Items			Negligible	Unlikely	0
AS-13	Planning, Engineering, & Design			Negligible	Unlikely	0

AS-14	Construction Management			Negligible	Unlikely	0
Construction Elements				**Maximum Project Growth**		**30%**
CON-1	16 BANK STABILIZATION	Assessment of existing conditions occurred during a single field visit during the summer of 2014.	Changes may have occurred at the sites since summer 2014, which could necessitate the change of design applications.	Moderate	Likely	3
CON-2	06 FISH AND WILDLIFE FACILITIES	Assessment of existing conditions occurred during a single field visit during the summer of 2014.	It is unclear if the planned project features will fully address the intent of the project.	Negligible	Unlikely	0
CON-3	14 RECREATION FACILITIES	Assessment of existing conditions occurred during a single field visit during the summer of 2014.	It is unclear if the planned project features will fully address the intent of the project.	Negligible	Unlikely	0
CON-12	Remaining Construction Items			Negligible	Unlikely	0
CON-13	Planning, Engineering, & Design			Negligible	Unlikely	0
CON-14	Construction Management			Negligible	Unlikely	0
Quantities for Current Scope				**Maximum Project Growth**		**20%**
Q-1	16 BANK STABILIZATION	Quantities are based on plan dimensions taken from GIS concept plans, with assumptions regarding depths and widths where necessary.	Quantities are not based on specific topographic/bathymetric data. Limited precision of GIS data increases the uncertainty of quantity calculations. These computations will change during the final design phases once more detailed information is collected.	Moderate	Likely	3
Q-2	06 FISH AND WILDLIFE FACILITIES	Quantities are based on plan dimensions taken from GIS concept plans, with assumptions regarding depths and widths where necessary.	Quantities are not based on specific topographic/bathymetric data. Limited precision of GIS data increases the uncertainty of quantity calculations. These computations will change during the final design phases once more detailed information is collected.	Marginal	Likely	2
Q-3	14 RECREATION FACILITIES	Quantities are based on plan dimensions taken from GIS concept plans, with assumptions regarding depths and widths where necessary.	Quantities are not based on specific topographic/bathymetric data. Limited precision of GIS data increases the uncertainty of quantity calculations. These computations will change during the final design phases once more detailed information is collected.	Marginal	Likely	2
Q-12	Remaining Construction Items			Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design			Negligible	Unlikely	0
Q-14	Construction Management			Negligible	Unlikely	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**75%**
FE-1	16 BANK STABILIZATION	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0
FE-2	06 FISH AND WILDLIFE FACILITIES	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0
FE-3	14 RECREATION FACILITIES	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0

FE-12	Remaining Construction Items			Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design			Negligible	Unlikely	0
FE-14	Construction Management			Negligible	Unlikely	0
Cost Estimate Assumptions				Maximum Project Growth		35%
EST-1	16 BANK STABILIZATION	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders. RISK RECLASSIFIED FROM "Marginal" to "Moderate" BASED ON 2/18/16 CEB COMMENTS.	Moderate	Likely	3
EST-2	06 FISH AND WILDLIFE FACILITIES	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders. RISK RECLASSIFIED FROM "Marginal" to "Moderate" BASED ON 2/18/16 CEB COMMENTS.	Moderate	Likely	3
EST-3	14 RECREATION FACILITIES	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders. RISK RECLASSIFIED FROM "Marginal" to "Moderate" BASED ON 2/18/16 CEB COMMENTS.	Moderate	Likely	3
EST-12	Remaining Construction Items			Negligible	Unlikely	0
EST-13	Planning, Engineering, & Design			Negligible	Unlikely	0
EST-14	Construction Management			Negligible	Unlikely	0
External Project Risks				Maximum Project Growth		40%
EX-1	16 BANK STABILIZATION	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-2	06 FISH AND WILDLIFE FACILITIES	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-3	14 RECREATION FACILITIES	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-12	Remaining Construction Items			Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design			Negligible	Unlikely	0
EX-14	Construction Management			Negligible	Unlikely	0

Attachment E
Lower Passaic and Hackensack Cost Estimate Package
Supporting Documents

Hudson River Estuary (HRE) and Lower Passaic HRE Feasibility Study Alternative Analysis Cost Matrices Summary Tabulation

	Alt A Cost	Alt B Cost	Alt C Cost
865. Kearny Point	$ 81,650,000	$ 75,520,000	$ 57,790,000
866. Oak Island Yards	$ 29,640,000	$ 29,960,000	$ 28,160,000
887. First River Branch Brook Park	$ 74,690,000	$ 74,390,000	$ 21,890,000
900. Dundee Island Park/Pulaski Park	$ 2,720,000	-	-
902. Clifon Dundee Canal Green Acres Purchase and Dundee Island Preserve	$ 11,950,000	$ 10,750,000	$ 9,530,000
719. Meadowlark Marsh	$ 63,700,000	$ 56,400,000	$ 41,660,000
720. Metromedia	$ 32,510,000	$ 49,800,000	$ 36,600,000

865. Kearny Point
Alternative Analysis Cost Matrix

	Contingency	Alternative A Cost	Alternative B Cost	Alternative C Cost
ACCOUNT 16: BANK STABILIZATION				
EMERGENT WETLAND - LOW MARSH		$ 23,952,651	$ 23,066,013	$ 11,781,534
EMERGENT WETLAND - HIGH MARSH		$ 2,694,556	$ 2,247,239	$ 1,789,271
FORESTED WETLAND AND SCRUB SHRUB WETLAND		$ 5,845,011	$ 3,422,117	$ 10,372,464
COASTAL AND MARITIME FOREST		$ 920,336	$ 1,493,725	$ 1,786,378
BANK STABILIZATION / SHORELINE SOFTENING		$ 604,865	$ 621,355	$ 623,110
E&S - CONSTRUCTION ENTRANCES		$ 11,153	$ 11,153	$ 11,153
E&S - SILT FENCE		$ 60,500	$ 60,500	$ 60,500
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 562,740	$ 457,226	$ 140,685
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		**$ 34,651,813**	**$ 31,379,328**	**$ 26,565,094**
ACCOUNT 06: FISH AND WILDLIFE FACILITIES				
HABITAT FOR FISH CRAB AND LOBSTER		$ 3,166,411	$ 2,992,433	$ 835,097
HABITAT FOR FISH CRAB AND LOBSTER - EXISTING		$ 3,017,915	$ 3,024,136	$ 3,017,915
SUBTOTAL - ACCOUNT 06: FISH AND WILDLIFE FACILITIES		**$ 6,184,326**	**$ 6,016,568**	**$ 3,853,013**
ACCOUNT 14: RECREATION FACILITIES				
PUBLIC ACCESS - TRAIL ENHANCEMENT		$ 177,217	$ 340,007	$ 497,394
PUBLIC OVERLOOK DECK		$ 2,666,188	$ 2,666,188	$ -
SUBTOTAL - ACCOUNT 14: RECREATION FACILITIES		**$ 2,843,405**	**$ 3,006,195**	**$ 497,394**
SUBTOTAL - CONSTRUCTION COST (2016$)		**$ 43,679,545**	**$ 40,402,091**	**$ 30,915,500**
MONITORING		$ 436,795	$ 404,021	$ 309,155
ADAPTIVE MANAGEMENT		$ 1,310,386	$ 1,212,063	$ 927,465
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 8,954,307	$ 8,282,429	$ 6,337,678
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 3,931,159	$ 3,636,188	$ 2,782,395
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		**$ 58,318,992**	**$ 53,943,592**	**$ 41,278,993**
Contingency (per results of ARA analysis)	40.00%	$ 23,327,597	$ 21,577,437	$ 16,511,597
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		**$ 81,646,589**	**$ 75,521,029**	**$ 57,790,590**
SAY (2016$)		**$ 81,650,000**	**$ 75,520,000**	**$ 57,790,000**

