



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, DC 20310-2600

JUL 08 2013

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MEMORANDUM FOR: THE SECRETARY OF THE ARMY

SUBJECT: Morganza to the Gulf of Mexico, Louisiana

1. I submit for transmission to Congress my report updating the authorized Morganza to the Gulf of Mexico, Louisiana project. This report supplements the reports of the Chief of Engineers dated 23 August 2002 and 22 July 2003 and is accompanied by the reports of the New Orleans District Commander, Mississippi Valley Division Commander and the Mississippi River Commission. This report presents the updated design and associated costs to the project as a result of applying more robust design and hydrologic and hydraulic modeling standards developed subsequent to Hurricane Katrina. These updated changes have caused the project to exceed the maximum authorized project cost limit under Section 902 of the Water Resources Development Act of (WRDA) 1986. While the project was not reformulated as part of this update, an analysis using the post-Katrina design criteria was initially performed that confirmed the authorized project alignment as the alignment that best meets the Federal objective.
2. The Morganza to the Gulf of Mexico, Louisiana hurricane and storm damage risk reduction project was authorized by Section 1001(24)(A) of the Water Resources Development Act (WRDA) of 2007 at a total cost of \$886,700,000 consistent with the reports of the Chief of Engineers dated 23 August 2002 and 22 July 2003. In addition Section 1001(24)(B) of WRDA 2007 provides that operation, maintenance, repair, rehabilitation and replacement (OMRR&R) of the Houma Navigation Canal lock complex and the Gulf Intracoastal Waterway floodgate features of the project that provides for inland waterways transportation shall be a Federal responsibility in accordance with Section 102 of WRDA 1986 (33 U.S.C. 2212).
3. The authorized Morganza to the Gulf of Mexico, Louisiana project was designed to provide hurricane and storm damage risk reduction while maintaining navigational passage and tidal exchange. The project is located approximately 60 miles southwest of New Orleans, Louisiana and includes Terrebonne Parish and a portion of Lafourche Parish. The project recommended in the reports of the Chief of Engineers dated 23 August 2002 and 22 July 2003 was to reduce hurricane and storm damages by providing the one percent annual exceedance (1% annual exceedance probability (AEP)) probability level of risk reduction.

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4. The reporting officers considered the WRDA 2007 authorized project by applying two different water surface design elevation assumptions. The first assumption retained the pre-Katrina water surface design elevations used in developing the authorized project. The second assumption applied the post-Katrina water surface design elevations to the previously authorized project. Using post-Katrina water surface design elevation calculation methodologies, the pre-Katrina water surface design elevation is equal to approximately a 3% AEP. The post-Katrina water surface design elevation is equal to a 1% AEP as used for the second assumption. Of the two, the assumption associated with the post-Katrina 1% AEP water elevation project provided the greater net benefits, lower residual risk, and greatest adaptability to sea level rise. This 1% AEP project identified by the reporting officers provides the same target level of risk reduction as the authorized project and follows the same alignment with some refinements to address the new storm surge modeling which showed deeper and wider storm surge inundation. The updated project also involves no change in project purpose. However, the application of the more rigorous storm modeling and more robust post-Katrina design standards has resulted in expansion of the project features authorized by WRDA 2007. Changes to the major project features are as follows:

