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## **COST APPENDIX**

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# **New York and New Jersey Harbor Anchorage Final General Reevaluation Report and Environmental Assessment**

## **APPENDIX D**

**April 2020**



**U.S. Army Corps  
of Engineers  
Norfolk District**

**THE PORT AUTHORITY  
OF NY & NJ**

## APPENDIX D – COST ESTIMATES

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## **Introduction**

This appendix documents the development of the estimated cost for the Recommended Plan for anchorage deepening in the NY-NJ Harbor. To evaluate alternatives, improvements for two existing anchorage locations (Gravesend & Red Hook) were considered and preliminary cost estimates were prepared. This document summarizes the estimates considered and provides greater detail for the optimized selected plan.

## **Summary of Alternatives**

Five (5) general designs were considered for this feasibility study:

- Expansion of the existing Red Hook Anchorage to include a 3,000FT-Diameter berth with deeper capacity.
- Expansion of the existing Red Hook Anchorage to include a 3,600FT-Diameter berth with deeper capacity.
- Expansion of the existing Gravesend Anchorage to include a 3,000FT-Diameter berth with deeper capacity.
- Expansion of the existing Gravesend Anchorage to include a 3,600FT-Diameter berth with deeper capacity.
- A “Hybrid” expansion of the existing Gravesend Anchorage to include a 3,600FT-Diameter berth with deeper capacity. This “Hybrid” design accommodates a ship requiring a 3,000FT Diameter berth entirely within the dimensions of the anchorage while a ship requiring a 3,600FT Diameter berth will float partially into the channel during tide changes.

Each general design was considered at depths of 50' (+2' OD), 51' (+2' OD), 52' (+2' OD), 53' (+2' OD). This resulted in a total of twenty (20) alternatives for which preliminary cost estimates were generated during this phase of the study. The Tentatively Selected Plan (TSP) was selected from these twenty on the basis of maximized Net Benefits. The TSP was optimized to become the Recommended Plan based on discussions with Port Authority and Harbor Pilots based on alignment requirements.

## **Quantities**

Volume takeoffs based on survey data were provided to the cost engineer. TIN XYZ data from 2017 USACE surveys was used and all volume reports are included within that spreadsheet. Dredge quantities for all twenty (20) alternatives are shown in Table 1 below.

ALTERNATIVE	VOLUME REQUIR ED (CY)	OVERDEPTH VOLUME (CY)	TOTAL VOLUME (CY)
Alt 1: Red Hook Flats - 3000' Diam (50' + 2')	2,112,604	687,836	2,800,440
Alt 2: Red Hook Flats - 3000' Diam (51' + 2')	2,561,753	711,233	3,272,986
Alt 3: Red Hook Flats - 3000' Diam (52' + 2')	3,029,718	725,196	3,754,914
Alt 4: Red Hook Flats - 3000' Diam (53' + 2')	3,510,063	731,727	4,241,790
Alt 5: Red Hook Flats - 3600' Diam (50' + 2')	5,839,605	1,223,498	7,063,103
Alt 6: Red Hook Flats - 3600' Diam (51' + 2')	6,648,459	1,240,055	7,888,514
Alt 7: Red Hook Flats - 3600' Diam (52' + 2')	7,470,936	1,250,104	8,721,040
Alt 8: Red Hook Flats - 3600' Diam (53' + 2')	8,301,866	1,255,784	9,557,650
Alt 9: Gravesend - 3000' Diam (50' + 2')	643,000	247,500	890,500
Alt 10: Gravesend - 3000' Diam (51' + 2')	798,000	273,750	1,071,750
Alt 11: Gravesend - 3000' Diam (52' + 2')	972,000	296,250	1,268,250
Alt 12: Gravesend - 3000' Diam (53' + 2')	1,162,000	314,250	1,475,250
Alt 13: Gravesend - 3600' Diam (50' + 2')	2,244,000	447,000	2,681,000
Alt 14: Gravesend - 3600' Diam (51' + 2')	2,529,000	488,250	3,017,250
Alt 15: Gravesend - 3600' Diam (52' + 2')	2,839,000	528,000	3,367,000
Alt 16: Gravesend - 3600' Diam (53' + 2')	3,179,000	558,000	3,737,000
Alt 17: Gravesend – “Hybrid” (50' + 2')	700,000	252,000	952,000
Alt 18: Gravesend – “Hybrid” (51' + 2')	860,000	273,000	1,133,000
Alt 19: Gravesend – “Hybrid” (52' + 2')	1,035,000	291,000	1,326,000
Alt 20: Gravesend – “Hybrid” (53' + 2')	1,224,000	305,250	1,529,250

**Table 1: Takeoff Quantities by Alternative** -- Overdepth volumes estimated at 75% of available overdepth.

Based on PDT discussions, including an Abbreviated Risk Analysis, all material to be dredged is assumed not to require pre-treatment (blasting, etc) and to be suitable for disposal at the offshore Historic Area Remediation Site (HARS).

