DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, D.C. 20310-2600

DAEN

16 APR 2014

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)
108 ARMY PENTAGON, WASHINGTON, DC 20310-0108

SUBJECT: Jacksonville Harbor, Duval County, Florida – Final USACE Response to Independent External Peer Review

1. Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-214, and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).

2. The IEPR was conducted by Battelle Memorial Institute. The IEPR panel consisted of five members with technical expertise in Civil Works planning, economics, biology/ecology, geotechnical engineering, and hydraulic engineering.

3. The final written responses to the IEPR are hereby approved. The enclosed document contains the final written responses of the Chief of Engineers to the issues raised and the recommendations contained in the IEPR. The IEPR Report and the USACE responses have been coordinated with the vertical team and will be posted on the Internet, as required in EC 1165-2-214.

4. If you have any questions on this matter, please contact me or have a member of your staff contact Ms. Stacey Brown, Deputy Chief, South Atlantic Division Regional Integration Team, at 202-761-4106.

Encl

THOMAS P. BOSTICK
Lieutenant General, USA
Chief of Engineers

Jacksonville Harbor
Duval County, Florida
General Reevaluation Report (GRR) II
U.S. Army Corps of Engineers Response to
Independent External Peer Review
April 2014

Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of WRDA 2007, EC 1165-2-214 and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review (2004).*

The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to always provide the most scientifically sound, sustainable water resource solutions for the nation. The USACE review processes are essential to ensuring project safety and quality of the products USACE provides to the American people. Battelle Memorial Institute (Battelle), a non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to conduct the IEPR of the Jacksonville Harbor GRR (General Reevaluation Report) II.

The IEPR panel reviewed the Draft GRR, as well as supporting documentation. The Final IEPR Battelle Report was issued on 12 July 2013. Overall, thirteen comments were identified and documented; two were identified as having high significance, seven were identified as having medium significance, and four were identified as having low significance. The following discussions present the USACE Final Response to the thirteen comments.

1. Comment – *High Significance*: Federal interest has not been demonstrated in the General Reevaluation Report II (GRRII) because a multi-port analysis assessing competition among regional ports is not provided.

This comment included one recommendation, which was not adopted as discussed below. The comment expresses the concern that a multi-port analysis has not been done, therefore, the national need of port development and expansion cannot be assessed and prioritized.

USACE Response: Not Adopted

The IEPR panel recommended the report (1) include a multi-port analysis to demonstrate Federal interest in the proposed project. Historical data indicates that many of the ports that would be regional competitors to the Port of Jacksonville are also on the same itineraries. For example, many services call New York, Norfolk, Charleston, Savannah, Jacksonville, and Miami during the course of a single voyage. There are roughly seven services for which Jacksonville and Savannah are on the same itinerary. The reality is that from a national perspective, the major eastern seaboard container ports all function as a system for the trade of value added goods. The economic function of competition between established regional container ports is to incentivize them to be more responsive to the needs of global maritime freight transportation industry. As each port authority makes strategic decisions to attract more cargo, regional competitors will make similar strategic decisions. From a national perspective, it makes the most sense to assume the net effect of

this interplay would be equilibrium. As such it is valid to assume that each seaport will continue to retain its historical share of regional cargo throughput. By assuming that historic share is constant, shifting cargo benefits among regional ports is excluded from the decision making process.

2. Comment – *High Significance*: The tentatively selected plan (TSP) assumes that the proposed construction of a training wall at the Mile Point area of the main navigation channel is included in the without-project condition, but the wall construction is neither authorized nor budgeted.

This comment included two recommendations; both were not adopted as discussed below. The comment expresses a concern about the impact to the project if the Mile Point training wall is not constructed.

