

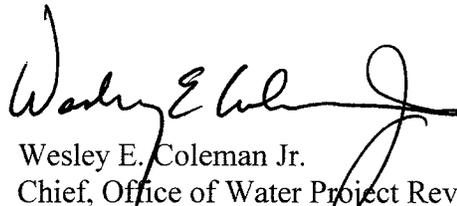
25 JAN 2011

CECW-PC (1105-2-10a)

MEMORANDUM FOR CECW-MVD (ATTN: John Lucyshyn)

SUBJECT: Cedar River, Cedar Rapids, Iowa, Flood Risk Management Project, Feasibility Study Report with Integrated Environmental Assessment (November 2010) – Documentation of Review Findings

1. This memorandum forwards the documentation of policy compliance review findings for the subject project proposal. In the opinion of the policy compliance review team, all policy review concerns have been adequately addressed for this phase of project formulation and development.
2. Office of Water Project Review consideration of subject report and environmental assessment is complete. Questions concerning the HQUSACE policy compliance review of this project proposal may be discussed with review manager, Thomas Hughes, at 202-761-5534.



Wesley E. Coleman Jr.
Chief, Office of Water Project Review
Planning and Policy Division
Directorate of Civil Works

Encl

DOCUMENTATION OF REVIEW FINDINGS

**CEDAR RIVER – CEDAR RAPIDS, IOWA
FLOOD RISK MANAGEMENT PROJECT**

**FEASIBILITY REPORT
AND
ENVIRONMENTAL ASSESSMENT**

January 2011

ENCLOSURE

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15 January 2011

DOCUMENTATION OF REVIEW FINDINGS

CEDAR RIVER, CEDAR RAPIDS, IOWA FLOOD RISK MANAGEMENT PROJECT

FEASIBILITY REPORT AND INTEGRATED ENVIRONMENTAL ASSESSMENT NOVEMBER 2010

A. GENERAL.

1. Policy Compliance Review Findings. The following summarizes the final HQUSACE policy compliance review findings for Cedar River, Cedar Rapids, Iowa Flood Risk Management Project Linn County, Iowa Final Feasibility Report and Integrated Environmental Assessment. This summary includes the concerns and the related resolutions of those concerns for the HQUSACE reviews of the Alternative Formulation Briefing Documentation received in June 2010, Draft Report and EA dated August 2010, and the November 2010 Final Feasibility Report and EA.

2. Project Location. The study area is located in Linn County, Iowa. The Cedar River watershed is in northeastern Iowa, approximately 70 miles west of Dubuque, Iowa; 30 miles north of Iowa City; and 130 miles northeast of Des Moines. The drainage area of the Cedar River at Cedar Rapids is 6,510 square miles.

3. Authority. The Cedar River, Cedar Rapids, Iowa, Flood Risk Management Project, Feasibility Report with Integrated Environmental Assessment (Study) is authorized by Senate Resolution adopted May 23 2006 by the US Senate Committee on Environment and Public Works. The resolution reads as follows:

“Resolved by the Committee on Environment and Public Works of the United States Senate, that the Secretary of the Army is requested to review the report of the Chief of Engineers on the Iowa and Cedar Rivers, Iowa and Minnesota, published as House Document 166, 89th Congress 1st Session, and other pertinent reports, to determine whether any modifications to the recommendations contained therein are advisable at the present time in the interest of flood damage reduction, ecosystem restoration, recreation, and related purposes along the Cedar River in Cedar Rapids, Iowa”

4. Non-Federal Sponsors. The non-Federal sponsor for the study is the City of Cedar Rapids, Iowa. The Feasibility Cost Sharing Agreement (FCSA) was originally signed on

May 30, 2008 for the Time Check area, and last amended May 6, 2009, when it was expanded to include the entire study area.

5. Problems, Needs And Opportunities. Much of downtown Cedar Rapids lies within the 100 year floodplain. Historically, major floods have been caused by a combination of rainfall and snowmelt or by heavy rainfall alone. The city experienced record flooding in June 2008, double any previous flood event based on approximately 100 years of gage information. Nearly 10 square miles and 1,300 city blocks were impacted, displacing approximately 25,000 people.

