

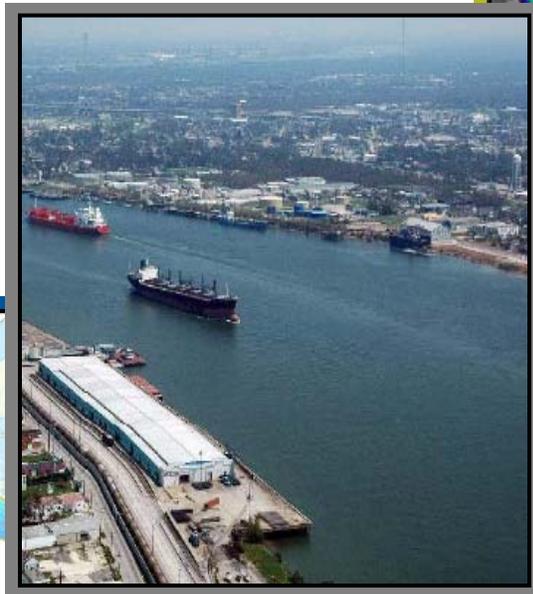
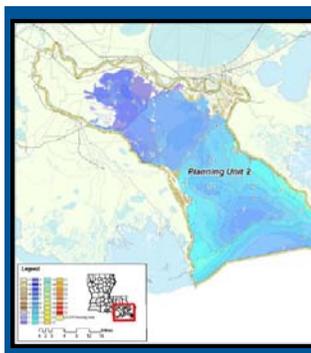
# Final Independent External Peer Review Report Donaldsonville, Louisiana, to the Gulf of Mexico, Flood Control — Mississippi River and Tributaries Project Feasibility Scoping Report and Supporting Documentation

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  
Baltimore District

Contract No. W911NF-11-D-0001  
Task Control Number: TCN12-015  
Delivery Order: 0106

May 15, 2012



**SHORT-TERM ANALYSIS SERVICE (STAS)**

**on**

**Final Independent External Peer Review Report  
Donaldsonville, Louisiana, to the Gulf of Mexico, Flood Control — Mississippi River and  
Tributaries Project Feasibility Scoping Report and Supporting Documentation**

**by**

**Battelle  
505 King Avenue  
Columbus, OH 43201**

**for**

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

**May 15, 2012  
Version 1**

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**Scientific Services Program**

The views, opinions, and/or findings contained in this report are those of the author and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

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**FINAL  
INDEPENDENT EXTERNAL PEER REVIEW REPORT  
for the**

**Donaldsonville, Louisiana, to the Gulf of Mexico, Flood Control — Mississippi  
River and Tributaries Project Feasibility Scoping Report and Supporting  
Documentation**

**EXECUTIVE SUMMARY**

**Project Background and Purpose**

The Donaldsonville, Louisiana to the Gulf of Mexico study area is located in Southeast Louisiana and includes portions of the Parishes of Ascension, Assumption, St. James, St. John the Baptist, Lafourche, St. Charles, Jefferson, and Plaquemines. The study area is located between Bayou Lafourche and the Mississippi River, from Donaldsonville to the Gulf of Mexico. Areas of development located within the study area are mostly unleveed or have inadequate levee systems, are dependent on gravity drainage, and are subject to the effects of interior rainfall flooding and riverine flooding. The southern half of the study area is also subject to tidal flooding due to hurricanes and other storms. The area is mostly wetland and agricultural lands with numerous communities located adjacent to major highways and adjacent to the Mississippi River and Bayou Lafourche. Before construction of the Mississippi River levees, the area was subjected to rainfall, tidal, and hurricane flooding from the Mississippi River resulting in structural, agricultural, and environmental damages. Flood damages are aggravated by the long duration of the high stages due to conveyance constrictions. Floods in June 1959, April 1980, November 1989, January 1991, and April/May 1991 produced near 100-year flood conditions. Hurricane Juan, in 1985, also produced near 100-year flood stages. This area has been declared a Federal disaster area three times since 1985 and has experienced several additional storms causing the Federal Emergency Management Administration (FEMA) to provide disaster assistance. Over 300 structures were damaged during the April/May 1991 flood.

In the development of plans for addressing the problems and needs of the study area relative to hurricane flooding, structural alternatives were considered. Due to the extent and types of existing development, limitations on the times for advance flood forecasting, and limitations on the capacities of hurricane evacuation routes, the development of strictly non-structural measures would not be responsive to the problems and needs of the area relative to hurricane flooding. Structural alternatives for addressing the problems and needs of the study area were limited to barriers to hurricane surges, such as levees, floodwalls, floodgates, and pumping stations.

The purpose of plan formulation was to identify economically justified and environmentally acceptable alternatives to provide flood protection to the Donaldsonville, Louisiana to the Gulf of Mexico study area. To develop these plans, municipal officials from the eight parishes located in the study area were contacted to determine if there were any areas under their jurisdiction that might qualify for protection under this study. The Lafourche Basin Levee District was contacted for the same purposes and served as the U.S. Army Corps of Engineers (USACE) liaison with

the parishes. In addition to discussions with these officials, USACE reviewed previous reports prepared by the New Orleans District, and reports prepared by consulting engineers, including the Barataria Terrebonne National Estuary Program Plan. Newspaper reports also identified areas of significant damage. Efforts were concentrated on the area of development in the study area most vulnerable to flooding.

Various alternative plans for providing flood damage protection to the study area were evaluated to provide protection from 100-year outside stages and 10-year interior stages due to rainfall. Lower levels of protection would not be acceptable to local residents and parish officials given the study area's vulnerability to storm surge and the potential loss of life if the protection were to be overtopped. The costs and benefits for each plan were evaluated using a traditional analysis to determine the plan that provides the greater net annual benefits. The plans were also evaluated based on their environmental impacts.

The evaluations performed during the initial feasibility study activities and subsequent screening-level analysis identified five alternative levee alignments that were analyzed in the final feasibility phase study. These alternatives were considered as well as the no-action (current condition) plan. Non-structural alternatives were not developed during the plan formation process.

The project is being suspended due to lack of economically justified alternatives leading to Federal interest as defined by the National Economic Development (NED) Plan criteria.

### **Independent External Peer Review Process**

USACE is conducting an Independent External Peer Review (IEPR) of the Donaldsonville, Louisiana, to the Gulf of Mexico, Flood Control — Mississippi River and Tributaries Project Feasibility Scoping Report and Supporting Documentation (hereinafter: Donaldsonville to the Gulf project). Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. Battelle, an independent, a 501(c)(3) non-profit science and technology organization, was engaged to coordinate the IEPR of the Donaldsonville to the Gulf project. Battelle is free from conflicts of interest (COIs), meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2010), and has experience in establishing and administering peer review panels for USACE. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2010), USACE (2007), and OMB (2004). This final report describes the IEPR process, describes the panel members and their selection, and summarizes the Final Panel Comments of the IEPR Panel (the Panel).

The candidates for the Panel were evaluated based on their technical expertise in the following key areas: Civil Works planning, hydrologic and hydraulic engineering, civil/construction engineering, economics, geotechnical/structural engineering, and coastal engineering. These areas correspond to the technical content of the Donaldsonville to the Gulf Feasibility Scoping Report and Supporting Documentation and overall scope of the Donaldsonville to the Gulf project.

The Civil Works planning, hydrologic and hydraulic engineering, civil/construction engineering, and economics technical areas of expertise listed above are among those previously identified for the Louisiana Water Resources Council (LWRC, as defined in WRDA 2007, Section 7009) Primary Panel.<sup>1</sup> Battelle consulted with the four appropriate LWRC Primary Panel Members and confirmed that their expertise and schedule commitments made them suitable to serve on the Panel. To locate experts for the last two technical areas of expertise listed above (geotechnical/structural engineering and coastal engineering), Battelle inquired with appropriate experts in the LWRC Candidate Pool; however, none of the candidates with suitable expertise in the Pool was available or qualified for this review. Therefore, to identify candidate panel members for these roles, 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 made the final selection of panel members according to the selection criteria described in the Work Plan. The final Panel was composed of six expert reviewers, with four experts from the LWRC Primary Panel and two experts from outside the LWRC Candidate Pool. 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.

The Panel received electronic versions of the Donaldsonville to the Gulf project review documents, totaling more than 900 pages, along with a charge that solicited comments on specific sections of the documents to be reviewed. The charge was prepared by USACE according to guidance provided in USACE (2010) and OMB (2004). Charge questions were provided by USACE and included in the draft and final Work Plans.

The USACE Project Delivery Team briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to the start of the review. In addition, an in-person meeting and site visit to discuss the Donaldsonville to the Gulf project was held in New Orleans on April 5-6, 2012. The purpose of the site visit was to brief the participants about the project and give them a driving tour of specific locations pertinent to the IEPR. Other than this site visit, there was no direct communication between the Panel and USACE during the peer review process. The Panel produced more than 500 individual comments in response to the 92 charge questions.

IEPR panel members reviewed the Donaldsonville to the Gulf 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, 16 Final Panel Comments were identified and documented. Of these, none were identified as having high significance, eight had medium significance, and eight had low significance.

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<sup>1</sup> Environment/ecology is the one LWRC Primary Panel expertise area that was not required for this IEPR.

## Results of the Independent External Peer Review

The panel members agreed among one another on their “assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used” (USACE, 2010; p. D-4) in the Donaldsonville to the Gulf project documents. The panel members approached their review of this project with the understanding that it was suspended due to there being no economically justified alternatives; however, many of the issues presented in their Final Panel Comments originated from the lack of acknowledgement in the review documents that the project was suspended. As the Final Panel Comments describe more specifically, the Panel thought that many aspects of the review documents were incomplete. In addition, if the review documents had included a summary of the project’s current state (i.e., suspension) some of the issues they found would have been eliminated or ameliorated.

Table ES-1 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. The following statements summarize the Panel’s findings.

**Plan Formulation Rationale:** The planning process is appropriate and USACE generally prioritized analyses according to their potential to affect the overall findings and the benefit-cost ratio. However, without explanation, certain elements are not analyzed in depth. The Panel’s Final Panel Comments identify specific areas for further consideration (e.g., refinements to flood modeling, relative sea level rise evaluations) because they have the potential (albeit, small) to affect the overall finding. Public involvement, which may have occurred, is not documented enough to ensure "acceptability." The entire process would have been strengthened by increased attention to and analysis of non-structural alternatives, which were eliminated very early in the planning structure with insufficient rationale presented as to why.

**Economics:** Overall, the benefit-cost analysis is sound and USACE’s conclusions drawn are consistent with the analysis. However, the benefit-cost analysis of structural alternatives may have underestimated both benefits and costs. For example, it appears that the benefit-cost ratios do not include any public infrastructure damages avoided as a project benefit. Some construction costs may have been underestimated because they were calculated on a lump sum basis, including costs for highway ramps, bridge relocations, and pump station frontal protection. There is no evidence that any incremental economic analysis of portions of structural alternatives was conducted. The limited discussion of income distribution and ethnicity does not sufficiently address environmental justice issues.

**Engineering:** The Feasibility Phase Study generally includes sufficient development of preliminary engineering design required to evaluate project feasibility with regard to cost-benefit analysis at this stage of the project. However, the Panel finds the engineering design incomplete with regard to rationale used for conservative levee design assumptions, some cost estimate elements, and some elements of the flood analysis.

**Environmental:** The descriptions of environmental changes associated with the alternatives are incomplete. While the Panel understands that further assessment of the environmental changes is

not likely to result in economically feasible alternatives, no reason for the incomplete assessment is provided. Any further analyses are likely to reduce the benefit-cost ratios even further for every alternative due to mitigation expenses.

**Table ES-1. Overview of 16 Final Panel Comments Identified by the Donaldsonville to the Gulf IEPR Panel**

No.	Final Panel Comment
<b>Significance – Medium</b>	
1	The rationale is not provided for why non-structural alternatives are not evaluated equivalently to structural alternatives.
2	Potential environmental impacts due to proposed changes in basin hydrology/hydraulics are not fully evaluated and no rationale is provided for omitting the analysis.
3	Evidence is not provided that a complete incremental economic analysis was conducted to identify possible combinations of separable reaches and alternatives that may be economically feasible.
4	Some of the coastal engineering assumptions used in the levee design are not described in detail and appear to be unnecessarily conservative, with no rationale provided.
5	The modeling of flooding inside the proposed levee alignments is not described in enough detail in some areas to understand the basis for, and certainty level of, the flood elevations used in the design and economic assessment.
6	Project planning does not consider how the findings may change under the range of relative sea level rise scenarios specified for consideration by USACE guidance.
7	A borrow availability analysis has not been conducted to verify if the magnitude of suitable borrow material is available for levee construction.
8	Detailed estimates for infrastructure damages avoided are not included in the FSM's Summary of the Economic Analysis, even though the benefits of avoiding these damages may have raised the benefit-cost ratio.
<b>Significance – Low</b>	
9	Easily accessible information on the characteristics of each alternative is not provided, making it difficult to compare alternatives.
10	Stability analyses for unbalanced force computations are not included for the sluice gate T-wall in the structural computations.
11	While it appears that some level of outreach was conducted, there is no documentation of public meetings or stakeholder feedback.
12	Based on specific omissions from the cost estimates, the estimated project costs are less than the probable actual project costs.
13	The construction cost estimate is limited in its use because significant items have not been estimated on a calculated quantities basis.
14	The results of the RMA2 hydrodynamic model should be considered qualitative in nature and only valid for relative comparison between existing and post-project conditions.