USACE Response: Not Adopted

The IEPR panel recommended (1) that if the Mile Point training wall construction moves forward as a Federal project, to revise the GRR to indicate that construction of the Mile Point training wall has a signed Chief of Engineers Report and is awaiting authorization, and (2) that the report state the basis for including the construction of the Mile Point training wall in the without-project condition and describe the impact on the navigability of the improved channel and project benefits if the wall is not constructed. However, the GRR already indicated in Section 1.6.2.1 that the Chief of Engineers Report for the Mile Point project was signed April 30, 2012 and the Assistant Secretary of the Army for Civil Works transmitted the report to congress on August 16, 2012. If there is not a Congressional authorization for the Mile Point project, there are still other mechanisms, which the Port of Jacksonville is pursuing, by which the project could be constructed.

3. Comment – *Medium Significance*: The methods and assumptions used to develop the economic analysis are not sufficiently documented.

This comment included seven recommendations; all of which have been adopted as discussed below. The comment expresses a concern that lack of sufficient documentation of the methods and assumption used to calculate the National Economic Development (NED) benefits makes it difficult to understand how the recommended plan was selected.

USACE Response: Adopted

Action Taken: The IEPR panel recommended adding to the report (1) sufficient detail on the methods and assumptions used to develop the commodity and fleet forecasts and cite the Global Insight (GI) and Maritime Strategies International (MSI) reports in the references. In response, the methods and assumptions used to derive the commodity and fleet forecasts were added to Section 3.0 of the Economics Appendix, and the GI and MSI reports were added to the report citations. The IEPR panel recommended (2) that the report clarify the apparent discrepancy in Tables 23 and 24 of the GRR between stated commodity growth rates, by trade routes and the projected increases in commodity movements from 2010 to 2060. In response, clearer descriptions of the commodity growth rates were added to Section 3.1 of the main report. The IEPR panel recommended (3) the report describe the assumptions associated with the transition of the Jacksonville with-project fleet to post-Panamax vessels over the period of analysis. In

response, the method for the fleet transition, which was based on an analysis conducted by MSI, was added to Section 3.3.2.3 of the Economic Appendix. The IEPR panel recommended (4) that the report describe the methods and assumptions used to develop total voyage costs for each trade route/vessel class. In response, a detailed discussion on the methods and assumptions used in transportation cost calculations by trade route was added to Section 3.4 of the Economics Appendix. The IEPR panel recommended (5) that additional description is provided of how the total transportation costs were developed, such as total transportation costs by trade routes. In response, an example of the transportation cost calculations was added to Section 3.4 of the Economics Appendix**.** The IEPR panel recommended (6) the report describes the cost savings attributable to the different components of the project (i.e., channel deepening, channel widening, turning basins, and reduced congestion). In response, cost savings were divided into the components attributable to the deepening, and greater navigation efficiencies were described in terms of reductions in the overall voyage cost allocated to the subject port and the reductions in the time needed to navigate the harbor system. This information was added to Section 4 of the Economics Appendix. However, the widening and turning basin measures are necessary to accommodate the design vessel and as such, are not separable from the deepening. Therefore, the difference in transportation costs was not included for these individual components. The IEPR panel recommended (7) the report describe the critical parameters entered into the HarborSym model and the assumptions used to define those parameters. In response, an addendum was added to the Economics Appendix which discusses the setup of the HarborSym critical parameters.

4. Comment – *Medium Significance*: Use of different salinity models for the main stem versus the tributary evaluations makes evaluating salinity effects very difficult.

This comment included one recommendation, which was not adopted as discussed below. This comment expresses a concern that use of different models for different part of the river makes evaluating salinity effects difficult.

USACE Response: Not Adopted

The IEPR recommended (1) the salinity be evaluated by performing the tributary salinity and marsh modeling with the EFDC model that was used to model the mainstem river, instead of the MIKE21 model. Use of the EFDC model for the tributary and marsh modeling was not deemed to be appropriate by the Corps. The performance of any hydrodynamic/ transport model is limited by the uncertainties in available input flow, bathymetry, and gauged salinity data. The rationale for choosing MIKE21 flexible mesh (FM) hydrodynamic (HD) model and transport module rather than the EFDC 3D model used for the main stem was based on several factors. First, one of the initial goals of the salt marsh tributary modeling effort was to evaluate hydrodynamics and salinity in the Timucuan salt marsh area. This area is not represented in the EFDC model in any detail. The EFDC cells in the Timucuan salt marsh area are used to represent the volume of the salt marsh but do not represent the complex geometry of the tidal creeks and the marsh. The second factor considered in the choice of the MIKE21 hydrodynamic model for the tributaries and Timucuan Salt Marsh was that there was not readily available EFDC input and calibration data in these areas. Hence, using the EFDC model in these areas would introduce more uncertainty in the results.