6. Plan Formulation. A wide variety of FRM alternatives were developed that would address one or more of the planning objectives. These measures were evaluated and then screened. Alternative plans were then formulated with one or more of the FRM measures, by using an iterative screening process in three phases. Phase 1 prepared conceptual designs and rough order of magnitude cost estimates for 25 structural and 10 nonstructural measures, and recommended further study to continue planning levee/floodwall alignment measures. Phase 2 analyzed technical aspects of all Phase 1 measures, a structural inventory of the study area, a public meeting and developed and applied screening criteria for alternative selection. As screening criteria, Phase 2 used Planning Guidance Notebook criteria, Planning Objectives and draft BCR's. Phase 3 analyzed 15 separate levee/floodwall plans with five alignments using updated hydrology and hydraulics modeling as well as the economic structural inventory. Final formulation refined the alternatives to determine the NED plan. The final array of alternatives was as follows:

- “No action” alternative
- Alternative 1(Z-D)
- Alternative 1A(Z-D)
- Alternative 4 (Z-D)
- The preceding plans with the addition of nonstructural alternatives

7. Selected Plan. The selected-plan 4C includes structural flood risk reduction measures for flood risk management. No nonstructural measures are included in this plan because they are already being implemented by other Federal agencies, like the Federal Emergency Management Authority's buyout of certain residences on the west bank. Structural measures are only recommended on the east bank, and include the following features:

- Concrete floodwalls. Concrete floodwalls comprise approximately two thirds of the total alignment length of 2.17 miles.
- Earthen levees.
- Closure structures.
- Pump stations.
- Recreation features.

8. Project Costs. Based on an October 2010 price level, the estimated total first cost of the recommended plan is \$99,000,000. The cost of lands, easements, rights-of-way, relocations, and excavated material disposal areas is estimated at \$11,700,000. Based on a 4.125-percent discount rate and a 50-year period of analysis, the total equivalent average annual costs of the project, including OMRR&R, are estimated to be \$5,125,000.

9. Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R).

Future OMRR&R practices would include operations for inspection and monitoring, levee mowing, vegetation control, outfall cleaning, maintenance of pumps, etc. Additional cost will be added by the project with respect to maintenance of six new pumps. The appropriate Operation and Maintenance manuals will be updated accordingly at the conclusion of the project design and construction period. Annual OMRR&R Costs are estimated at \$18,000, including routine maintenance like mowing and gate maintenance, and replacement of pumps with a 30-year life expectancy. The non-Federal sponsor's responsibility for maintenance of all FRM components continues indefinitely beyond the 50-year period of this study.

10. Project Benefits. Based on a 4.125-percent discount rate and a 50-year period of analysis, the equivalent average annual benefits are estimated to be \$6,144,000 with net average annual benefits of \$1,019,000. The benefit-cost ratio is approximately 1.2 to 1. The reporting officers estimate that the recommended plan has a 99.99% chance of containing a 1% flood event and a 91.24% chance of containing a 0.2% flood event. The recommended plan would reduce expected annual flood damages to the east bank area by about 84 percent.

11. Cost Sharing. In accordance with the cost sharing provisions of the Section 103 of the Water Resources Development Act of 1986 (WRDA 1986), as amended by Section 202 of WRDA 1996, the Federal share of the total project cost is estimated at \$64,350,000 (65 percent) and the non-Federal share is estimated at \$34,650,000 (35 percent). The City of Cedar Rapids would be responsible for the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project after construction.

12. Environmental Compliance. The Cedar River, Cedar Rapids Flood Risk Management Feasibility Report includes an integrated Environmental Assessment (EA), and appropriate plates and appendices. There are no significant environmental or social impacts from construction of the Recommended Plan. The Corps has responded to all resource agencies and interested party comments, and the Statement of Findings and Finding of No Significant Impact were signed on 15 October 2010. On 12 Oct 2010 the State of Iowa issued a Section 401 water quality certification for the Recommended Plan.

