US Army Corps of Engineers®

Chicago District

Great Lakes and Ohio River Division

Waukegan Harbor Breakwater Repairs

P2/Project Number: 484338

Review Plan

PREPARED BY:

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Frank Appelfeller, P.E.
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USACE, Great Lakes and Ohio River Division
Review Management Organization (RMO)

APPROVED BY:

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Joseph M. Savage, P.E., SES
Regional Business Director
USACE, Great Lakes and Ohio River Division

MSC APPROVAL DATE:

REVIEW PLAN
ENGINEERING AND DESIGN PRODUCTS
WAUKEGAN HARBOR BREAKWATER REPAIRS
CHICAGO DISTRICT

Version Date: 23 April 2020

1. PURPOSE AND REQUIREMENTS

   a. Purpose. This programmatic review plan defines levels and scopes of review required for the engineering and design (E&D) products for the Lake George Canal Restoration Project.

   b. References. This review plan is prepared per the regional business process QMS 08504 LRD (*QC/QA Procedures for Civil Works Engineering and Design Projects*) and latest versions of the guidance documents listed below.

      (1) Engineering Regulation (ER) 415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews
      (2) ER 1110-1-12, Quality Management
      (3) Engineering Circular (EC) 1165-2-217, Civil Works Review Policy

   c. Requirements. The design and construction activities and documents for the Waukegan Harbor Breakwater Repairs project are required to be reviewed by independent technical experts in accordance with ER 1110-1-12 and EC 1165-2-217. Review requirements may include district quality control/assurance (DQC), agency technical review (ATR) and independent external peer (IEPR) review as indicated below.

2. REVIEW MANAGEMENT ORGANIZATION (RMO)

The RMO for this project is the Great Lakes and Ohio River Division. The RMO has provided the District with an email stating concurrence with this review plan.

3. PROJECT SCOPE AND PRODUCTS

a. The proposed project will consist of repairing the existing North Breakwater to restore the structures to original design elevations and slopes in order to maintain safe passage for vessels entering and exiting the harbor. Repair work will consist of concrete repairs and resurfacing of the existing concrete and timber crib breakwater structure. Steel armor plates will be utilized in the concrete repairs. The repair section is approximately 275 LF and will consist of 5,000 SF of concrete removal to be armor plated and filled in with approximately 400 CY of concrete placement. The steel plates will serve as formwork during placement and remain in place for additional protection.

   Work will also include the installation of steel access ladders at the North Piers adjacent to the breakwater. 6 ladders, extending approximately 11 feet below the top of the north pier parapet.

   Anticipated total construction cost is $1-2M, although scope may vary depending on receipt of workplan funds.

Additional repairs may involve the placement of new armor stone and resetting of existing armor stone as needed. Repairs would not change the existing footprint of the structure.

Table 1. Project Summary	
Project Type:	Operation and Maintenance
Locations:	Waukegan, IL
Purpose/Function:	The proposed project will consist of repairing the existing North Breakwater to restore the structures to original design elevations and slopes in order to maintain safe passage for vessels entering and exiting the harbor. Repair work would consist of concrete repairs and resurfacing of the existing concrete and timber crib breakwater structure.
Key Physical Components:	Concrete resurfacing, ladder installation
Estimated Construction Cost:	$1-2M (FS Estimate)
E&D Product Method Delivery:	In-House Design
Construction Delivery Method:	Invitation for Bid (IFB)

b. Engineering and Design Products. The engineering and design products to be prepared and reviewed include the following:

(1) Plans and Specifications (P&S)
(2) Design Documentation Report / Design Analysis
(3) Engineering Considerations and Instructions for Field Personnel

c. Required Quality Reviews.

(1) District Quality Control (DQC): DQC procedures will be performed for all E&D products following local business processes.
(2) Agency Technical Review (ATR): The District Chief of Engineering has determined based on Tables 3 and 4 of QMS 08504 LRD that ATR *is* required.
(3) Type II Independent External Peer Review (IEPR), Safety Assurance Review (SAR): The District Chief of Engineering has determined that the project *does not* pose significant life safety risks and a Type II IEPR (SAR) *is not* required.

d. Technical Risk Analysis and Review Charge: ATR *is* required and a review charge will be prepared and issued to each review team. According to paragraph 7.4 d and Table 4 of QMS 08504 LRD, the reviews will focus on the following primary project complexities and risks:

(1) The ATR team will focus on the concrete resurfacing and armored steel plate design to ensure technical adequacy, stability, and practicality. Design will consider durability and constructability of concrete placed. Design review will ensure no spillage of concrete during construction, proper bond, and long term durability. Steel plate concrete resurfacing has been performed at Waukegan North and South Pier and it planned at Michigan City Harbor East Pier. The design has been previously reviewed. This cross section of breakwater is slightly different and will need to be examined for any additional design considerations.