Because of the limits of the input flow and bathymetry data and salinity data for EFDC model calibration and validation, the goal of the salt marsh and tributary modeling was to develop a modeling method commensurate with the level of data available. A statement was added to the Engineering Appendix, Attachment M - Hydrodynamic modeling for Salt Marsh and Tributary Salinity and Water-levels, on how the results of tributary salinity modeling may warrant explanation in comparison with the main stem results. Additionally, salinity will be monitored post construction in order to verify model results.

5. Comment – *Medium Significance*: The adaptive hydraulics (ADH) sediment modeling results do not provide a reliable estimate of the annual sedimentation rates necessary to establish environmental effects and sediment management requirements.

This comment had three recommendations, which were not adopted as discussed below. The comment expresses concerns that the sediment modeling and methodology used to estimate annual sedimentation rates does not produce valid results.

USACE Response: Not Adopted

The IEPR recommended (1) that the ADH model be validated by comparing the modeled deposition rates in a year with representative freshwater flows, tides, and storms (including data from a recent hurricane, such as 2012's *Sandy*) to average annual dredging quantities by section of channel, (2) the use of the representative year or a representative series of years (wet, dry, stormy, etc.) as base test and plan tests, including the Tentatively Selected Plan, in order to define changes in sedimentation rates attributable to the plans, and (3) the report provide an interpret the results in terms of the error bounds and in light of salinity and circulation changes predicted by the Environmental Fluid Dynamics Code (EFDC) model to ensure that the two-dimensional approach of ADH is appropriate. These recommendations relate to the use of the ADH model for determining sedimentation rates. While it is acknowledged that the ADH model as calibrated was inadequate for measuring sedimentation rates, the model was not used for that purpose in the study. Sedimentation rates were measured using historical dredging records, which were determined to be a more accurate method given the limitations of applying the ADH model to this study. ADH model results were only used for comparative purposes and identifying sedimentation 'hot spots', and the results were not used to either compare alternatives, identify the selected plan, or determine total project cost. However, based on the comment, Section 10 of the Engineering Appendix was revised to indicate that the ADH modeling was used for determination of advanced maintenance locations and not for computing future maintenance dredging quantities.

6. Comment – *Medium Significance*: It is unclear how the factors of safety for the slope stability analyses were selected given the acknowledged uncertainty in the sediment strength data.

This comment had two recommendations; one was adopted and one was not adopted as discussed below. The comment expresses the concern that without an understanding of the assumed minimum factor of safety and sensitivity to data gaps, the results of the slope stability analyses could not be fully reviewed.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) that the report should state what the minimum factor(s) of safety are assumed to be for the project. In response, the Factors of Safety (FOS) of 1.3 for end of construction and 1.5 for long-term/steady state conditions, which are based on USACE guidance, were added to Sections 21 and 22 of the Engineering Appendix.

USACE Response: Not Adopted

The IEPR panel recommended (2) that a sensitivity analysis be performed on key slope stability parameters that are not well understood at the feasibility stage. A sensitivity analysis of slope stability parameters was outside the scope of the feasibility study. However, more detailed investigation and analyses related to slope stability will be done during the development of the project Plans and Specifications. These analyses would be more comprehensive than a sensitivity analysis.

7. Comment – *Medium Significance*: The accuracy of the cost estimate for the tentatively selected plan (TSP) is unclear without a comparison of annual operation and maintenance (O&M) costs for the with- and without-project conditions.

This comment included four recommendations; three were adopted and one was not adopted, as discussed below. This comment indicates that additional information on the comparison of operation and maintenance is needed to evaluate the accuracy of the tentatively selected plan.