To avoid impacts to known and unknown significant historic properties, the Corps has executed the *Programmatic Agreement Among the United States Army Corps of Engineers Rock Island District, Iowa State Historic Preservation Officer, City of Cedar Rapids, and Advisory Council on Historic Preservation for Alternative 4C Implemented Under the Cedar River, Cedar Rapids, Iowa Flood Risk Management Feasibility Study – Linn County, Cedar Rapids, Iowa* (PA). The PA was executed October 12, 2010, in fulfillment of our responsibilities under Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's regulations.

The final U.S. Fish & Wildlife Service Coordination Act Report was received on May 18, 2010, and the Recommended Plan would result in no significant impacts on federally-listed species or habitats. The Findings of Compliance for Clean Water Act Section 404(b)(1) Evaluation was signed on 15 October 2010. The Clean Water Act Section 402 NPDES

permits will be obtained from the Iowa Department of Natural Resources by the construction contractor before the start of construction.

B. RESOLUTION OF REVIEW COMMENTS ON THE JUNE 2010 ALTERNATIVE FORMULATION BRIEFING PACKAGE.

1. Planning Objectives. Minimize the risk of failure of the existing FRM could be considered as an objective if alternatives were identified to reduce the risk of failure. The approach taken to address this objective is to replace the existing FRM with a larger FRM option, which is already addressed in the first objective. There are no options to modify the existing FRM to reduce its risk of failure or improve its performance. Reducing the amount of flood fighting is not necessarily an objective that you would want to achieve. Flood fighting may be a very cost effective alternative to achieve the first objective of reducing flood damages. Have alternatives been developed to increase public awareness.

CEMVR Response: Concur. Recommended changes have been addressed as proposed.

A. “Minimize the risk of failure of the existing FRM” & “Reducing the amount of flood fighting” will be removed from the objectives.

B. Yes, Nonstructural alternatives to increase public awareness were formulated including Evacuation Planning and Public Education, Route Mapping & Signage, Community Flood Response Education (Appendix P Nonstructural).

HOUSACE Assessment: Resolved.

2. Planning Constraints. O&M and Real Estate and infrastructure are not constraints. They are items that will be considered in the costs of the alternatives but are not areas that should necessarily be avoided during formulation. Constraints should not eliminate potential NED alternatives. These items can be considered during the formulation and they may meet an objective of the local sponsor but they should not be considered a constraint.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. O&M, RE, and infrastructure will be removed from constraints.

HOUSACE Assessment: Resolved.

3. Existing and Future Without Project Condition. Chapter 3 does not sufficiently describe the existing and future without project condition. The purpose of this chapter is to describe these conditions in relationship to the problems and objectives. The purpose of this study is to reduce flood risk but the 47 pages of this section includes only 5 pages dealing with the flood risk and most of that only addresses the probability of a flood event with no discussion of consequences. This section of the report should support your problem statement. There should be a detailed discussion of the existing flood risk. This discussion should include number of structures impacted, water depth, extent of flooding of various events, damages of various events. After reading this section the reader should have an understanding of the

nature of the problems identified earlier. Section 3.2 FWOP has a limited discussion about land use and population in the next 50 years.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Chapter 3 is being updated and will include updated floodplain maps, number of structures impacted, water depth, extent of flooding of various events, damages of various events.

HOUSACE Assessment: Resolved.

4. Value Engineering. There is no evidence that value engineering has been utilized in the formulation of alternatives. Public meetings should be facilitated by the value engineer to assure that all viable alternatives are considered.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. The VE Engineering was considered under planning iteration #1 resulting in the Cedar River Corridor Redevelopment - Flood Mitigation Options Report. The MVR VE Officer has provided a report on the VE Study. As reported 8 Jun 2010,