### Recommended Plan

The recommended plan incorporates the Hybrid design described in the above summary at the Gravesend Anchorage authorized to 50FT deep (Alternative #17 in the above table). This hybrid design allows the sponsors to enjoy the benefits of the 3600FT-Diameter anchorage, without requiring a large excavation volume and the 50FT authorized depth matches the existing authorized depths of adjacent federal channels.

The plan was optimized for performance in discussions with the PDT and partners (harbor pilots and Port Authority) and is detailed in the engineering appendix. Refined anticipated quantities

were received and incorporated into the cost estimate below: 723,000CY of required volume to grade, with another 311,000CY available in an overdepth template. The total volume available is reflected in the First Cost table below and within the costs summarized elsewhere in this appendix.

In addition to the estimated construction costs, the study's Project Delivery Team (PDT) considered all work that might contribute added costs to this project. As shown in the First Cost Summary Table below (Table 2), the PDT determined that costs associated with Real Estate (Account 01), Utility or other structural relocations (Account 02), and Environmental and Cultural Resource Mitigation efforts (Accounts 06 and 18) will not be incurred on this project.

**NY/NJ HARBOR ANCHORAGE STUDY & GRR**

October 2019 Price Level - Escalated to Program Year 2020

**Feasibility Report Cost Estimate Summary**

Feat. Acct.	Description	Qty	UoM	Subtotal	Cont. %	Cont \$\$	Total Cost (2019 \$)	Escalated to Program Year 2020
01	LANDS AND DAMAGES	-	-	\$ -	-	\$ -	\$ -	\$ -
02	RELOCATIONS	-	-	\$ -	-	\$ -	\$ -	\$ -
06	FISH & WILDLIFE FACILITIES	-	-	\$ -	-	\$ -	\$ -	\$ -
12	NAVIGATION PORTS & HARBORS	1,034,000	CY	\$ 18,386,900	17.9%	\$ 3,296,298	\$ 21,683,198	\$ 22,233,969
18	CULTURAL RESOURCE PRESERVATION	-	-	\$ -	0.0%	\$ -	\$ -	\$ -
30	PLANNING, ENGINEERING AND DESIGN	1	LS	\$ 1,594,428	9.3%	\$ 147,945	\$ 1,742,373	\$ 1,809,851
31	CONSTRUCTION MANAGEMENT	1	LS	\$ 1,062,952	9.2%	\$ 97,879	\$ 1,160,831	\$ 1,205,787
<b>TOTAL</b>				\$ 21,044,280		\$ 3,542,121	\$ 24,586,401	\$ 25,249,607

**Table 2: First Cost Summary Table:** Gravesend hybrid design at 50' + 2' depths (Alternative 17) optimized at North alignment.

Planning, Engineering and Development costs, (Account 30) are estimated as 11% of the excavation portion of the first cost. Construction Management costs (Account 31) are estimated at 8% of the same base cost. By excluding the mobilization/demobilization costs from the base of these calculations, this estimate avoids inflating these overhead accounts. Contingencies for these accounts were developed by the PDT with the same Abbreviated Risk Analysis as the construction contingencies were developed.

**Operational & Planning Considerations**

The following operational considerations were used in developing the construction cost estimates.

- Mobilization and demobilization were based on the use of two mechanical dredges and their associated plant. It was assumed that 15 days would be required for mobilization and 15 days would be required for demobilization.
- Dredging operations will be 24 hours per day operating 7 days a week.
- Inspections will be required for placement of material at the HARS.
- It is assumed that clean non-rock material will be utilized for remediation material and will be placed at the HARS. Restrictions based on material characterization, will not apply to this placement at the HARS. The distance to the HARS is approximately 8 miles one way from the Gravesend anchorage (estimates for non-selected alternatives from the Red Hook anchorage incorporate an 11-mile sail distance, each way).

Planners and engineers on the PDT have determined that there would be no added maintenance dredging costs associated with a deepened anchorage. The existing rate of sedimentation is expected to remain stable within the footprint of the deepened anchorage.