USACE Response: Adopted

Action Taken: The IEPR Panel recommended (2) that the total increase under the with-project condition in the operations and maintenance (O&M) shoaling be updated to 137,000 cubic yards/year. In response, the shoaling rate was updated and the project cost was adjusted accordingly. The IEPR panel recommended (3) that the bulking factor removal from the quantities be changed from multiplying by 0.80 to dividing by 1.2 which results in a small increase (5,000 cubic yards) in these values and subsequently an increase in the future O&M costs. In response, the O&M costs were updated with this new quantity. The IEPR panel recommended (4) that additional details are provided for the basis of the unit cost of dredging and disposal (including maintenance dredging). In response, the detailed cost engineering output sheets were provided to the panel for review.

USACE Response: Not Adopted

The IEPR panel recommended (1) that the deposition rate be computed for the with-project condition based on results from the adaptive hydraulics (ADH) model after it has been validated to observed sedimentation rates. As indicated in the response to Final Panel Comment #5, the ADH model was not used for determining sedimentation rates and a more accurate estimate of sedimentation was obtained by using historical dredging records.

8. Comment – *Medium Significance*: The National Economic Development (NED) benefits identified in the economic analysis cannot be verified because the economic risk and uncertainty analysis is not documented.

This comment included three recommendations; two were adopted and one was not adopted as discussed below. The comment expresses the concern that failure to adequately quantify and communicate project risk and uncertainty could result in inefficient allocation of resources.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) that the report better describe the risks and uncertainties inherent in the commodity and fleet forecasts and provide a distribution of possible forecast outcomes. In response, Section 5 on risks and uncertainty, which included sensitivity analysis results, was added to the Economics Appendix. The IEPR panel recommended (3) that the report further describe the risks assessed in the HarborSym model and provide the range of values assigned to critical parameters and entered into the model. In response, an addendum was added to the economics appendix that will describe in detail the HarborSym inputs, including the ranges used to represent model uncertainty.

USACE Response: Not Adopted

The IEPR panel recommended (2) the report describe the risks and uncertainties associated with the transition of the Jacksonville with-project fleet to post-Panamax vessels over the period of analysis. As is discussed in Section 3 of the Economics Appendix, there is much surplus capacity in the world container fleet. Larger vessels have shown up on the US East Coast much sooner than what was anticipated in the recent past. Because the project base year for the study is 2022, the risks of the post-Panamax fleet transition not occurring are minimal. Section 5 of the Economics Appendix includes 12 fleet transition and commodity forecast scenarios and a discount rate sensitivity to address risk and uncertainty."

9. Comment – *Medium Significance*: The analysis and presentation of salinity results in the General Reevaluation Report II (GRRII) provide an incomplete understanding of the impacts of channel enlargement.

The comment included three recommendations; one was adopted and two were not adopted, as discussed below. The comment expresses the concern that the results and interpretation of the modeling results provide only a partial evaluation of estimated salinity changes.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) that a complete error analysis be performed on the EFDC salinity model validation, including absolute and percentage average error by location. In response, additional EFDC model validation statistics were added for the EFDC model validation to Attachment K of the Engineering Appendix.

USACE Response: Not Adopted

The IEPR panel recommended (2) that the report interpret the model validation results for the implications of possible under- and over-mixing of salinity. The EFDC model validation statistics already imply and quantify vertical under- and over-mixing of salinity. No further analysis is considered necessary to interpret model validation results for vertical under-mixing of salinity at Dames Point because this under-mixing leads to a more conservative model result (i.e., greater

salinity intrusion than would occur otherwise) as the very small changes in modeled salinity for the base and plan scenarios will likely be smaller. The IEPR panel recommended (3) that the salinity intrusion findings be presented through contours (plan and elevation views) at high and low water slack under a range of conditions, and analyze how the results can be interpreted in light of model validation statistics. The ecological modeling used the results of the EFDC salinity model to evaluate the impact of salinity changes on the ecology. The ecological modeling findings already include plan salinity contours that show changes in the contours between base and plan scenarios. The evaluation of the salinity changes at different locations along the river and at different locations along the water column already provides salinity changes longitudinally and vertically in the river.

