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Final Independent External Peer Review Report Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR)



Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Coastal Storm Damage Reduction Planning Center of Expertise
for the Baltimore District

Contract No. W912HQ-10-D-0002
Task Order: 0034

Final Independent External Peer Review Report
Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR)

by

Battelle
505 King Avenue
Columbus, OH 43201

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Department of the Army
U.S. Army Corps of Engineers
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EXECUTIVE SUMMARY

Project Background and Purpose

Chicago's shoreline is largely man-made and constructed on landfill averaging 1,500 feet wide. This landfill is a key contributing factor to the creation of an extensive series of lakeshore parks that began in the mid- to late 1800s and continued through the 1940s. During the early 1900s and into the 1930s, wooden crib structures were constructed primarily to contain stone fill material in order to provide a base upon which 4- to 8-ton cut limestone blocks would be placed in step-stone fashion to construct the existing revetment structure. This project provides storm damage protection to the Lake Michigan shoreline and, in particular, to Lake Shore Drive, a major transportation artery in the City of Chicago. The previous shoreline structures, built in the early 1900s, had deteriorated and no longer functioned to protect against storms, flooding, and erosion.

The Chicago Shoreline project was authorized under the Water Resources Development Act of 1996 (P.L. 104–303) Section 101(12), which stipulated:

> The project for storm damage reduction and shoreline erosion protection, Lake Michigan, Illinois, from Wilmette, Illinois, to the Illinois-Indiana State line: Report of the Chief of Engineers, dated April 14, 1994, at a total cost of $204,000,000, with an estimated Federal cost of $110,000,000 and an estimated non-Federal cost of $94,000,000. The project shall include the breakwater near the South Water Filtration Plant described in the report as a separate element of the project, at a total cost of $11,470,000, with an estimated Federal cost of $7,460,000 and an estimated non-Federal cost of $4,010,000. The Secretary shall reimburse the non-Federal interest for the Federal share of any costs incurred by the non-Federal interest— (A) in reconstructing the revetment structures protecting Solidarity Drive in Chicago, Illinois, if such work is determined by the Secretary to be a component of the project; and (B) in constructing the breakwater near the South Water Filtration Plant in Chicago, Illinois.

Additional authorization was provided under the Water Resources Development Act of 1999 (P.L. 106–53) Section 318, which stipulated:

> The project for storm damage reduction and shore protection, Lake Michigan, Illinois, from Wilmette, Illinois, to the Illinois-Indiana State line, authorized by section 101(a)(12) of the Water Resources Development Act of 1996 (110 Stat. 3664), is modified to provide for reimbursement for additional project work undertaken by the non-Federal interest. The Secretary shall credit or reimburse the non-Federal interest for the Federal share of project costs incurred by the non-Federal interest in designing, con-

> structing, or reconstructing reach 2F (700 feet south of Fullerton Avenue and 500 feet north of Fullerton Avenue), reach 3M (Meigs Field), and segments 7 and 8 of reach 4 (43rd Street to 57th Street), if the non-Federal interest carries out the work in accordance with plans approved by the Secretary, at an estimated total cost of $83,300,000. The Secretary shall reimburse the non- Federal interest for the Federal share of project costs incurred by the non-Federal interest in reconstructing the revetment structures protecting Solidarity Drive in Chicago, Illinois, before the signing of the project cooperation agreement, at an estimated total cost of $7,600,000.

Construction of the Chicago Shoreline project began in 1997. Design and construction responsibility was divided between the U.S. Army Corps of Engineers (USACE), Chicago District, and the non-federal sponsor under the terms of the project cooperation agreements. Project segments were constructed by USACE's Chicago District or by the City of Chicago's Department of Transportation and the Chicago Park District. Remaining construction contracts to be pursued by the non-federal sponsors will likely exceed the maximum project cost limit according to Section 902 of the Water Resources Development Act of 1986, as amended.

The Chicago Shoreline project Post Authorization Change Report (PACR) documents changes to the project since its authorization, reevaluates the economics of the project, and updates the total project cost estimate. No additional plan formulation activities were completed as part of the preparation of the PACR. Development of the PACR is needed to obtain Congressional reauthorization because the estimated total project costs exceed the authorized 902 limit.

Independent External Peer Review Process

USACE is conducting an Independent External Peer Review (IEPR) of the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR) (hereinafter: Chicago Shoreline project). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, is free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate the IEPR of the Chicago Shoreline project. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2012) and OMB (2004). This final report details the IEPR process, describes the panel members and their selection, and summarizes the Final Panel Comments of the IEPR Panel (the Panel).

Based on the technical content of the Chicago Shoreline project review documents and the overall scope of the project, Battelle identified candidates for the Panel in the following key technical areas: civil/cost engineering and economics. Two panel members were selected for the IEPR from more than nine candidates identified. USACE was given the list of candidate panel members, but Battelle made the final selection of the Panel.

The Panel received an electronic version of the 462-page Chicago Shoreline project document, along with a charge that solicited comments on specific sections of the documents to be

reviewed. USACE prepared the charge questions following guidance provided in USACE (2012) and OMB (2004). Battelle reviewed the charge questions and suggested revisions for consistency and clarity, additions, or deletions. USACE was given the opportunity to provide comments and revisions, and subsequently approved the final charge questions, which were included in the draft and final Work Plans.

The USACE Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to the start of the review to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. Other than this teleconference, there was no direct communication between the Panel and USACE during the peer review process. The Panel produced more than 90 individual comments in response to the 16 charge questions.

IEPR panel members reviewed the Chicago Shoreline project documents individually. The panel members then met via teleconference with Battelle to review key technical comments, discuss charge questions for which there were conflicting responses, and reach agreement on the Final Panel Comments to be provided to USACE. Each Final Panel Comment was documented using a four-part format consisting of: (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium, or low); and (4) recommendations on how to resolve the comment. Overall, nine Final Panel Comments were identified and documented. Of these, one was identified as having high significance, five had medium significance, and three had low significance.

Results of the Independent External Peer Review

The two panel members agreed other on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Chicago Shoreline project review documents. The following summarizes the Panel's findings.

Cost Engineering – The Panel found that the PACR and appendices generally provided a good level of analysis and description of purpose. However, the panel members expressed concern that a 1993 coastal engineering analysis (CEA) was not updated to account for potential changes in Lake Michigan water levels, which could have a significant effect on the determination of project benefits. Also noted was a lack of clarity and details regarding the use of historical project cost information in the economic reevaluation process. These factors could have a significant impact on both project benefit-cost ratio (BCR) and estimated costs for completing the project. The panel members also noted instances where technical descriptions and discussions in the PACR and appendices need improvement to make the document easier to understand.

Economics – USACE is to be commended for making an effort to update to 2012 several of the major components of the benefits and costs analyzed in this PACR. However, the Panel had concerns about the basis for many of the updates and assumptions used in calculating these updated benefit estimates. Specifically, there were very large increases in replacement values, both in percentage terms and in absolute magnitude, between the 1993 values and the 2012

values. The basis for these large increases either was not documented at all or relied on very limited information. Another concern arose when assessing the method used to calculate replacement values; the method excluded the depreciation of facilities without providing data supporting the exclusion. In addition, the method used to calculate updated 2012 dollar values of travel time saved relied on incomplete documentation.

Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Appendix A of this report.

