

# Cedar River-Cedar Rapids, Iowa Flood Risk Management Feasibility Study “Lessons Learned” By Christopher Haring, Rock Island District

The Cedar River, Cedar Rapids, Iowa Flood Risk Management Project Feasibility Study Report with Integrated Environmental Assessment (Study) was authorized by Congress in 2006 to investigate flood risk management (FRM) alternatives for the City of Cedar Rapids, Iowa (City). The purpose of the Study was to formulate and evaluate cost effective, environmentally-sensitive, and technically sound FRM alternatives to reduce risk to the City. A Feasibility Cost Share Agreement (FCSA) between the City and the U.S. Army Corps of Engineers, Rock Island District (District) was signed in early May 2008 to initiate a study for a portion of the City known as the Time Check Levee Area.

Beginning in late May and extending through the first two weeks of June 2008, the Cedar River Watershed received extraordinary amounts of rainfall. The resulting flood exceeded any previous records in the City by 12 feet and was approximately 4 feet greater than the 500-year flood event. The record flooding inundated the entire downtown river corridor, engulfed 1,300 city blocks, displaced 25,000

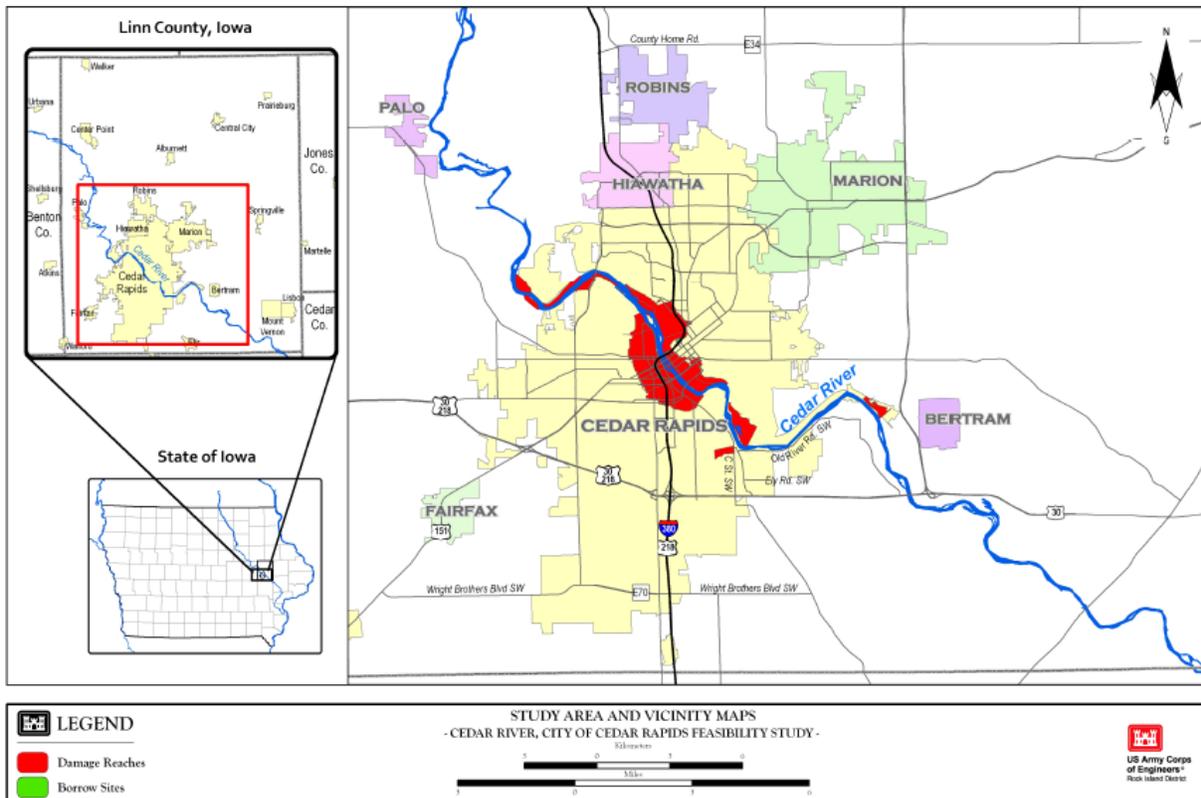
people, and caused over \$5 billion in damage in Cedar Rapids and Linn County (Photo 1). This disaster ranks as the fifth worst natural disaster in the nation for public facility losses.