### **Equipment Considerations**

Applicability of available equipment was evaluated. The following summarizes the applicability of equipment and the assumed use of the equipment for this project:

Hopper Dredge – Hopper dredges are considered feasible for executing this work. The lack of upland disposal requirements anticipated allows for re-suspension of dredged material and the distance from borrow site to disposal location also makes the hopper dredge an attractive tool for the job. Preliminary cost estimates of the alternatives were performed assuming partial execution by hopper dredges but compared alternatives did not incorporate these estimates.

Cutterhead Dredge – Due to the distance between the borrow area and the disposal location, a Cutterhead dredge is considered an infeasible tool for this job.

Mechanical Dredge – Clamshell dredges were assumed to be the tool of choice for this project. Two mechanical dredges are incorporated into the Cost Engineering Dredge Estimating Program (CEDEP) estimates along with 6 scows. Similar historic projects within the NY/NJ Harbor made extensive use of mechanical dredges during the deepening of the harbor channels. Despite the growing share of the dredging market to hopper dredges in 2019, sufficient capacity for mechanical dredges exist for a 2-dredge project of this duration (<2 months for the selected alternative).

In addition to the two (2) dredges, the mechanical dredge assemblies used on the alternatives under consideration all include six (6) scows, four (4) tug boats, a survey vessel, and a crew boat.

## **Production Assumptions**

The following assumptions are incorporated into the CEDEP program and inform the estimated production of 16,500CY/Day for the recommended plan:

- Sand, mud and loose rock material to allow for 74-second cycle time and 26CY bucket payloads
- No upland requirements which would impose a maximum hoist speed through the water column
- Two working dredges to allow for 72% working efficiency (including major weather delays)
- 15-minute prep time for new scows, 10-minute disengage time for loaded scows and 15 minute disposal time at the offshore location

These assumptions are based upon the dredging and estimating experience of the cost engineer along with feedback from members of the PDT familiar with geotechnical and sedimentary data provided for the anchorages under consideration.

## **Risk Analysis**

An Abbreviated Risk Analysis (ARA) was conducted by the Project Delivery Team on June 28, 2019 to consider risks facing all alternatives. The ARA summary in Table 3 below reflects all risks considered for the selected plan.

Risks associated with the Dredging line item include the potential for shoaling to increase the volumes to be dredged, potential for contaminated sediment requiring upland disposal and the potential for pretreatment should the existing borings under-represent the geotechnical composition of the project area. All these risks are considered unlikely due to the completeness of the survey and geotechnical data available and the known low-sediment nature of the project areas under consideration.

Acquisition strategy risk includes the prospects of further deterioration of the competition within the mechanical dredging market. Recent USACE experience has indicated that dredging costs are increasing associated with low competition. If this pattern continues, costs may continue to climb.

Risk associated with external factors includes possible changes to fuel prices in the North Atlantic. This is always a risk, especially for projects scheduled years out in the future. That risk is captured within the ARA.

Contingencies associated with the Planning, Engineering and Design account corresponds with the risk of discovery of a cultural resource to be mitigated. Contingency associated with

Construction Management correspond to the potential for contaminated sediment (upland disposal) and, in some alternatives, the potential need for pretreatment (not identified as a risk for Alternative 17).

No risk is considered for the zero cost Lands and Damages account. All work will be performed offshore.

**Abbreviated Risk Analysis**

Project: **NY/NJ HARBOR ANCHORAGE STUDY & GRR** Alternative: **Gravesend - NORTH 3000/3600FT Diam w/ 60deg Approaches (50' + 2')**  
 Project Development Stage/Alternative: **Feasibility (Recommended Plan)**  
 Risk Category: **Moderate Risk: Typical Project Construction Typ** Meeting Date: **6/28/2019**