Table ES-1. Overview of Nine Final Panel Comments Identified by the Chicago Shoreline Project IEPR Panel

No.	Final Panel Comment
	Significance – High
1	The rates of erosion, loss of infrastructure, and flooding frequency appear to be based on 1993 Feasibility Study Coastal Engineering Analysis (CEA) Report estimates, resulting in an overestimate of project benefits.
	Significance – Medium
2	No evidence for the lack of depreciation of Chicago's infrastructure is provided, and exclusion of depreciation may result in an overstatement of the benefit-cost ratio (BCR).
3	Large increases in replacement costs for city infrastructure from 1993 to 2012 are not supported by sufficient data and may result in an overstatement of the benefit-cost ratio (BCR).
4	There is insufficient documentation to ascertain whether the economic reevaluation utilized historic project data to validate cost models and assumptions.
5	Significant cost changes, such as Planning, Engineering and Design (PED) and Breakwaters & Seawalls, are not supported by data and may impact the benefit-cost ratio (BCR).
6	The method used to calculate the estimated 1992 and 2012 monetary value of travel time saved is not explained in sufficient detail to substantiate the benefits of reducing traffic delays caused by road closures from erosion and flooding.
	Significance – Low
7	The assumption that 73.7% of the operations and maintenance (O&M) costs have been sunk because specific project segments are complete is not correct.
8	Appendix A does not describe the deductive reasoning-based method that was used to address the lack of specificity on transportation flooding damages in the Feasibility Report.
9	The application of Unit Day Values (UDVs) for valuing project visitor use is inconsistent with U.S. Water Resources Council Principles and Guidelines.

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LIST OF ACRONYMS

ASCE	American Society of Civil Engineers
ATR	Agency Technical Review
BCR	Benefit-Cost Ratio
CEA	Coastal Engineering Analysis
COI	Conflict of Interest
CSU	Colorado State University
DrChecks	Design Review and Checking System
EC	Engineer Circular
ER	Engineer Report
ERDC	Engineer Research and Development Center
IEPR	Independent External Peer Review
NED	National Economic Development
O&M	Operations and Maintenance
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PACR	Post Authorization Change Report
PDT	Project Delivery Team
PED	Planning, Engineering and Design
POP	Period of Performance
RBRCR	Remaining Benefit to Remaining Cost Ratio
SWL	Still Water Level
UDV	Unit Day Value
USACE	United States Army Corps of Engineers
WES	Waterways Experiment Station

1. INTRODUCTION

Chicago's shoreline is largely man-made and constructed on landfill averaging 1,500 feet wide. This landfill is a key contributing factor to the creation of an extensive series of lakeshore parks that began in the mid- to late 1800s and continued through the 1940s. During the early 1900s and into the 1930s, wooden crib structures were constructed primarily to contain stone fill material in order to provide a base upon which 4- to 8-ton cut limestone blocks would be placed in step-stone fashion to construct the existing revetment structure. This project provides storm damage protection to the Lake Michigan shoreline and, in particular, to Lake Shore Drive, a major transportation artery in the City of Chicago. The previous shoreline structures, built in the early 1900s, had deteriorated and no longer functioned to protect against storms, flooding, and erosion.

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The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR) (hereinafter Chicago Shoreline project) in accordance with procedures described in the Department of the Army, USACE Engineer Circular (EC) *Civil Works Review* (EC 1165-2-209, Change 1) (USACE, 2012)[1] and Office of Management and Budget (OMB) bulletin *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses.

This final report details the IEPR process, describes the IEPR panel members and their selection, and summarizes the Final Panel Comments of the IEPR Panel on the existing environmental, economic, and engineering analyses contained in the Chicago Shoreline project documents. The full text of the Final Panel Comments is presented in Appendix A.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review (ATR), as described in USACE (2012).

In general, the purpose of peer review is to strengthen the quality and credibility of the USACE decision documents in support of its Civil Works program. IEPR provides an independent assessment of the economic and engineering analysis of the project study. In particular, the IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

[1] On December 15, 2012, USACE issued *Civil Works Review* (EC 1165-2-214), which supersedes EC 1165-2-209. However, the contract for this IEPR was awarded on December 5, 2012, before EC 1165-2-214 took effect. Accordingly, all tasks under this contract, including development of this IEPR report, were performed under *Civil Works Review Policy* EC 1165-2-209.

In this case, the IEPR of the Chicago Shoreline project was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC No. 1165-2-214) under Section 501(c)(3) of the U.S. Internal Revenue Code with experience conducting IEPRs for USACE.

3. METHODS

This section describes the method followed in selecting the members for the IEPR Panel (the Panel) and in planning and conducting the IEPR. The IEPR was conducted following procedures described by USACE (2012) and in accordance with OMB (2004) guidance. Supplemental guidance on evaluation for conflicts of interest (COIs) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

3.1 Planning and Schedule

At the beginning of the Period of Performance (POP), Battelle held a kick-off meeting with USACE to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., clarify expertise areas needed for panel members). Any revisions to the schedule were submitted as part of the final Work Plan.

Table 1 presents the schedule followed in executing the IEPR. Due dates for milestones and deliverables are based on the award/effective date of December 5, 2012. The review documents were provided by USACE on March 8, 2013. Note that the work items listed in Task 6 occur after the submission of this report. Battelle will enter the nine Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (DrChecks), a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle. Battelle will provide USACE and the Panel a pdf printout of all DrChecks entries, through comment closure, as a final deliverable and record of the IEPR results.

Table 1. Chicago Shoreline IEPR Schedule

Task	Action	Due Date
1	**Award/Effective Date**	12/5/2012
	Review documents available	3/8/2013
	Battelle submits draft Work Plan[a]	2/22/2013
	USACE provides comments on draft Work Plan	2/26/2013
	Teleconference (if necessary)	2/26/2013
	Battelle submits final Work Plan[a]	2/28/2013
2	Battelle requests input from USACE on the COI questionnaire	12/6/2012
	USACE provides comments on COI questionnaire	1/15/2013
	Battelle submits list of selected panel members[a]	1/25/2013
	USACE provides comments on selected panel members	1/30/2013
	Battelle completes subcontracts for panel members	3/7/2013
3	USACE/Battelle kick-off meeting	2/26/2013
	Battelle sends review documents to IEPR Panel	3/9/2013
	USACE/Battelle/Panel kick-off meeting	3/11/2013
	Battelle convenes mid-review teleconference for panel to ask clarifying questions of USACE	3/14/2013
4	Panel members complete their individual reviews	3/15/2013
	Battelle convenes panel review teleconference	3/20/2013
	Panel members provide draft Final Panel Comments to Battelle	3/25/2013
5	**Battelle submits Final IEPR Report to USACE[a]**	**4/2/2013**
6[b]	Battelle inputs Final Panel Comments to DrChecks; Battelle provides Post-Final Panel Comment Response Process template to USACE	4/3/2013
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses and clarifying questions to Battelle	4/4/2013
	Teleconference between Battelle, Panel, and USACE to discuss Final Panel Comments, draft responses, and clarifying questions	4/9/2013
	USACE inputs final PDT Evaluator Responses in DrChecks	4/11/2013
	Battelle inputs the Panel's BackCheck Responses in DrChecks	4/17/2013
	Battelle submits pdf printout of DrChecks project file[a]	**4/18/2013**
	Contract End/Delivery Date	12/5/2013

a Deliverable.

b Task 6 occurs after the submission of this report.

3.2 Identification and Selection of IEPR Panel Members

The candidates for the Panel were evaluated based on their technical expertise in the following key areas: civil/cost engineering and economics. These areas correspond to the technical content of the Chicago Shoreline IEPR review documents and the overall scope of the Chicago Shoreline project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle initially identified more than nine candidates for the Panel, evaluated their technical expertise, and inquired about potential COIs. Of these, Battelle chose the most qualified candidates and confirmed their interest and availability, and ultimately proposed two experts for the final Panel. Information about the candidate panel members, including brief biographical information, highest level of education attained, and years of experience, was provided to USACE for feedback. Battelle made the final selection of panel members according to the selection criteria described in the Work Plan.

The two proposed primary reviewers constituted the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

The candidates were screened for the following potential exclusion criteria or COIs.[2] These COI questions were intended to serve as a means of disclosure and to better characterize a candidate's employment history and background. Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

- Previous and/or current involvement by you or your firm[3] in the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR).
- Previous and/or current involvement by you or your firm[3] in the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR).
- Previous and/or current involvement by you or your firm[3] in coastal storm damage reduction in the Lake Michigan, Illinois, region from Wilmette, Illinois, to the Illinois-Indiana state line.
- Previous and/or current involvement by you or your firm[3] in the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR) related projects.
- Previous and/or current involvement by you or your firm[3] in the conceptual or actual design, construction, or operation and maintenance (O&M) of any projects in the Illinois

[2] Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. See OMB (2004, p. 18), "….when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

[3] Includes any joint ventures in which a panel member's firm is involved and if the firm serves as a prime or as a subcontractor to a prime.

Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR) related projects.

- Current employment by the U.S. Army Corps of Engineers (USACE).
- Previous and/or current involvement with paid or unpaid expert testimony related to the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR) and technical appendices.
- Previous and/or current employment or affiliation with members of the cooperating agencies or local sponsors (for pay or pro bono): City of Chicago, Department of Transportation, or the Chicago Park District.
- Past, current, or future interests or involvements (financial or otherwise) by you, your spouse or children related to the Lake Michigan, Illinois, region from Wilmette, Illinois, to the Illinois-Indiana state line.
- Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, Engineer Research and Development Center [ERDC], etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Chicago District.
- Previous or current involvement with the development or testing of models that will be used for or in support of the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR) project.
- Current firm[3] involvement with other USACE projects, specifically those projects/contracts that are with the Chicago District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Chicago District. Please explain.
- Any previous employment by the USACE as a direct employee or contractor (either as an individual or through your firm[3]) within the last 10 years, notably if those projects/contracts are with the Chicago District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning coastal storm damage reduction and include the client/agency and duration of review (approximate dates).
- Pending, current, or future financial interests in the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR) related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm[3] revenues within the last 3 years came from USACE contracts.
- A significant portion (i.e., greater than 50%) of personal or firm[3] revenues within the last 3 years from contracts with the non-federal sponsors including the City of Chicago, Department of Transportation and the Chicago Park District.

- Any publicly documented statement (including, for example, advocating for or discouraging against) related to the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR).
- Participation in relevant prior federal studies relevant to this project and/or the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR) and technical appendices.
- Previous and/or current participation in prior non-federal studies relevant to this project and/or the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR).
- Is there any past, present or future activity, relationship or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

Other considerations:

- Participation in previous USACE technical review panels
- Other technical review panel experience

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. One of the two final reviewers is affiliated with an academic institution and the other is affiliated with a consulting company. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle made the final selection of the Panel. Section 4 of this report provides names and biographical information on the panel members.

Prior to beginning their review and within 2 days of their subcontracts being finalized, all members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel.

3.3 Preparation of the Charge and Conduct of the IEPR

USACE prepared the charge questions following guidance provided in USACE (2012) and OMB (2004). Battelle reviewed the charge questions and suggested revisions for consistency and clarity, additions, or deletions. USACE was given the opportunity to provide comments and revisions, and subsequently approved the final charge questions, which were included in the draft and final Work Plans. In addition to a list of 16 charge questions/discussion points, the final charge included general guidance for the Panel on the conduct of the peer review (provided in Appendix B of this final report).

Battelle planned and facilitated a kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meeting, the IEPR Panel received an electronic version of the final charge as well as the Chicago Shoreline project documents and reference materials listed below. The documents and files in bold font were provided for review; the other documents were provided for reference or supplemental information only. In addition,

throughout the review period, USACE provided additional documents at the request of panel members. These additional documents were provided to Battelle and then disseminated to the Panel as supplemental information only and were not part of the official review. A list of these additional documents requested by the Panel is provided below.

- **Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Post Authorization Change Report (PACR) Main Report (20pp)**
- **Plates (3pp)**
- **Appendix A: Economic Reevaluation (70pp)**
- **Appendix A: Attachments (60pp)**
- **Appendix B: Project Cooperation Agreements (128pp)**
- **Appendix C: Cost Estimating (159pp)**
- **Appendix D: Cost Increase Details (7pp)**
- **Appendix E: Computation of FY12 902 Limit (12pp)**
- **Appendix F: NEPA History (3pp)**
- USACE guidance Civil Works Review, (EC 1165-2-209, Change 1) released January 31, 2012
- Office of Management and Budget's Final Information Quality Bulletin for Peer Review released December 16, 2004

During the review process, the Panel requested the following supplemental information from USACE:

- Illinois Shoreline Erosion Interim III Wilmette to Illinois/Indiana State Line Engineering Technical Volume (136pp)

About halfway through the review of the Chicago Shoreline project review documents, a teleconference was held with USACE, the Panel, and Battelle so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this teleconference, Battelle submitted nine panel member questions to USACE. USACE was able to provide responses to some of the questions during the teleconference; the remaining panel member questions that required additional coordination within USACE were addressed by USACE by March 15, 2013.

3.4 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a comment-response form provided by Battelle. At the end of the review period, the Panel produced 90 individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. As a result of the review, Battelle summarized the 90 comments into a preliminary list of 13 overall comments and discussion points. Each panel member's individual comments were shared with the full Panel in a merged individual comments table.

3.5 IEPR Panel Teleconference

Battelle facilitated a 3-hour teleconference with the Panel so that the panel members could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member would serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of high-level importance to the findings, and merged any related individual comments. In addition, Battelle confirmed each Final Panel Comment's level of significance to the Panel.

At the end of these discussions, the Panel identified nine comments and discussion points that should be brought forward as Final Panel Comments.

3.6 Preparation of Final Panel Comments

Following the teleconference, Battelle prepared a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the Chicago Shoreline project:

- Lead Responsibility: For each Final Panel Comment, one panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed the merged individual comments table, a summary detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.
- Directive to the Lead: Each lead was encouraged to communicate directly with the other panel member as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.
- Format for Final Panel Comments: Each Final Panel Comment was presented as part of a four-part structure:
    1. Comment Statement (succinct summary statement of concern)
    2. Basis for Comment (details regarding the concern)
    3. Significance (high, medium, low; see description below)
    4. Recommendation(s) for Resolution (see description below).
- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:
    1. High: Describes a fundamental problem with the project that could affect the recommendation, success, or justification of the project. Comments rated as high

indicate that the Panel analyzed or assessed the methods, models, and/or analyses and determined that there is a "showstopper" issue.

2. Medium: Affects the completeness of the report in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium indicate that the Panel does not have sufficient information to analyze or assess the methods, models, or analyses.
3. Low: Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project. Comments rated as low indicate that the Panel identified information (tables, figures, equations, discussions) that was mislabeled or incorrect or data or report sections that were not clearly described or presented.

- Guidance for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

At the end of this process, nine Final Panel Comments were prepared and assembled. Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Final Panel Comments are presented in Appendix A of this report.

4. PANEL DESCRIPTION

Candidates for the Panel were identified using Battelle's Peer Reviewer Database, targeted Internet searches using key words (e.g., technical area, geographic region), searches of university websites or other compiled expert sites, and referrals. The selection of panel members was described previously in Section 3.2.

An overview of the credentials of the final two primary members of the Panel and their qualifications in relation to the technical evaluation criteria is presented in Table 2. More detailed biographical information regarding each panel member and his respective area of technical expertise is presented in the text that follows the table.

Table 2. Chicago Shoreline IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Phillips	Loomis
Civil/Cost Engineering		
Minimum 15 years of experience in civil or construction cost engineering for flood damage prevention	x	
Experience in performing cost engineering/construction management for all phases of flood risk management projects and of projects related to coastal storm damage reduction	x	
Familiar with and have demonstrated experience related to seawall design and construction	x	
Familiar with and have demonstrated experience related to concrete revetment structures	x	
Experience in associated contracting procedures, total cost growth analysis, and related cost risk analysis	x	
Familiar with the construction industry	x	
Registered Professional Engineer	x	
Economics		
Minimum 10 years of experience in public works planning		x
Direct experience working for or with USACE		x
Experience with USACE related to flood risk management and coastal storm damage reduction projects		x
Experience with the National Economic Development (NED) analysis procedures, particularly as they relate to flood risk management, coastal storm damage reduction, and economic benefit calculations		x
Active participation in related professional societies		x
M.S. degree or higher in economics		x

Shane Phillips, P.E.

Role: Civil/Cost Engineering
Affiliation: Coast and Harbor Engineering, Inc.