866. Oak Island Yards
Alternative Analysis Cost Matrix

	Contingency	Alternative A Cost	Alternative B Cost	Alternative C Cost
ACCOUNT 16: BANK STABILIZATION				
EMERGENT WETLAND - LOW MARSH		$ 7,858,834	$ 6,784,122	$ 6,313,935
EMERGENT WETLAND - HIGH MARSH		$ 1,395,205	$ 2,492,198	$ 2,172,686
FORESTED WETLAND AND SCRUB SHRUB WETLAND		$ 1,485,570	$ 875,425	$ 1,954,232
COASTAL AND MARITIME FOREST		$ 246,306	$ 246,306	$ 246,306
BANK STABILIZATION / SHORELINE SOFTENING		$ 364,353	$ 496,845	$ 463,722
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 538,837	$ 538,837	$ 538,837
E&S - CONSTRUCTION ENTRANCES		$ 5,576	$ 5,576	$ 5,576
E&S - SILT FENCE		$ 72,600	$ 72,600	$ 72,600
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 225,096	$ 225,096	$ 225,096
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		**$ 12,192,378**	**$ 11,737,006**	**$ 11,992,991**
ACCOUNT 06: FISH AND WILDLIFE FACILITIES				
HABITAT FOR FISH CRAB AND LOBSTER		$ 1,548,410	$ 2,174,733	$ 939,485
HABITAT FOR FISH CRAB AND LOBSTER - EXISTING		$ 145,142	$ 145,142	$ 160,693
SUBTOTAL - ACCOUNT 06: FISH AND WILDLIFE FACILITIES		**$ 1,693,552**	**$ 2,319,875**	**$ 1,100,177**
ACCOUNT 14: RECREATION FACILITIES				
PUBLIC OVERLOOK PIER/DOCK		$ 1,559,448	$ 1,559,448	$ 1,559,448
PUBLIC ACCESS - TRAIL ENHANCEMENT		$ 407,435	$ 407,468	$ 407,435
SUBTOTAL - ACCOUNT 14: RECREATION FACILITIES		**$ 1,966,883**	**$ 1,966,916**	**$ 1,966,883**
SUBTOTAL - CONSTRUCTION COST (2016$)		**$ 15,852,812**	**$ 16,023,797**	**$ 15,060,051**
MONITORING		$ 158,528	$ 160,238	$ 150,601
ADAPTIVE MANAGEMENT		$ 475,584	$ 480,714	$ 451,802
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 3,249,827	$ 3,284,878	$ 3,087,310
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 1,426,753	$ 1,442,142	$ 1,355,405
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		**$ 21,170,305**	**$ 21,398,568**	**$ 20,111,968**
Contingency (per results of ARA analysis)	40.00%	$ 8,468,122	$ 8,559,427	$ 8,044,787
Escalation to Construction Midpoint (EXCLUDED)	0.00%	$ -	$ -	$ -
TOTAL COST (2016$)		**$ 29,638,426**	**$ 29,957,996**	**$ 28,156,755**
SAY (2016$)		**$ 29,640,000**	**$ 29,960,000**	**$ 28,160,000**

887. First River Branch Brook Park
Alternative Analysis Cost Matrix

	Contingency	Alternative A Cost	Alternative B Cost	Alternative C Cost
ACCOUNT 16: BANK STABILIZATION				
EMERGENT WETLAND CREATION		$ -	$ 10,194,695	$ -
FORESTED WETLAND AND SCRUB SHRUB WETLAND		$ 9,611,819	$ -	$ -
SHORELINE SOFTENING		$ 1,974,958	$ 2,871,851	$ 1,974,958
CHANNEL DEEPENING (1.5')		$ 5,532,468	$ 4,015,274	$ 5,532,468
STREAM NATURALIZATION AND CLEARING		$ 1,749,701	$ -	$ -
BANK AND SLOPE STABILIZATION		$ 6,878,342	$ 6,878,342	$ -
SEDIMENT BASIN		$ 6,940,589	$ 9,716,825	$ -
SELECT NATIVE PLANTINGS		$ 2,141,723	$ 2,141,723	$ 606,512
INVASIVE SPECIES REMOVAL WITH SELECT NATIVE PLANTINGS		$ 2,920,637	$ 2,920,637	$ 2,920,637
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 290,400	$ 290,400	$ 181,500
E&S - CONSTRUCTION ENTRANCES		$ 44,612	$ 44,612	$ 22,306
E&S - SILT FENCE		$ 290,400	$ 290,400	$ 217,800
E&S - DOWNSTREAM TURBIDITY BARRIER		$ -	$ -	$ 28,137
E&S - DEWATERING		$ 403,733	$ 403,733	$ 201,867
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		**$ 38,779,382**	**$ 39,768,492**	**$ 11,686,185**
ACCOUNT 14: RECREATION FACILITIES				
PUBLIC ACCESS - TRAIL ENHANCEMENT		$ 1,147,728	$ -	$ -
INTERPRETIVE SIGNS		$ 29,750	$ 29,750	$ 21,000
SUBTOTAL - ACCOUNT 14: RECREATION FACILITIES		**$ 1,177,478**	**$ 29,750**	**$ 21,000**
SUBTOTAL - CONSTRUCTION COST (2016$)		**$ 39,956,860**	**$ 39,798,242**	**$ 11,707,185**
MONITORING		$ 399,569	$ 397,982	$ 117,072
ADAPTIVE MANAGEMENT		$ 1,198,706	$ 1,193,947	$ 351,216
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 8,191,156	$ 8,158,640	$ 2,399,973
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 3,596,117	$ 3,581,842	$ 1,053,647
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		**$ 53,349,209**	**$ 53,137,453**	**$ 15,635,892**
Contingency (per results of ARA analysis)	40.00%	$ 21,339,683	$ 21,254,981	$ 6,254,357
Escalation to Construction Midpoint (EXCLUDED)	0.00%	$ -	$ -	$ -
TOTAL COST (2016$)		**$ 74,688,892**	**$ 74,392,435**	**$ 21,890,248**
SAY (2016$)		**$ 74,690,000**	**$ 74,390,000**	**$ 21,890,000**