10. Comment - *Low Significance*: Rock strength data collected within the Jacksonville Harbor Project site suggest that proposed pretreatment methods may be unnecessary for the type of rock typically found there, which is contrary to previous experience at the site.

The comment included two recommendations, both of which have been adopted as discussed below. The comment requests clarification of the type of rock and corresponding rock strength that is needed to support the need for pre-treatment.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) the report clarify whether the strengths measured in the rock disposal area (averaging over 5,700 psi) are representative of the rock strengths expected within the project area in light of the lower rock strengths measured as part of this study. In response, Section 18 of the Engineering Appendix was modified to clarify that the rock strengths from the disposal area are not representative of the entire project area, but are presented to show potential rock strengths to be encountered. The IEPR panel recommended (2) that the report more clearly document what rock strength data were used in the assessment of pretreatment. In response, Section 18 of the Engineering Appendix was modified to indicate that the rock strength table presented in that section is based on the proposed project dredge depth. The section was also edited to clarify that the table presents data from within the proposed dredge prism.

11. Comment - *Low Significance*: The General Reevaluation Report II (GRRII) and appendices do not clearly characterize the actual Ocean Dredged Material Disposal Site (ODMDS) site as new or existing, which could affect costs and environmental impacts.

The comment included 2 recommendations, both of which have been adopted as discussed below. The comment recommends clarification regarding "new" and "expanded" ODMDS affects the technical quality of the report.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) clarification of the discussion on the creation of a new Offshore Dredged Material Disposal Site (ODMDS) and to include a reference to the ongoing EPA evaluation. In response, the report was revised to indicate a "new" instead of an "expanded" ODMDS would be created, since the expanded area would be considered a new site even if it incorporates some of the existing site. This revision was made in Section 2.2.9, Section

5.6.1.2, and Section 6.4 of the main report, in Section 27 of the Engineering Appendix, and in Section 3 of the Real Estate Appendix. The IEPR panel recommended (2) that the report include a summary of the modeling and scenarios related to the ODMDS being evaluated by EPA. In response, a summary of the EPA evaluation of the new ODMDS designation was added to Section 2.2.8 of the main report.

12. Comment - *Low Significance*: The Regional Economic Development (RED) benefits are incorrectly attributed to the harbor deepening and therefore overemphasize regional benefits of the Jacksonville Harbor Project.

The comment included one recommendation, which was adopted as discussed below. The comment expresses a concern that an accurate assessment of the RED benefits generated by the proposed project is needed to support the overall understanding of project benefits and of the project's impact on the regional economy.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) that the Regional Economic Deveolpment (RED) benefits analysis be revised to accurately reflect the impact of harbor deepening. In response, Section 6.6.1 of the main report was revised and a qualitative discussion of RED benefits was used instead of the previous quantitative analysis.

13. Comment - *Low Significance*: The Adaptive Management Plan does not include key elements such as trigger thresholds and specific actions to correct deficiencies.

The comment included four recommendations, all which have been adopted, as discussed below. The comment notes that because the Adaptive Management Plan and the Monitoring Plan will govern how the project sponsor satisfies relevant permit conditions for the life of the project, the information should be clearly identified, comprehensible, and easily found.

USACE Response: Adopted

Action Taken: The IEPR panel recommended (1) that the report extract the success criteria, predicted salinity levels, SAV stress levels, and any other pertinent environmental parameters established in the appendices and create a table of threshold or trigger levels and their durations to be inserted in the Adaptive Management Plan; (2) that a list of potential salinity mitigation measures be provided; (3) the plan better explain how the results of the range of monitoring efforts will be integrated and interpreted; and (4) that the report explains the consequences of agency re-coordination should monitoring/modeling indicate its need, and to describe the mechanism for adaptive management to modify the mitigation plan, should that action prove necessary. In response, all these suggested additions were incorporated into Section 6 of a new Ecological Effects and Compensatory Mitigation Appendix.