Mr. Phillips is a principal civil/coastal engineer at Coast and Harbor Engineering, Inc. in Edmonds, Washington, with 20 years of experience in civil and coastal engineering. He earned his B.S. in civil engineering from Washington State University in 1993 and is a registered professional engineer in Washington, California, Texas, Louisiana, and Florida. His coastal engineering design experience includes the feasibility, evaluation, preliminary design, and final design of civil and structural components of coastal shoreline protection and flood control projects. He was responsible for all technical engineering components during the project design and construction phases, including preparation of construction plans, specifications, and bid documents. His coastal structure design experience includes shore protection, slope stabilization, the layout and design of seawalls, bulkheads, revetments, breakwaters, sheetpile walls, and groins.

Mr. Phillips is experienced in performing cost engineering/construction management for all phases of flood risk management and coastal storm damage reduction-related projects. Relevant studies include the engineering analysis and design of the Key Allegro Bay Road Shoreline Stabilization Project, Rockport, Texas, which included installation of a concrete bulkhead and seawall to prevent shoreline erosion and overtopping and flood damage to the community access road. He has demonstrated experience related to seawall, bulkhead, and pile-supported pier structure design and construction for coastal protection projects such as the Live Oak Peninsula Shoreline Stabilization Project, Aransas County, Texas. This project involved shoreline stabilization and overtopping protection for county and city roads consisting of combinations of concrete seawalls and bulkheads, rock revetment, beach nourishment, and coastal protective structures. Responsibilities included site assessments, master planning, cost estimating, and conceptual engineering design.

Mr. Phillips's demonstrated experience in concrete revetment structures for coastal protection includes the Lewis Yard Offloading Facility Seawall, Freeport, Grand Bahama Island. This project included assessment, conceptual design, and cost estimating for post-hurricane damage of a concrete barrier seawall for the coastal liquid bulk terminal. His familiarity and experience with the construction industry includes contracting procedures, total cost growth analysis, and related cost risk analysis.

Mr. Phillips has been responsible for the final design, cost estimating, and contracting management of over 75 projects related to coastal and water resources engineering, including projects ranging in size from $50,000 to $40 million; has managed more than 50 construction management projects; and has served as onsite resident engineer for over 10 coastal and water resources projects during his career. Mr. Philips previously served as the Civil Design/Construction (Coastal Engineering) expert on the USACE IEPR Major Rehabilitation of the Jetty System at the Mouth of the Columbia River Study.

John Loomis, Ph.D.

Role: Economics
Affiliation: Colorado State University (CSU)

Dr. Loomis is a professor of economics in the Department of Agricultural and Resource Economics at CSU. He earned his Ph.D. in economics from CSU in 1983, has taught courses in economics at the University of California-Davis and CSU for more than 20 years, and has conducted economic water resources evaluations for over 30 years. His experience in public works planning includes teaching graduate-level courses in water resource economics for public works; authoring a book on environmental policy analysis for public projects; and serving for 3 years as an economic reviewer for the USACE Upper Yuba River studies on reservoir management in California. In addition, he served as an economics reviewer for the Lower Colorado River Authority San Antonio Water System, Texas, transbasin water public project to move water from the Lower Colorado River to the City of San Antonio; as a science advisor on the Grand Canyon Monitoring and Research Center for operation of Glen Canyon dam hydropower and irrigation releases and effect on Grand Canyon National Park; and as a consultant for the State of Utah economic benefits of public works projects to improve water quality in rivers and lakes.

Dr. Loomis has direct experience working for USACE. As an employee for the U.S. Fish and Wildlife Service, Dr. Loomis was an economics instructor for USACE Waterways Experiment Station (WES) training courses for USACE employees. In addition, he was an USACE contractor on the Lower Snake River dam removal feasibility study and environmental impact statement and has served as an economist on four Battelle-led USACE IEPRs: two flood control projects (Donaldsonville to the Gulf and Morganza to the Gulf); one coastal storm damage reduction project (Surf City and North Topsail Beach, North Carolina); and one water management and reallocation project (Chatfield Storage Reallocation Study, Colorado).

Dr. Loomis's experience with USACE related to flood risk management and coastal storm damage reduction projects includes the two New Orleans District flood control IEPR projects (Donaldsonville and Morganza) and his significant experience with USACE procedures for calculating flood damages. His experience with storm damage reduction projects includes the Surf City, North Carolina, IEPR. Dr. Loomis has demonstrated experience in National Economic Development (NED) analysis procedures related to flood risk management, coastal storm damage reduction, and economic benefit calculations. His economic courses for USACE-WES were related directly to the NED procedures presented in both U.S. Water Resources Council Economic and Environmental Principles and Guidelines. He also includes NED benefit calculations (benefit-cost ratios [BCRs], net present value, etc.) in his CSU Water Resource Economics course. Dr. Loomis is an active member of relevant professional societies.

Dr. Loomis served as Associate Editor for the Water Resources Research journal and is currently associate editor for the American Journal of Agricultural Economics and co-editor of the Association of Environmental and Resource Economists newsletter. He also served as an elected officer for the Association of Environmental and Resource Economists.

5. SUMMARY OF FINAL PANEL COMMENTS

The two panel members agreed other on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Chicago Shoreline project review documents. The following summarizes the Panel's findings.

Cost Engineering – The Panel found that the PACR and appendices generally provided a good level of analysis and description of purpose. However, the panel members expressed concern that a 1993 coastal engineering analysis (CEA) was not updated to account for potential changes in Lake Michigan water levels, which could have a significant effect on the determination of project benefits. Also noted was a lack of clarity and details regarding the use of historical project cost information in the economic reevaluation process. These factors could have a significant impact on both project benefit-cost ratio (BCR) and estimated costs for completing the project. The panel members also noted instances where technical descriptions and discussions in the PACR and appendices need improvement to make the document easier to understand.

Economics – USACE is to be commended for making an effort to update to 2012 several of the major components of the benefits and costs analyzed in this PACR. However, the Panel had concerns about the basis for many of the updates and assumptions used in calculating these updated benefit estimates. Specifically, there were very large increases in replacement values, both in percentage terms and in absolute magnitude, between the 1993 values and the 2012 values. The basis for these large increases either was not documented at all or relied on very limited information. Another concern arose when assessing the method used to calculate replacement values; the method excluded the depreciation of facilities without providing data supporting the exclusion. In addition, the method used to calculate updated 2012 dollar values of travel time saved relied on incomplete documentation.

Table 3 lists the Final Panel Comments statements by level of significance. The full text of the Final Panel Comments is presented in Appendix A of this report.

Table 3. Overview of Nine Final Panel Comments Identified by the Chicago Shoreline IEPR Panel

No.	Final Panel Comment
	Significance – High
1	The rates of erosion, loss of infrastructure, and flooding frequency appear to be based on 1993 Feasibility Study Coastal Engineering Analysis (CEA) Report estimates, resulting in an overestimate of project benefits.
	Significance – Medium
2	No evidence for the lack of depreciation of Chicago's infrastructure is provided, and exclusion of depreciation may result in an overstatement of the benefit-cost ratio (BCR).
3	Large increases in replacement costs for city infrastructure from 1993 to 2012 are not supported by sufficient data and may result in an overstatement of the benefit-cost ratio (BCR).
4	There is insufficient documentation to ascertain whether the economic reevaluation utilized historic project data to validate cost models and assumptions.
5	Significant cost changes, such as Planning, Engineering and Design (PED) and Breakwaters & Seawalls, are not supported by data and may impact the benefit-cost ratio (BCR).
6	The method used to calculate the estimated 1992 and 2012 monetary value of travel time saved is not explained in sufficient detail to substantiate the benefits of reducing traffic delays caused by road closures from erosion and flooding.
	Significance – Low
7	The assumption that 73.7% of the operations and maintenance (O&M) costs have been sunk because specific project segments are complete is not correct.
8	Appendix A does not describe the deductive reasoning-based method that was used to address the lack of specificity on transportation flooding damages in the Feasibility Report.
9	The application of Unit Day Values (UDVs) for valuing project visitor use is inconsistent with U.S. Water Resources Council Principles and Guidelines.

