COST ENGINEERING
APPENDIX

NASSAU COUNTY BACK BAYS
COASTAL STORM RISK MANAGEMENT
FEASIBILITY STUDY

PHILADELPHIA, PENNSYLVANIA

APPENDIX D

August 2021

NCBB
Nassau County Back Bays Study

U.S. Army Corps of Engineers
Philadelphia District

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CHAPTER 1 INTRODUCTION

1.1 COST NARRATIVE

Corps of Engineers cost estimates for planning purposes are prepared in accordance with the following guidance:

- Engineer Technical Letter (ETL) 1110-2-573, Construction Cost Estimating Guide for CivilWorks, 30 September 2008
- Engineer Regulation (ER) 1110-1-1300, Cost Engineering Policy and General Requirements, 26 March 1993
- ER 1110-2-1302, Civil Works Cost Engineering, 15 September 2008
- ER 1110-2-1150, Engineering and Design For Civil Works Projects, 31 August 1999
- ER 1105-2-100, Planning Guidance Notebook, 22 April 2000, as amended
- Engineer Manual (EM) 1110-2-1304 (Tables revised 30 March 2007), Civil Works Construction Cost Index System, 31 March 2013
- CECW-CP Memorandum For Distribution, Subject: Initiatives To Improve The Accuracy Of Total Project Costs In Civil Works Feasibility Studies Requiring Congressional Authorization, 19 Sep 2007
- CECW-CE Memorandum For Distribution, Subject: Application of Cost Risk Analysis Methods To Develop Contingencies For Civil Works Total Project Costs, 3 Jul 2007
- Cost and Schedule Risk Analysis Guidance, 17 May 2009

The goals of the Nassau County Coastal Storm Risk Management Feasibility Study are to present a Total Project Cost (construction and non-construction costs) for the Recommended Plan at the current price level to be used for project justification/authorization and to project costs forward in time for budgeting purposes. In addition, the costing efforts are intended to produce a final product, or cost estimate, that is reliable and accurate and that supports the definition of the Government's and the non-Federal sponsor's obligations.

1.2 PROJECT DESCRIPTION

The feasibility study formulates, evaluates, and compares reasonable solutions to reduce the risk of coastal storm damages to property and infrastructure and minimize risk to public safety in the study area. The study area is located entirely in Nassau County, New York.

Several alternatives were considered by the PDT in order to accomplish the goals of reducing the risk of coastal storm damages and minimize risk to public safety. These alternatives consist of shoreline

stabilization via revetments at Marco Island, floodproofing/elevating/acquisition of both critical and noncritical structures found throughout the study areas, and beach nourishment at select areas.

CHAPTER 2 ALTERNATIVES

2.1 No Action Plan

The No action plan includes taking absolutely no action.

2.2 Nonstructural Countywide Plan

The Nonstructural Countywide Plan includes elevating 14,183 residential structures, and dry floodproofing 2,667 industrial/commercial structures.

2.3 Comprehensive Structural HVA & NS Plan

The Comprehensive Structural HVA & NS Plan includes both structural and nonstructural measures. Structural measures include 46,400 LF of floodwall, 5 miter gates, 4 road closures and 1 rail closure at the city of Long Beach. Nonstructural measures include the elevation of 12,251 residential structures, and the dry flood proofing of 2,140 industrial/commercial structures.

2.4 Localized Structural CI & NS Plan

The Localized Structural CI & NS Plan includes both structural and nonstructural measures. At the village of Freeport, structural measures include 12,250 LF of floodwall and 3 road closures. At Island park, structural measures include 6,950 LF of floodwall, 2 road closures and 2 sluice gates. At the city of Long Beach, structural measures include 10,280 LF of floodwall, 3 road closures and 1 rail closure. Nonstructural measures include the elevation of 14,159 residential structures, and the dry flood proofing of 2,427 industrial/commercial structures.

2.5 Locally Preferred Plan

The Locally Preferred Plan is not applicable to this study.