900. Dundee Island Park/Pulaski Park
Alternative Analysis Cost Matrix

	Contingency	Alternative A Cost	Alternative B Cost	Alternative C Cost
ACCOUNT 16: BANK STABILIZATION				
BANK STABILIZATION / SHORELINE SOFTENING		$ 457,419	$ -	$ -
SELECT NATIVE PLANTINGS		$ 745,416	$ -	$ -
ACCESS - CLEAR, SURFACE & RESTORE ACCESS ROAD		$ 58,080	$ -	$ -
E&S - CONSTRUCTION ENTRANCES		$ 5,576	$ -	$ -
E&S - SILT FENCE		$ 2,420	$ -	$ -
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 9,379	$ -	$ -
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		**$ 1,278,291**	**$ -**	**$ -**
ACCOUNT 14: RECREATION FACILITIES				
PUBLIC ACCESS - TRAIL ENHANCEMENT		$ 173,484	$ -	$ -
SUBTOTAL - ACCOUNT 14: RECREATION FACILITIES		**$ 173,484**	**$ -**	**$ -**
SUBTOTAL - CONSTRUCTION COST (2016$)		**$ 1,451,775**	**$ -**	**$ -**
MONITORING		$ 14,518	$ -	$ -
ADAPTIVE MANAGEMENT		$ 43,553	$ -	$ -
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ -	$ -
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 297,614	$ -	$ -
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 130,660	$ -	$ -
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		**$ 1,944,919**	**$ -**	**$ -**
Contingency (per results of ARA analysis)	40.00%	$ 777,968	$ -	$ -
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		**$ 2,722,887**	**$ -**	**$ -**
SAY (2016$)		**$ 2,720,000**	**$ -**	**$ -**

902. Clifton Dundee Canal Green Acres Purchase and Dundee Island Preserve
Alternative Analysis Cost Matrix

	Contingency	Alternative A Cost	Alternative B Cost	Alternative C Cost
ACCOUNT 16: BANK STABILIZATION				
EMERGENT WETLAND (FRESHWATER)		$ 29,142	$ 29,142	$ -
FORESTED WETLAND AND SCRUB SHRUB WETLAND (FRESHWATER)		$ 1,707,204	$ -	$ -
INVASIVE SPECIES REMOVAL W/ SELECT NATIVE PLANTINGS		$ 3,071,416	$ 4,389,332	$ 4,428,423
DEBRIS REMOVAL		$ 85,012	$ 85,012	$ 85,012
SEDIMENT BASIN		$ 200,912	$ 200,912	$ -
ACCESS - CLEAR, GRADE, SURFACE & RESTORE ACCESS ROAD		$ 145,200	$ 145,200	$ 54,450
E&S - CONSTRUCTION ENTRANCES		$ 5,576	$ 5,576	$ 5,576
E&S - SILT FENCE		$ 72,600	$ 60,500	$ 4,840
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 9,379	$ 9,379	$ 9,379
E&S - DEWATERING		$ 151,400	$ 50,467	$ -
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		**$ 5,477,840**	**$ 4,975,519**	**$ 4,587,680**
ACCOUNT 06: FISH AND WILDLIFE FACILITIES				
HABITAT FOR FISH, CRAB AND LOBSTER		$ 260,746	$ 260,746	$ -
SUBTOTAL - ACCOUNT 06: FISH AND WILDLIFE FACILITIES		**$ 260,746**	**$ 260,746**	**$ -**
ACCOUNT 14: RECREATION FACILITIES				
PUBLIC OVERLOOK		$ 389,862	$ 389,862	$ 389,862
PUBLIC ACCESS - TRAIL ENHANCEMENT		$ 118,694	$ 118,727	$ 118,727
PUBLIC ACCESS - BOAT LAUNCH		$ 142,703	$ -	$ -
SUBTOTAL - ACCOUNT 14: RECREATION FACILITIES		**$ 651,258**	**$ 508,589**	**$ 508,589**
SUBTOTAL - CONSTRUCTION COST (2016$)		**$ 6,389,844**	**$ 5,744,854**	**$ 5,096,269**
MONITORING		$ 63,898	$ 57,449	$ 50,963
ADAPTIVE MANAGEMENT		$ 191,695	$ 172,346	$ 152,888
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 1,309,918	$ 1,177,695	$ 1,044,735
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 575,086	$ 517,037	$ 458,664
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		**$ 8,537,242**	**$ 7,676,180**	**$ 6,810,319**
Contingency (per results of ARA analysis)	40.00%	$ 3,414,897	$ 3,070,472	$ 2,724,128
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		**$ 11,952,138**	**$ 10,746,652**	**$ 9,534,446**
SAY (2016$)		**$ 11,950,000**	**$ 10,750,000**	**$ 9,530,000**