Total Estimated Construction Contract Cost = \$ 24,600,000

CWWBS	Feature of Work	Contract Cost	% Cont	\$ Cont	Total
1	01 LANDS AND DAMAGES Real Estate	\$ -	0.00%	\$ -	\$ -
2	12 NAVIGATION, PORTS AND HARBORS Dredging	\$18,386,900	17.93%	\$ 3,296,298	\$ 21,683,198
3	30 PLANNING, ENGINEERING, AND DESIGN Planning, Engineering, & Design	\$1,594,428	9.28%	\$ 147,945	\$ 1,742,373
4	31 CONSTRUCTION MANAGEMENT Construction Management	\$1,062,952	9.21%	\$ 97,879	\$ 1,160,831
<b>Totals</b>					
	Real Estate	\$ -	0.00%	\$ -	\$ -
	Total Construction Estimate	\$ 18,386,900	17.93%	\$ 3,296,298	\$ 21,683,198
	Total Planning, Engineering & Design	\$ 1,594,428	9.28%	\$ 147,945	\$ 1,742,373
	Total Construction Management	\$ 1,062,952	9.21%	\$ 97,879	\$ 1,160,831
	<b>Total Excluding Real Estate</b>	<b>\$ 21,044,280</b>	<b>16.8%</b>	<b>\$ 3,542,121</b>	<b>\$ 24,586,401</b>
	<b>Confidence Level Range Estimate (\$000's)</b>			<b>Base 50% 80%</b>	
				\$21,044k \$23,169k	\$24,586k

**Table 3: Abbreviated Risk Analysis Summary Table**

**Unit Price Cost Estimate**

The unit prices were developed using the Corps of Engineers Dredge Estimating Program (CEDEP). The CEDEP uses the following inputs:

- The dredgeability and area of the material (from the Geotechnical investigation)
- The volume of the material
- Productivity is affected by the ratio of bank height to bucket depth (bank factor) which maximizes when bank height is equal to or greater than bucket depth.
- Operational costs and ownership costs (determined from other dredging projects constructed in NY and other similar areas)
- Operating time, distance to placement, and other similar factors (quantified from the underlying assumptions discussed earlier in this document)

The cost of excavating the improved anchorage is based upon the volume to be dredged and unit prices. Also included is the cost of mobilizing/demobilizing the equipment and

contingencies. 75% of Overdepth (OD) volume assumed to be excavated in the cost estimates considered.

### Mitigation & Real Estate Costs

Mitigation and Real Estate accounts are assumed to be zero (\$0) on this project. PDT members have determined that no cultural resources are anticipated to be impacted in this offshore anchorage location (it is currently a working anchorage), that the impacts on air will not surpass the threshold to require environmental mitigation. Also, environmental planners have deemed that this anchorage expansion will have no impact on wetlands. Also, the real estate office has determined that the minimum administrative Real Estate costs of \$10,000 will be sufficient and covered by the PED phase budget.

### Annualized Cost

The table below reflects the annualized cost based on a current discount rate of 2.75% and the first costs calculated. These costs include contingencies as developed with the Abbreviated Risk Analysis described above.

#### NY/NJ HARBOR ANCHORAGE STUDY & GRR Annualized Cost Summary

<b>First Cost*</b>	\$	25,250,000
<b>Sunk Cost</b>	\$	-
<b>Investment Cost</b>		
Interest During Construction <sup>(a)</sup>	\$	57,000
<b>Total Investment Cost:</b>	\$	25,307,000
<b>Annual Costs</b>		
Annualized Investment Cost <sup>(b)</sup>	\$	937,395
Annualized Operation & Maintenance Repair, Replacement & Rehabilitation Cost <sup>(c)</sup>	\$	-
<b>Total Annual Cost*</b>	<b>\$</b>	<b>937,395</b>

\*October 2019 Price Level (Program Year 2020)

- (a) Based on 3 months of construction @ 2.75% (IDC, E&D, RE and Sunk costs calculated separately and included in this total)
- (b) Annualized investment cost only includes the remaining features. For annualized investment cost with the sunk cost, please see the economic appendix.  $i = 2.75\%$  and  $n = 50$  yrs
- (c) Assume \$0 additional O&M costs associated with expansion, per PDT discussion.

**Table 4: Annualized Cost Summary Table**

## Construction Execution & Schedule

Construction of the recommended plan requires mobilization of the dredge and appurtenant plant, dredging with offshore disposal (at HARS) and demobilization. With the anticipated construction start in 2025, the following schedule reflects anticipated mob/demob and dredging productions as estimated with the CEDEP program. January 15 was chosen as an arbitrary date for the Notice to Proceed.