No.	Final Panel Comment
15	The income characteristics of, and the impacts to, low income and minority populations are not discussed in the documentation.
16	It is unclear how the absence of Lafourche Ridge 1 will affect the Morganza to the Gulf project, and whether or not benefits should be assigned to Lafourche Ridge 1 for protecting the east flank of the Morganza project.

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## LIST OF ACRONYMS

ATR	Agency Technical Review
BAA	Borrow Availability Assessment
BBBS	Barataria Basin Barrier Shoreline
COI	Conflict of Interest
DrChecks	Design Review and Checking System
FEMA	Federal Emergency Management Agency
FSM	Feasibility Scoping Meeting
GIWW	Gulf Intercoastal Waterway
HEC-FDA	Hydrologic Engineering Center Floor Damage Reduction Analysis
HSDRRS	Hurricane and Storm Damage Risk Reduction System
IEPR	Independent External Peer Review
LWRC	Louisiana Water Resources Council
NED	National Economic Development
NTP	Notice to Proceed
O&M	Operation and Maintenance
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PDT	Project Delivery Team
SAR	Safety Assurance Review
RSLR	Relative sea level rise
SLR	Sea level rise
TAW	Technology Advisory Committee on Flood Defence
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
WES	Waterways Experimental Station
WRDA	Water Resources Development Act

# 1. INTRODUCTION

The Donaldsonville, Louisiana to the Gulf of Mexico study area is located in Southeast Louisiana and includes portions of the Parishes of Ascension, Assumption, St. James, St. John the Baptist, Lafourche, St. Charles, Jefferson, and Plaquemines. The study area is located between Bayou Lafourche and the Mississippi River, from Donaldsonville to the Gulf of Mexico. Areas of development located within the study area are mostly unleveed or have inadequate levee systems, are dependent on gravity drainage, and are subject to the effects of interior rainfall flooding and riverine flooding. The southern half of the study area is also subject to tidal flooding due to hurricanes and other storms. The area is mostly wetland and agricultural lands with numerous communities located adjacent to major highways and adjacent to the Mississippi River and Bayou Lafourche. Before construction of the Mississippi River levees, the area was subjected to rainfall, tidal, and hurricane flooding from the Mississippi River resulting in structural, agricultural, and environmental damages. Flood damages are aggravated by the long duration of the high stages due to conveyance constrictions. Floods in June 1959, April 1980, November 1989, January 1991, and April/May 1991 produced near 100-year flood conditions. Hurricane Juan, in 1985, also produced near 100-year flood stages. This area has been declared a Federal disaster area three times since 1985 and has experienced several additional storms causing FEMA to provide disaster assistance. Over 300 structures were damaged during the April/May 1991 flood.

In the development of plans for addressing the problems and needs of the study area relative to hurricane flooding, structural alternatives were considered. Due to the extent and types of existing development, limitations on the times for advance flood forecasting, and limitations on the capacities of hurricane evacuation routes, the development of strictly non-structural measures would not be responsive to the problems and needs of the area relative to hurricane flooding. Structural alternatives for addressing the problems and needs of the study area were limited to barriers to hurricane surges, such as levees, floodwalls, floodgates, and pumping stations.

The purpose of plan formulation was to identify economically justified and environmentally acceptable alternatives to provide flood protection to the Donaldsonville, Louisiana to the Gulf of Mexico study area. To develop these plans, municipal officials from the eight parishes located in the study area were contacted to determine if there were any areas under their jurisdiction that might qualify for protection under this study. The Lafourche Basin Levee District was contacted for the same purposes and served as the USACE liaison with the parishes. In addition to discussions with these officials, USACE reviewed previous reports prepared by the New Orleans District, and reports prepared by consulting engineers, including the Barataria Terrebonne National Estuary Program Plan. Newspaper reports also identified areas of significant damages. Efforts were concentrated on the area of development in the study area most vulnerable to flooding.

Various alternative plans for providing flood damage protection to the study area were evaluated to provide protection from 100-year outside stages and 10-year interior stages due to rainfall. Lower levels of protection would not be acceptable to local residents and parish officials given the study area's vulnerability to storm surge and the potential loss of life if the protection were to

be overtopped. The costs and benefits for each plan were evaluated using a traditional analysis to determine the plan that provides the greater net annual benefits. The plans were also evaluated based on their environmental impacts.

The evaluations performed during the initial feasibility study activities and subsequent screening-level analysis identified five alternative levee alignments that were analyzed in the final feasibility phase study. These alternatives were considered as well as the no-action (current condition). Non-structural alternatives were not developed during the plan formation process.

The project is being suspended due to lack of economically-justified alternatives leading to Federal interest as defined by the National Economic Development Plan criteria.

The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Donaldsonville to the Gulf project in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE) Engineer Circular *Civil Works Review Policy* (EC No. 1165-2-209) (USACE, 2010), USACE CECW-CP memorandum *Peer Review Process* (USACE, 2007), 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 Donaldsonville to the Gulf project. 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 (2010) and USACE (2007).

In general, the purpose of peer review is to strengthen the quality and credibility of USACE decision documents in support of its Civil Works program. IEPR provides an independent assessment of the economic, engineering, and environmental 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.

In this case, the IEPR of the Donaldsonville to the Gulf project was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC No. 1165-2-209) 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 (2010) and in accordance with USACE (2007) and 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

After receiving the notice to proceed (NTP), 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).<sup>2</sup> Any revisions to the schedule were submitted as part of the final Work Plan.

Table 1 defines the schedule followed in executing the IEPR. Due dates for milestones and deliverables are based on the pre-award funding authorization date of February 9, 2012. USACE's statement of work (SOW) for the Donaldsonville to the Gulf IEPR identified Task 6 (Post-Final Panel Comment Process) as an option that would be exercised at USACE's discretion after USACE had reviewed the Panel's working drafts of the Final Panel Comment Statements. After Battelle provided the working drafts to USACE, USACE decided not to exercise the Task 6 option because the Project Delivery Team (PDT) did not have any major comments or questions for the Panel. Therefore, this Final IEPR Report for the Donaldsonville to the Gulf project is the final deliverable under this contract. No Final Panel Comments, PDT Evaluator Responses, or BackCheck Responses will be entered into USACE's Design Review and Checking System (DrChecks) system.

#### 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 Works planning, hydrologic and hydraulic engineering, civil/construction engineering, economics, geotechnical/structural engineering, and coastal engineering. These areas correspond to the technical content of the Donaldsonville to the Gulf Feasibility Scoping Report and Supporting Documentation and overall scope of the Donaldsonville to the Gulf project.

The first four technical areas of expertise listed above are among those previously identified for the Louisiana Water Resources Council (LWRC, as defined in WRDA 2007, Section 7009) Primary Panel (environment/ecology is the one LWRC Primary Panel expertise areas that was not required for this IEPR). Battelle consulted with the four appropriate LWRC Primary Panel Members and confirmed that their expertise and schedule commitments made them suitable to serve on the Panel. To locate experts for the last two technical areas of expertise, geotechnical/structural engineering and coastal engineering, Battelle inquired with appropriate

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<sup>2</sup> Pre-award funding was authorized by the Army Research Office (ARO) on February 9, 2012. The official Notice to Proceed (NTP) was awarded by ARO on February 16, 2012, and received by Battelle on February 17, 2012.

**Table 1. Donaldsonville to the Gulf IEPR Schedule**

Task	Action	Due Date
1	Pre-award funding approval <sup>3</sup> /NTP	February 9, 2012
	Review documents available	February 23, 2012
	Battelle submits draft Work Plan <sup>4</sup>	March 5, 2012
	USACE provides comments on draft Work Plan	March 12, 2012
	Battelle submits final Work Plan <sup>4</sup>	March 19, 2012
2	Battelle submits list of 6 selected panel members <sup>4</sup>	February 28, 2012
	USACE confirms panel members have no COI	March 13, 2012
	Battelle completes subcontracts for panel members	March 15, 2012
3	Battelle convenes kick-off meeting with USACE	February 24, 2012
	Battelle sends review documents and charge to the Panel	March 16, 2012
	Battelle convenes kick-off meeting with the Panel	March 20, 2012
	Battelle convenes kick-off meeting with USACE and the Panel	March 20, 2012
	USACE convenes a site visit in New Orleans for the Panel and Battelle	April 6, 2012
4	Panel completes review and provides comments to Battelle	April 17, 2012
	Battelle consolidates comments from IEPR Panel	April 19, 2012
	Battelle convenes Panel Review Teleconference with the Panel	April 23, 2012
	Panel members provide draft Final Panel Comments to Battelle	May 1, 2012
	Panel members finalize Final Panel Comments	May 10, 2012
5	Battelle submits Final IEPR Report to USACE <sup>4</sup>	May 15, 2012
	Project Closeout	August 27, 2012

experts in the LWRC Candidate Pool; however, none of the candidates with suitable expertise in the Pool was available or qualified for this review. Therefore, to identify candidate panel members for these roles, 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 made the final selection of panel members according to the selection criteria described in the Work Plan. The final Panel was composed of six expert reviewers, with four experts coming from the LWRC Primary Panel and two experts from outside the LWRC Candidate Pool. 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.

<sup>3</sup> Requested to start on Panel subcontracting procedures to meet an aggressive schedule

<sup>4</sup> Deliverable

The candidates were screened for the following potential exclusion criteria or COIs.<sup>5</sup> 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<sup>6</sup> in any part of the Donaldsonville, Louisiana, to the Gulf of Mexico, Flood Control—Mississippi River and Tributaries Project (Donaldsonville, Louisiana, to the Gulf of Mexico project).
- Previous and/or current involvement by you or your firm<sup>6</sup> in any work related to the Donaldsonville, Louisiana to the Gulf of Mexico, Flood Control—Mississippi River and Tributaries Project (Donaldsonville, Louisiana, to the Gulf of Mexico project).
- Previous and/or current involvement by you or your firm<sup>6</sup> in any work on Louisiana Coastal Protection and Restoration Authority-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 Donaldsonville, Louisiana, to the Gulf of Mexico project.
- Current or previous employment or affiliation with members of the cooperating entities, including the Louisiana Coastal Protection and Restoration Authority, the Lafourche Basin Levee District, Sunshine Levee District, South Lafourche Levee District, Ascension Parish Government, Assumption Parish Government, Lafourche Parish Government, St. James Parish Government, St. John the Baptist Parish Government, St. Charles Parish Government, Jefferson Parish Government, Plaquemines Parish Government, National Resources Conservation Service (NRCS), Barataria/Terrebonne National Estuary Program (BTNEP), Louisiana Department of Transportation and Development, U.S. Fish and Wildlife Service, U.S. EPA Region VI, National Marine Fisheries Service, Advisory Council on Historic Preservation, Louisiana Department of Natural Resources, Louisiana Department of Environmental Quality, and/or the Louisiana State Historic Preservation Office.
- Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to the Donaldsonville, Louisiana, to the Gulf of Mexico project.

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<sup>5</sup> 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."

<sup>6</sup> Includes any joint ventures in which your firm is involved and if your firm serves as a prime or as a subcontractor to a prime. Please clarify which relationship exists.

- 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, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the New Orleans District.
- Previous and/or current firm<sup>6</sup> involvement with other USACE projects, specifically those projects/contracts that are with the New Orleans District. If yes, provide (a) title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role: (b) MVN division, branch or section and contract/task order technical manager.
- Any previous employment by USACE as a direct employee or contractor (either as an individual or through your firm<sup>6</sup>) within the last 10 years, notably if those projects/contracts are with the New Orleans 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 flood damage protection and hurricane and storm damage risk reduction, and include the client/agency and duration of review (approximate dates).
- Pending, current, or future financial interests in Donaldsonville, Louisiana, to the Gulf of Mexico project- related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm<sup>6</sup> revenues within the last 3 years came from USACE contracts.
- Any publicly documented statement (including, for example, advocating for or discouraging against) related to the Donaldsonville, Louisiana, to the Gulf of Mexico project
- Participation in relevant prior Federal studies relevant to this project:
  - Donaldsonville, Louisiana, to the Gulf of Mexico, Flood Control – Mississippi River & Tributaries, Reconnaissance Study (June 2000)
  - LACPR Technical Report and Appendixes (June 2009)
  - Integrated Ecosystem Restoration and Hurricane Protection: Louisiana’s Comprehensive Master Plan for a Sustainable Coast (May 2007).
  - Louisiana Coastal Area, Louisiana Ecosystem Restoration (LCA Study)
  - Donaldsonville to the Gulf of Mexico Flood Control Project, Value Engineering Study Summary Report (July 2003)
- Previous and/or current participation in prior non-Federal studies relevant to the Donaldsonville, Louisiana, to the Gulf of Mexico project.
- 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:

In selecting the final members of the Panel from the list of candidates, Battelle chose experts who best fit the expertise areas and had no COIs. The six final reviewers were either affiliated with academic institutions (serving as independent contractors) or consulting companies.