In response to the disaster and at the request of the City, the FCSA Scope of Work was expanded from the original Time Check area to include the downtown business district; additional residential neighborhoods; commercial and industrial areas; and critical infrastructure including potable water supply, wastewater treatment facilities, power generation and public health and safety facilities. The amended FCSA was executed in May 2009.

The estimated Study area (Figure 1) increased significantly which caused the study cost to increase from \$1.5 to \$7.5 million and caused the need for provisions for the City to make accelerated payments of its local share. The Project Delivery Team (PDT) was at an early disadvantage as there was little to no data available on the expanded Study area. This required new scoping documents, extensive data gathering, new modeling, revising existing



**Photo 1 Downtown Cedar Rapids June 2008**



**Figure 1. Cedar Rapids Study Area and Vicinity Map**

conditions, and close coordination with the local sponsor. The PDT consisted of an interdisciplinary group representing the City, several Corps districts, and consultants.

This study was a high profile study for the District and the Region. The Corps committed to completing a feasibility study on an expedited schedule. The normal planning process normally takes 3 – 5 years. The Civil Works Review Board for the project was held in November 2010 and a Chief’s Report was signed on 27 January 2011 just 18 months after the FCSA was executed.

**Lessons Learned**

Innovative planning was needed as the team overcame challenges and constraints throughout the Study. New innovations from this study included early study plan formulation development and sponsor coordination, fully funded studies at the beginning which were critical in condensing the study timeline to 18 months, the use of expedited and concurrent

technical review periods including the engagement of the Vertical Team early in the study process, the importance of employing regional assets and A/E firms, and concise implementation of analytical analysis approaches. The Cedar Rapids study’s best practices are being used as a benchmark for the implementation of a new planning paradigm initiative started by HQUSACE and the ASA(CW).