PHASE	START	DURATION (DAYS)	CONSTRUCTION SCHEDULE (2025)			
			JAN	FEB	MAR	APR
Notice to Proceed	15-Jan-25	1				
Mobilize Plant	16-Jan-25	15				
Dredging with Offshore Disposal	31-Jan-25	54				
Demobilize Plant	26-Mar-25	15				

**Figure 1: Sample Construction Schedule for 2 month estimated duration in 2025**

## Cost Summary

The recommended plan is the 50' + 2' depth alternative of the Hybrid anchorage expansion design applied to the existing Gravesend anchorage. This estimate assumes two clamshell dredges working with six scows and four tugs, in addition to a crew boat and a survey vessel. All material is assumed to be suitable for offshore disposal at the HARS site and no pretreatment of material is anticipated. Based on these assumptions, the anticipated volume of 723,000CY within the dredge template, plus another 311,000CY within the overdredge template can be dredged and disposed within two months of active dredging. The total first cost, including contingencies, Planning Engineering and Design and Construction Management, is estimated at \$25,250,000.

\*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

Printed:10/21/2019

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PROJECT: NY/NJ HARBOR ANCHORAGE STUDY & GRR  
 PROJECT NO: 474207  
 LOCATION: NY/NJ HARBOR

DISTRICT: NAO  
 POC: COST ENGINEERING, Christopher Dols NAN)  
 PREPARED: 9/25/2019

This Estimate reflects the scope and schedule in report; Optimized TSP Documents

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST Constant Dollar Basis)					TOTAL PROJECT COST FULLY FUNDED)					
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST (\$K) C	CNTG (\$K) D	CNTG (% E	TOTAL (\$K) F	ESC (% G	COST (\$K) H	CNTG (\$K) I	TOTAL (\$K) J	Program Year Budget EC): 2020 Effective Price Level Date: 1 OCT 19		TOTAL FIRST COST (\$K) K	INFLATED (% L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
										Spent Thru: 1-Oct-18 (\$K)						
12	NAVIGATION PORTS HARBORS	\$18,387	\$3,296	17.9%	\$21,683	2.5%	\$18,853.94	\$3,380.03	\$22,234	\$0	\$22,234	16.8%	\$22,014	\$3,947	\$25,961	
	<b>CONSTRUCTION ESTIMATE TOTALS:</b>	\$18,387	\$3,296		\$21,683	2.5%	\$18,854	\$3,380	\$22,234	\$0	\$22,234	16.8%	\$22,014	\$3,947	\$25,961	
01	LANDS AND DAMAGES	\$0	\$0	0.0%	\$0.00	2.5%	\$0.00	\$0.00	\$0.00	\$0	\$0.00	7.7%	\$0.00	\$0.00	\$0.00	
30	PLANNING, ENGINEERING & DESIGN	\$1,594	\$148	9.3%	\$1,742	3.9%	\$1,656.18	\$153.67	\$1,810	\$0	\$1,810	9.7%	\$1,816	\$169	\$1,985	
31	CONSTRUCTION MANAGEMENT	\$1,063	\$98	9.2%	\$1,161	3.9%	\$1,104.12	\$101.67	\$1,206	\$0	\$1,206	21.3%	\$1,339	\$123	\$1,462	
	<b>PROJECT COST TOTALS:</b>	\$21,044	\$3,542	16.8%	\$24,586		\$21,614	\$3,635	\$25,250	\$0	\$25,250	16.5%	\$25,169	\$4,238	\$29,408	

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PROJECT MANAGER, Richard Klein

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CHIEF, REAL ESTATE, Donna Carrier-Tal

Susan L. Conner  
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CHIEF, PLANNING, Susan Conner

Abbreviated Risk Analysis – Gravesend Hybrid Anchorage Expansion (50' + 2')

