Cedar River, Cedar Rapids, Iowa Flood Risk Management
Feasibility Study Report with Integrated Environmental Assessment
Cedar River, Cedar Rapids, Iowa
Linn County, Iowa

Summary of USACE Responses to Independent External Peer Review
November 2010

Independent External Peer Review (IEPR) was conducted for the Public Review Draft of the *Cedar River, Cedar Rapids, Iowa Flood Risk Management Feasibility Study with Integrated Environmental Assessment* (Study) in accordance with Department of the Army, USACE, guidance *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.

The U.S. Army Corps of Engineers (USACE) has developed a plan for the flood risk management for the Cedar River, Cedar Rapids, Iowa study area. Presently, the City has a discontinuous levee system and must perform emergency flood fighting activities to close gaps in the flood risk system. The opportunity exists to provide a comprehensive flood risk management system. The actions and strategies in the Study would manage flood risk to private and public property caused by Cedar River flooding in the City through 2060. Preparation of the Study complies with requirements contained in the USACE *Planning Guidance Notebook* (ER 1105-2-100) dated April 22, 2000 as updated to the present.

The recommended plan has a 99.99% chance of containing a 1% (100-year) flood event and a 91.24% chance of containing a 0.2% (500-year) flood event. The recommended plan, Alternative 4C, would include floodwalls and levees that total 3.15 miles in length. Alternative 4C is also the National Economic Development (NED) Plan. The recommended plan reduces flood risks for the central business district and industrial areas on the east side of the Cedar River for a more viable, sustainable community.

The goal of the USACE Civil Works program is always to 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. In August 2010 Battelle Memorial Institute, 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 *Study*.

The Final Independent External Peer Review Report, Cedar River—Cedar Rapids, Iowa, Flood Risk Management Feasibility Study with Integrated Environmental Assessment, Battelle Memorial Institute, dated October 28, 2010, presents the panel's final review and advice for improvements of the draft Study. The Panel assigned a significance level to each comment using the following criteria:

> "'High': Describes a fundamental problem with the project that could affect the recommendation or justification of the project.

'Medium': Affects the completeness or understanding of the reports/project
'Low': Affects the technical quality of the reports but will not affect the recommendation of the project."

USACE commends the IEPR Panel for their grasp and understanding of this important project; their prompt comments were instrumental in maintaining the project schedule. The following outline summarizes USACE actions which addressed each recommendation for each of the twelve comments provided. The IEPR Panel concurred and closed all 12 comments.

1. IEPR Comment - High Significance: The analysis of existing cultural resources within the Cedar Rapids Flood Risk Management Feasibility Study Area (Study Area) remains to be completed, creating a potential for increased project costs.

USACE Response: Adopted

Action Taken: USACE concurs and more descriptions have been added to the report as follows. Discussion in Section 5.1.9., Cultural Resources was revised to explain why the resolution of the cultural resources will not exceed the budgeted cost of the project. The discussion in Section 5.1.9., Cultural Resources was revised to explain how cultural resource assessments reduced uncertainties with area screening based on literature review and geomorphic assessment, and explain why the mitigation costs would not exceed the limit due to avoidance strategies. The cited sentence in Section 5.1.9., Cultural Resources was revised to better describe how costs in excess of 1 percent could merit a waiver request, in which case the non-Federal project sponsor would provide the non-Federal share.

2. IEPR Comment - High Significance: The 2008 flood event created additional economic uncertainties such that existing and future project damage estimates need further justification.

USACE Response: Adopted

Action Taken: Concur, additional information for clarification of procedural explanations to Federal Emergency Management Agency damage repairs, sewer damage costs, future flood damage costs, flood frequency/elevations, stage-damage relationships, and green space considerations were added to the report Appendix B. Economic Analysis, Section III.B.3.d. Water Control Facilities, and g. Parks and Recreation.

3. IEPR Comment - Medium Significance: The costs and benefits of Alternative 1A-C require further justification because this alternative creates the greatest reduction in Expected Annual Damage (EAD) and may have a benefit-to-cost ratio (BCR) approaching 1.0.