865. Kearny Point
Alternative Analysis Cost Matrix

	Alternative A Quantities	Alternative B Quantities	Alternative C Quantities	Estimated Unit Cost *	Alternative A Cost	Alternative B Cost	Alternative C Cost
ECOLOGICAL RESTORATION MEASURES							
EMERGENT WETLAND - LOW MARSH	776,675 SF	747,925 SF	382,021 SF	$ 30.84	$ 23,952,651	$ 23,066,013	$ 11,781,534
EMERGENT WETLAND - HIGH MARSH	110,207 SF	91,912 SF	73,181 SF	$ 24.45	$ 2,694,556	$ 2,247,239	$ 1,789,271
FORESTED WETLAND AND SCRUB SHRUB WETLAND	287,932 SF	168,577 SF	510,959 SF	$ 20.30	$ 5,845,011	$ 3,422,117	$ 10,372,464
COASTAL AND MARITIME FOREST	302,742 SF	491,357 SF	587,624 SF	$ 3.04	$ 920,336	$ 1,493,725	$ 1,786,378
BANK STABILIZATION / SHORELINE SOFTENING	1,724 LF	1,771 LF	1,776 LF	$ 350.85	$ 604,865	$ 621,355	$ 623,110
SUBTOTAL - ECOLOGICAL RESTORATION MEASURES					**$ 34,017,420**	**$ 30,850,449**	**$ 26,352,756**
FISH HABITAT IMPROVEMENTS							
HABITAT FOR FISH CRAB AND LOBSTER	79,279 SF	74,923 SF	20,909 SF	$ 39.94	$ 3,166,411	$ 2,992,433	$ 835,097
HABITAT FOR FISH CRAB AND LOBSTER - EXISTING	1,268,032 SF	1,270,645 SF	1,268,032 SF	$ 2.38	$ 3,017,915	$ 3,024,136	$ 3,017,915
SUBTOTAL - ECOLOGICAL RESTORATION MEASURES					**$ 6,184,326**	**$ 6,016,568**	**$ 3,853,013**
RECREATION FACILITY CONSTRUCTION							
PUBLIC ACCESS - TRAIL ENHANCEMENT	1,614 LF	3,097 LF	4,530 LF	$ 109.80	$ 177,217	$ 340,007	$ 497,394
PUBLIC OVERLOOK DECK	2,979 SF	2,979 SF	- SF	$ 895.00	$ 2,666,188	$ 2,666,188	$ -
SUBTOTAL - RECREATION FACILITY CONSTRUCTION					**$ 2,843,405**	**$ 3,006,195**	**$ 497,394**
GENERAL REQUIREMENTS FOR CONSTRUCTION							
E&S - CONSTRUCTION ENTRANCES	2 EA	2 EA	2 EA	$ 5,576.48	$ 11,153	$ 11,153	$ 11,153
E&S - SILT FENCE	12,500 LF	12,500 LF	12,500 LF	$ 4.84	$ 60,500	$ 60,500	$ 60,500
E&S - DOWNSTREAM TURBIDITY BARRIER	6,000 LF	4,875 LF	1,500 LF	$ 93.79	$ 562,740	$ 457,226	$ 140,685
SUBTOTAL - GENERAL REQUIREMENTS FOR CONSTRUCTION					**$ 634,393**	**$ 528,879**	**$ 212,338**
SUBTOTAL - CONSTRUCTION COST (2016$)					**$ 43,679,545**	**$ 40,402,091**	**$ 30,915,500**
ACCOUNT 01 - REAL ESTATE				Lump Sum	$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN				20.50%	$ 8,954,307	$ 8,282,429	$ 6,337,678
ACCOUNT 31 - CONSTRUCTION MANAGEMENT				9.00%	$ 3,931,159	$ 3,636,188	$ 2,782,395
MONITORING				1.00%	$ 436,795	$ 404,021	$ 309,155
ADAPTIVE MANAGEMENT				3.00%	$ 1,310,386	$ 1,212,063	$ 927,465
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION					**$ 58,318,992**	**$ 53,943,592**	**$ 41,278,993**
Contingency (per results of ARA analysis)				40.00%	$ 23,327,597	$ 21,577,437	$ 16,511,597
Escalation to Construction Midpoint (EXCLUDED)				0.00%	$ -	$ -	$ -
TOTAL COST (2016$)					**$ 81,646,589**	**$ 75,521,029**	**$ 57,790,590**
SAY (2016$)					**$ 81,650,000**	**$ 75,520,000**	**$ 57,790,000**

719. Meadowlark Marsh
Alternative Analysis Cost Matrix

	Contingency	Alternative A Cost	Alternative B Cost	Alternative C Cost
ACCOUNT 16: BANK STABILIZATION				
EMERGENT WETLAND - LOW MARSH		$ 7,288,529	$ 7,786,437	$ 7,044,872
EMERGENT WETLAND - LOW MARSH EXCAVATION		$ 4,317,803	$ 4,612,762	$ 4,173,484
EMERGENT WETLAND - HIGH MARSH		$ 1,078,350	$ 845,238	$ 828,468
EMERGENT WETLAND - HIGH MARSH CLEAN SAND FILL		$ 2,847,663	$ 2,231,960	$ 2,187,765
FORESTED WETLAND AND SCRUB SHRUB WETLAND		$ 1,865,666	$ 1,803,262	$ 1,848,451
FORESTED WETLAND AND SCRUB SHRUB WETLAND CLEAN SAND FILL		$ 3,839,706	$ 3,711,240	$ 3,804,296
COASTAL AND MARITIME FOREST		$ 508,149	$ 536,746	$ 706,129
ACCESS - TIMBER MATTING		$ 390,000	$ 260,000	$ 130,000
E&S - CONSTRUCTION ENTRANCES		$ 22,306	$ 22,306	$ 5,576
E&S - SILT FENCE		$ 145,200	$ 96,800	$ 24,200
E&S - DOWNSTREAM TURBIDITY BARRIER		$ 46,895	$ 46,895	$ 14,069
SUBTOTAL - ACCOUNT 16: BANK STABILIZATION		**$ 22,350,266**	**$ 21,953,646**	**$ 20,767,309**
ACCOUNT 06: FISH AND WILDLIFE FACILITIES				
HABITAT FOR FISH, CRAB AND LOBSTER		$ 1,276,913	$ 921,137	$ -
HABITAT FOR FISH, CRAB AND LOBSTER - EXCAVATION		$ 9,264,230	$ 6,554,067	$ -
HABITAT FOR FISH, CRAB AND LOBSTER - EXISTING		$ 267,476	$ 340,047	$ 1,318,718
SUBTOTAL - ACCOUNT 06: FISH AND WILDLIFE FACILITIES		**$ 10,808,619**	**$ 7,815,250**	**$ 1,318,718**
ACCOUNT 14: RECREATION FACILITIES				
OPEN SPAN BRIDGE		$ 920,000	$ -	$ -
CULVERT REPLACEMENT		$ -	$ 400,000	$ 200,000
SUBTOTAL - ACCOUNT 14: RECREATION FACILITIES		**$ 920,000**	**$ 400,000**	**$ 200,000**
SUBTOTAL - CONSTRUCTION COST (2016$)		**$ 34,078,885**	**$ 30,168,897**	**$ 22,286,027**
MONITORING		$ 340,789	$ 301,689	$ 222,860
ADAPTIVE MANAGEMENT		$ 1,022,367	$ 905,067	$ 668,581
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 6,986,171	$ 6,184,624	$ 4,568,636
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 3,067,100	$ 2,715,201	$ 2,005,742
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		**$ 45,502,112**	**$ 40,282,277**	**$ 29,758,646**
Contingency (per results of ARA analysis)	40.00%	$ 18,200,845	$ 16,112,911	$ 11,903,458
Escalation to Construction Midpoint (EXCLUDED)		$ -	$ -	$ -
TOTAL COST (2016$)		**$ 63,702,956**	**$ 56,395,188**	**$ 41,662,105**
SAY (2016$)		**$ 63,700,000**	**$ 56,400,000**	**$ 41,660,000**