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 selections of the Panel. Section 4 of this report provides names and biographical information on the panel members.

Prior to beginning their review and within 5 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. In addition, on April 5 and 6, 2012, all six panel members accompanied by two Battelle personnel attended an in-person meeting and site visit in New Orleans. The USACE PDT provided a site visit debriefing meeting on the evening of April 5, designed to give the Panel a geographic overview of the following day’s site visit. On April 6, USACE PDT led the Panel and Battelle personnel on a site visit, consisting of a driving tour to specific locations of interest for the Donaldsonville to the Gulf project, answering questions from the Panel, and providing additional background information on the study area and project. Other than this site visit, there was no direct communication between the Panel and USACE during the peer review

### 3.3 Preparation of the Charge and Conduct of the IEPR

Charge questions were provided by USACE and included in the draft and final Work Plans. In addition to a list of 92 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 final 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 Donaldsonville to the Gulf project documents, supplemental information, and the reference materials listed below. The documents listed in Table 2 were provided for review; documents provided for supplemental information only (i.e., there are no charge questions about these documents) are listed in Table 3. Three other documents were provided for reference.

**Table 2. Documents for Panel Review**

No.	Document Name
1	Donaldsonville, Louisiana to the Gulf of Mexico Reconnaissance Report
2	Donaldsonville, Louisiana, to the Gulf of Mexico Feasibility Scoping Meeting Pre-Conference Submittal
3	Donaldsonville, Louisiana to the Gulf of Mexico Feasibility Study: H&H Appendix, Volume 2
4	Donaldsonville to the Gulf, Louisiana Summary of the Economic Analysis Feasibility Scoping Meeting, December 2010
5	Analysis of all proposed alignments_final.xlsx
6	Donaldsonville to the Gulf, Louisiana Hurricane Protection Project_ROW
7	Donaldsonville to the Gulf, Louisiana Hurricane Protection Project Feasibility Report Appendix, Levees

**Table 3. Supplemental Information for IEPR Panel.**

No.	Document Name
1	Donaldsonville To The Gulf Barataria Bay Interior Drainage And Transport Model Study
2	Vol 1 Nav and Floodwall Gate Alt DDR for GIWW, Hwy 90 and Pipeline Alignments
3	Vol 2 Nav and Floodwall Gate Alt Design Calc for GIWW
4	Vol 3 Nav and Floodwall Gate Alt Design Cal for Hwy 90
5	Vol 4 Nav and Floodwall Gate Alt Design for Pipeline
6	Vol 5 Nav and Floodwall Gate Alt Plans for GIWW, Hwy 90, and Pipeline Alignments
7	Depth-Damage Relationships for Structures, Contents, and Vehicles and Content-To-Structure Value Ratios (CSVR) in Support of the Donaldsonville to the Gulf, Louisiana, Feasibility Study
8	Donaldsonville To The Gulf Feasibility Study: Residential And Nonresidential Structure Inventory
9	Donaldsonville_HECFDA_12_08_2010_DRAFT_2.xlsx
10	Geotechnical Design Preliminary, USACE Screening Phase Final Report, Donaldsonville, Louisiana To The Gulf Of Mexico Flood Control, Mississippi River And Tributaries Feasibility Study Eustis Engineering Project No. 20065
11	Donaldsonville, Louisiana To The Gulf Of Mexico Project Study Plan (PMP), February 2002
12	Donaldsonville, Louisiana To The Gulf Of Mexico Project Study Plan Amendment (PMP amendment), January 2007
13	Donaldsonville, Louisiana To The Gulf Of Mexico Project Management Plan (PSP), March 2009
14	ATR Comments of FSM Meeting Pre-Conference Submittal
15	HSDRRS Quality Management Plan

**Documents for Reference**

- USACE guidance Civil Works Review Policy (EC 1165-2-209) dated January 31, 2010
- CECW-CP Memorandum dated March 31, 2007
- Office of Management and Budget’s Final Information Quality Bulletin for Peer Review released December 16, 2004.

In addition, during the review process, the Panel requested the following supplemental information from USACE:.

- Final Report: Development of Depth-Emergency Cost and Infrastructure Damage Relationships for Selected South Louisiana Parishes, March 2012.

This additional document was provided to Battelle and then sent to the Panel as supplemental information only and was not part of the official review

**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 approximately 500 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 500 comments into a preliminary list of 19 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 4-hour teleconference with the Panel so that the panel members, many of whom are from diverse scientific backgrounds, 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.

The Panel also discussed responses to one specific charge question where there appeared to be disagreement among panel members. The conflicting comment was resolved based on the professional judgment of the Panel and was determined not to be conflicting.

At the end of these discussions, the Panel identified 16 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 Donaldsonville to the Gulf IEPR:

- **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 other IEPR panel members 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, 16 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 from the LWRC Primary Panel and by using Battelle’s Peer Reviewer Database, targeted Internet searches using key words (e.g., technical area, geographic region), searches of websites of universities or other compiled expert sites, and referrals.

An overview of the credentials of the final six primary members of the Panel and their qualifications in relation to the technical evaluation criteria is presented in Table 4. More detailed biographical information regarding each panel member and his or her area of technical expertise is presented below.

**Table 4. Donaldsonville to the Gulf IEPR Panel: Technical Criteria and Areas of Expertise**

Technical Criteria	Casavant	Orr	Fenical	Loomis	Farmer	Ellis
<b>Civil Works Planning (one expert needed)</b>						
Minimum 10 years demonstrated experience in public works planning	X					
Direct experience working for or with USACE	X				X	
Very familiar with USACE plan formulation process, procedures, and standards	X					
Familiar with USACE hurricane and coastal storm damage risk reduction projects, as well as riverine flood risk management projects	X				X	
Minimum 5 years experience directly dealing with the USACE six-step planning process as described in ER 1105-2-100	X					
Experience identifying and evaluating impacts to environmental resources from structural flood risk management and hurricane and coastal storm damage risk reduction projects	X					
<b>Hydrology and Hydraulics Engineering (one expert needed)</b>						
Expert in hydraulic and hydrologic modeling related to riverine flood risk management		X				
Minimum 10 years experience in hydrologic and hydraulic engineering		X				
Familiar with USACE application of risk and uncertainty analyses in flood risk management studies		X				
Familiar with standard USACE hydrologic and hydraulic models, including HEC-HMS and HEC-RAS, as well as familiarity with ADCIRC storm surge simulation model		X	X			

**Table 4. Donaldsonville to the Gulf IEPR Panel: Technical Criteria and Areas of Expertise, continued**

Technical Criteria	Casavant	Orr	Fenical	Loomis	Farmer	Ellis
<b>Coastal Engineering (one expert needed)</b>						
Minimum 10 years experience in coastal and hydraulic engineering			X			
Familiar with USACE application of risk and uncertainty analyses in hurricane and coastal storm damage risk reduction projects			X			
Familiar with standard USACE coastal, hydrologic, hydraulic computer models, including SBEACH and GENESIS			X			
Registered professional engineer			X			
Minimum Master's Degree in engineering			X			
Minimum 10 years experience in coastal and hydraulic engineering			X			
<b>Economics (one expert needed)</b>						
Minimum 10 years experience directly related to water resource economic evaluation or review				X		
Direct experience working for or with USACE				X		
Familiar with the USACE planning process, guidance, and economic evaluation techniques				X		
Familiar with the USACE flood risk management analysis and benefit calculations, including the use of standard USACE computer programs				X		

**Table 4. Donaldsonville to the Gulf IEPR Panel: Technical Criteria and Areas of Expertise, continued**

Technical Criteria	Casavant	Orr	Fenical	Loomis	Farmer	Ellis
Experience with the National Economic Development (NED) analysis procedures, particularly as they relate to flood risk management and hurricane and coastal storm damage risk reduction				X		
<b>Geotechnical/Structural Engineering (one expert needed)</b>						
Minimum 10 years experience in civil or construction engineering					X	
Familiar with geotechnical practices associated with levee, T-wall structure, closure structure, and pumping station design and construction, specifically related to flood risk management and hurricane and coastal storm damage risk reduction projects in southeastern Louisiana					X	
Capable of addressing the USACE Safety Assurance Review (SAR) aspects of all projects					X	
Registered professional engineer					X	
<b>Civil/Construction Engineering (one expert needed)</b>						
Minimum 10 years experience in civil or construction engineering						X
Demonstrated experience in performing cost engineering/construction management for all phases of flood risk management and storm damage risk reduction related projects						X
Familiar with and have demonstrated experience related to levee design and construction					X	X
Experience related to pumping station design as well as water control structures						X
Capable of addressing the USACE SAR aspects of all projects						X
Registered professional engineer						X

### ***Ken Casavant***

**Role:** This panel member was chosen primarily for his Civil Works planning experience and expertise.

**Affiliation:** Independent contractor

**Ken Casavant, Ph.D.** is currently a professor and agricultural economist at the School of Economic Sciences at Washington State University and has also served as an adjunct professor at North Dakota State's Upper Great Plains Transportation Institute since 2002. He earned his Ph.D. in economics from Washington State University in 1971 and has 46 years of experience as an economist, with expertise in transportation economics and planning. He has served as an economic consultant detailing the tradeoffs necessary on several public works projects, most recently on studies of the deep draft national and international maritime industry. Dr. Casavant also has over 10 years experience in plan formulation, evaluation and comparison of alternative plans for numerous ecosystem restoration projects, navigation studies, and feasibility studies including his technical reviews of the Lower Columbia River Channel Deepening Project, the Upper Mississippi and Illinois Navigation Study, the Barataria Basin Barrier Shoreline (BBBS) Restoration Study, and the Mississippi River Gulf Outlet Ecosystem Restoration Plan. Many of these included the assessment and sensitivity analyses of coastal storm damage and flood risk management. He is familiar with USACE standards and procedures and the IWR-Planning Suite methodologies, with a focus on ecological output per dollar of relevant expenditure for alternative project formulations. He also has experience evaluating the usage and output of HEC-FDA models. Risk analysis and risk models are critical to many of his projects, including ecosystem restoration projects that included a methodological review of flood risk management. His dam construction and public works development and evaluation projects have included benefit/cost analysis where a major benefit has been flood risk reduction. His expertise on the needs and policy alternatives for agricultural and system transportation, ranging from development of intelligent transportation systems' applications to logistical designs for port physical distribution systems, and competitive impacts from investments in infrastructure and regulatory changes has been sought out by the public and private organizations state governments, railroad/ truck/marine firms, and legal institutions. He is a member of numerous professional associations including the Transportation Research Board - National Research Council, the International Agricultural Economics Association, and the Logistics and Physical Distribution Association.

### ***Michelle Orr***

**Role:** This panel member was chosen primarily for her hydrologic and hydraulic engineering experience and expertise.

**Affiliation:** ESA PWA

**Michelle Orr, P.E.,** is a Director at ESA PWA (formerly Philip Williams and Associates, Ltd.). She earned her M.S. in water resources engineering from the University of California, Berkeley in 1995 and is a registered professional civil engineer in California. With a background in coastal and riverine hydraulics, Ms. Orr has 18 years of experience in coastal wetland restoration planning and design, flood management and habitat restoration integration, environmental impact assessment, and project management. She is an experienced manager of multidiscipline

ecosystem restoration projects, including major projects in the San Francisco Bay, the Sacramento-San Joaquin Delta, the San Diego Bay, and Puget Sound and has completed over 100 planning and engineering studies related to the management and restoration of estuaries, wetlands, and lagoons. For the South San Francisco Bay project she was responsible for engineering analyses related to flood risk reduction for 15 miles of shoreline, including combined coastal and riverine flood modeling at the mouths of three major creeks/ivers. Ms. Orr has conducted numerous drainage analyses of flood-prone, low-lying areas behind flood protection levees, including modeling simulation of runoff, ponding/detention, and drainage by pumping and gravity flow through culverts.

She has extensive experience using standard hydrologic, hydraulic, and sediment transport models (HEC-RAS, HEC-HMS, HEC-6) and has been responsible for numerous projects that use 1D and 2D hydrodynamic and sediment transport models to address circulation, flooding, and deposition/erosion (e.g., MIKE-11, MIKE-21, MIKE Flood, Delft 3D, UNET). Though her education and experience with hydraulic and hydrologic modeling related to flood/coastal storm damage reduction, Ms Orr is familiar with aspects of USACE Safety Assurance Review (SAR) such as assessment of appropriate methods, best practices, resilience, and performance monitoring.