2.6 Tentatively Selected Plan (TSP)

The TSP is the NS countywide plan.

CHAPTER 3 COST ESTIMATE

3.1 BASIS OF ESTIMATE

The structural construction cost estimate was developed using Micro-Computer Aided Cost Estimating System (MCACES), Second Generation (MII) using the appropriate Work Breakdown Structure (WBS). These cost estimates were developed utilizing cost resources such as RSMeans, MII Cost Libraries, and vendor quotations and are supported by the preferred labor, equipment, materials, and crew/production breakdown to align with current construction methods. Quantities were provided by the PDT and checked by the cost engineer.

The nonstructural cost estimate was developed using Micro-Computer Aided Cost Estimating System (MCACES), Second Generation (MII) using the appropriate Work Breakdown Structure (WBS). These cost estimates were developed utilizing cost resources such as RSMeans, MII Cost Libraries, and vendor quotations and are supported by the preferred labor, equipment, materials, and crew/production breakdown to align with current construction methods. Quantities were provided by the PDT and checked by the cost engineer.

For the nonstructural cost estimates, the estimates developed by the cost engineer have been compared to data provided by the National Nonstructural Committee (NNC) as well as data obtained from contractors. It has been found that data from all sources are comparable.

3.2 SCHEDULE

The project schedule for the Recommended Plan was developed using Primavera P6. The construction schedule was based on various pieces of data obtained from the PDT, the MII file and conversations with industry contractors. For nonstructural elevations, it is assumed that a single contractor can elevate around 400 hundred structures per year, and most are able to staff up to meet this large scale of a project. Stone revetment durations are based off of durations from MII. Durations for floodwall construction are also taken from MII.

The schedule for the Recommended Plan is provided as Attachment 1 to this Cost Engineering Appendix.

3.3 CONTINGENCY

The goal in contingency development is to identify the uncertainties associated with an item of work or task, forecast the cost/risk relationship, and assign a value to this task that would limit the cost risk to an acceptable degree of confidence. Consideration must be given to the details available at each stage of planning, design, or construction for which a cost estimate is being prepared.

A Cost & Schedule Risk Analysis (CSRA) was conducted in according with the procedures outlined in the manual entitled "Cost and Schedule Risk Analysis Guidance", dated 17 May 2009. Members of the Philadelphia District Project Delivery Team (PDT) participated in a cost risk analysis brainstorming session to identify risks associated with the project. The Risk Analysis utilized the "LOW RISK" category as the project involves typical construction with possible life safety issues. Assumptions were made to the likelihood and impact of each risk item, as well as the probability of occurrence and magnitude of the impact if it were to occur.

Adjustments were made to the analysis upon review by the PDT and the final contingencies were established.

The CSRA Report is provided as Attachment 2 to this Cost Engineering Appendix.

3.4 PLANNING, ENGINEERING, AND DESIGN (PED)

Costs for Planning, Engineering and Design (PED) have been included based on the standard percentage included in the Total Project Cost Summary (TPCS). The percentage breakout can be found in the TPCS.

3.5 CONSTRUCTION MANAGEMENT (S&A)

Costs for Construction Management (S&A) have been included based on the standard percentage included in the Total Project Cost Summary (TPCS). The percentage breakout can be found in the TPCS.

3.6 TOTAL PROJECT COST SUMMARY (TPCS)

The Total Project Cost Summary (TPCS) addresses the inflation through project completion; accomplished by escalation to the mid-point of construction. The TPCS includes Federal and non-Federal costs for all construction features of the project, PED and S&A, along with the appropriate contingencies and escalation associated with each of these activities. The TPCS is formatted according to the CWWBS. The TPCS was prepared using the MCACES/MII cost estimate, contingencies developed by the ARA, the project design and construction schedule, and estimates of PED and S&A prepared by others.

The Certified TPCS for the Structural, Nonstructural and Beach Nourishment selected plans are provided as Attachment 3 to this Cost Engineering Appendix.