720. Metromedia
Alternative Analysis Cost Matrix

		Alt A Cost Total	Alt B Cost Total	Alt C Cost Total
BANK STABILIZATION				
ACCOUNT 16 - BANK STABILIZATION		**$ 18,490,588**	**$ 28,327,419**	**$ 20,819,076**
SUBTOTAL - CONSTRUCTION COST (2016$)		**$ 18,490,588**	**$ 28,327,419**	**$ 20,819,076**
MONITORING		$ 184,906	$ 283,274	$ 208,191
ADAPTIVE MANAGEMENT		$ 554,718	$ 849,823	$ 624,572
ACCOUNT 01 - REAL ESTATE		$ 6,800	$ 6,800	$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN		$ 3,790,571	$ 5,807,121	$ 4,267,910
ACCOUNT 31 - CONSTRUCTION MANAGEMENT		$ 1,664,153	$ 2,549,468	$ 1,873,717
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION		**$ 24,684,935**	**$ 37,817,104**	**$ 27,793,466**
Contingency (per results of ARA analysis)	31.69%	$ 7,822,707	$ 11,984,318	$ 8,807,806
TOTAL COST (2016$)		**$ 32,507,642**	**$ 49,801,422**	**$ 36,601,272**
SAY (2016$)		**$ 32,510,000**	**$ 49,800,000**	**$ 36,600,000**

Abbreviated Risk Analysis

Project Name & Location: **MetroMedia Site, Hackensack Meadowlands, Ecosystem**
Project Development Stage/Alternative: **Feasibility (Alternatives)**
Risk Category: **Low Risk: Typical Construction, Simple**

District: **New York District**
Alternative: **ALT A**
Meeting Date: **4/22/2016**

Total Estimated Construction Contract Cost = **$ 18,490,588**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	16 BANK STABILIZATION		$ 18,490,588		35.97%	$ 6,651,225	$ 25,141,813
2			$ -		0.00%	$ -	$ -
3			$ -		0.00%	$ -	$ -
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	**$ -**	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 3,790,571		17.86%	$ 677,181	$ 4,467,751
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 1,664,153		21.76%	$ 362,168	$ 2,026,321
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 18,490,588	35.97%	$ 6,651,225	$ 25,141,813	
Total Planning, Engineering & Design	$ 3,790,571	17.86%	$ 677,181	$ 4,467,751	
Total Construction Management	$ 1,664,153	21.76%	$ 362,168	$ 2,026,321	
Total	**$ 23,945,311**	**32%**	**$ 7,690,574**	**$ 31,635,885**	
		Base	**50%**	**80%**	
Range Estimate ($000's)		$23,945k	$28,560k	$31,636k	

* 50% based on base is at 50% CL.

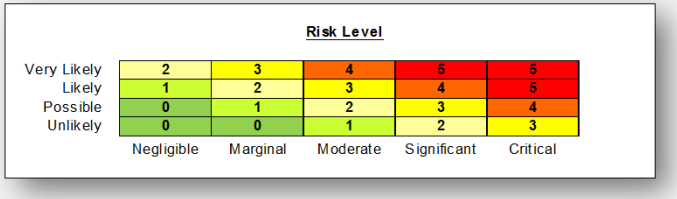
Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

MetroMedia Site, Hackensack Meadowlands, Ecosystem Restoration Feasibility Study ALT A

Feasibility (Alternatives)

Abbreviated Risk Analysis

Meeting Date: 22-Apr-16



Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Scope Growth				**Maximum Project Growth**		**40%**
PS-1	16 BANK STABILIZATION	Scope growth, i.e.; additional features, Changes in site conditions since field surveys, Location of existing utilities	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth.	Significant	Possible	3
PS-2				Negligible	Unlikely	0
PS-3				Negligible	Unlikely	0
PS-12	Remaining Construction Items			Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
PS-14	Construction Management	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
Acquisition Strategy				**Maximum Project Growth**		**30%**
AS-1	16 BANK STABILIZATION	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes a 13% allowance for JOOH, and a 10% allowance for profit.	Moderate	Possible	2
AS-2				Negligible	Unlikely	0
AS-3				Negligible	Unlikely	0
AS-12	Remaining Construction Items			Negligible	Unlikely	0

AS-13	Planning, Engineering, & Design	• Contracting plan firmly established? • 8a or small business likely?	No Impact expected	Negligible	Unlikely	0
AS-14	Construction Management	• Contracting plan firmly established? • 8a or small business likely?	Construction office may need to provide extra attention to the small business contractor as the firm may or may not be familiar with USACE requirements.	Moderate	Possible	2
Construction Elements				**Maximum Project Growth**		**15%**
CON-1	16 BANK STABILIZATION	Difficulties with site access.	It is unclear if the planned project features will fully address the intent of the project.	Marginal	Likely	2
CON-2				Negligible	Unlikely	0
CON-3				Negligible	Unlikely	0
CON-12	Remaining Construction Items			Negligible	Unlikely	0
CON-13	Planning, Engineering, & Design	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
CON-14	Construction Management	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
Quantities for Current Scope				**Maximum Project Growth**		**20%**
Q-1	16 BANK STABILIZATION	Quantities are based on plan dimensions taken from GIS concept plans, with assumptions regarding depths and widths where necessary.	Quantities are not based on specific topographic/bathymetric data. Limited precision of GIS data increases the uncertainty of quantity calculations. These computations will change during the final design phases once more detailed information is collected.	Moderate	Likely	3
Q-2				Negligible	Unlikely	0
Q-3				Negligible	Unlikely	0
Q-12	Remaining Construction Items			Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
Q-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**50%**
FE-1	16 BANK STABILIZATION	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0

FE-2				Negligible	Unlikely	0
FE-3				Negligible	Unlikely	0
FE-12	Remaining Construction Items			Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
FE-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**25%**
EST-1	16 BANK STABILIZATION	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders.	Marginal	Likely	2
EST-2				Negligible	Unlikely	0
EST-3				Negligible	Unlikely	0
EST-12	Remaining Construction Items			Negligible	Unlikely	0
EST-13	Planning, Engineering, & Design	• Changes or modifications during construction	This cost is for project design. It is highly unlikely that Modification will be excuted for this project	Negligible	Unlikely	0
EST-14	Construction Management		No major concerns	Negligible	Unlikely	0
External Project Risks				**Maximum Project Growth**		**20%**
EX-1	16 BANK STABILIZATION	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-2				Negligible	Unlikely	0
EX-3				Negligible	Unlikely	0
EX-12	Remaining Construction Items			Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	• Political influences, lack of support, obstacles?	Project delays due to lack of political support can cause schedule delays. No concerns for E&D	Negligible	Possible	0
EX-14	Construction Management		No concerns.	Negligible	Unlikely	0

Abbreviated Risk Analysis

Project Name & Location: **MetroMedia Site, Hackensack Meadowlands, Ecosystem**
Project Development Stage/Alternative: **Feasibility (Alternatives)**
Risk Category: **Low Risk: Typical Construction, Simple**

District: **New York District**
Alternative: **ALT B**
Meeting Date: **4/22/2016**

Total Estimated Construction Contract Cost = **$ 28,327,418**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	16 BANK STABILIZATION		$ 28,327,418		35.97%	$ 10,189,618	$ 38,517,036
2			$ -		0.00%	$ -	$ -
3			$ -		0.00%	$ -	$ -
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	$ -	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 6,940,218	17.86%	17.86%	$ 1,239,861	$ 8,180,079
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 2,549,468	21.76%	21.76%	$ 554,839	$ 3,104,307
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ -		0.00%	$ -	$ -
Total Construction Estimate	$ 28,327,418		35.97%	$ 10,189,618	$ 38,517,036
Total Planning, Engineering & Design	$ 6,940,218		17.86%	$ 1,239,861	$ 8,180,079
Total Construction Management	$ 2,549,468		21.76%	$ 554,839	$ 3,104,307
Total	**$ 37,817,104**		**32%**	**$ 11,984,318**	**$ 49,801,421**
			Base	**50%**	**80%**
Range Estimate ($000's)			$37,817k	$45,007k	$49,801k

* 50% based on base is at 50% CL.