(2) The ATR team will also consider constructability issues related to accessing the breakwater if shoaling limited protected mooring along the breakwater.

(3) The ATR tem will also consider the type of safety ladders to be installed and method of installation, as well as any safety issues associated with the ladder design.

4. PROJECT DELIVERY TEAM (PDT)

The project delivery team members are listed in Attachment A.

5. REVIEW EXECUTION

District quality control (DQC) will be performed per Chapter 3 of ER 1110-1-12 and Section 8 of EC 1165-2-217. ATR shall be performed in accordance with Section 9 of EC 1165-2-217. Based on the review charge in paragraph 3.d, the technical discipline(s), Structural Engineering expertise is required for the ATR. ATR reviewers are listed Attachment A. Type II IEPR (SAR), if required, will be executed in accordance with procedures in Appendix E of EC 1165-2-217 and as directed by the RMO.

6. REVIEW SCHEDULE AND BUDGET

The schedule and budgets for reviews are shown in Table 2. Note that review dates are tentative, and dependent on other phases of work which are being conducted by other entities. Review dates must be updated if the work by others slips, or if the scope changes.

Table 2. Review Schedule and Budgets*

Review	Start Date	Finish Date	Budget ($)
50% DQC	Feb 17, 2020	2 weeks after start	$5,000/occurrence
50% BCOES / ATR	Mar 9, 2020	2 weeks after start	$2,500/occurrence
100% DQC	June 15, 2020	2 weeks after start	$5,000/occurrence
100% BCOES / ATR	June 29, 2020	2 weeks after start	$2,500/occurrence

*Costs and dates include backcheck

7. REVIEW PLAN POINTS OF CONTACT

Questions and comments relating to this review plan can be directed to the following points of contact:

a. District Project Leaders.
   (1) Project Manager: Mike Nguyen, CELRC-PMD, (312) 846-5555, Mike.Nguyen@usace.army.mil
   (2) Chief of Design Branch: John Groboski, CELRC-TSD-DC, (312) 846-5417, John.A.Groboski@usace.army.mil
b. Review Management Organization (RMO) Representative: Frank Appelfeller, RMO, 513-684-6200, Frank.A.Appelfeller@usace.army.mil

8. DISTRICT

Technical Risk Analysis has been completed for this project and the required quality reviews have been determined.

GROBOSKI.JOHN.A.JR.1249715510

RECOMMEND FOR APPROVAL: John A. Groboski, P.E.
Chief, Design Branch

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DISTRICT APPROVAL: Linda M. Sorn, P.E.
Chief, Engineering and Construction Division

Attachment A – TEAM MEMBERS

PROJECT DELIVERY TEAM		
Function/Discipline	Name (Last, First)	Office
Customer	Seidelmann, Joe	Waukegan Port Dist
Project Manager	Nguyen, Mike	CELRC-PMD-PM
Technical Lead	Cooke, Mark	CELRC-TSD-DH
Cost Engineer	Cooke, Mark	CELRC-TSD-DC
Value Engineer	Goodpaster, Steven	CELRC-TSD-DC
CAD	Karr, Adam	CELRC-TSD-DC
Geotechnical Engineer	Pickering, Chris	CELRC-TSD-DG
Environmental Engineer	Saichek, Richard	CELRC-TSD-DH
Civil Engineer	Cooke, Mark	CELRC-TSD-DC
Structural Engineer	Harris, Jeremy	CELRC-TSD-DT
Navigation Structures Mgr	Griffeth, Justin	CELRC-C-O
DQC REVIEWERS		
Function/Discipline	Name (Last, First)	Office
Environmental	Miller, Jennifer	CELRC-TSD-DH
Civil	Mishra, Rana	CELRC-TSD-DC
Cost	Druzbicki, David	CELRC-TSD-DC
Geotechnical	Rochford, Bill	CELRC-TSD-DG
Structural	Leffler, Faye / Dave Force	CELRC-TSD-DT
Operations	Borreli, Adam	TS-C-O
BCOES REVIEWERS		
Function/Discipline	Name (Last, First)	Office
Legal	Kim Sabo	GOC
Construction	Phil Stavrides	TS-C
Contracting Officers Rep	Lynn Ewing	TS-C-N
Operations	Jeff MacDonald	TS-C-O
Safety Officer	Pete Flanagan	GSO
Contracting	Regina Blair	PMD-CT
ATR REVIEWERS		
Function	Name	Office
Lead, Structural	Dustin Tellinghuisen	LRB