- **Levee Length:** The total levee length has increased from 72 miles to approximately 98 miles. The reason for the increase is to reduce risk of flanking, based on the assumption of higher rates of relative sea level rise, and higher surge and waves in the future.
- **Levee/Structure Elevations:** Levee and structure elevations were increased by 6 feet to 18 feet. Most of the increase in elevation is attributable to higher predicted surge and waves and post Katrina design criteria.
- **Levee Widths:** Levee widths have increased from approximately 40 feet to 200 feet wide to approximately 282 feet to 725 feet wide. The increased widths are attributable to increases in levee heights and the post Katrina geotechnical stability factors of safety.
- **Houma Navigation Canal (HNC) lock complex and Gulf Intracoastal Waterway (GIWW) floodgate feature:** These features which cross federal navigation channels are generally the same except the HNC structure sill depth would be increased by 5 feet as part of the requested sponsor funded work item and the HNC floodgate width increased from 200 feet to 250 feet. The HNC floodgate needed to be widened given that the pre-Katrina design was no longer technically feasible with the increased project height. The GIWW floodgate near Houma was redesigned to eliminate one of the two sector gates.
- **Floodgates:** The number of floodgates on other canals and bayous increased from 9 to 19 as several bayous were not previously identified as being used for navigation and with the extension of the levee length several additional navigable bayous were crossed.
- **Environmental Control Structures:** The number of environmental control structures increased from 12 to 23 sets of concrete box culverts with sluice gates. The increase in the number of structures is attributable to more refined set of design criteria, which considered precipitation event conditions water level and velocity and box culvert design criteria.

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- Environmental Mitigation: Impacted acres requiring mitigation increased from approximately 3,740 acres to 4,100 acres. The increase is directly related to the increase in the foot print of the levee.
- Structures Afforded Protection: The number of structures afforded hurricane and storm damage risk reduction increased from approximately 26,000 structures to 53,000 structures. The increase in the number of structures afforded risk reduction is a result of post-Katrina change in 1% AEP water surface elevation.
- Hydraulic Mitigation: Costs have been included for measures to address a potential indirect impact of the construction to raise water levels outside the levees. Potential impact areas include portions of the communities of Gibson, Bayou Dularge, Dulac, and all of Cocodrie and Isle de Jean Charles. In addition, measures and associated costs have been included to offset potential induced stages on the existing Larose to Golden Meadows project.

5. Based on October 2012 price levels, the estimated first cost of the updated project is \$10,265,000,000, with the Federal and non-Federal shares estimated at \$6,672,000, 000 and \$3,593,000,000, respectively. The Coastal Protection and Restoration Authority of Louisiana in coordination with the Terrebonne Levee and Conservation District has expressed intent to be the non-Federal cost sharing sponsor for the project. Upon completion of construction, the non-Federal sponsor would be responsible for the OMRR&R of the project, a cost currently estimated at \$7,400,000 per year. In accordance with Section 1001(24)(B) of WRDA 2007 the OMRR&R for the GIWW floodgates and the Houma Navigation Canal Lock, estimated at \$1,700,000 per year, is a Federal responsibility.

6. Based on a 3.75-percent discount rate, October 2012 price levels and a 50-year period of analysis, the total equivalent average annual costs of the updated project, including OMRR&R, are estimated to be \$716,000,000. The equivalent average annual benefits are estimated to be \$1,023,000,000. The net average annual benefits would be \$307,000,000. The benefit-to-cost ratio is 1.4 to 1.

7. While the estimated project costs in the district's report are the best available and compliant with current post-Katrina design criteria, the U.S. Army Corps of Engineers Risk Management Center and the New Orleans District jointly evaluated the proposed Morganza to the Gulf project to assess whether the post-Katrina design criteria, specifically in the areas of global stability and overtopping and structural superiority, could be site adapted to reduce project cost without significantly increasing risk. Based on the results of this effort, site adaptations of the criteria were identified for consideration during the next phase of implementation, preconstruction, engineering and design.