### ***John Loomis***

**Role:** This panel member was chosen primarily for his economics experience and expertise.

**Affiliation:** Independent Contractor

**John Loomis, Ph.D.,** is a professor of economics in the Department of Agricultural and Resource Economics at Colorado State University (CSU) with more than 30 years of experience. He earned his Ph.D. in economics from Colorado State University in 1983, has taught courses in economics there and at University of California-Davis for 23 years. For more than 20 years, Dr. Loomis has been performing economic evaluations for numerous water resource projects, such as hydroelectric relicensing, irrigation water and trade-offs with instream flows and waterfowl, endangered fish recovery, and reservoir management

Dr. Loomis has several areas of direct experience working with USACE that include conducting training courses in conjunction with USACE Waterways Experimental Station. He has evaluated water resource management at several USACE reservoirs in CA and TN, participated in the Lower Snake River Feasibility Study on dam removal for the USACE Walla Walla District, and conducted studies on the value of salmon fisheries used in the agency Environmental Impact Statement.

Through his work with the USACE WES and other federal agencies, he is very familiar with the U.S. Water Resources Council Principles and Guidelines for conducting benefit-cost analysis for NED that USACE utilizes to conduct economic analyses. He was a panel member for the Surf City and North Topsail Beach IEPR in which hurricane and coastal storm damage reduction was the main part of the NED analysis; this also involved reviewing HEC-FDA output. He has familiarity with flood risk management analysis and benefit calculations on damage avoided and property values. Dr. Loomis's extensive work on EISs has provided him with a strong

understanding of the USACE planning process. He is well versed in economic evaluation techniques including discounting, present value calculations, and plan evaluation.

He has experience with standard economic computer models based on multiple regression (e.g., Hedonic Property Models of damages to property from floods, hurricanes and other natural and manmade effects) and spreadsheet analysis (e.g., Excel-based economic analysis models). He is familiar with flood damage avoidance analyses and USACE's HEC models and their use of 50-year and 100-year flood events probabilities, damages associated with them, and how the damages can be reduced.

Dr. Loomis has authored three books that include chapters on economic evaluation techniques, and published numerous economic studies using the Travel Cost Method and Contingent Valuation Methods for valuation of NED benefits from recreational fishing, hunting and wildlife viewing.

### ***Ronald Farmer***

**Role:** This panel member was chosen primarily for his geotechnical/structural engineering experience and expertise.

**Affiliation:** Short Elliott Hendrickson, Inc.

**Ronald Farmer, P.E.** is a principal and geotechnical project engineer at Short Elliott Hendrickson, Inc. (SEH) and has 40 years of experience specializing in field investigations, laboratory testing programs, and analysis and design of civil engineering projects. He earned his M.S. in civil engineering from Purdue University in 1977 and worked with the USACE from 1982-1988. He is a licensed professional engineer in Wisconsin, Minnesota, North Dakota, Indiana, and Louisiana with a background (among other things) in levees and flood control structures, wastewater treatment plants, sludge storage dikes, earth and gravity dams, relief wells, bank erosion/shore protection, retaining walls, and construction inspection.

Mr. Farmer was the lead geotechnical engineer for the Crookston, Minnesota Flood Control project, a nearly \$30 million flood control project along the Red Lake River. The Crookston project involved over 25,000 linear feet of levees and floodwalls, numerous pump stations, reinforced retaining wall design and construction, T-wall structures, erosion control design work, toe drain design, utility relocations, and cutoff channels. His design analyses for this project included seepage analysis, slope stability computations, floodwall bearing capacity and underseepage computations, settlement estimates, segmental retaining wall design, and corrosion control designs. Mr. Farmer was also the lead geotechnical engineer for USACE's Heartsville Coulee Diversion and Levee project in East Grand Forks, Minnesota, which included a mile-long diversion channel, drop structures, three miles of levee and a 40-foot high coulee closure dike. His experience with closure structures includes USACE's St. Paul Flood Control, Stage 2 project, for which he was responsible for the final design of \$3 million of flood control improvements. Mr. Farmer is capable of addressing USACE SAR aspects of projects, having worked on numerous USACE projects, being a registered civil engineer in Louisiana, and having completed the geotechnical portion of a Type II IEPR SAR for Columbus, Hooper, and Waterloo, NE USACE Section 408 improvements.

Mr. Farmer is a member of American Society of Civil Engineers, Minnesota Geotechnical Conference Organizing Committee, Minnesota Geotechnical Society, and the Association of State Dam Safety Officials (ASDSO).

***Ralph Ellis***

**Role:** This panel member was chosen primarily for his civil/construction engineering experience and expertise.

**Affiliation:** Independent Contractor

**Ralph Ellis, Ph.D., P.E.**, is an Associate Professor in the Department of Civil Engineering at the University of Florida (UF) specializing in the areas of engineering management, construction engineering, and the legal aspects of construction. He earned a Ph.D. in civil engineering from the University of Florida in 1989, and is a licensed professional engineer in Florida. Dr. Ellis has over 35 years of construction engineering and management experience, and has worked on large-scale civil engineering projects both regionally and internationally.

Prior to joining the university, he was president of the Hammer Corporation construction firm and Director of Projects for the FMI Hammer Joint Venture where he was responsible for estimating and delivering all construction projects, including numerous projects for USACE, U.S. Navy, and the Panama Canal Company. Many of these projects were located in South Florida and Central America and involved the construction of large-scale earthworks, some directly associated with flood control projects. He is familiar with all aspects required for the construction of pump station structures, which typically require setting up complex dewatering operations. Dr. Ellis is familiar with construction practices commonly required for Everglades Restoration projects in South Florida, as well as those used on Gulf Coast projects. Through his background and project experience, Dr. Ellis has an understanding of the USACE SAR design and analysis processes with regard to civil structures such as those constructed for flood control purposes. He is familiar with incorporating environmental protection planning into project operations, and has been teaching earthwork construction methods and environmental protection planning to engineering students for over 20 years.

Dr. Ellis has written more than 55 construction related research publications, and has performed over 48 research projects focusing on construction management and construction technical issues. He has also served as a construction cost engineering expert for previous IEPRs of USACE projects.

***Scott Fenical***

**Role:** This panel member was chosen primarily for his coastal engineering experience and expertise.

**Affiliation:** Coast & Harbor Engineering, Inc.

**Scott Fenical, P.E.**, is a Principal Coastal Engineer at Coast & Harbor Engineering, with 16 years of professional experience in coastal processes analysis, numerical modeling, coastal engineering structure and marine habitat design, as well as port and dredging/dredged material disposal design in the U.S. and overseas. He earned his M.S. in Ocean Engineering from Texas A&M University in 1996 and is a registered professional engineer in Louisiana and California.

His areas of expertise are in the preparation and review of engineering plans and specifications for coastal/shoreline structures, including breakwaters, groins, revetments, floodwalls, beach nourishment, and dredging.

His coastal engineering analysis experience includes development, verification, and application of advanced numerical modeling tools to simulate hurricane-induced storm surge and waves, tidal and river current circulation, beach evolution, local wind-wave generation and transformation, wave and wind-generated nearshore circulation, sediment transport under waves and currents, and water quality and mixing zones. He is familiar with USACE application of risk and uncertainty analyses in hurricane and coastal storm damage risk reduction projects, and is familiar with USACE development of extreme storm analysis and return period determination based on wind field and storm surge.

Mr. Fenical has extensive experience in the application, calibration, validation and practical use of standard USACE numerical modeling tools including SBEACH, GENESIS and ADCIRC. Direct model applications related to hurricanes and typhoons have included storm surge modeling for hurricanes Rita and Katrina on the Gulf Coast; Caminada Pass Bridge Design, Grand Isle, Louisiana, and Oil Spill Hydrodynamic Analysis, Barataria Bay, Louisiana; Hurricane Wilma wave modeling in the Caribbean; Hurricane Floyd storm surge modeling in New York; and wave modeling and storm surge modeling for Glass Breakwater Repair Hydrodynamic Analysis in Guam. Mr. Fenical has also used Pacific Ocean scale ADCIRC modeling to develop coastal currents and storm surges for such projects as the Siuslaw River Jetties Major Maintenance Report, Florence, Oregon. He has used SBEACH for beach nourishment projects on the Gulf and Pacific coasts, and for evaluation of impacts to buried pipelines from seasonal beach changes. He has also been involved in the analysis of coastal conditions and modeling for preparation of FEMA flood elevations for the FEMA Flood Zone Appeal and Hydrodynamic Modeling, Port of San Francisco.

## **5. SUMMARY OF FINAL PANEL COMMENTS**

The panel members agreed among one another on their “assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used” (USACE, 2010; p. D-4) in the Donaldsonville to the Gulf project documents. The panel members approached their review of this project with the understanding that it was suspended due to there being no economically justified alternatives; however, many of the issues presented in their Final Panel Comments originated from the lack of acknowledgement in the review documents that the project was suspended. As the Final Panel Comments describe more specifically, the Panel thought that many aspects of the review documents were incomplete. In addition, if the review documents had included a summary of the project’s current state (i.e., suspension) some of the issues they found would have been eliminated or ameliorated.

Table ES-1 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. The following statements summarize the Panel’s findings.

**Plan Formulation Rationale:** The planning process is appropriate and USACE generally prioritized analyses according to their potential to affect the overall findings and the benefit-cost ratio. However, without explanation, certain elements are not analyzed in depth. The Panel’s Final Panel Comments identify specific areas for further consideration (e.g., refinements to flood modeling, relative sea level rise evaluations) because they have the potential (albeit, small) to affect the overall finding. Public involvement, which may have occurred, is not documented enough to ensure "acceptability." The entire process would have been strengthened by increased attention to and analysis of non-structural alternatives, which were eliminated very early in the planning structure with insufficient rationale presented as to why.

**Economics:** Overall, the benefit-cost analysis is sound and USACE’s conclusions drawn are consistent with the analysis. However, the benefit-cost analysis of structural alternatives may have underestimated both benefits and costs. For example, it appears that the benefit-cost ratios do not include any public infrastructure damages avoided as a project benefit. Some construction costs may have been underestimated because they were calculated on a lump sum basis, including costs for highway ramps, bridge relocations, and pump station frontal protection. There is no evidence that any incremental economic analysis of portions of structural alternatives was conducted. The limited discussion of income distribution and ethnicity does not sufficiently address environmental justice issues.

**Engineering:** The Feasibility Phase Study generally includes sufficient development of preliminary engineering design required to evaluate project feasibility with regard to cost-benefit analysis at this stage of the project. However, the Panel finds the engineering design incomplete with regard to rationale used for conservative levee design assumptions, some cost estimate elements, and some elements of the flood analysis.

**Environmental:** The descriptions of environmental changes associated with the alternatives are incomplete. While the Panel understands that further assessment of the environmental changes is not likely to result in economically feasible alternatives, no reason for the incomplete assessment is provided. Any further analyses are likely to reduce the benefit-cost ratios even further for every alternative due to mitigation expenses.

**Table 5. Overview of 16 Final Panel Comments Identified by the Donaldsonville to the Gulf IEPR Panel.**

No.	Final Panel Comment
<b>Significance – Medium</b>	
1	The rationale is not provided for why non-structural alternatives are not evaluated equivalently to structural alternatives.
2	Potential environmental impacts due to proposed changes in basin hydrology/hydraulics are not fully evaluated and no rationale is provided for omitting the analysis.
3	Evidence is not provided that a complete incremental economic analysis was conducted to identify possible combinations of separable reaches and alternatives that may be economically feasible.

No.	Final Panel Comment
4	Some of the coastal engineering assumptions used in the levee design are not described in detail and appear to be unnecessarily conservative, with no rationale provided.
5	The modeling of flooding inside the proposed levee alignments is not described in enough detail in some areas to understand the basis for, and certainty level of, the flood elevations used in the design and economic assessment.
6	Project planning does not consider how the findings may change under the range of relative sea level rise scenarios specified for consideration by USACE guidance.
7	A borrow availability analysis has not been conducted to verify if the magnitude of suitable borrow material is available for levee construction.
8	Detailed estimates for infrastructure damages avoided are not included in the FSM's Summary of the Economic Analysis, even though the benefits of avoiding these damages may have raised the benefit-cost ratio.
<b>Significance – Low</b>	
9	Easily accessible information on the characteristics of each alternative is not provided, making it difficult to compare alternatives.
10	Stability analyses for unbalanced force computations are not included for the sluice gate T-wall in the structural computations.
11	While it appears that some level of outreach was conducted, there is no documentation of public meetings or stakeholder feedback.
12	Based on specific omissions from the cost estimates, the estimated project costs are less than the probable actual project costs.
13	The construction cost estimate is limited in its use because significant items have not been estimated on a calculated quantities basis.
14	The results of the RMA2 hydrodynamic model should be considered qualitative in nature and only valid for relative comparison between existing and post-project conditions.
15	The income characteristics of, and the impacts to, low income and minority populations are not discussed in the documentation.
16	It is unclear how the absence of Lafourche Ridge 1 will affect the Morganza to the Gulf project, and whether or not benefits should be assigned to Lafourche Ridge 1 for protecting the east flank of the Morganza project.