**Sponsor plan formulation can contribute significantly to expediting study schedule**

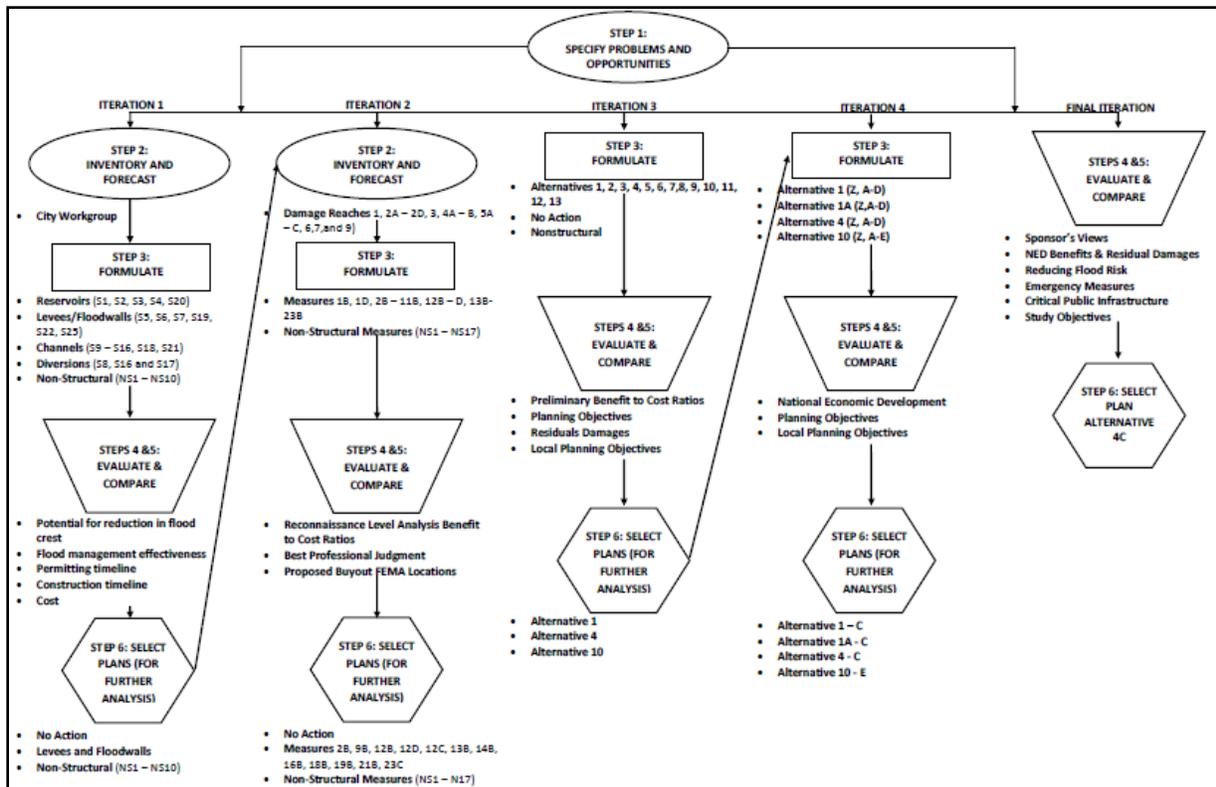
Early on in the planning process, the City played a key role through its planning efforts in developing and refining FRM features. The efforts began with the formation of the City workgroup, which consisted of a group of consultants working closely with the District. The City workgroup consisted of a multi-disciplined team of hydrologists, landscape architects, urban designers, hydraulic engineers, civil engineers, transportation engineers, architects, ecologists, sustainability specialists,

market analysts and watershed experts. The group met weekly and used information gathered from the monthly City-sponsored public forums held on the development of the River Corridor Redevelopment Plans (RCRP) and neighborhood meetings. The process was iterative and intense as ideas from the public meetings were vetted through the workgroup and investigated in detail for opportunities to use as FRM features. The public meetings and the City workgroup's intensive planning efforts were finalized by the City approving a preferred FRM plan in November 2008 with the final screening document completed in March 2009 as documented in the City's RCRP Flood Mitigation Options Report. This report was instrumental in the re-evaluation and screening of the FRM features and development of alternatives for use in the Corps feasibility study. The complexity of the Study process is outlined in Figure 2 that depicts five major iterations in the planning process. The 6-step planning process was integrated within all of the iteration steps and became more detailed as planning progressed. In many cases previous iteration details were reviewed and reformulated

effectively verifying previous planning assumptions.

**Fully funded studies in the beginning are critical**

During the development of the City workgroup's initial scoping document the Corps worked closely with the City and the Vertical Team to accelerate sponsor funding provided in the revised FCSA. The accelerated City funds greatly expedited the PDT's ability to gather data to define the existing conditions and future without project (FWOP) conditions. The Study also received American Recovery and Reinvestment Act funding in July 2009 that provided Federal funding to match the City's. Despite the inherent complexity of the study, Corps leadership made the commitment to the City to complete the Study within 18 months of the signing of the revised FCSA in May 2009. The PDT worked efficiently and concentrated on the goal to meet the commitment. The team completed the draft report in August 2010 just 15 months after the signing of an amended FCSA.