1. An evaluation of flood mitigation proposals by Stanley Consultants via a report entitled *Cedar Rapids River Corridor Redevelopment, Flood Mitigation Options, March 2009*. A total of 30 structural and 10 non-structural flood mitigation proposals obtained by multiple brainstorming sessions with multiple interested parties were evaluated, including rough order of magnitude cost evaluation. Based on the results of further proposal development and cost and customer needs evaluations, the report recommended that levees and floodwalls were the most cost-effective alternatives.
2. During the further development of proposals in the feasibility study report, additional cost-savings were achieved by: adjusting unit prices for concrete floodwalls and architectural concrete, replacing removable floodwalls with permanent floodwalls, shortening the protection system alignment, utility line relocations, and pump stations modifications. Refer to the enclosed documents for details. The resulting savings totaled nearly \$90 million.
3. A more detailed VE study will be performed on the final recommended plan early in the preliminary engineering and design (PED) phase – prior to the 35% PED level.

HOUSACE Assessment: Resolved.

5. Existing Levees (Section 3.1.4). The report identifies existing levees. Are these federally authorized/constructed levees? Several statements are made about the unacceptable risk of failure during flood events even though it has withstood past events by removing the existing system. There needs to be more discussion about the performance of the existing structure. Are the substandard conditions due to design/construction problems or also due to poor O&M? Has there been an engineering evaluation of these levees to determine the level of risk reduction that they provide.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Specifically, a MVR Memorandum for the Record has been inserted into the Geotech Appendix, also maps and further description will be added to the Existing Conditions Chapter 3 Section of the main report.

None of the five existing flood protection systems were federally authorized or constructed. None of the systems have ever been recognized or accepted into the PL 84-99 program.

There are many substandard issues with the systems that clearly fall short of federal standards to even consider application into the PL 84-99 program. No in-depth engineering analysis was completed.

The systems are capable of holding back floodwaters and have done so successfully in the past but only in conjunction with significant flood fighting efforts by the city. Significant flood fighting efforts include; sandbagging where tie-offs to high ground do not exist, bringing in temporary pumps, and plugging or pooling up storm drains. However, lack of closure structures on storm sewers, lack of permanent pump stations, combined with unknowns with underground utility penetrations made it clear that no credit should be given to the existing systems according to federal standards.

In response to this comment, editing was done to the main report and the geotechnical appendix to further define why no credit for the existing systems was included under the existing condition analysis. A map will be added to the main report in order to show where all the existing systems are located.

HOUSACE Assessment: Resolved.

6. Warning Time and Evacuation Time. The report does not discuss the warning time or time required to evacuate the floodplain. If such plans already exist they should be discussed in the report as part of the without-project conditions per ER 1105-2-100, paragraph 2-4.b.(3). The potential for loss of life under the future “without” project condition and the various “with” project alternatives also needs to be addressed. It is not evident how warning time figures into the damage analysis and EAD calculations. What is assumed for content damages? The text should explain how effective these non-structural actions are, the resultant effects and costs, and they are accounted for under the without-project EAD calculations. See E-19 of ER 1105-2-100.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. See response to B. Plan Evaluation #7. Consequences of project exceedance. The part concerning warning and evacuation is reproduced as follows.

“During the 2008 event, the river elevation rose 5.6 feet in 18.5 hours. Several elderly people were removed by boat from their homes and no one drowned. Two key elements to the severity of the consequences of capacity exceedance are the time of year of flooding and the amount of warning time. The distance from the river bank to high ground varies from 1,000 to 3,700 linear feet. These distances could be walked in 4 to 15 minutes during daylight hours and 8 to 30 minutes during the night.

“For the Without-Project condition the warning time is estimated to be 6 to 12 hours. Under normal With-Project conditions for Alternative 4C the warning time for a gradual levee overtop would also be 6 to 12 hours. For the with-project condition of sudden, catastrophic levee failure warning time would be 1 to 3 hours. Two new stream gages on the Cedar River between Waterloo and Cedar Rapids are part of the without project used by the national weather service that allow an increase in warning time measured in hours over what was available in 2008. The amount of warning time was not considered in the content damage curve. The assumption for the without project and the with-project condition was that contents were left in place and were not elevated above the damage zone.”