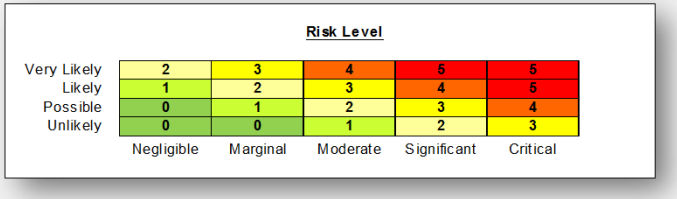
Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

MetroMedia Site, Hackensack Meadowlands, Ecosystem Restoration Feasibility Study ALT B

Feasibility (Alternatives)

Abbreviated Risk Analysis

Meeting Date: 22-Apr-16



Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Scope Growth				**Maximum Project Growth**		**40%**
PS-1	16 BANK STABILIZATION	Scope growth, i.e.; additional features, Changes in site conditions since field surveys, Location of existing utilities	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth.	Significant	Possible	3
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PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
PS-14	Construction Management	• Potential for scope growth, added features? • Project accomplishes intent? • Funding Difficulties? • Sufficent Staffing/Support?	(1)- Changes may have occurred at the sites since last inspacted, which could necessitate the change of design applications. (2)- Location of utilities may require rearrangement of project elements, but is unlikely to result in quantity growth. (3) No Staffing issues expected.	Significant	Possible	3
Acquisition Strategy				**Maximum Project Growth**		**30%**
AS-1	16 BANK STABILIZATION	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes a 13% allowance for JOOH, and a 10% allowance for profit.	Moderate	Possible	2
AS-2				Negligible	Unlikely	0
AS-3				Negligible	Unlikely	0
AS-12	Remaining Construction Items			Negligible	Unlikely	0

AS-13	Planning, Engineering, & Design	• Contracting plan firmly established? • 8a or small business likely?	No Impact expected	Negligible	Unlikely	0
AS-14	Construction Management	• Contracting plan firmly established? • 8a or small business likely?	Construction office may need to provide extra attention to the small business contractor as the firm may or may not be familiar with USACE requirements.	Moderate	Possible	2
Construction Elements				**Maximum Project Growth**		**15%**
CON-1	16 BANK STABILIZATION	Difficulties with site access.	It is unclear if the planned project features will fully address the intent of the project.	Marginal	Likely	2
CON-2				Negligible	Unlikely	0
CON-3				Negligible	Unlikely	0
CON-12	Remaining Construction Items			Negligible	Unlikely	0
CON-13	Planning, Engineering, & Design	• High risk or complex construction elements, site access, in-water? • Potential for construction modification and claims?	Access to the site might be challenging. The proximity to water could increase the difficulty of work causing modifications.	Marginal	Possible	1
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Quantities for Current Scope				**Maximum Project Growth**		**20%**
Q-1	16 BANK STABILIZATION	Quantities are based on plan dimensions taken from GIS concept plans, with assumptions regarding depths and widths where necessary.	Quantities are not based on specific topographic/bathymetric data. Limited precision of GIS data increases the uncertainty of quantity calculations. These computations will change during the final design phases once more detailed information is collected.	Moderate	Likely	3
Q-2				Negligible	Unlikely	0
Q-3				Negligible	Unlikely	0
Q-12	Remaining Construction Items			Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
Q-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**50%**
FE-1	16 BANK STABILIZATION	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0

FE-2				Negligible	Unlikely	0
FE-3				Negligible	Unlikely	0
FE-12	Remaining Construction Items			Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
FE-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**25%**
EST-1	16 BANK STABILIZATION	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders.	Marginal	Likely	2
EST-2				Negligible	Unlikely	0
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EST-14	Construction Management		No major concerns	Negligible	Unlikely	0
External Project Risks				**Maximum Project Growth**		**20%**
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EX-2				Negligible	Unlikely	0
EX-3				Negligible	Unlikely	0
EX-12	Remaining Construction Items			Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	• Political influences, lack of support, obstacles?	Project delays due to lack of political support can cause schedule delays. No concerns for E&D	Negligible	Possible	0
EX-14	Construction Management		No concerns.	Negligible	Unlikely	0

Abbreviated Risk Analysis

Project Name & Location: **MetroMedia Site, Hackensack Meadowlands, Ecosystem**
Project Development Stage/Alternative: **Feasibility (Alternatives)**
Risk Category: **Low Risk: Typical Construction, Simple**

District: **New York District**
Alternative: **ALT C**
Meeting Date: **4/22/2016**

Total Estimated Construction Contract Cost = **$ 20,819,075**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	16 BANK STABILIZATION		$ 20,819,075		35.97%	$ 7,488,802	$ 28,307,877
2			$ -		0.00%	$ -	$ -
3			$ -		0.00%	$ -	$ -
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	$ -	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 5,100,673		17.86%	$ 911,229	$ 6,011,902
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 1,873,717		21.76%	$ 407,776	$ 2,281,493
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 20,819,075	35.97%	$ 7,488,802	$ 28,307,877	
Total Planning, Engineering & Design	$ 5,100,673	17.86%	$ 911,229	$ 6,011,902	
Total Construction Management	$ 1,873,717	21.76%	$ 407,776	$ 2,281,493	
Total	**$ 27,793,466**	**32%**	**$ 8,807,806**	**$ 36,601,272**	
		Base	**50%**	**80%**	
Range Estimate ($000's)		$27,793k	$33,078k	$36,601k	

* 50% based on base is at 50% CL.