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8. The draft report / programmatic environmental impact statement underwent an independent external peer review by the Louisiana Water Resource Council (LWRC). The LWRC assessed the adequacy and acceptability of the economic, engineering, and environmental methods, models and analysis used, during two reviews. A second review was added to focus on the economics supporting the report findings. There were a total of 18 comments of which 13 were medium significance and five were low significance. In summary, the panel felt that the engineering, economics, plan formulation, and environmental analysis were adequate and needed to be properly documented in the final report. The final report / programmatic environmental impact statement also underwent state and agency review. The state and agency comments received during review of the final report/ programmatic environmental impact statement included comments from federal agencies and agencies from the state of Louisiana. Comments provided by the National Ocean and Atmospheric Administration's National Marine Fisheries Service included the need for additional detailed analysis of the potential direct, indirect, and cumulative impacts to Essential Fisheries Habitat related to the closure structures. They were informed this will be further analyzed during the design phase and that the Corps intends to use a certified habitat change model and appropriate fisheries impact models as part of these future analyses. The Department of Interior also expressed similar concerns that will also be addressed as the design is further analyzed. The United States Environmental Protection Agency expressed concerns regarding the need to provide continued coordination with affected communities in the project area to identify any disproportional effects to low income or minority populations in accordance with Executive Order 12898. In addition they were concerned with the impacts associated with potential sea level rise. We acknowledged that under some future relative sea level rise scenarios, increased frequency of closure of the system's gates and water control structures could result in significant adverse indirect impacts to wetlands, hydrology, fisheries, water quality, threatened/endangered species, and navigation. The level of those impacts cannot be fully quantified at this time and these will be analyzed further as well as that adaptive management measures may mitigate for that potentiality. The state of Louisiana had several agencies that provided comments which were generally in support of the project and recognized that earlier comments had been addressed in the final document but were still concerned over the cost of the risk reduction designs. The response noted that the Corps will continue to identify cost-reduction measures that do not sacrifice the overall level of risk reduction to the citizens of Louisiana. Concerns expressed by the Louisiana Department of Wildlife and Fisheries (LDWF) with the Pointe aux Chenes Wildlife Management Area and the Mandalay National Wildlife Refuge that will be unavoidably impacted by the construction. The impacts have been and will continue to be coordinated with the appropriate offices of USFWS and LDWF to ensure that appropriate and practicable efforts are made to minimize adverse environmental impacts to the areas. In summary, responses were provided re-iterating the considerations during the planning process and the extensive coordination that occurred regarding environmental effects and mitigation with the natural resource agencies and that a detailed analysis of the potential indirect and cumulative impacts to wildlife and fisheries related to the construction of this project and specifically to the closure of the structures will occur during the design phase. The Corps will

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produce tiered National Environmental Policy Act documents as needed to document the analysis of the plans and the impacts to the human and natural environments and the informed decision being made as the project proceeds forward. The Corps will make a diligent effort to identify and assess ways to further avoid and minimize any significant adverse environmental and socioeconomic impacts.

9. I concur that the reporting officers have updated the plan identified within the previous reports of the Chief of Engineers and find that the updated plan is economically justified, environmentally acceptable and engineeringly sound. Post-Katrina engineering design criteria and standards for gulf coast communities were applied to reduce the potential of loss of life and property from coastal storms. These engineering practices were developed using the findings of the *Interagency Performance Evaluation Task Force* including key lessons learned from Hurricane Katrina and their implications for future hurricane preparedness and planning for south Louisiana. Project modifications were also found necessary to address developments after the project was authorized, including community resettlement patterns after Katrina, to incorporate improved water control elements and navigation features, and to update other outmoded aspects of the authorized project to more effectively provide the utility of function originally intended by Congress. Accordingly, I submit for transmission to Congress my report updating the authorized Morganza to the Gulf of Mexico, Louisiana project with the required modifications and changes necessary for engineering and construction reasons to produce the degree and extent of coastal storm damage reduction improvements intended by Congress. Finally, the non-Federal sponsor must agree with the following requirements prior to project implementation.

a. Provide 35 percent of total project costs as further specified below:

1. Provide the required non-Federal share of design costs in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;

2. Provide, during the first year of construction, any additional funds necessary to pay the full non-Federal share of design costs;

3. Provide all lands, easements, and rights-of-way, including those required for relocations, the borrowing of material, and the disposal of dredged or excavated material; perform or ensure the performance of all relocations; and construct all improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material all as determined by the Government to be required or to be necessary for the construction, operation, and maintenance of the project;

4. Provide, during construction, any additional funds necessary to make its total contribution equal to 35 percent of total project costs;