6. REFERENCES

ASCE (2013). 2013 Report Card for America's Infrastructure: Illinois. American Society of Civil Engineers website. Available at http://www.infrastructurereportcard.org/illinois/illinois/. Accessed March 27, 2013.

OMB (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.

The National Academies (2003). Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports. The National Academies (National Academy of Science, National Academy of Engineering, Institute of Medicine, National Research Council). May 12.

USACE (2013). Lake Michigan-Huron sets all-time record for lowest monthly water level. U.S. Army Corps of Engineers – Detroit District. News Release, February 5, 2013. Available online at http://www.lre.usace.army.mil/Media/NewsReleases/tabid/11351/Article/10794/lake-michigan-huron-sets-all-time-record-for-lowest-monthly-water-level.aspx. Accessed March 29, 2013.

USACE (2012). Water Resources Policies and Authorities: Civil Works Review Policy. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Circular (EC) No. 1165-2-209, Change 1. January 31.

USACE (1993). Appendix A Coastal Engineering (CEA) Analysis, Illinois Shoreline Erosion Storm Damage Reduction, U.S. Army Corps of Engineers, Chicago District. July.

U.S. Water Resources Council (1983). Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. March 10. Available at http://planning.usace.army.mil/toolbox/library/Guidance/Principles_Guidelines.pdf. Accessed March 27, 2013.

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APPENDIX A

Final Panel Comments

on the

Chicago Shoreline

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Final Panel Comment 1

The rates of erosion, loss of infrastructure, and flooding frequency appear to be based on 1993 Feasibility Study Coastal Engineering Analysis (CEA) Report estimates, resulting in an overestimate of project benefits.

Basis for Comment

The 1993 CEA (USACE, 1993) was not updated for the cost reevaluation work. The major economic categories for determining project benefits include Prevention of Transportation Road Loss, Facilities and Infrastructure, and Incidental Recreation (Post Authorization Change Report [PACR], Appendix A [Economic Reevaluation], Section 4). These three categories account for more than 90 percent of the potential benefit (damage reduction) and are primarily determined based on wave-induced shore erosion and overtopping processes. Without an updated CEA, it is difficult to determine the current and actual risk to traffic and recreational use for the remaining segments of the project. Updating traffic and recreational use with current data without updating the CEA further overestimates the project benefits.

Page 1 of Appendix A, Economic Reevaluation, states that the scope of the analysis focused on three key benefits categories: prevention of roadway loss, valuation of facilities and infrastructure, and traffic delays. Although it is reasonable to update these elements to current conditions, the values have no meaning if the risk of damage (coastal flooding and erosion) is not equally evaluated for current conditions.

As stated in paragraph 4.1 of Appendix A, Economic Reevaluation:

> "Two critical economic assumptions for this study are the coastal engineering recession rate and probability of the onset of failure."

The following describe these two assumptions with respect to water levels, erosion rates, and flooding and the difference relative to 1993 and 2013 conditions:

- **Lake Surface Water Levels**. The lake water surface has exhibited a declining long-term trend of water levels, which are a critical component of the CEA for evaluating wave overtopping and shore erosion. Recent data indicate that the trend is expected to continue:

  > "Lake Michigan-Huron's water levels have also been below average for the past 14 years, which is the longest period of sustained below average levels since 1918 for that lake…" (USACE, 2013)

  The condition used for the 1993 evaluation appears to be a combination of 20-year still water level (SWL) combined with a 10-year deep water wave. Updated water-level statistics would likely indicate a much lower elevation for the 20-year SWL. Lower lake levels would result in reduction of erosion and flooding for similar predicted wave conditions. Given the large difference in time and the trending lower-than-expected water

levels, it is likely that the shore erosion and wave-induced flooding rates determined in 1993 are overly conservative for 2013 conditions.

- **Erosion Rates**. Appendix A, page A-55, of the 1993 CEA states:

  > "The expected erosion rates are based on higher than normal Lake Michigan water levels (+4 feet LWD) and thus, would represent exaggerated erosion rates during periodically low lake levels."

  Given the current lower lake surface levels, both the estimated erosion recession rate and probability of onset failure are overestimated for current conditions.

- **Flooding**. The assumptions pertaining to wave-induced flooding along Reach 5 is not well defined in the 1993 CEA and therefore could overstate the risk of flooding within the area prone to flood-induced road closures.

The economic reevaluation work should consider updating the most critical factor (the CEA) in determining project benefits for the shore stabilization and flood protection project to ensure that an accurate benefit-cost ratio (BCR) is developed for the remaining project elements.

Significance – High

Utilizing the 20-year-old CEA does not incorporate new information, such as actual measured erosion rates and changes in lake water levels, which could substantially change the estimated risk and associated project benefits and result in a significantly reduced BCR.

Recommendations for Resolution

1. Update the 1993 CEA to reflect current conditions and to provide a more current estimate of project benefits as they relate to the coastal flooding and shore erosion.

Literature Cited:

USACE (1993). Appendix A Coastal Engineering (CEA) Analysis, Illinois Shoreline Erosion Storm Damage Reduction, U.S. Army Corps of Engineers, Chicago District. July 1993.

USACE (2013). Lake Michigan-Huron sets all-time record for lowest monthly water level. U.S. Army Corps of Engineers – Detroit District. News Release, February 5, 2013. Available online at http://www.lre.usace.army.mil/Media/NewsReleases/tabid/11351/Article/10794/lake-michigan-huron-sets-all-time-record-for-lowest-monthly-water-level.aspx. Accessed March 29, 2013.

Final Panel Comment 2

No evidence for the lack of depreciation of Chicago's infrastructure is provided, and exclusion of depreciation may result in an overstatement of the benefit-cost ratio (BCR).

Basis for Comment

Page 26 of Appendix A indicates that the U.S. Army Corps of Engineers (USACE) guidance (Engineer Report [ER] 1105-2-100, page E-19) requires the use of replacement value less depreciation. However, in Appendix A, page 26, USACE indicates that it used full replacement cost based on the assumption that the city infrastructure and historical landmarks are constantly maintained and renovated, establishing a low effective age for the facilities and infrastructure listed in Table 4-8 on page 27. USACE provides no written documentation or verification from the city officials responsible for maintenance or renovation of these facilities to support this assumption. No independent confirmation of this statement by outside groups such as the American Society of Civil Engineers (ASCE) is presented. For example, ASCE rates the condition of Illinois drinking water infrastructure as D+ (ASCE, 2013) on the A-F grading system, and the Panel sees no reason to believe Chicago would be any different since it is the major city in Illinois. Given the recent recession, it is possible that cities and the state may have been forced to defer maintenance and postpone renovation on infrastructure and facilities such as those under study. Using full replacement value without subtracting depreciation overstates the damages avoided from protecting infrastructure on the second-largest categories of project benefits (Appendix A, page 55), and hence overstates the BCR.

Significance – Medium

Without documentation to support the assumption that Chicago infrastructure has not depreciated, the economic analysis is incomplete and the Panel cannot determine the accuracy of the BCR.

Recommendations for Resolution

1. Provide data from the City of Chicago and an outside group such as ASCE to support the assumption that the facilities listed in Table 4-8 of Appendix A, page 27 have not depreciated in value. If it is not possible to substantiate the assumption, use data on depreciation of infrastructure and recalculate the replacement value to include depreciation.

Literature Cited:

ASCE (2013). 2013 Report Card for America's Infrastructure: Illinois. American Society of Civil Engineers website. Available at http://www.infrastructurereportcard.org/illinois/illinois/. Accessed March 27, 2013.

Final Panel Comment 3

Large increases in replacement costs for city infrastructure from 1993 to 2012 are not supported by sufficient data and may result in an overstatement of the benefit-cost ratio (BCR).

Basis for Comment

Table 4-8 (page 27 of Appendix A) shows very large increases in replacement costs (two to ten times the original amount) for some facilities such as South Shore Filtration Plant, Alder Planetarium and the Lincoln Park Zoo. In some cases, the new replacement values represent increases of several hundred million dollars.