## 6. REFERENCES

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USACE (2011). Sea-Level Change Considerations for Civil Works Programs. Engineer Circular (EC) 1165-2-212. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 1 October.

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USACE (2012b). Civil Works Construction Cost Index System (CWCCIS). Engineering Manual 1110-2-1304. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 31 March.

**APPENDIX A**

**Final Panel Comments**

**on the**

**Donaldsonville to the Gulf IEPR**

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**Final Panel Comment 1:**

**The rationale is not provided for why non-structural alternatives are not evaluated equivalently to structural alternatives.**

**Basis for Comment:**

The planning process for the Donaldsonville project is not complete because non-structural alternatives do not appear to receive consideration equal to that given to structural alternatives. The June 2010 Feasibility Scoping Meeting (FSM) document (p. 5) states “The full range of non-structural measures will be addressed for the project.” Pages 38-40 also state that USACE is required as part of a feasibility study “...to ensure that the benefits and costs associated with structural and non-structural alternatives are evaluated in an equitable manner.” However, the Panel did not see a level of analysis for the non-structural alternatives equivalent to that performed for the structural alternatives. Further, there is no specific analysis of the interrelationships between the possible non-structural and structural alternatives chosen for evaluation. The Panel understands that levees and floodgates are emphasized because of storm surge and resultant damage; these alternatives do yield tidal interchange capability but other non-structural alternatives are not adequately discussed.

The 2000 Reconnaissance Study discusses the non-structural measures and alternatives in a general fashion, but the discussion lacks specificity and subsequent documents largely do not consider non-structural alternatives, even as part of a system of actions. Based on information given during the site visit, the Panel assumes that the local sponsor did not want to consider non-structural alternatives because of the potential impact on the community (e.g., job loss), but no analysis of these impacts is made available.

It is possible that, as the major structural alternatives receive benefit-cost ratios less than unity (i.e., 1.0), other solutions that may not have been considered could consist of an acceptance of various non-structural alternatives such as structural raises or buyouts. Therefore, increased attention to non-structural alternatives is warranted.

**Significance –Medium:**

The planning process does not present all structural and non-structural alternatives, and therefore does not facilitate the determination of no economically justified alternative

**Recommendations for Resolution:**

1. Conduct a detailed inventory of possible non-structural alternatives applicable to the Donaldsonville project.
2. Conduct and provide complete evaluations (costs and benefits) of non-structural alternatives relative to structural alternatives or as complementary measures to structural alternatives.
3. To address the acceptability evaluation criteria for Civil Works planning, document the local sponsor’s and public’s perspectives on non-structural alternatives.

**Final Panel Comment 2:**

**Potential environmental impacts due to proposed changes in basin hydrology/hydraulics are not fully evaluated and no rationale is provided for omitting the analysis.**

**Basis for Comment:**

The potential changes to estuarine ecology that are indicated by hydrodynamic modeling results (circulation and water quality) are not analyzed to a level commensurate with a project of this magnitude, and should include a more detailed description of basin and estuarine ecological changes and a relative analysis of hydrodynamic conditions. If the reason for the lack of detail is the project's low benefit-cost ratio, this reason was not provided. The sections of the H&H Appendix provided for review contain no analysis of the circulation and water quality modeling results specific to potential changes in basin water quality and ecosystems, and only include the scope of work for the hydrodynamic modeling consultant. In the absence of a specific analysis of changes in basin hydrodynamics, the Panel considered the broader Barataria Bay Interior Drainage and Transport Model Study (CHT Report) provided in the supplemental documents.

The CHT report presents detailed descriptions of tidal analysis, model setup, and calibration. However, the CHT report supplemental document and the review documents, as a whole, provide only limited discussion of the changes in basin hydraulics, salinity, water quality, and related environmental impacts, notably:

- The CHT report shows changes in water surface elevation that are roughly 10% of tidal ranges, which could significantly change velocities relevant to the behavior of the basin ecosystem. No comparison of velocity time series is provided, only vector maps from which usable information cannot be obtained.
- Salinity plots for the Gulf Intracoastal Waterway (GIWW) and pipeline alignments show very large changes in salinity in some areas, up to roughly 50% (CHT report, Figure 2.3.10). Changes of this magnitude will have a significant impact on the basin ecology, and there is no discussion of these predicted changes in the CHT report or the review documents.
- Figure 2.3.13 of the CHT report shows that the RMA4 model predicts increases in residence (flushing) times of up to 50% after levee construction. Discussions during the site visit on April 6, 2012 indicate that the area is already subject to water quality problems following storm events due to poor drainage, so these increases in flushing times are likely to further impact water quality in the basin significantly.

**Significance – Medium:**

While a more complete assessment of potential environmental impacts is not expected to change the findings of no economically justified alternative, the lack of rationale for omitting this assessment affects projects completeness and understanding.

**Recommendations for Resolution:**

1. Explain why a complete environmental assessment was not completed and why not completing one would not affect the findings of no economically-justified alternative.
2. Add a broad, qualitative description of environmental changes associated with the alternatives and how these changes would vary between alternatives.

**Final Panel Comment 3:**

**Evidence is not provided that a complete incremental economic analysis was conducted to identify possible combinations of separable reaches and alternatives that may be economically feasible.**

**Basis for Comment:**

Given the finding that none of the alternatives are economically feasible on their own, typically one would conduct an incremental analysis of logical separable portions of a project.

In the FSM's Summary of the Economic Analysis, pages 26-28 display damages reduced by reach for the GIWW alignment alternative. It is clear that several contiguous reaches (e.g., 7A, 7B, 8A, and 9A) would have zero damages reduced with the construction of the GIWW alternative, whereas other contiguous reaches would have sizeable damages reduced (e.g., Gulf2, Gulf3, and Gulf4). These differences suggest that an incremental analysis for groups of contiguous reaches may be worthwhile to identify areas within the project area that potentially may be economically feasible to protect.

Aside from the GIWW alternative, the Panel did not find data on damages reduced by reach in the documentation provided for the other structural alternatives. Likewise, the Panel did not find any cost data by reach that could be compared to the damages reduced by reach in order to perform an incremental analysis of combinations of contiguous reaches of the Donaldsonville project.

**Significance – Medium:**

The omission of a complete economic analysis of structural flood control alternatives could result in overlooking potentially economically feasible flood control protection options in portions of the Donaldsonville project area.

**Recommendations for Resolution:**

1. Provide data on damages reduced by reach and cost of each reach for the other alternatives (e.g., Pipeline, Hwy 90, Ridge, and Modified Ridge) in the project documents.
2. For each structural alternative considered, perform an incremental analysis of the benefits and costs of reaches or combination of contiguous reaches to determine if any of these portions of each alternative are economically feasible.
3. Provide documentation of the results of this incremental analysis in project documents.

#### Final Panel Comment 4:

**Some of the coastal engineering assumptions used in the levee design are not described in detail and appear to be unnecessarily conservative, with no rationale provided.**

#### **Basis for Comment:**

Levee design calculation assumptions are not well documented and appear to be overly conservative from an engineering standpoint, increasing costs.

The levee crest height and berm height/width is controlled entirely by surge elevation, wave height, and wave period. Use of the runup and overtopping formulations (i.e., the Van der Meer equations) from the Technical Advisory Committee on Flood Defence (TAW 2002) is accepted current industry practice. The analysis (H&H Appendix, Section 2.5) adopts a wave overtopping limit of 0.1 cfs/ft at 90% level of assurance and 0.01 cfs/ft at 50% level of assurance (assuming no scour protection on the protected side). This is a reasonable maximum overtopping rate specified in the TAW report (2002), under which no scour protection would be required on the protected side and wave overtopping volumes can be neglected in the flooding analysis.

In the documentation, the wave berm width (and hence levee design) is being driven by two seemingly arbitrary assumptions. Since wave overtopping limit should determine the wave berm width, it is unclear why berms were included based on these two contradictory and arbitrary assumptions:

- The H&H Appendix (Section 2.5) assumes a “wave berm factor” of 0.7 to be used in the Van der Meer equations. This automatically assumes the levee will have a wave berm, regardless of whether the TAW formulations predict that it is required to reduce wave overtopping to below the specified limit. The TAW formulations can be used to directly calculate a required wave berm width based on the specified overtopping limit and wave conditions.
- In Attachment A, wave berm widths are calculated using another seemingly arbitrary assumption – that they are equal to one-quarter of deepwater wave length based on *peak* wave period. In the TAW formulations the “largest present definition of a berm” is one-quarter of deepwater wave length based on *spectral* wave period. This assumption is not explained and results in large wave berms.

No discussion is provided in the review documents as to why berms are included (#1 above), or why their widths are specified based solely on wavelength (#2 above). The TAW formulations should be used as a guide to directly determine berm width based on the allowable overtopping. For levee design cross-sections with low wave activity, this represents a significant increase in levee cross-section based on undocumented assumptions. The Panel recognizes that the stability analyses included in the Geotechnical Design Preliminary USACE Screening Phase Final Report indicates that some of the berms (those used in the cost estimate) may be required for geotechnical slope stability considerations. However, some of the stability analyses indicate that smaller berms could be used.

Several other seemingly arbitrary and/or unnecessarily conservative assumptions exist, such as the following:

- The assumption that conditions in year 2060 include 2 feet of additional storm surge and

controls the wave height is based on an assumed breaker criterion. It is unclear as to why an approach similar to that used in the hydrodynamic modeling was not used (i.e., assume the mid-range sea level rise value from EC 1165-2-211 (USACE 2009), combined with a logical subsidence value, and repeat the modeling simulations for future conditions).

- Wave angles are prescribed as being normal to the structures in all locations, which is realistic for the GIWW alignment and somewhat for the Pipeline alignment, but is overly conservative for ridge alignments, and in particular ring levees facing northerly directions whose design does not need to account for any significant wave overtopping.

These conservative assumptions were stated in the documentation; however, their reasoning was not explained. It is possible that they were included to minimize the analysis effort and introduce some conservatism during this phase of design. If this is the case, then the reasoning should be stated; however, it is not expected that fine-tuning the coastal engineering assumptions would increase benefit-cost ratios.

**Significance – Medium:**

While the conservative coastal engineering assumptions used are not unusual for feasibility-level design, these assumptions need further justification since they result in higher costs and lower benefit-cost ratios for the overall project.

**Recommendations for Resolution:**

1. Provide the rationale for using conservative coastal engineering assumptions on project costs and benefit-cost ratios, including a description of how such assumptions affect (or not) the feasibility-level findings, or use less conservative assumptions, if appropriate.
2. If less conservative assumptions are appropriate, recalculate wave berm requirements and widths using the TAW formulations using only the required wave overtopping limit.
3. If less conservative assumptions are appropriate, refine the design calculations to lower the levee crest elevations and eliminate wave berms in areas protected from wave action, such as along the north sides of ring levees.
4. Cross reference, or include, the results of the geotechnical stability analyses in the H&H appendix to corroborate the need for the extensive wave berms, if they are required.

**Literature Cited:**

1. TAW (2002). Technical Report on Wave Run-up and Wave Overtopping at Dikes (TAW), Technical Advisory Committee on Flood Defence, The Netherlands. May.
2. USACE (2009). Water Resource Policies and Authorities Incorporating Sea-Level Change Considerations in Civil Works Programs. Engineer Circular (EC) 1116-2-211. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 1 July.

**Final Panel Comment 5:**

**The modeling of flooding inside the proposed levee alignments is not described in enough detail in some areas to understand the basis for, and certainty level of, the flood elevations used in the design and economic assessment.**

**Basis for Comment:**

The HEC-HMS and HEC-RAS modeling covers a large and complex watershed. The level of detail in the documentation does not provide the Panel with an understanding of some important aspects of model performance and potential variability in model results. Documentation of parameters/methods is limited in the following areas:

- The only information on downstream boundary conditions provided was that “estimated water surface elevations were used for downstream boundary conditions for each of the profiles computed” (H&H Appendix, p. 22). In such a gently sloped watershed, downstream boundary conditions and initial water level assumptions have a significant effect on the simulated water levels during storm events.
- The HEC-RAS model was calibrated for the June 2001 Tropical Storm Allison, with reasonably good agreement between modeled and observed results. However, the frequency of the calibration storm was not provided, making it difficult to understand how representative the calibration event is within the range of design storms. Also, the model is not verified; verification would help evaluate model performance.
- The HEC-HMS model uses the SCS Curve Number method (H&H Appendix, Table 2.7) to estimate interception and infiltration. Given the high groundwater in the project watershed, this approach may overestimate infiltration and underestimate runoff. No calculations were presented to evaluate the appropriateness or sensitivity of this approach.
- LIDAR data are used for ground elevations (H&H Appendix, p. 21). The data source is not provided and any data corrections to account for the extensive vegetation in the watershed are not discussed.