**Figure 2. Cedar Rapids Planning Process Iterations**

### **Expedited and concurrent review periods with early Vertical Team engagement**

The PDT used new innovative expedited review periods for the completion of the Agency Technical Review (ATR) and the Independent External Peer Review (IEPR) in the timeframe required while still complying with policy. This was accomplished by an intensive review period utilizing special coordination; In Progress Reviews (IPR) with the vertical team; and concurrent ATR, Public Review, IEPR; and Headquarters policy compliance review as appropriate. For example, the PDT was able to address all public review comments and sign the Environmental Assessment's Finding of No Significant Impact (FONSI) within 7 days of the close of the public comment review period. Using the public review draft the PDT was able to facilitate an expedited review for the IEPR completion. All of these expedited and concurrent review periods were instrumental in meeting the project schedule completion.

### **Importance of employing regional assets and A/E firms**

Developed in close conjunction with the PDT, a Cost and Schedule Risk Analysis was facilitated by the Cost Engineering Directorate of Expertise (Cost DX in Walla Walla District). The review process was highly iterative and required very close coordination by many team members to complete the estimate on the accelerated schedule. The end result was the certification of the Recommended Plan's cost estimate of \$99,004,000 (Figure 3).

Throughout the Study, the PDT effectively incorporated the consultants' work to minimize the time required to complete the Study schedule. Optimizing consultants' work was accomplished through detailed coordination in PMP development and planning activities. These activities effectively partnered the City's and the District's consultant resources to provide specific detail oriented products based on individual disciplines. For example, prior to the initiation of the Study, the City hired a consultant to develop recreation plans for the downtown area. By using the previously



**Figure 3. Recommended Plan Alternative 4C**

developed plans and integrating them with the District plans, significant time and funding was saved.

### **Implementation of concise analytical analysis approaches**

Additional aspects of the Study were impacted by the expedited Study schedule. They included coordination and analytical data collection methods for hydrology and hydraulics, economics, cultural and historic resources, real estate, cost engineering, and consultant coordination. To accommodate the aggressive schedule, concise analytical objectives needed to be provided to establish the minimum amount of details needed to further the plan formulation screening efforts. The entire downtown floodplain was in a state of recovery and many properties were vacated, repaired, reconstructed or demolished during the Study. The hydrologic and hydraulic engineers re-surveyed and recalibrated the models and collected additional data in very short periods of time. The

economists also identified problems on how to define existing and future without project conditions when assessing property damages from the 2008 event. Real estate specialists experienced challenges in identifying property ownership, defining costs, and making contacts with absentee landowners. This was accomplished through diligent coordination between the City and the District's PDT members, thereby setting new standards for Real Estate coordination during a feasibility study. Cultural and historical resources data were gathered to identify areas of significance such as the Czech Village. Czech Village has a rich historical identity (National Historic Register) and includes the National Czech and Slovak Museum. The PDT was sensitive to this neighborhood as well as other important cultural and historical sites in formulation of alternatives.

### **Concluding Remarks**

As demonstrated by the completion of the study, expedited study schedules can work as indicated by the PDT completing a draft report on time, despite rapidly evolving conditions in the City, modeling and analysis changes, and the resolution of the many technical and policy review comments. The team communicated deliberately and transparently through entire PDT weekly meetings including contractors, frequent meeting between core team members, frequent email announcements, and a dedicated ProjectWise filing system directory.

Another metric when determining study success is the customer service rating. The PDT's excellence in service was demonstrated by the superior customer service surveys from the Sponsor. The average rating on the three completed surveys was 4.83 out of 5.0 with two overall surveys ratings over 4.9. Comments included in the surveys reflect the team's commitment to excellence. One responder said "...staff has been aggressive in meeting on-site and being available to problem solve when "new" issues arise that impact the progress of the study. That has been invaluable to our success [sic] staying on schedule and - ahead of the typical timeline." Another responder included this comment: "The ACOE continues

to be a great partner in addressing needs for current and future residents. Thank you!"

In summation without an engaged and proactive local sponsor, a dedicated and committed PDT willing to expend the time and effort required to meet the Study's demanding schedule, intense review periods with extensive Vertical Team engagement, and the use of regional assets and contractors to augment the District's technical capabilities; the study would not have been successful.