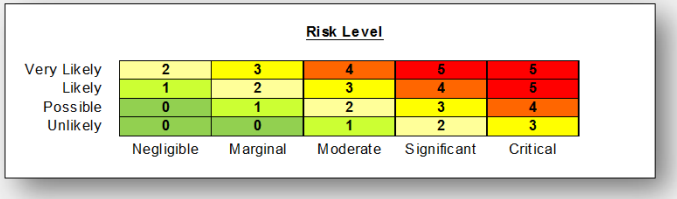
Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

MetroMedia Site, Hackensack Meadowlands, Ecosystem Restoration Feasibility Study ALT C

Feasibility (Alternatives)

Abbreviated Risk Analysis

Meeting Date: 22-Apr-16



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Acquisition Strategy				**Maximum Project Growth**		**30%**
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Construction Elements				**Maximum Project Growth**		**15%**
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Quantities for Current Scope				**Maximum Project Growth**		**20%**
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Q-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
Q-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**50%**
FE-1	16 BANK STABILIZATION	The need for specialty fabrication or equipment for this project is not a concern.	Project involves earthwork, plantings, and miscellaneous fish facilities and recreational construction features. The need for specialty fabrication or equipment is not anticipated.	Negligible	Unlikely	0

FE-2				Negligible	Unlikely	0
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FE-12	Remaining Construction Items			Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design		No Impact expected	Negligible	Unlikely	0
FE-14	Construction Management		No Impact expected	Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**25%**
EST-1	16 BANK STABILIZATION	Access at some sites is a significant challenge. The estimated costs to establish access could prove to be inadequate.	Access at some sites will require coordination with multiple stakeholders.	Marginal	Likely	2
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EST-14	Construction Management		No major concerns	Negligible	Unlikely	0
External Project Risks				**Maximum Project Growth**		**20%**
EX-1	16 BANK STABILIZATION	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-2				Negligible	Unlikely	0
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EX-12	Remaining Construction Items			Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	• Political influences, lack of support, obstacles?	Project delays due to lack of political support can cause schedule delays. No concerns for E&D	Negligible	Possible	0
EX-14	Construction Management		No concerns.	Negligible	Unlikely	0

Attachment F
HRE Oyster Sites Cost Estimate Package Supporting Documents

HRE Ecosystem Restoration Feasibility Study
Oyster Reef Restoration
Cost Estimate Summary Tabulation

	Cost
Bush Terminal	$ 32,950,000
Governors Island	$ 4,880,000
Jamaica Bay	$ 810,000
Naval Weapons Station Earle	$ 7,420,000
Soundview Park	$ 760,000
TOTAL FOR FIVE (5) SITES	**$ 46,820,000**

Notes:
1- See the attached tabulations to obtain further detail for each site.
2- See Appendix 1 for full details of construction cost development.
3- Values include Account 01 (Lands and Damages) cost at $6,800 per site.
4- Values include Account 30 (Planning, Engineering & Design) costs at 20.5% of Construction Costs.
5- Values include Account 31 (Construction Management) costs at 9.0% of Construction Costs.
6- Values include 29% Contingency per results of ARA analysis.
7- Values are in 2016$.
8- Monitoring costs at 1.00% of Construction Costs per NYD on October 6, 2016.
9- Adaptive management costs at 3.00% of Construction Costs per NYD on October 6, 2016.

Bush Terminal - Oyster Reef Restoration
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost
ACCOUNT 06 - FISH & WILDLIFE FACILITIES / OYSTER REEF RESTORATION MEASURE			
Restoration with Oyster Condos	152,055 SF		$ 2,519,551
Restoration with 12x3x3 Gabion Blocks	369,307 SF		$ 6,983,595
Restoration with Spat-on-Shell	1,378,550 SF		$ 9,622,279
SUBTOTAL - CONSTRUCTION COST (2016$)			**$ 19,125,426**
MONITORING			$ 191,254
ADAPTIVE MANAGEMENT			$ 573,763
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 3,920,712
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 1,721,288
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			**$ 25,539,243**
Contingency (per results of ARA analysis)		29.00%	$ 7,406,381
Escalation to Construction Midpoint (**EXCLUDED**)			$ -
TOTAL COST (2016$)			**$ 32,945,624**
SAY (2016$)			**$ 32,950,000**

***** *See Appendix 1 for unit cost development. Unit costs include allowances for Contractor Indirect Expenses (JOOH), Contractor Overhead (HOOH), Profit, and Bond.*

Governors Island - Oyster Reef Restoration
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost
OYSTER REEF RESTORATION MEASURE			
Restoration with Oyster Condos	78,066 SF		$ 1,291,992
Restoration with 12x3x3 Gabion Blocks	72,555 SF		$ 1,372,015
Restoration with Lantern Bags	29,664 SF		$ 162,262
SUBTOTAL - CONSTRUCTION COST (2016$)			**$ 2,826,269**
MONITORING			$ 28,263
ADAPTIVE MANAGEMENT			$ 84,788
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 579,385
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 254,364
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			**$ 3,779,870**
Contingency (per results of ARA analysis)		29.00%	$ 1,096,162
Escalation to Construction Midpoint (**EXCLUDED**)			$ -
TOTAL COST (2016$)			**$ 4,876,032**
SAY (2016$)			**$ 4,880,000**

***** *See Appendix 1 for unit cost development. Unit costs include allowances for Contractor Indirect Expenses (JOOH), Contractor Overhead (HOOH), Profit, and Bond.*

Jamaica Bay - Oyster Reef Restoration
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost
OYSTER REEF RESTORATION MEASURE			
Place Shells for Oyster Beds	2,620 CY		$ 133,044
Install Hanging Super Tray System	2 LS		$ 333,616
SUBTOTAL - CONSTRUCTION COST (2016$)			**$ 466,660**
MONITORING			$ 4,667
ADAPTIVE MANAGEMENT			$ 14,000
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 95,665
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 41,999
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			**$ 629,791**
Contingency (per results of ARA analysis)		29.00%	$ 182,639
Escalation to Construction Midpoint (**EXCLUDED**)			$ -
TOTAL COST (2016$)			**$ 812,430**
SAY (2016$)			**$ 810,000**

***** *See Appendix 1 for unit cost development. Unit costs include allowances for Contractor Indirect Expenses (JOOH), Contractor Overhead (HOOH), Profit, and Bond.*

Naval Weapons Station Earle - Oyster Reef Restoration
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost
OYSTER REEF RESTORATION MEASURE			
Restoration with Reef Balls	56,628 SF		$ 465,482
Restoration with Spat-on-Shell	135,036 SF		$ 941,201
Restoration with 4x4x4 Gabion Blocks	139,392 SF		$ 2,899,354
SUBTOTAL - CONSTRUCTION COST (2016$)			**$ 4,306,037**
MONITORING			$ 43,060
ADAPTIVE MANAGEMENT			$ 129,181
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 882,738
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 387,543
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			**$ 5,755,359**
Contingency (per results of ARA analysis)		29.00%	$ 1,669,054
Escalation to Construction Midpoint (**EXCLUDED**)			$ -
TOTAL COST (2016$)			**$ 7,424,413**
SAY (2016$)			**$ 7,420,000**

***** *See Appendix 1 for unit cost development. Unit costs include allowances for Contractor Indirect Expenses (JOOH), Contractor Overhead (HOOH), Profit, and Bond.*