The largest absolute dollar increase is for the South Shore Filtration Plant. The replacement value increases from $173 million in 1993 to $750 million in 2012, for over a $500 million increase (a four-fold increase; Table 4-8, page 27). This increase is based only on a personal communication, with no independent estimates from companies that build such water filtration plants. For an item making up about half the infrastructure replacement values, it is critical that the basis for this updated estimate be accurate, substantiated, and well documented.

The increase in replacement cost of the Alder Planetarium, to $150 million in 2012 from $25 million in 1993 (a six-fold increase—see Table 4-8), is based on consultation with members of the International Planetarium Society. Details of the method used to solicit new replacement values from the International Planetarium Society are not presented on page 42.

No explanation is provided for the increase in costs of the Lincoln Park Zoo to $300 million in 2012 from $81 million in 1993 (the second largest replacement value in terms of dollar amount—see Table 4-8).

The very large percentage increases in replacement values and magnitudes of replacement values far exceed the Civil Works Construction Cost Index System cost increases during the 1993-2012 time period. The Panel is concerned that these much higher replacement values may result in overstating the BCR.

Significance – Medium

The accuracy of the BCR cannot be evaluated without sufficient data to substantiate updated replacement values and document the basis of the large increases in the replacement values of facilities from 1993 to 2012.

Recommendations for Resolution

1. Obtain estimates for the replacement cost of a facility of similar type and capacity as the South Shore Filtration Plant.
2. Document the process used to familiarize International Planetarium Society members with the Alder Planetarium, and explain in Appendix A how replacement cost estimates were developed.
3. Describe how the new replacement value for the Lincoln Park Zoo was estimated.

Final Panel Comment 4

There is insufficient documentation to ascertain whether the economic reevaluation utilized historic project data to validate cost models and assumptions.

Basis for Comment

Accurate estimating of construction cost is critical to ensure that sufficient funds are authorized for the remaining project elements and that a reasonable benefit-cost ratio (BCR) is computed. It is not clear that the economic reevaluation work utilized historical project data (bid results, change orders, changes in scope, etc.) to validate the cost models and to determine if historical assumptions were correct. The following are examples where there is a lack of information or explanation for the basis of cost reevaluation:

- Appendix A. Quantity estimate descriptions state that they are based on current plans. It is not clear from the discussion in Appendix A that the lessons learned and documented reasons for cost increases (outlined in the Post Authorization Change Report [PACR], paragraph 6.6, Cost Changes) have been incorporated into the updated cost estimating work.
- Appendix D. Cost increases relative to various construction contracts (and project reaches) are described but without specific details on the cost sensitivity of each element described. For example, contract modifications to the Diversey to Fullerton contract resulted in a $4.7-million increase. It is not clear which of the 17 different elements (from wave deflector redesign to increased quantities to additional control joints) had the biggest impacts on cost. It is also not clear if these cost increases were incorporated into the current cost estimating models and analysis.
- Stone for Breakwaters and Revetments. Stone is a very large contributor to the overall cost basis for the project. It is not documented whether new costs reflect currently available sources with sufficient available quantity (meeting project specifications) to complete the project. The price used in the estimate is valid only if the source used has the capacity to meet the project demands, which is not stated anywhere in this document.
- Post Authorization Change Report. The cost numbers in the various tables are very hard to follow and track when trying to understand where and how the various factors change from 1993 to 2013. For example, it was not clear by reading the PACR that the Total for Entire Project Cost of $534,060,000 in Table 6 is equal to the $536,013,000 Total in Table 11 minus the $1,953,000 described in paragraph 6.8. There should be additional discussion (not only on this example but elsewhere in the document), possibly through the use of footnotes, to aid the reader in understanding how all the numbers relate. Without this supplemental information, it is almost impossible for someone to understand all the various numbers presented in the text and tables.

Use of both current costs and lessons learned from the previous 20 years of project implementation is critical to accurately estimate costs and therefore ensure that sufficient funds are authorized for the remaining project elements and that a reasonable BCR is computed.

Significance – Medium

Sufficient documentation has not been provided to ensure that the current estimated costs reflect the most accurate estimate of anticipated construction costs.

Recommendations for Resolution

1. Provide additional documentation and description of specific historical information and methods used to incorporate previously completed project cost information into the current cost estimates, including a description of calibration of the original model for current use.
2. Ensure that data and lessons learned from completed projects are brought forward into the current project cost estimates.
3. Supply additional documentation regarding costs for stone. Include quotations acquired from stone sources that meet the project quality requirements and determine whether those sources have a sufficient quantity of material available to complete the project.
4. Provide additional discussion in the PACR (such as the use of footnotes) to aid the reader in understanding how all the numbers relate.

Final Panel Comment 5

Significant cost changes, such as Planning, Engineering and Design (PED) and Breakwaters & Seawalls, are not supported by data and may impact the benefit-cost ratio (BCR).

Basis for Comment

The Post Authorization Change Report (PACR) provides a bulleted summary of cost changes with corresponding brief descriptions for various project features (PACR, Section 6), and Appendix A provides a summary list of updated replacement values for significant facilities (Table 4-8). There is no indication of any supporting data. Some of these cost changes are significant and directly affect the determination of Total Project Cost/Benefits and the corresponding project BCR. Specific areas of concern include the following:

- **Post Authorization Change Report**. A $64,183,000 increase in PED, representing a 440% increase over authorized costs, is stated with very little supporting data. The increase in construction cost (Breakwaters & Seawalls) was $139,333,000, or approximately 58%. PED is typically a function of the overall construction cost and there is no explanation for such a disproportionate increase in PED relative to the construction work. Additionally, the proposed Construction Management cost is approximately 58%, similar to the construction cost increase.
- **Post Authorization Change Report**. Breakwaters & Seawalls have a $139,333,000 cost increase but no backup data stating why there was such a large increase or which elements caused the increase. Additionally, the PACR does not indicate whether the reasons for the increase were incorporated into the cost estimates for future construction work that is being estimated.

Significance – Medium

If supporting data do not justify the large increases in costs and benefits, the BCR may be overstated.

Recommendations for Resolution

1. Add an appendix that provides detailed explanations for all large increases in costs and for all elements listed in Section 6.0 of the PACR.

Final Panel Comment 6

The method used to calculate the estimated 1992 and 2012 monetary value of travel time saved is not explained in sufficient detail to substantiate the benefits of reducing traffic delays caused by road closures from erosion and flooding.

Basis for Comment

It is appropriate to include the monetary value of travel time saved in estimating the monetary benefits of reducing road closures due to flooding and erosion. The value of travel time is important input data for calculating the largest category of project benefits (see Table 7-1, page 55).

However, the Panel had several concerns with how the original 1992 benefit estimate was obtained, and then updated in 2012. First, the original 1992 dollar value of *weekend* travel time (presented on page 24 of Appendix A) was estimated to be higher ($13.93 an hour) than the original 1992 *peak-hour commuting* time ($8.58 an hour). This relationship between the dollar value of weekend travel time and commute time is also seen in the updated 2012 estimate ($17.22 an hour for recreation trips and $15.44 an hour for work trips) (see Appendix A, Table 5-3). The analysis does not explain why weekend/recreation trip time is more valuable than commuting work time. Second, Table 5-3 states that the value of travel time is from Table D-4 of USACE Engineer Report (ER) 1105-2-100 Appendix D: Value of Time Saved; however, this is not the Appendix D provided to the Panel. Finally, Table 5-3 does not identify which numbers from this table were used to derive the updated $17.57 per hour value of travel time (bottom row of Table 5-3). Even though these numbers were not identified, the Panel was able to derive the $17.57 per hour using the Weight Categories and the fifth column of Table 5-3, Value of Time Saved Adjusted to Hourly and Occupancy. In sum, the explanation, sources for, and calculations of the value of travel time saved are not well described or documented in Appendix A.

Significance – Medium

A clear explanation describing how the updated 2012 value of travel time was derived would support the input used to calculate one of the largest benefit categories.