USACE Response: Not Adopted

Action Not Taken: USACE agrees that Alternative 1A-C provides the greatest reduction in EAD. But consistent with the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, alternatives for the study were formulated based on maximizing net national economic development benefits and not on greatest reduction of expected annual damages. The analysis of alternatives is sound and there is no reasonable

expectation that a more detailed analysis of Alternative 1A-C would result in finding that it has greater net economic benefits than Alternative 4C.

4. IEPR Comment - Medium Significance: The topic of Environmental Justice, as it relates to the Federally Supportable Plan (FSP), requires a more detailed examination.

USACE Response: Not Adopted

Action Not Taken: USACE addressed this comment through additional coordination with the IEPR panel. Referencing the data from the 2000 census presented in Table 27 in the report, none of these criteria have been exceeded to indicate a significant environmental justice impact from the proposed flood risk management project. All residents were invited to participate in all public meetings and the public review and participation process for this study was more than adequate to accommodate this Executive Order.

The impact of induced flooding was analyzed during the formulation and evaluation of alternatives. Where induced damages would occur within the damage reaches they were calculated and factored into the economic analysis using the certified HEC-FDA models; and utilized for evaluation and comparison of alternatives. Once the recommended plan was identified, the induced damages/stages were analyzed again to determine if they were significant enough to require mitigation. Under the recommended plan, certified HEC-RAS hydraulic models indicate the increase during a 1% chance event would be less than ¼ foot. For a 0.2% chance event the modeled average increase for the west bank would still remain less than 1 foot. The state of Iowa code (Iowa Administrative Code Section 567 Chapter 71) specifies how much the overbanks of a stream can be restricted or encroached. In Iowa the water surface elevation of the .01 exceedance probability flood cannot be increased more than 1 foot. Based on the modeling, state of Iowa code and analysis completed on other alternatives, for the relatively small induced stages coupled with the infrequent events additional mitigation efforts were not supportable. Non-structural measures such as flood-proofing were analyzed as shown in Appendix P and benefits were found to not exceed the costs. The City of Cedar Rapids is pursuing flood mitigation measures for the west side using other authorities. Additional information summarizing this discussion has been added to the final report in the Main Report, Section "3.2.1.3. City Plan".

5. IEPR Comment - Medium Significance: The effects of project implementation on the borrow and disposal areas require further description and analysis.

USACE Response: Partially Adopted

Action Taken: Text was added to the Main Report Section 5.1.12. Airport Borrow Area to reflect that with the implementation of the National Economic Development (NED) Plan/Alternative 4C, the primary proposed borrow area around the airport would most likely return to agricultural land, resulting in no significant adverse direct, indirect or cumulative impacts. The compilation of a formal "borrow plan" is not planned for the feasibility study because details of the borrow activities for the project will be developed in the Engineering and Design Phase. Impacts of the scenario most likely to occur for the proposed airport borrow area are discussed. The most likely scenario is that the agricultural fields that have been present for decades will revert to agricultural fields following completion of the construction process.

Verbiage for the most likely scenario for the borrow area if the project were to be implemented is included in Section 5.1.12 of the Main Report. Text concerning the avoidance of the three sites within the airport borrow area with hazardous, toxic or radioactive waste (HTRW) concerns was added to the main report section 5.1.12. HTRW "…soil sampling was completed for the Cedar Rapids Airport potential borrow area. Three soil sample locations indicate chemical or metal concentrations above the Iowa DNR Statewide Standards for soil. No soil from theses three locations would be used for borrow material." Similar avoidance verbiage already exists in the Main Report sections 4.7.1.5, 5.1.8.5, and in the HTRW Appendix section VI.D.

Action To Be Taken: The compilation of a formal "borrow plan" is not planned because details of the borrow activities for the project will be developed in the Project Engineering and Design phase.

6. IEPR Comment - Medium Significance: The Cedar Rapids Flood Risk Management Feasibility Study (Study) should either clarify the rationale for the selection of the 1% (100-year) flood event as a project objective or restate the objective.

USACE Responses: Partially Adopted
Action Taken: Concur, removed text mentioning a specific level of event within an objective.