Soundview Park - Oyster Reef Restoration
Cost Estimate Summary Tabulation

	Unit of Measurement	Contingency	Total Cost
OYSTER REEF RESTORATION MEASURE			
Restoration with 12x3x3 Gabion Blocks	6,222 SF		$ 117,782
Restoration with Spat-on-Shell	36,032 SF		$ 251,143
Seed Existing Spat-on-Shell	4,328 SF		$ 10,863
Seed Hard Rock Substrate	22,151 SF		$ 55,599
SUBTOTAL - CONSTRUCTION COST (2016$)			**$ 435,388**
MONITORING			$ 4,354
ADAPTIVE MANAGEMENT			$ 13,062
ACCOUNT 01 - REAL ESTATE			$ 6,800
ACCOUNT 30 - PLANNING, ENGINEERING & DESIGN			$ 89,254
ACCOUNT 31 - CONSTRUCTION MANAGEMENT			$ 39,185
SUBTOTAL - ALL COSTS BEFORE CONTINGENCY & ESCALATION			**$ 588,043**
Contingency (per results of ARA analysis)		29.00%	$ 170,532
Escalation to Construction Midpoint (**EXCLUDED**)			$ -
TOTAL COST (2016$)			**$ 758,575**
SAY (2016$)			**$ 760,000**

***** *See Appendix 1 for unit cost development. Unit costs include allowances for Contractor Indirect Expenses (JOOH), Contractor Overhead (HOOH), Profit, and Bond.*

Abbreviated Risk Analysis

Project Name & Location: **HRE Eco-Restoration - Oyster Sites - Feasibility Study**
Project Development Stage/Alternative: **Feasibility (Alternatives)**
Risk Category: **Moderate Risk: Typical Project Construction Type**

District: NYD
Alternative:
Meeting Date: 3/17/2016

Total Estimated Construction Contract Cost = $ 26,921,364

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	06 FISH AND WILDLIFE FACILITIES		$ 26,921,364		40.28%	$ 10,843,197	$ 37,764,561
2					0.00%	$ -	$ -
3					0.00%	$ -	$ -
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	$ -	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 9,287,871		7.00%	$ 650,151	$ 9,938,022
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 3,903,598		7.00%	$ 273,252	$ 4,176,850
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

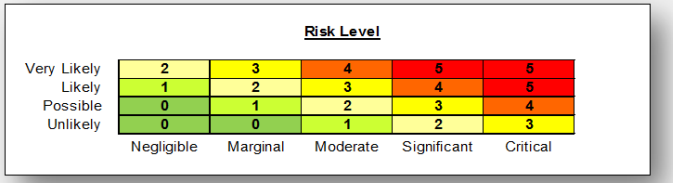
Totals					
Real Estate	$ -		0.00%	$ -	$ -
Total Construction Estimate	$ 26,921,364		40.28%	$ 10,843,197	$ 37,764,561
Total Planning, Engineering & Design	$ 9,287,871		7.00%	$ 650,151	$ 9,938,022
Total Construction Management	$ 3,903,598		7.00%	$ 273,252	$ 4,176,850
Total	**$ 40,112,832**		**29%**	**$ 11,766,599**	**$ 51,879,432**
			Base	**50%**	**80%**
	Range Estimate ($000's)		$40,113k	$47,173k	$51,879k

* 50% based on base is at 50% CL.

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

HRE Eco-Restoration - Oyster Sites - Feasibility Study Preliminary Cost Estimate

Feasibility (Alternatives)
Abbreviated Risk Analysis
Meeting Date: 17-Mar-16



Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Scope Growth				Maximum Project Growth		60%
PS-1	06 FISH AND WILDLIFE FACILITIES	(1) Scope growth is possible upon refinement of design. (2) Scope growth may be necessary to accomplish project intent.	Scope modifications are certainly possible as project design is refined. However, scope modifications could result in cost increase at some sites and cost reduction at others.	Moderate	Possible	2
PS-12	Remaining Construction Items			Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design			Negligible	Possible	0
PS-14	Construction Management			Negligible	Possible	0
Acquisition Strategy				Maximum Project Growth		40%
AS-1	06 FISH AND WILDLIFE FACILITIES	Packaging of this program as a single project or as multiple smaller projects is not a settled matter. Eventual size of the project may effect competitive landscape amongst the bidders.	MCACES baseline pricing includes conservative allowances for JOOH, HOOH, and profit. These allowances should prove reasonable.	Moderate	Possible	2
AS-12	Remaining Construction Items			Negligible	Unlikely	0
AS-13	Planning, Engineering, & Design			Negligible	Possible	0
AS-14	Construction Management			Negligible	Possible	0
Construction Elements				Maximum Project Growth		30%
CON-1	06 FISH AND WILDLIFE FACILITIES	Work requires use of divers and floating equipment which increases risk.	Profit allowance reflects performance of a higher risk project.	Significant	Likely	4
CON-12	Remaining Construction Items			Negligible	Unlikely	0

CON-13	Planning, Engineering, & Design			Negligible	Unlikely	0
CON-14	Construction Management			Negligible	Unlikely	0
Quantities for Current Scope				**Maximum Project Growth**		**20%**
Q-1	06 FISH AND WILDLIFE FACILITIES	Quantities are based on plan dimensions taken from GIS concept plans. However, quantities for this project can be scaled as required to accommodate budgetary constraints.	Quantity revisions are certainly possible as project design is refined. However, quantity increases or reductions are equally possible.	Moderate	Unlikely	1
Q-12	Remaining Construction Items			Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design			Negligible	Unlikely	0
Q-14	Construction Management			Negligible	Unlikely	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**75%**
FE-1	06 FISH AND WILDLIFE FACILITIES	Specialty fabrication of items such as "reef balls" and "oyster condos" are required; however, these items are not seen as particularly complex.	Specialty fabrications are not complex, and will not impact the project risk profile.	Negligible	Likely	1
FE-12	Remaining Construction Items			Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design			Negligible	Unlikely	0
FE-14	Construction Management			Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**35%**
EST-1	06 FISH AND WILDLIFE FACILITIES	Work is assumed to be performed 100% with contracted union labor. Use of volunteer labor may be possible for some activities resulting in cost reduction.	The project is estimated conservatively by assuming 100% contracted union labor. Use of volunteer labor for select activities would serve to decrease project costs.	Negligible	Unlikely	0
EST-12	Remaining Construction Items			Negligible	Unlikely	0
EST-13	Planning, Engineering, & Design			Negligible	Unlikely	0
EST-14	Construction Management			Negligible	Unlikely	0
External Project Risks				**Maximum Project Growth**		**40%**
EX-1	06 FISH AND WILDLIFE FACILITIES	A sharp rise in commodity prices and/or a less competitive contracting environment could cause an increase is project costs.	The risk of severe inflation in the near-term (< 3 years) appears low. However, the outlook for a horizon over three years can not be predicted with confidence.	Moderate	Possible	2
EX-12	Remaining Construction Items			Negligible	Unlikely	0

EX-13	Planning, Engineering, & Design			Negligible	Unlikely	**0**
EX-14	Construction Management			Negligible	Unlikely	**0**