Recommendations for Resolution

1. Explain why the dollar values of travel time, in Appendix A, page 24, are higher on weekends than during the work week.
2. Provide the source numbers in Table 5-3 (or include Appendix D-4 from ER 1105-2-100) as an appendix to the PACR.
3. Identify which numbers in Table 5-3 are used to calculate the $17.57 updated value of travel time in Table 5-3.

Final Panel Comment 7

The assumption that 73.7% of the operations and maintenance (O&M) costs have been sunk because specific project segments are complete is not correct.

Basis for Comment

Table 8-1 in Appendix A classifies 73.7% of O&M costs as sunk when performing the Remaining Benefit to Remaining Cost Ratio (RBRCR). Sunk costs are past costs that have already been incurred and cannot be recovered. O&M costs have yet to be incurred because they are recurring costs that are paid in the future, either annually (in the case of operations) or periodically (in the case of maintenance). Thus, O&M costs are variable costs. Classifying 73.7% of the O&M costs as sunk may result in an inaccurate estimate of the RBRCR, although the effect is likely small given the O&M costs considered sunk are small.

Significance – Low

Misclassifying O&M costs as sunk affects the accuracy of the RBRCR but does not affect the conclusions regarding the project's economic viability.

Recommendations for Resolution

1. Reclassify the 73.7% of O&M costs as Total Annual Remaining Costs in Table 8-1 of Appendix A, and recalculate the RBRCR.

Final Panel Comment 8

Appendix A does not describe the deductive reasoning-based method that was used to address the lack of specificity on transportation flooding damages in the Feasibility Report.

Basis for Comment

On page 41 of Appendix A, the U.S. Army Corps of Engineers (USACE) states that the Feasibility Report lacks specific details on how transportation flooding values were originally calculated. USACE further states (page 41) that because of this lack of specificity, a new method was developed for calculating the transportation flooding damages based on deductive reasoning. Appendix A does not describe the deductive reasoning-based method or explain how it was used to calculate the new transportation flooding damages in Table 5-13 (page 41 of Appendix A). Therefore, the specific steps used to calculate the updated transportation flooding damage estimates are not clear to the Panel. However, given the small magnitude of the transportation flooding damages, any changes to this category of benefits will not change the recommendations regarding the project's economic feasibility.

Significance – Low

An explanation of how the deductive reasoning-based method was used to calculate the updated transportation flooding damages is needed for the Panel to assess the adequacy of this method and the accuracy of the damage estimates in Table 5-13.

Recommendations for Resolution

1. Describe the deductive reasoning-based method employed to address the lack of specificity in the Feasibility Report on transportation flooding damages.
2. Provide details on how the deductive reasoning developed was used to calculate the updated transportation flooding damages in Table 5-13 of Appendix A.

Final Panel Comment 9

The application of Unit Day Values (UDVs) for valuing project visitor use is inconsistent with U.S. Water Resources Council Principles and Guidelines.

Basis for Comment

The U.S. Water Resources Council Principles and Guidelines (1983; page 69) indicate that if visitor use is over 750,000 visitor days, a site-specific Travel Cost Method or Contingent Valuation Method study should be conducted to value recreation use rather than employing the UDV method. The U.S. Army Corps of Engineers (USACE) reports project visitor use at 37.4 million visitor days (Appendix A). USACE applied the UDV method to value these 37.4 million visitor days Appendix A, page 27). Appendix A does not explain why this high level of recreation use warranted the application of UDVs rather than the Travel Cost Method or Contingent Valuation Method. However, it is unlikely that the project's economic feasibility was affected by applying UDVs for recreation instead of one of the more appropriate recreation valuation methods.

Significance – Low

The technical credibility of Appendix A, and of the recreation economic analysis in particular, would be improved by including an explanation of why the UDV method is used rather than the Travel Cost Method or Contingent Valuation Method.

Recommendations for Resolution

1. Explain why the UDVs in Appendix A, Section 4.5 were chosen to value recreation use for this project instead of the Travel Cost Method or Contingent Valuation Method.

Literature Cited:

U.S. Water Resources Council (1983). Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. March 10. Available at http://planning.usace.army.mil/toolbox/library/Guidance/Principles_Guidelines.pdf. Accessed March 27, 2013.

APPENDIX B

Final Charge to the Independent External Peer Review Panel as Submitted to USACE on February 26, 2013

on the

Chicago Shoreline

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Charge Questions and Guidance to the Peer Reviewers for the Independent External Peer Review of the Chicago Shoreline

BACKGROUND

Chicago's shoreline is largely man-made and constructed on landfill an average of 1,500 feet wide. This landfill is a key-contributing factor to the creation of an extensive series of lakeshore parks that began in the mid to late 1800s and continued through the 1940s. During the turn of the last century and into the 1930s, wooden cribs structures were constructed primarily to contain the stone fill material in order to provide a base upon which 4 to 8 ton cut limestone blocks would be placed in step-stone fashion to construct the existing revetment structure. This project provides storm damage protection to the Lake Michigan shoreline and, in particular, to Lake Shore Drive, a major transportation artery in the City of Chicago. The previous shoreline structures, built in the early 1900s, had deteriorated and no longer functioned to protect against storms, flooding and erosion.

The Chicago Shoreline project was authorized under the Water Resources Development Act of 1996 (P.L. 104–303) Section 101(12) which stipulated:
The project for storm damage reduction and shoreline erosion protection, Lake Michigan, Illinois, from Wilmette, Illinois, to the Illinois-Indiana State line: Report of the Chief of Engineers, dated April 14, 1994, at a total cost of $204,000,000, with an estimated Federal cost of $110,000,000 and an estimated non-Federal cost of $94,000,000. The project shall include the breakwater near the South Water Filtration Plant described in the report as a separate element of the project, at a total cost of $11,470,000, with an estimated Federal cost of $7,460,000 and an estimated non-Federal cost of $4,010,000. The Secretary shall reimburse the non-Federal interest for the Federal share of any costs incurred by the non-Federal interest— (A) in reconstructing the revetment structures protecting Solidarity Drive in Chicago, Illinois, if such work is determined by the Secretary to be a component of the project; and (B) in constructing the breakwater near the South Water Filtration Plant in Chicago, Illinois.

Additional authorization was provided under Water Resources Development Act of 1999 (P.L. 106–53) Section 318 which stipulated:
The project for storm damage reduction and shore protection, Lake Michigan, Illinois, from Wilmette, Illinois, to the Illinois-Indiana State line, authorized by section 101(a)(12) of the Water Resources Development Act of 1996 (110 Stat. 3664), is modified to provide for reimbursement for additional project work undertaken by the non-Federal interest. The Secretary shall credit or reimburse the non-Federal interest for the Federal share of project costs incurred by the non-Federal interest in designing, constructing, or reconstructing reach 2F (700 feet south of Fullerton Avenue and 500 feet north of Fullerton Avenue), reach 3M (Meigs Field), and segments 7 and 8 of reach 4 (43rd Street to 57th Street), if the non-Federal interest carries out the work in accordance with plans approved by the Secretary, at an estimated total cost of $83,300,000. The Secretary shall reimburse the non- Federal interest for the Federal share of project costs incurred by the non-Federal interest in reconstructing the revetment structures protecting Solidarity Drive in Chicago, Illinois, before the signing of the project cooperation agreement, at an estimated total cost of $7,600,000.

The construction of the Chicago Shoreline Project began in 1997 and design and construction responsibility was divided between the U.S. Army Corps of Engineers (USACE), Chicago District and the non-Federal sponsor under the terms of the project cooperation agreements. Project segments were constructed by USACE, Chicago District or by the City of Chicago, Department of Transportation and the Chicago Park District. Remaining construction contracts to be pursued by the non-Federal sponsors will likely exceed the maximum project cost limit according to Section 902 of the Water Resources Development Act of 1986, as amended.