Importantly, the evaluation of model risk and reliability (H&H Appendix, pp. 36-37) is limited. The text states that “risk-based analysis has been completed for the H&H Hydraulic Designs,” but much of the discussion consists of explaining why confidence limits could not be calculated. The discussion cites the lack of discharge data for developing discharge-probability and stage-discharge relationships. While observed long-term daily stage data are available, these data are not used to calculate stage-probability directly (without using discharge). Calculation of observed stage-probability would be useful in understanding system performance, variability, and model performance.

No systematic model sensitivity assessment is presented to evaluate model risk and reliability. The discussion of Manning’s “n” as a source of model uncertainty (H&H Appendix, p. 37) is useful. However, the uncertainty range provided is based only on general guidance (applicability to the Donaldsonville to the Gulf project is not established), is not fully referenced (described as “research at HEC”), and applies only to the stage-discharge part of model uncertainty. Other contributions to model uncertainty are not discussed.

**Significance – Medium:**

The lack of detailed documentation of various parameters/methods affects project completeness and understanding of the flood elevations used in the design and economic assessment.

**Recommendations for Resolution:**

1. Provide additional discussion of the following parameters/methods or explain why the model results are not sensitive to these parameters/methods, if applicable.
  - a. Selection of downstream boundary conditions and initial water levels
  - b. Model calibration and why verification is not required, if applicable
  - c. Use of the SCS Curve Number method in a region with high groundwater
  - d. LIDAR data reliability.
2. Provide additional documentation of model risk and reliability including discussion of observed stage-probability relationships, discussion of applicability of the HEC research regarding Manning's "n" to the Donaldsonville to the Gulf project, and consideration of all potential sources of uncertainty (not just uncertainty in the stage-discharge calculations).
3. Provide a model sensitivity assessment that identifies likely sources of model error, potential ranges in model parameters, and uncertainty bands on modeled flood elevations. Alternatively, explain why such a sensitivity assessment is not needed and would not affect the findings of no economically justified alternative.

**Final Panel Comment 6:**

**Project planning does not consider how the findings may change under the range of relative sea level rise scenarios specified for consideration by USACE guidance.**

**Basis for Comment:**

USACE guidance EC 1165-2-212 (USACE 2011) specifies that projects must consider a range of future relative sea level rise (RSLR) scenarios in planning, engineering, and other project phases. The flood modeling and economic analysis consider one likely RSLR scenario, but do not consider how the findings (particularly the finding of no economically justified alternative) may change with the low, medium, and high RSLR scenarios specified for consideration in the EC guidance. Aside from the requirements of the EC guidance, given the project area's coastal flat terrain, consideration of a range of RSLR scenarios is integral to the planning and evaluation of alternatives in this study.

The FSM's flood assessment (H&H Appendix) and economic analysis use an RSLR of 1 ft (FSM, p. 31), presumably consisting of 0.5 ft for subsidence (Reconnaissance Study, pp. 11-13) and 0.5 ft for 50 years of sea level rise (SLR) to 2060. A global SLR rate of 0.5 ft is on the low end of the range of future SLR scenarios.

The selection of RSLR affects the estimated project costs (e.g., levee design height) and benefits (e.g., flood damages avoided). Consideration of higher RSLR scenarios would increase both project benefits and costs. The effects on the benefit-cost ratios are not known. While the consideration of higher RSLR scenarios is not expected to significantly affect the calculated benefit-cost ratios, these scenarios are not presented.

**Significance – Medium:**

Lack of consideration of higher RSLR scenarios in the economic analysis makes it difficult to understand whether the findings may change under other reasonable scenarios of RSLR.

**Recommendations for Resolution:**

1. Provide quantitative and/or qualitative descriptions of the impacts of other RSLR scenarios on project benefits, costs, and benefit-cost ratios.

**Literature Cited**

USACE (2011). Sea-Level Change Considerations for Civil Works Programs. Engineer Circular (EC) 1165-2-212. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 1 October.

**Final Panel Comment 7:**

**A borrow availability analysis has not been conducted to verify if the magnitude of suitable borrow material is available for levee construction.**

**Basis for Comment:**

Haul-in borrow material is a critical material component of the project. Depending on the alternative selected, as much as 8.4 million cubic yards of borrow material will be required (see the Levee Cost Summary Appendix by Lafourche Engineering Consultants). Material availability may directly influence project cost and schedule. An additional consideration is the possibility of other concurrent projects in the area, which may be in competition for the available borrow material.

The availability of the required borrow material has not been confirmed with consideration given to other competing project demands. Haul-in borrow sources are assumed to be within 50 miles of the fill location. However, a comprehensive Borrow Availability Assessment (BAA), including a geotechnical analysis of the borrow sites to confirm material suitability, has not been performed. Without this information, it remains uncertain if the demands of concurrent projects for borrow material have been considered, and whether the identified borrow materials are compatible with design requirements.

**Significance – Medium:**

While the completion of a BAA is not expected to change the findings of no economically justified alternative, the lack of rationale for omitting this analysis affects the project's completeness and understanding with regard to levee construction schedule and costs.

**Recommendations for Resolution:**

1. Develop a comprehensive BAA early in the design phase that includes geotechnical testing at borrow sites to confirm material suitability and gives consideration to other competing project demands for borrow materials.

<b>Final Panel Comment 8:</b>
<b>Detailed estimates for infrastructure damages avoided are not included in the FSM's Summary of the Economic Analysis, even though the benefits of avoiding these damages may have raised the benefit-cost ratio.</b>
<b>Basis for Comment:</b>
<p>In the FSM's Summary of the Economic Analysis (pp. 18 and 29), it is stated that avoiding repairs to roads and bridges would be considered a National Economic Development (NED) benefit.</p> <p>It is further stated (p. 29) that USACE elicited experts to address flood-related infrastructural damage to roads and utilities. Specific information on this expert elicitation is not provided in the FSM, but is available in the Emergency Cost Draft Report that the Panel requested from USACE New Orleans District. A review of the Emergency Cost Draft Report indicates that USACE developed unit values for damages for a wide range of utility infrastructure, roads, pipelines, etc. However, there is no evidence that infrastructure damages were incorporated into the FSM Economic Analysis of Donaldsonville infrastructure in the project area. Additionally, footnotes to Tables 19-24 in the FSM's Summary of the Economic Analysis present the benefits and costs by alternative and suggest infrastructure damages avoided were not included in the economic analysis. Including these damages avoided would increase the benefit to cost ratio.</p>
<b>Significance –Medium</b>
The economic analysis of the project is incomplete without documentation of why the benefits of infrastructure damages avoided were not incorporated and to what extent the inclusion of infrastructure damages avoided would affect the overall project feasibility.
<b>Recommendations for Resolution:</b>
<ol style="list-style-type: none"> <li>1. Add existing documentation on infrastructure damages to the FSM Economic Analysis Summary, or add an explanation as to why these damages avoided were not included.</li> </ol>

**Final Panel Comment 9:**

**Easily accessible information on the characteristics of each alternative is not provided, making it difficult to compare alternatives.**

**Basis for Comment:**

The Donaldsonville project is broad and complex, consisting of several alternatives, each with multiple features and different environmental and economic effects. Many technical details are provided throughout the FSM and supplemental documents, but these details are not tabulated in one convenient place. The lack of a summary table makes it difficult for the Panel to directly compare the project's alternatives in terms of environmental effects, benefits achieved, operational characteristics, and costs of construction and implementation.

**Significance – Low:**

To varying degrees, the data and analyses currently exist in the documents provided, but a summary table with corresponding text would improve the documents' readability and conciseness.

**Recommendations for Resolution:**

1. Compile important characteristics of the Donaldsonville Study into summary tables or charts depicting the performance of the various alternatives. Such important characteristics may include, but not be limited to:
  - a. Miles of levees, number of navigational gates, tidal mechanisms, number of residential and commercial structures protected, area(s) of the basin primarily protected, costs of the key features, population of areas protected, etc.

**Final Panel Comment 10:**

**Stability analyses for unbalanced force computations are not included for the sluice gate T-wall in the structural computations.**

**Basis for Comment:**

Stability analyses to determine the unbalanced horizontal force and elevation of critical failure surface are required by Hurricane and Storm Damage Risk Reduction System (HSDRRS) guidance documents, but are not included for the sluice gate T-wall. Information in the review documents (specifically the T-wall with sluice gate typical section computations and the T-wall foundation pile loads) include an unbalanced horizontal force (6 kips), but not the stability analysis upon which that force was based. In addition, neither the computations nor the report provide the elevation of critical failure surface to determine the portion of axial pile capacity to be ignored.

Determination of the critical failure surface elevation and unbalanced horizontal force are important factors in T-wall design using HSDRRS procedures (USACE 2012a). The stability analysis would convey whether or not the structural forces used are reasonable, the required axial pile capacities are attainable, and the cost estimate developed for this structure's piling is reasonable.

**Significance – Low:**

While any changes resulting from a stability analysis would be unlikely to improve the benefit-cost ratio, the omission of this information affects the technical quality of the report.

**Recommendations for Resolution:**

1. Explain why T-wall slope stability analyses were not included in the computations and why not including them does not affect the finding of no economically-justified alternative.
2. Explain why the elevation above which axial pile capacity is to be ignored was not included in the computations and technical design report and why not including it does not affect the finding of no economically-justified alternative.

**Literature Cited:**

1. USACE (2012a). Hurricane and Storm Damage Risk Reduction System (HSDRRS) Design Guidelines (Interim, with revisions through March 2012). U.S. Army Corps of Engineers, New Orleans District Engineering Division. March.

**Final Panel Comment 11:**

**While it appears that some level of outreach was conducted, there is no documentation of public meetings or stakeholder feedback.**

**Basis for Comment:**

Any information on public opinion is only generally presented and evidence of public outreach is not provided. Local levee districts and city and state organizations and institutions representing the individuals in the Donaldsonville study area appear to have been consulted, but these efforts are not inventoried and report findings are not available.

The concerns of resource agencies are described in both the FSM and Reconnaissance Study during the discussions on particular alternatives and hydrodynamic modeling rationale; however, the Panel found no discussion regarding concerns of the general public in affected areas. For instance, the general public is likely to be concerned with T-wall type levees cutting off their waterfront property water access within the ring levee alternatives.

Some parts of the review documents allude to public outreach, but no confirming documentation is provided. The FSM (p. 5) indicates that the GIWW alternative is the one preferred by residents and all elected officials representing the area. This would seem to indicate that there was some form of public meeting, involving opinion elicitation, but it is not clear if concerns from all stakeholders were collected in a systematic way.

In the Reconnaissance report (p. 77), a Notice of Study Initiation and a questionnaire are mentioned. However, no information is provided as to which newspapers or other media carried this Notice. Nor is there any information on the questionnaire content, number returned, or what was learned from the questionnaire.

**Significance – Low:**

The lack of documentation of the degree and form of public outreach and stakeholder involvement may not be sufficient to meet NEPA requirements and planning principle and guidelines standards.

**Recommendations for Resolution:**

1. Explain why the Donaldsonville project did not document the various elements of the public involvement plan/process, including types of interactions with stakeholders, responses obtained from questionnaires, and summaries of and responses to public comments.

**Final Panel Comment 12:**

**Based on specific omissions from the cost estimates, the estimated project costs are less than the probable actual project costs.**

**Basis for Comment:**

Items that are large enough to influence the accuracy of the project cost estimate are not included in the project cost estimate. The omission of these items results in an estimated project cost that is less than the probable actual cost. More specifically, the current cost estimate is not complete because the following required cost items are not included:

- **Escalation Costs:** The construction cost estimate uses a 2010 date for initial construction costs and future levee fill costs are priced using 2012 costs. Construction on this project would occur in a future time period, when the actual costs may be significantly higher than the 2010 costs (see Levee Cost Summary, detail estimate sheets; also Civil Works Construction Cost Index System, EM 1110-2-1(USACE 2012b)).
- **Operation and Maintenance (O&M) Costs:** Operation, maintenance, and repair costs have specifically been omitted from the cost estimate. Given the number of structures included in the project scope, O&M costs would add significantly to the total actual project cost (see Technical Design Report, Project Cost Estimate, p. 2).
- **Right-of-way Cost for the GIWW Alternative:** The right-of-way cost for the GIWW alternative is listed as \$0, without explanation as to how the right-of-way (i.e., land purchases) can be obtained without cost (see Analysis of All Proposed Alternatives, GIWW).
- **Cost of Excavating and Disposing of Unsuitable Adjacent Borrow Material:** The proposed design approach assumes that the top 10 feet of existing material at the adjacent borrow sites is unsuitable. The cost of excavating that material, stock piling it, and placing it in the completed borrow site is not included in the cost estimate.
- **Utility Relocation Costs:** The project cost estimate does not include the cost of any required utility relocations. The 2000 Reconnaissance Study (pp. 47, 57, 66) specifically describes the required utility relocations and corresponding costs. It is reasonable to believe that the current design alternatives would also require the relocation of existing utilities. Therefore the cost of required utility relocations should be included in the project cost estimate.