Use/View	Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level	
-	<b>Project Management &amp; Scope Growth</b>						<b>Maximum Project Growth</b>	<b>75%</b>
Yes	PS-1	Dredging	Potential for scope growth or funding difficulties	Scope growth possible in the event future design during PED and review result in increased dimensions required for the design vessel. Funding difficulties possible in the event there is delay in WRDA authorization and construction new start approval.	Marginal	Possible	1	
Yes	PS-2	Planning, Engineering, & Design	PED scope expand beyond typical.	Current estimate @ 12% of anticipated construction cost. Unlikely to exceed this amount	Negligible	Unlikely	0	
Yes	PS-3	Construction Management	S&A scope expand beyond typical.	Current estimate @ 10% of anticipated construction cost. Unlikely to exceed this amount	Negligible	Unlikely	0	
-	<b>Acquisition Strategy</b>						<b>Maximum Project Growth</b>	<b>30%</b>
Yes	AS-1	Dredging	Competition in the mechanical dredging market is down. Concern is that this trend may continue.	Unlikely that bidder competition will get markedly worse, but if it were to happen, that would have a moderate impact on project cost.	Moderate	Unlikely	1	
Yes	AS-2	Planning, Engineering, & Design	No risk elements ID-ed at this time.	Well established acquisition methods for such work. Well-defined market.	Negligible	Unlikely	0	
Yes	AS-3	Construction Management	No risk elements ID-ed at this time.	Well established acquisition methods for such work. Well-defined market.	Negligible	Unlikely	0	
-	<b>Construction Elements</b>						<b>Maximum Project Growth</b>	<b>25%</b>
Yes	CON-1	Dredging	Need for upland disposal of top layer of material if deemed unsuitable for offshore disposal.  Differing site conditions.	Upland disposal is unlikely due to high-scour nature of Gravesend; Additional subsurface investigations will be performed during PED; Moderate impact ID'd because of high cost of what would likely be a small volume to go upland (if any).  Differing site conditions are always a possibility but impacts marginal compared to overall size of project.  (Unlikely/Moderate and Possible/Marginal both = Risk Level of 1)	Moderate	Unlikely	1	
Yes	CON-2	Planning, Engineering, & Design	No risk elements ID-ed at this time.	PED might reveal the need for upland disposal but would not overrun on cost in the event that such upland disposal is deemed necessary.	Negligible	Unlikely	0	



Yes	CON-3	Construction Management	Upland disposal or Differing Site Conditions. Tracks with Dredging line above.	Construction management cost increases would correspond with added costs associated with upland disposal. Same risk level applied as to Dredging line item above.	Moderate	Unlikely	1	
-	<b>Specialty Construction or Fabrication</b>						<b>Maximum Project Growth</b>	<b>65%</b>
Yes	SC-1	Dredging	Possible discovery of contaminated sediment may require upland disposal.	Need for upland disposal is considered unlikely. If it were necessary it would be in a minority of the work area and would therefore have have a moderate impact.	Moderate	Unlikely	1	
Yes	SC-2	Planning, Engineering, & Design	Possible discovery of contaminated sediment may require upland disposal.	Need for upland disposal is considered unlikely. If it were necessary it would be in a minority of the work area and would therefore have have a moderate impact.	Moderate	Unlikely	1	
Yes	SC-3	Construction Management	Possible discovery of contaminated sediment may require upland disposal.	Need for upland disposal is considered unlikely. If it were necessary it would be in a minority of the work area and would therefore have have a moderate impact.	Moderate	Unlikely	1	
-	<b>Technical Design &amp; Quantities</b>						<b>Maximum Project Growth</b>	<b>30%</b>
Yes	T-1	Dredging	Significant siltation occurs between latest surveys and project start.	The Gravesend anchorage is in a scour area, with very low shoaling rate and infrequency of maintenance dredging. Even if this occurs, siltation would be considered maintenance dredging and would be paid by the O&M account, not the Construction account.	Negligible	Possible	0	
Yes	T-2	Planning, Engineering, & Design	Discovery of cultural resource within proposed anchorage location.	Would necessitate reconsideration of position. Would drive PED costs but not dredging costs.	Moderate	Unlikely	1	
Yes	T-3	Construction Management	No risk elements ID-ed at this time.	Construction management costs not expected to track with risk elements identified above.	Negligible	Unlikely	0	
-	<b>Cost Estimate Assumptions</b>						<b>Maximum Project Growth</b>	<b>35%</b>
Yes	EST-1	Dredging	Dredge plant assumption (2 clams) may be wrong if contractor anticipates efficiencies associated with introducing additional plant.	Impact would reduce cost and likelihood is low.	Negligible	Possible	0	
Yes	EST-2	Planning, Engineering, & Design	No risk elements ID-ed at this time.	12% assumed PED rate already conservative.	Negligible	Unlikely	0	
Yes	EST-3	Construction Management	No risk elements ID-ed at this time.	10% assumed S&A rate already conservative.	Negligible	Unlikely	0	
-	<b>External Project Risks</b>						<b>Maximum Project Growth</b>	<b>40%</b>
Yes	EX-1	Dredging	Fuel costs could change significantly by the time of construction.	Fuel costs are currently low and it is possible that a jump in prices could have a moderate impact on the overall cost of the project.	Moderate	Possible	2	
Yes	EX-2	Planning, Engineering, & Design	No risk elements ID-ed at this time.		Negligible	Unlikely	0	
Yes	EX-3	Construction Management	No risk elements ID-ed at this time.		Negligible	Unlikely	0	



**Cost Review Comments and Responses – Final Report**

Anchorage Cost Products Review

By ???