The Chicago Erosion Project PACR documents changes to the project since its authorization, reevaluates the economics of the project, and updates the total project cost estimate. No additional plan formulation activities were completed as part of the preparation of the PACR. Development of the PACR is needed to seek Congressional reauthorization due to estimated total project costs exceeding the authorized 902 limit.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR) (hereinafter: Chicago Shoreline IEPR) in accordance with the Department of the Army, USACE, Water Resources Policies and Authorities' *Civil Works Review* (EC 1165-2-214) dated December 15, 2012, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

The purpose of the IEPR is to assess the "adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (EC 1165-2-214; p. D-4) for the Chicago Shoreline documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) with extensive experience in civil/cost engineering and economic issues relevant to the project. They will also have experience applying their subject matter expertise to coastal storm damage reduction.

The Panel will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-214, Appendix D, review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The

panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Documents for Review
The following documents are to be reviewed by designated discipline:

Title	Approximate Number of Pages	Required Disciplines
Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Post Authorization Change Report (PACR) Main Report	20	All Disciplines
Plates	3	All Disciplines
Appendix A: Economic Reevaluation	70	All Disciplines
Appendix A: Attachments	60	All Disciplines
Appendix B: Project Cooperation Agreements	128	All Disciplines
Appendix C: Cost Estimating	159	All Disciplines
Appendix D: Cost Increase Details	7	All Disciplines
Appendix E: Computation of FY12 902 Limit	12	All Disciplines
Appendix F: NEPA History	3	All Disciplines
Total Pages for review	**462**	

Documents for Reference

- USACE guidance Civil Works Review, (EC 1165-2-209, Change 1) released January 31, 2012
- Office of Management and Budget's Final Information Quality Bulletin for Peer Review released December 16, 2004.

SCHEDULE

This final schedule is based on the March 7, 2013 receipt of the final review documents. The schedule will be revised upon receipt of final review documents.

Task	Action	Days to Complete Action	Due Date
Conduct Peer Review	Battelle sends review documents to IEPR Panel	Within 1 day of panel being under subcontract or submission of Final Work Plan, whichever is later	3/9/2013
	Battelle/IEPR Panel kick-off meeting	Within 2 days of panel being under subcontract or submission of Final Work Plan, whichever is later	3/11/2013
	USACE/Battelle/Panel kick-off meeting	Within 2 days of panel being under subcontract or submission of Final Work Plan, whichever is later	3/11/2013
	Battelle convenes mid-review teleconference for panel to ask clarifying questions of USACE	Upon panel members completing 75% of review	3/14/2013
	Panel members complete their individual reviews	Within 15 days of Battelle/panel Kick-off meeting	3/15/2013
Prepare Final Panel Comments and Final IEPR Report	Battelle provides Panel merged individual comments and talking points for panel review teleconference	Within 2 days of receipt of individual comments	3/19/2013
	Convene panel review teleconference	Within 3 days of Panel members completing their review	3/20/2013
	Battelle provides Final Panel Comments directive to Panel	Within 1 day of Panel review teleconference	3/21/2013
	Panel members provide draft Final Panel Comments to Battelle	Within 6 days of Panel review teleconference	3/25/2013
	Battelle provides feedback to Panel on draft Final Panel Comments; Panel provides revised draft Final Panel Comments per Battelle feedback (iterative process)	Iterative process, no more than 2 days for each revision	3/26/2013-3/28/2013
	Final Panel Comments finalized	Within 7 days of receipt of draft Final Panel Comments	3/29/2013
	Battelle provides Final IEPR Report to Panel for review	Within 2 days Final Panel Comments being finalized	3/29/2013
	Panel provides comments on Final IEPR Report	Within 1 days of receipt of Final IEPR report	4/1/2013
	*Battelle submits Final IEPR Report to USACE	Within 19 days of panel review teleconference	4/2/2013

Task	Action	Days to Complete Action	Due Date
Post-Final Panel Comment Response Process	Battelle inputs Final Panel Comments to DrChecks; Battelle provides Post-Final Panel Comment Response Process template to USACE	Within 2 days of submittal of final report	4/3/2013
	USACE provides draft PDT Evaluator Responses and clarifying questions to Battelle	Within 5 days of receipt of final report	4/4/2013
	Battelle provides the Panel the draft PDT Evaluator Responses and clarifying questions	Within 3 day of receipt of draft PDT Evaluator responses and clarifying questions from USACE PDT	4/4/2013
	Panel members provide Battelle with draft comments on draft PDT Evaluator Responses (i.e., draft BackCheck Responses)	Within 1 days of receipt of draft PDT Evaluator responses from Battelle	4/5/2013
Post-Final Panel Comment Response Process, Continued	Teleconference with Battelle and Panel to discuss draft BackCheck Responses	Within 0 days of receipt of draft BackCheck comments	4/8/2013
	Teleconference between Battelle, Panel, and USACE to discuss Final Panel Comments, draft responses, and clarifying questions	Within 1 day of teleconference with Battelle and panel members	4/9/2013
	USACE inputs final PDT Evaluator Responses in DrChecks	Within 5 days of Final Panel Teleconference	4/12/2013
	Battelle provides PDT Evaluator Responses to Panel	Within 3 days of PDT Evaluator comments being available	4/15/2013
	Panel members provide Battelle with final BackCheck Responses	Within 3 days of receipt of PDT Evaluator comments	4/16/2013
	Battelle inputs the Panel's BackCheck Responses in DrChecks	Within 8 days of notification that USACE responses have been posted in DrChecks	4/17/2013
	*Battelle submits pdf printout of DrChecks project file	Within 1 day of DrChecks closeout	4/18/2013

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the Chicago Shoreline documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or Appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the Chicago Shoreline documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note the following guidance. Note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-214; Appendix D).

1. Your response to the charge questions should not be limited to a "yes" or "no." Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.
3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.
5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.
6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable
7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also please **do not** comment on or make recommendations on policy issues and decision making. Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Independent Technical Review.

2. Please contact the Battelle Project Manager (Dick Uhler, uhlerr@battelle.org) or Program Manager (Karen Johnson-Young (johnson-youngk@battelle.org) for requests or additional information.
3. In case of media contact, notify the Battelle Program Manager, Karen Johnson-Young (johnson-youngk@battelle.org) immediately.
4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to Dick Uhler, uhlerr@battelle.org, no later than March 15, 2013, 8 pm EST.

Independent External Peer Review of the Illinois Shoreline Erosion, Interim III Wilmette to Illinois/Indiana State Line (Chicago Shoreline) Project Post Authorization Change Report (PACR)

Charge Questions and Relevant Sections as Supplied by USACE

General Questions

1. Per ER1105-2-100, Section 4-1.b(2) Limited Reevaluation, does the document specifically detail the purpose of this limited reevaluation?
2. To what extent has it been shown that the project is technically sound?
3. Were all models used in the analyses used in an appropriate manner with assumptions appropriately documented and explained?
4. Were risk and uncertainty sufficiently considered related to the revised cost estimate?

SPECIFIC CHARGE QUESTIONS

Objectives

5. Is the purpose of the project adequately defined? If not, why?
6. Has the project need been clearly described?
7. Have the public concerns been identified and adequately described?
8. Are the specific objectives adequately described?
9. In your opinion, are there any other issues, resources, or concerns that have not been identified and/or addressed?

Alternatives/Affected Environment/Cost Estimates and Economics

10. Does the level of effort for the economic reevaluation commensurate with a reaffirmation of the justification of the authorized plan?
11. Does the limited economic reevaluations include sufficient data to describe what was done in the previously approved document, what was done in the limited reevaluation, what differences there are and the reasons for the differences.
12. Does the report use limited indexing for specific infrastructure benefit categories.
13. To what extent have significant project construction costs been adequately identified and described?
14. Are the costs adequately justified?

Public Involvement and Correspondence

15. Based on your experience with similar projects, has adequate public, stakeholder, and agency involvement occurred to determine all issues of interest and to ensure that the issues have been adequately addressed to the satisfaction of those interested parties? Should additional public outreach and coordination activities be conducted?

FINAL OVERVIEW QUESTION

16. What is the most important concern you have with the document or its appendices that was not covered in your answers to the questions above?