**Significance – Low:**

While cost estimate revisions resulting from the inclusion of the above items will not change the finding of there being no economically justified alternative, the omission of these costs affects the technical quality of the report.

**Recommendations for Resolution:**

1. Revise the project cost estimate to include the significant omitted project costs.

**Literature Cited:**

1. USACE (2012b). Civil Works Construction Cost Index System (CWCCIS). Engineering Manual 1110-2-1304. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. 31 March.

**Final Panel Comment 13:**

**The construction cost estimate is limited in its use because significant items have not been estimated on a calculated quantities basis.**

**Basis for Comment:**

Several project elements are composed of numerous distinct cost components, but their cost has been estimated on a lump sum basis (see Levee Cost Estimate Summary's detailed cost sheets). The cost of these items is large enough to influence the accuracy of the project cost estimate. The accuracy of the cost estimate would be improved if these items were estimated on a calculated quantity basis. The following are examples of project elements with significant influence on total project cost and which should be estimated on a calculated quantity basis (see Levee Cost Estimate Summary, detailed cost sheets):

- Highway ramps
- Bridge relocations
- Pump station frontal protection

**Significance – Low:**

Although the construction cost estimate is valid, it would be strengthened and more refined if significant project elements are estimated on a calculated quantity basis.

**Recommendations for Resolution:**

1. Revise the project cost estimate early in the design phase to include calculated quantity cost estimates for significant project elements.

**Final Panel Comment 14:**

**The results of the RMA2 hydrodynamic model should be considered qualitative in nature and only valid for relative comparison between existing and post-project conditions.**

**Basis for Comment:**

The RMA2 hydrodynamic model has been used successfully on previous projects for many years and is a reasonable tool for water resources projects where high levels of project feature detail and resolving geometry and hydrodynamic gradients are not required to perform a suitable hydraulic analysis. The authors of the Barataria Bay Interior Drainage and Transport Model Study (CHT 2010) have performed what appears to be a reasonable attempt at reproducing the highly complex, low-forcing hydrodynamics of the project area.

Although the modeling represents a reasonable analysis, there are significant limitations imposed on the use of its results due to resolution, limitations of the RMA2 model itself, the complexity of the project area, and geometry simplifications made during this preliminary level of analysis. Also, validation attempts were performed using only sparse water surface elevations. These validation attempts show some significant error, and indicate that velocity predictions in any given area are likely to contain significant errors.

Therefore the modeling results are considered qualitative in nature and only valid for relative comparison between existing conditions and post-project conditions. This direct comparison using consistent simulations (between existing conditions and post-project conditions) is likely to show a reasonable indication of the order of magnitude of hydrodynamic changes, but is not detailed enough for use in a feasibility-level study. If quantitative predictions are appropriate in future analysis and design, the model should be refined and a more detailed modeling tool to better characterize impacts should be considered.

**Significance – Low:**

While further model refinement, analysis, and validation would not affect the findings of no economically justified alternative, the use of the RMA2 results for quantitative purposes would affect the credibility of the predictions.

**Recommendations for Resolution:**

1. If quantitative predictions are appropriate in future analysis and design, the numerical modeling domain should be refined and perhaps a different modeling tool used to better characterize environmental impacts.
2. If quantitative predictions are appropriate in future analysis and design, validation of the refined numerical models should be performed at multiple locations using field measurements of water levels, velocities, and salinity.

**Literature Cited**

Computational Hydraulics and Transport, LLC (CHT). 2010. Donaldsonville to the Gulf Barataria Bay Interior Drainage and Transport Model Study. USACE New Orleans District. March.

**Final Panel Comment 15:**

**The income characteristics of, and the impacts to, low income and minority populations are not discussed in the documentation.**

**Basis for Comment:**

Income distribution across parishes is given in Table 6 of the FSM's Summary of Economic Analysis (p. 7). Approximately \$10,000 separates the lowest per capita income from the highest per capita income and this represents a 20% difference in per capita income. There is little discussion of the importance of this difference in income in the project area. There is also no discussion of income distribution within the parishes (e.g., percent of population in \$10,000 to \$19,999 range, \$20,000 to \$29,000 range, etc.).

Furthermore, there is no discussion of environmental justice issues related to differential distribution of income across parishes in terms of reduced flood damages to low income populations, who may live in older homes and mobile homes (data may be available from the U.S. Census). The depth-damage relationships show mobile homes and older homes tend to be more vulnerable to flood damages. Low income populations also have fewer financial resources to undertake private nonstructural flood proofing measures, such as raising houses.

A discussion of minority groups or ethnic populations in the study area is also lacking. In addition, the residual risk associated with different alternatives (e.g., with and without ring levees) with respect to these minority populations is not presented in the documentation.

**Significance – Low:**

The absence of any discussion of minority populations and income distribution within parishes affects the technical quality of the FSM report.

**Recommendations for Resolution:**

1. Explain why the project documents did not address potential environmental justice concerns, including income distribution, impacts on low income and minority populations, and ethnicity, and why not including these concerns does not affect the finding of no economically-justified alternative.

<b>Final Panel Comment 16:</b>
<b>It is unclear how the absence of Lafourche Ridge 1 will affect the Morganza to the Gulf project, and whether or not benefits should be assigned to Lafourche Ridge 1 for protecting the east flank of the Morganza project.</b>
<b>Basis for Comment:</b>
The FSM document (p. 59) indicates that without the Morganza to the Gulf and LaRose to Golden Meadow Projects in place, “...surge events could flank all the alternatives (for the Donaldsonville Study) by crossing Bayou Lafourche (from the west).” Based on this statement, the Panel assumes that if the Lafourche Ridge 1 is not in place, surge events may cross Bayou Lafourche (from the east) and flank the Morganza to the Gulf Project on its eastern side. If that assumption is accurate, either the benefits for the Lafourche Ridge 1 alignment in the Donaldsonville Study need to reflect protection of Houma and the surrounding area, or the Lafourche Ridge 1 alignment’s contribution to the Donaldsonville project cost should reflect its dual purpose in both the Donaldsonville and the Morganza to the Gulf Projects.
<b>Significance – Low:</b>
The ability to clearly compare alternative project costs and benefits is reduced by not considering the need for the Lafourche Ridge 1 alignment.
<b>Recommendations for Resolution:</b>
<ol style="list-style-type: none"> <li>1. Using additional H&amp;H model simulations, assess the impact of having no Lafourche Ridge 1 project in place on the Morganza to the Gulf and LaRose to Golden Meadow Projects.</li> <li>2. Document the results of the impact assessment.</li> </ol>

**APPENDIX B**

**Final Charge to the Independent External Peer Review Panel**

**as**

**Submitted to USACE on March 19, 2012**

**on the**

**Donaldsonville to the Gulf IEPR**

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**Charge Questions and Guidance to the Peer Reviewers  
for the  
Independent External Peer Review of the Donaldsonville, Louisiana, to the Gulf of Mexico,  
Flood Control — Mississippi River and Tributaries Project Feasibility Scoping Report and  
Supporting Documentation**

**BACKGROUND**

The Donaldsonville, Louisiana, to the Gulf of Mexico study area is located in Southeast Louisiana, between Bayou Lafourche and the Mississippi River, from Donaldsonville to the Gulf of Mexico. Areas of development located within the study area are mostly unleveed or have inadequate levee systems, are dependent on gravity drainage and are subject to the effects of interior rainfall flooding and riverine flooding. The southern half of the study area is also subject to tidal flooding due to hurricanes and other storms. The area is mostly wetland and agricultural lands with numerous communities located adjacent to major highways and adjacent to the Mississippi River and Bayou Lafourche. Before construction of the Mississippi River levees, the area was subjected to rainfall, tidal, and hurricane flooding from the Mississippi River resulting in structural, agricultural, and environmental damages. Flood damages are aggravated by the long duration of the high stages due to conveyance constrictions. Floods in June 1959, April 1980, November 1989, January 1991, and April/May 1991 produced near 100-year flood conditions. Hurricane Juan, in 1985, also produced near 100-year flood stages. This area has been declared a Federal disaster area three times since 1985 and has experienced several additional storms causing FEMA to provide disaster assistance.

In the development of plans for addressing the problems and needs of the study area relative to hurricane flooding, structural alternatives were considered. Due to the extent and types of existing development, limitations on the times for advance flood forecasting, and limitations on the capacities of hurricane evacuation routes, the development of strictly non-structural measures would not be responsive to the problems and needs of the area relative to hurricane flooding. Structural alternatives for addressing the problems and needs of the study area were limited to barriers to hurricane surges, such as levees, floodwalls, floodgates, and pumping stations.

The purpose of plan formulation was to identify economically justified and environmentally acceptable alternatives to provide flood protection to the Donaldsonville, Louisiana, to the Gulf of Mexico study area. Various alternative plans for providing flood damage protection to the study area were evaluated to provide protection from 100-year outside stages and 10-year interior stages due to rainfall. Lower levels of protection would not be acceptable to local residents and parish officials given the study area's vulnerability to storm surge and the potential loss of life if the protection were to be overtopped. The costs and benefits for each plan were evaluated using a traditional analysis to determine the plan that provides the greater net annual benefits. The plans were also evaluated based on their environmental impacts. The evaluations performed during the initial feasibility study activities and subsequent screening-level analysis identified five alternative levee alignments that were analyzed in the final feasibility phase study. These alternatives were considered as well as the no-action (current condition). Non-structural alternatives were not developed during the plan formation process.

The project is being suspended due to lack of economically-justified alternatives leading to Federal interest as defined by the National Economic Development Plan criteria.

## **OBJECTIVES**

The objective of this work is to conduct an independent external peer review (IEPR) of the Donaldsonville, Louisiana, to the Gulf of Mexico, Flood Control — Mississippi River and Tributaries Project Feasibility Scoping Report and Supporting Documentation (hereinafter: Donaldsonville, Louisiana, to the Gulf of Mexico IEPR) in accordance with the Department of the Army, USACE, Water Resources Policies and Authorities' *Civil Works Review Policy* (EC 1165-2-209) dated January 31, 2010, 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 1165-2-209; p. D-4) for the Donaldsonville, Louisiana, to the Gulf of Mexico 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 Works planning, hydrologic and hydraulic engineering, civil/construction engineering, economics, geotechnical/structural engineering, and coastal engineering issues relevant to the project. They will also have experience applying their subject matter expertise to flood risk management.

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 1165-2-209, 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 the Panel:

Title	Approximate Number of Pages
Donaldsonville, Louisiana to the Gulf of Mexico Reconnaissance Report	317
Donaldsonville, Louisiana, to the Gulf of Mexico Feasibility Scoping Meeting Pre-Conference Submittal	61
Donaldsonville, Louisiana to the Gulf of Mexico Feasibility Study: H&H Appendix, Volume 2	90 140 (stage data)
Donaldsonville to the Gulf, Louisiana Summary of the Economic Analysis Feasibility Scoping Meeting, December 2010	40
Analysis of all proposed alignments_final.xlsx	30
Donaldsonville to the Gulf, Louisiana Hurricane Protection Project_ROW	91
Donaldsonville to the Gulf, Louisiana Hurricane Protection Project Feasibility Report Appendix, Levees	180

### Supporting Information

The following documents are provided to the Panel for reference and clarification, but are not among the documents to be reviewed (i.e., there are no charge questions about these documents):

Title	Approximate Number of Pages
Donaldsonville To The Gulf Barataria Bay Interior Drainage And Transport Model Study	296
Vol 1 Nav and Floodwall Gate Alt DDR for GIWW, Hwy 90 and Pipeline Alignments	87
Vol 2 Nav and Floodwall Gate Alt Design Calc for GIWW	720
Vol 3 Nav and Floodwall Gate Alt Design Cal for Hwy 90	190
Vol 4 Nav and Floodwall Gate Alt Design for Pipeline	325
Vol 5 Nav and Floodwall Gate Alt Plans for GIWW, Hwy 90, and Pipeline Alignments	150

Title	Approximate Number of Pages
Depth-Damage Relationships for Structures, Contents, and Vehicles and Content-To-Structure Value Ratios (CSV) in Support of the Donaldsonville to the Gulf, Louisiana, Feasibility Study	163
Donaldsonville To The Gulf Feasibility Study: Residential And Nonresidential Structure Inventory	17
Donaldsonville_HECFDA_12_08_2010_DRAFT_2.xlsx	Hydrologic Engineering Center's Flood Damage Analysis (HECFDA) 1.2.5a computer program input excel file
Geotechnical Design Preliminary, USACE Screening Phase Final Report, Donaldsonville, Louisiana To The Gulf Of Mexico Flood Control, Mississippi River And Tributaries Feasibility Study Eustis Engineering Project No. 20065	25 139 (Figures) 20 (Appendix)
Donaldsonville, Louisiana To The Gulf Of Mexico Project Study Plan (PMP), February 2002	125
Donaldsonville, Louisiana To The Gulf Of Mexico Project Study Plan Amendment (PMP amendment), January 2007	7
Donaldsonville, Louisiana To The Gulf Of Mexico Project Management Plan (PSP), March 2009	115
ATR Comments of FSM Meeting Pre-Conference Submittal	18
HSDRRS Quality Management Plan	130

**Documents for Reference**

- USACE guidance Civil Works Review Policy (EC 1165-2-209) dated January 31, 2010
- CECW-CP Memorandum dated March 31, 2007
- 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 February 23, 2012 receipt of the final review documents.