Action Not Taken: Non-concur with the Panel's recommendation of re-writing the main objective to state "to maximize (or optimize) the NED benefits associated with flood risk reduction of the Cedar Rapids Study Area"; statement is too broad and is more of a goal than an objective. Developing specific, flexible, measurable, realistic, attainable, and acceptable objectives and constraints is critical to the success of the entire planning process (per ER 1105-2-100).

7. IEPR Comment - Medium Significance: The economic analysis should consider the benefits of the existing flood protection system for the 'future without project' condition because this could affect Benefit Cost Ratio (BCR) and the justification of the FSP.

USACE Response: Not Adopted
Action Not Taken: Further clarification occurred between the PDT and the IEPR panel to respond to the comment. The existing levees in Cedar Rapids do not reduce flood risk levels for the assumed existing and future without project conditions. Past inspections of the existing systems by the Corps revealed many items that do not meet Federal design standards. In addition existing flood risk management systems within Cedar Rapids lack basic features that preclude the need to perform a risk-based analysis of levee/floodwall integrity. Basic features lacking on systems include permanent closure structures on the storm discharge pipes and permanent pump stations. Major flood fighting efforts are required to prevent flooding through these systems. Major flood fighting efforts are not part of risk-based analysis. The reevaluation of the benefits is not appropriate for reasons noted above.

8. IEPR Comment - Medium Significance: The potential for erosion and sedimentation in the Cedar River due to project implementation needs to be addressed.

USACE Responses: Adopted

Action Taken: Additional text was added to Appendix A. Hydrology and Hydraulics to include a discussion of channel flow velocities comparing the without-project and with-project conditions. There was no case where the velocity changed from a non-erosive to an erosive velocity with the Recommended Plan as very little increase in flow velocity was identified across the full range of flooding events. Any natural erosion and sedimentation over the life of the project will not be amplified by the Recommended Plan (Alternative 4C).

9. IEPR Comment - Medium Significance: A summary of the justification to lower the contingency cost from 25 to 20% (Appendix B of the Study) and why it should be this low for this project should be presented in the Main Report.

USACE Response: Adopted

Action Taken: The text within section 4.6 of the main report was revised to explain the major items that reduced the overall project contingency attributable to the Cost and Schedule Risk Analysis (CSRA), like additional field data collection, conservative designs, and development of a contracting acquisition strategy. In addition, a CSRA was conducted on the Recommended Plan (Alternative 4C). The CSRA was facilitated by the Cost Engineering Directory of Expertise (Cost DX) and developed in conjunction with the Cedar Rapids product development team. This analysis established an overall project contingency by indentifying and measuring the cost and schedule impact of project uncertainties with respect to the estimated total project cost.

10. IEPR Comment - Low Significance: Additional text is needed to clarify the hydrology of the subwatersheds on the protected side of the watershed, which have to be pumped during a flood event.

USACE Responses: Partially Adopted

Action Taken: Confirmed that the floodplain management plan addresses future basin development and Section 5.6 of the report notes that the City of Cedar Rapids is currently undergoing review of their floodplain management ordinance to determine if modifications to the existing standards should be effected.

Action Not Taken: As coordinated with the IEPR panel, for the conditions of this study the most likely future with project condition does not include new development in the floodplain. Since the study area is the large urban area of Cedar Rapids, with the floodplain already fully developed, neither large scale new development, nor significant improvements to existing developments are anticipated behind the proposed levee/floodwall system. The pumping requirement changes are not expected as no significant improvements to existing developments are anticipated behind the proposed levee/floodwall system.

11. IEPR Comment - Low Significance: Section 3 of the Study contains potentially contradictory statements pertaining to watershed planning and flood risk for the future 'without project' conditions.

USACE Response: Adopted

Action Taken: Section 3.2.3.3 was revised to explain that development along the Cedar River and the watersheds above Cedar Rapids over the next 50 years is not expected to alter the discharge-frequency curve at Cedar Rapids. Section 3.2.7 was revised to reflect that the City of Cedar Rapids will likely explore planning efforts to maintain the status quo.

12. IEPR Comment - Low Significance: The Study could be strengthened by incorporating some material from the appendices into the Main Report.

USACE Response: Adopted

Action Taken: Additional supporting text was added to the Executive Summary and Main Report to address the development and screening of measures as suggested. The existing map early in the report was revised to orient readers. Terminology was defined as appropriate.