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- b. Shall not use funds from other Federal programs, including any non-Federal contribution required as a matching share therefore, to meet any of the non-Federal obligations for the project unless the Federal agency providing the Federal portion of such funds verifies in writing that expenditure of such funds for such purpose is authorized;
- c. Not less than once each year, inform affected interests of the extent of protection afforded by the project;
- d. Agree to participate in and comply with applicable Federal floodplain management and flood insurance programs;
- e. Comply with Section 402 of the Water Resources Development Act of 1986, as amended (33U.S.C. 701b-12), which requires a non-Federal interest to prepare a floodplain management plan within one year after the date of signing a project cooperation agreement, and to implement such plan not later than one year after completion of construction of the project;
- f. Publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in adopting regulations, or taking other actions, to prevent unwise future development and to ensure compatibility with protection levels provided by the project;
- g. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the level of protection the project affords, hinder operation and maintenance of the project, or interfere with the project's proper function;
- h. Comply with all applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way required for construction, operation, and maintenance of the project, including those necessary for relocations, the borrowing of materials, or the disposal of dredged or excavated material; and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act;
- i. For so long as the project remains authorized, operate, maintain, repair, rehabilitate, and replace (OMRR&R) the project or functional portions of the project, including any mitigation features, at no cost to the Federal Government, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government (except the HNC lock complex and the GIWW floodgate features of the project for which the

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responsibility for OMRR&R is assigned to the Government under Section 1001(24) of WRDA 2007);

j. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the project for the purpose of completing, inspecting, operating, maintaining, repairing, rehabilitating, or replacing the project;

k. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, rehabilitation, and replacement of the project and any betterments, except for damages due to the fault or negligence of the United States or its contractors;

l. Keep and maintain books, records, documents, or other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, or other evidence are required, to the extent and in such detail as will properly reflect total project costs, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Section 33.20;

m. Comply with all applicable Federal and State laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army"; and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141- 3148 and 40 U.S.C. 3701 – 3708 (revising, codifying and enacting without substantial change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a et seq.), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 et seq.), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c et seq.);

n. Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended (42 U.S.C. 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for construction, operation, and maintenance of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the non-Federal sponsor with prior specific written direction, in which case the non-Federal sponsor shall perform such investigations in accordance with such written direction;

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o. Assume, as between the Federal Government and the non-Federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for construction, operation, and maintenance of the project;

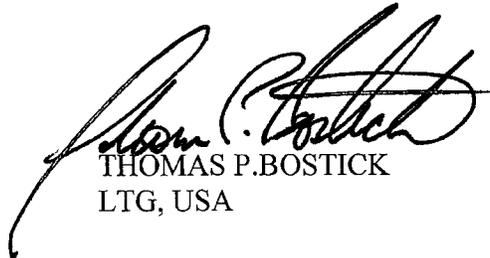
p. Agree, as between the Federal Government and the non-Federal sponsor, that the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, repair, rehabilitate, and replace the project in a manner that will not cause liability to arise under CERCLA; and

q. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended (42 U.S.C. 1962d-5b), and Section 103(j) of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2213(j)), which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until each non-Federal interest has entered into a written agreement to furnish its required cooperation for the project or separable element;

r. Shall not use any project features or lands, easements, and rights-of-way required for such features as a wetlands bank or mitigation credit for any other project;

s. Pay all costs due to any project betterments or any additional work requested by the sponsor, subject to the sponsor's identification and request that the Government accomplish such betterments or additional work, and acknowledgement that if the Government in its sole discretion elects to accomplish the requested betterments or additional work, or any portion thereof, the Government shall so notify the Non-Federal Sponsor in writing that sets forth any applicable terms and conditions;

10. This report reflects the information available at this time. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. Consequently, this supplemental report may be modified before it is transmitted to the Congress. However, prior to transmittal to Congress, the sponsor, the State, interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.



THOMAS P. BOSTICK
LTG, USA