<b>TASK</b>	<b>ACTION</b>	<b>DUE DATE</b>
<b>Conduct Peer Review</b>	Battelle sends review documents to Panel	3/19/2012
	Battelle convenes kick-off meeting with Panel	3/20/2012
	USACE/Battelle convenes kick-off meeting with Panel	3/20/2012
	Mid-review site visit	4/6/2012
	Panel members complete their individual reviews	4/10/2012
<b>Prepare Final Panel Comments and Final IEPR Report</b>	Battelle provides Panel merged individual comments and talking points for Panel Review Teleconference	4/16/2012
	Battelle convenes Panel Review Teleconference	4/17/2012
	Final Panel Comments finalized	5/4/2012
	Battelle provides Final IEPR Report to Panel for review	5/8/2012
	Panel provides comments on Final IEPR Report	5/10/2012
	*Battelle submits Final IEPR Report to USACE	5/15/2012

## CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the Donaldsonville, Louisiana, to the Gulf of Mexico 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 Donaldsonville, Louisiana, to the Gulf of Mexico 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 1165-2-209; 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 (Corey Wisneski, [wisneskic@battelle.org](mailto:wisneskic@battelle.org)) or Program Manager (Karen Johnson-Young ([johnson-youngk@battelle.org](mailto: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](mailto: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 Corey Wisneski, [wisneskic@battelle.org](mailto:wisneskic@battelle.org), no later than April 10, 2012, 10 pm ET.**

**Independent External Peer Review  
of the  
Donaldsonville, Louisiana, to the Gulf of Mexico, Flood Control—Mississippi River and  
Tributaries Project Feasibility Scoping Report and Supporting Documentation**

**FINAL CHARGE QUESTIONS**

**General Questions**

1. To what extent has it been shown that the project alternatives described in the report documentation are technically sound?
2. Are the assumptions that underlie the engineering, and environmental analyses sound?
3. Are the engineering, and environmental methods, models and analyses used adequate and acceptable?
4. Were all models used in the analyses used in an appropriate manner with assumptions appropriately documented and explained?
5. Were risk and uncertainty sufficiently considered?
6. Assess the alternatives described in the report documentation from the perspective of systems. This includes (but is not limited to) aspects such as, the impact on competing ports within an area of influence, or the impacts on resources used by transiting migratory species. It should also include systemic aspects being considered from a temporal perspective, including the potential effects of climate change.
7. Were the engineering, economic, and environmental analyses used for this study consistent with generally accepted methodologies? Why or why not?

**Safety Assurance Review Questions**

8. Have the appropriate alternatives been considered and adequately described for this project and do they appear reasonable?
9. Do the project features adequately address redundancy, resiliency, or robustness with an emphasis on interfaces between structures, materials, members, and project phases?
10. Are the quality and quantity of the surveys, investigations, and engineering sufficient to assess expected risk reduction at the current level of design as presented in the report documentation?
11. Have the hazards that affect the structures, including subsidence, been adequately documented and described at the current level of design as presented in the report documentation?

12. Is there sufficient information presented to identify, explain, and comment on the assumptions that underlie the engineering analyses?
13. Are there any additional analyses or information available or readily obtainable that would affect decisions regarding the structures at the current level of design as presented in the report documentation?
14. Does the physical data and observed data provide adequate information to characterize the structures and their performance?
15. Have all characteristics, conditions, and scenarios leading to potential failure, along with the potential impacts and consequences for the current level of design as presented in the report documentation, been clearly identified and described? Have all pertinent factors, including but not necessarily limited to population-at-risk been considered?
16. Does the analysis adequately address the uncertainty given the consequences associated with the potential loss of life for this type of project?
17. From a public safety perspective, are the proposed alternatives reasonably appropriate or are there other alternatives that should be considered?
18. Has anything significant been overlooked in the development of the assessment of the project or the alternatives?

**Specific Charge Questions for the Donaldsonville, Louisiana, to the Gulf of Mexico, Flood Control – Mississippi River and Tributaries Project Supporting Documentation**

**Draft FMS Report**

**Study Purpose and Scope**

19. Is the purpose of the project adequately defined? If not, why?
20. Has the project need been clearly described?
21. Please comment on the likelihood that the proposed work will achieve the expected outputs.

**Formulation and Evaluation of Preliminary Plans**

22. Have the impacts to existing infrastructure, such as utilities, been adequately addressed?
23. Are residual risks adequately described and is there a sufficient plan for communicating the residual risk to affected populations?
24. Have the public concerns been identified and adequately described?

## **Problems and Opportunities**

25. Are the problems, needs, constraints, and opportunities adequately and correctly defined?
26. Are the specific objectives adequately described?
27. In your opinion, are there any other issues, resources, or concerns that have not been identified and/or addressed?

## **Need for and Objectives of Actions and Donaldsonville, Louisiana to the Gulf of Mexico – Reconnaissance Study Appendix C – Environmental Appendix**

### **Existing Conditions**

28. Was the without-project conditions clearly and adequately described?
29. Is the description of the climate in the study area sufficiently detailed and accurate for the current level of design as presented in the report documentation?
30. Is the description of the geomorphic and physiographic setting of the proposed project area accurate and comprehensive for the current level of design as presented in the report documentation?
31. Is the description of wetland resources in the project area complete and accurate for the current level of design as presented in the report documentation?
32. Is the description of aquatic resources in the project area complete and accurate for the current level of design as presented in the report documentation?
33. Is the description of the historical and existing fishery resources in the study area complete and accurate for the current level of design as presented in the report documentation?
34. Is the description of Essential Fish Habitat in the study area complete and accurate for the current level of design as presented in the report documentation?
35. Is the description of threatened and endangered species resources in the study area complete and accurate for the current level of design as presented in the report documentation?
36. Is the description of the historical and existing recreational resources in the study area complete and accurate for the current level of design as presented in the report documentation?
37. Is the description of the cultural resources in the study area complete and accurate for the current level of design as presented in the report documentation?
38. Is the description of the historical and existing socioeconomic resources in the study area complete and accurate for the current level of design as presented in the report documentation?  
Were specific socioeconomic issues not addressed?

39. 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? Are the assumptions used to determine mitigation credit for the proposed project adequate?

40. Have the short-term and long-term impacts associated with the discharge of dredged and fill material been adequately and clearly described?

### **Future Without-Project Conditions**

41. Has anything significant been overlooked in the evaluation of the future without-project conditions? Please explain.

42. Please comment on the conclusion of the most probable future without project condition. Do you envision other potential probable outcomes?

### **Planning Tools - Modeling**

43. Have the design and engineering considerations presented been clearly outlined?

44. Are any additional design assumptions necessary to validate the preliminary design of the primary project components?

45. Were risk and uncertainty sufficiently considered in relation to future sea level rise and subsidence? Was EC 1165-2-211 applied appropriately?

### **Plan Alternatives**

46. Are the alternative plans clearly described?

47. Are project design features clearly and adequately described and discussed? If not, please explain.

48. Were the assumptions made for use in developing the future with project conditions for each alternative reasonable? Were adequate scenarios considered? Were the assumptions reasonably consistent across the range of alternatives and/or adequately justified where different?

49. Has the criteria to eliminate plans from further study been clearly described?

50. Are the changes between the without and with project conditions adequately described for each alternative?

51. Have comparative impacts been clearly and adequately described?

52. Was a reasonably complete array of possible measures considered in the development of alternatives?

53. For your particular area of expertise, provide an in-depth review of whether the analyses of the existing social, financial, and natural resources within the project area are sufficient to support the estimation of impacts of the array of alternatives.
54. Did the formulation process follow the requirement to avoid, minimize, and then mitigate adverse impacts to resources?
55. Has anything significant been overlooked in the development of the alternatives?
56. Are the uncertainties inherent in our evaluation of benefits, costs, and impacts, and any risk associated with those uncertainties, adequately addressed and described for each alternative?
57. Have impacts to significant resources been adequately and clearly described?
58. To what extent have the potential impacts of the alternatives on significant resources been addressed and supported?
59. Are the scope and detail of the potential adverse effects that may arise as a result of project implementation sufficiently described and supported?
60. Are future Operation, Maintenance, Repair, Replacement, and Rehabilitation efforts adequately described and are the estimated cost of those efforts reasonable for each alternative?

### **Donaldsonville, Louisiana to the Gulf of Mexico – Reconnaissance Study**

#### **Environmental Resources**

61. Are the existing conditions of the study area sufficiently detailed and accurate? If not, why?

#### **Environmental Concerns**

62. Have all appropriate environmental concerns been identified and described in sufficient detail?

#### **Alternative Plan Evaluation**

63. Was a reasonably complete array of possible measures considered in the development of alternatives?
64. Are the assumptions used to determine mitigation credit for the proposed project adequate?

### **Appendix A – Engineering Investigations (Water Quality Report)**

65. Is water quality adequately addressed? If not, describe why?

## **Appendix B – Economics Appendix**

66. Were the benefit categories used in the economic analysis adequate to calculate a benefit-to-cost ratio for each of the project alternatives?

## **Appendix D - Real Estate Appendix**

67. Comment on the extent to which assumptions and data sources used in the economics analyses are clearly identified and the assumptions are justified and reasonable.

## **Project Design Data – Design Structures**

68. Have the design and engineering considerations presented been clearly outlined?

69. Are any additional design assumptions necessary to validate the preliminary design of the primary project components?

70. To what extent have significant project construction costs been adequately identified and described?

71. Are residual risks adequately described and is there a sufficient plan for communicating the residual risk to affected populations?

72. Have the impacts to existing infrastructure, such as utilities, been adequately addressed?

## **Project Design Data - Levees**

73. Have the design and engineering considerations presented been clearly outlined?

74. Are any additional design assumptions necessary to validate the preliminary design of the primary project components?

75. To what extent have significant project construction costs been adequately identified and described?

76. Are residual risks adequately described and is there a sufficient plan for communicating the residual risk to affected populations?

77. Have the impacts to existing infrastructure, such as utilities, been adequately addressed?

## **Geotechnical**

78. Is the description of the geomorphic and physiographic setting of the proposed project area accurate and comprehensive?

79. Were the geotechnical analyses adequate and appropriate for the current level of design as presented in the report documentation?

## **Hydrology and Hydraulics**

80. Was the hydrology discussion sufficient to feasibility scope to characterize current baseline conditions and to allow for evaluation of how forecasted conditions (with and without proposed actions) are likely to affect hydrologic conditions. Please comment on the completeness of the discussion on the relationship between subsurface hydrology and the hydrodynamics of the project area.

81. Was the hydrodynamic modeling performed to gauge the effects of the alternative levee alignments and levee opening structures on the currents encountered by navigation, tidal propagation, tidal exchange, circulation, and transport conditions technically sound?

82. Has the role of background erosion and sea level rise been adequately considered in the model analysis?

83. Should storm events after 2007 (e.g., Tropical Storm Lee, Hurricane Gustav, etc.) be considered in the stage frequency analysis?

84. Should lower stage frequency data (e.g., 25-year, 15-year, or 10-year) have been developed for surge only for the Donaldsonville to the Gulf Study?

85. Were the rain and storm surge frequency curves applied correctly in FDA?

86. Were the assumptions and methodology presented in the Barataria Bay Interior Drainage and Transport Model study acceptable and appropriate?

## **Economics**

87. Were the benefit categories used in the economic analysis adequate to calculate a benefit-to-cost ratio for each of the project alternatives?

88. Was the methodology used to determine the characteristics and corresponding value of the structure inventory for the study area adequate?

89. Were risk and uncertainty sufficiently considered in relation to the future development process?

90. Are the costs adequately justified?

## **Public Coordination**

91. 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**

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