HOUSACE Assessment: Resolved.

7. Historic Record of Potential Flood Events. It is noted that, for a variety of reasons, the Cedar Rapids area has never experienced significant flooding or a levee failure. The main report contains very little information on flood events that have threatened the CR area. The report should provide information on peak stages that have occurred, by year, at key index points and relate these to the estimated levee failure probabilities at these index points. If there are obvious inconsistencies between the historic record and the estimates developed by the study team these need to be clearly explained. See E-19 j. and k. of ER 1105-2-100 which explains the relevance of historic flood data in determining existing and future flood damages.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Cedar Rapids has experienced one significant flood in 2008; we have expanded the discussion of the causes of the 2008 flood. Likewise in “Section 3.1.4 General Hydrology in Table 2 Flood of Record” the report provided information on peak flood stages by year at the Cedar Rapids gage for the largest 10 floods of record. We have moved this section to a more prominent location and expanded the material to include discussions of the other significant floods in 1961 and 1993.

Basin Description and Historic Floods

The Cedar River flows through northern and central parts of eastern Iowa and drains an area of 7,819 square miles at its mouth. It is a major tributary of the Iowa River. The Iowa River in turn enters the Mississippi River between Muscatine, Iowa, and Burlington, Iowa. The drainage area of the Cedar River at the City of Cedar Rapids is 6,510 square miles. Historically, major floods have been caused either by heavy rainfall or by a combination of rainfall and snowmelt. The largest 10 floods at the Cedar Rapids gage are listed in Table A- 1. This gage (05464500) is approximately 400 feet upstream of the 8th Avenue Bridge. The zero gage elevation is 700.46 feet NGVD or 701.38 NAVD (1988). The USGS has recorded peak stages at the Cedar Rapids gage since 1903.

Table A- 1 Cedar River Floods of Record at Cedar Rapids

Year	Discharge (cfs)	Gage Height (feet)	Elev. NAVD (feet)
2008	140,000	31.12	732.50
1961	73,000	19.66	721.04
1993	71,000	19.27	720.65
1965	66,800	18.51	719.89
1929	64,000	20.00	721.38
2004	62,500	18.30	719.68
1999	62,300	18.31	719.69
1933	58,400	18.60	719.98
1947	56,200	18.23	719.61
1906	55,700	17.60	718.98

The flood of record occurred on 13 June 2008. The peak water surface elevation was 731.50 feet NAVD from a discharge of about 140,000 cubic feet per second (cfs). Based upon the discharge-frequency analysis made for this study, this flood was in excess of the 0.2 percent chance event yet less than the estimated Standard Project Flood discharge. This elevation was 4 to 5 ft above the 500-year Flood Insurance Study (FIS) flood. To understand this flood one must appreciate that “timing and

location of rainfall conspired to maximize flood intensity.” It takes about seven days for water to travel along the Cedar River from the basin divide to the Cedar Rapids. “Rain in the upper watershed falling on June 8 moved downstream to combine with rain falling” north of Cedar Rapids on June 12 (Reference 20). NOAA observed daily rainfalls during this travel time interval at gages located within the upper, middle and lower third of the basin appears in the Table A-4 to define this event.

Table A- 2 Rainfall (inches) contributing to 2008 Flood

Date	Mason City Gage 14940	Waterloo Gage 94910	Cedar Rapids Gage 14990
6 Jun	0.24	0.46	0.18
7 Jun	1.39	1.52	T
8 Jun	4.91	1.90	2.41
9 Jun	0.03	0.15	0.14
10 Jun	0	T	0.42
11 Jun	0.99	0.60	0.06
12 Jun	0.44	1.41	1.73
13 Jun	0	0	0

The rainfall source is: <http://cdo.ncdc.noaa.gov/ulcd/ULCD>). For a basin map see Figure 2 of the Main Report along with a rainfall distribution map for the month of June (Figure 7). The result of the two storms was a single well-defined and extremely large peak flow at Cedar Rapids on June 13th. The flood hydrograph is shown in Figure A-2

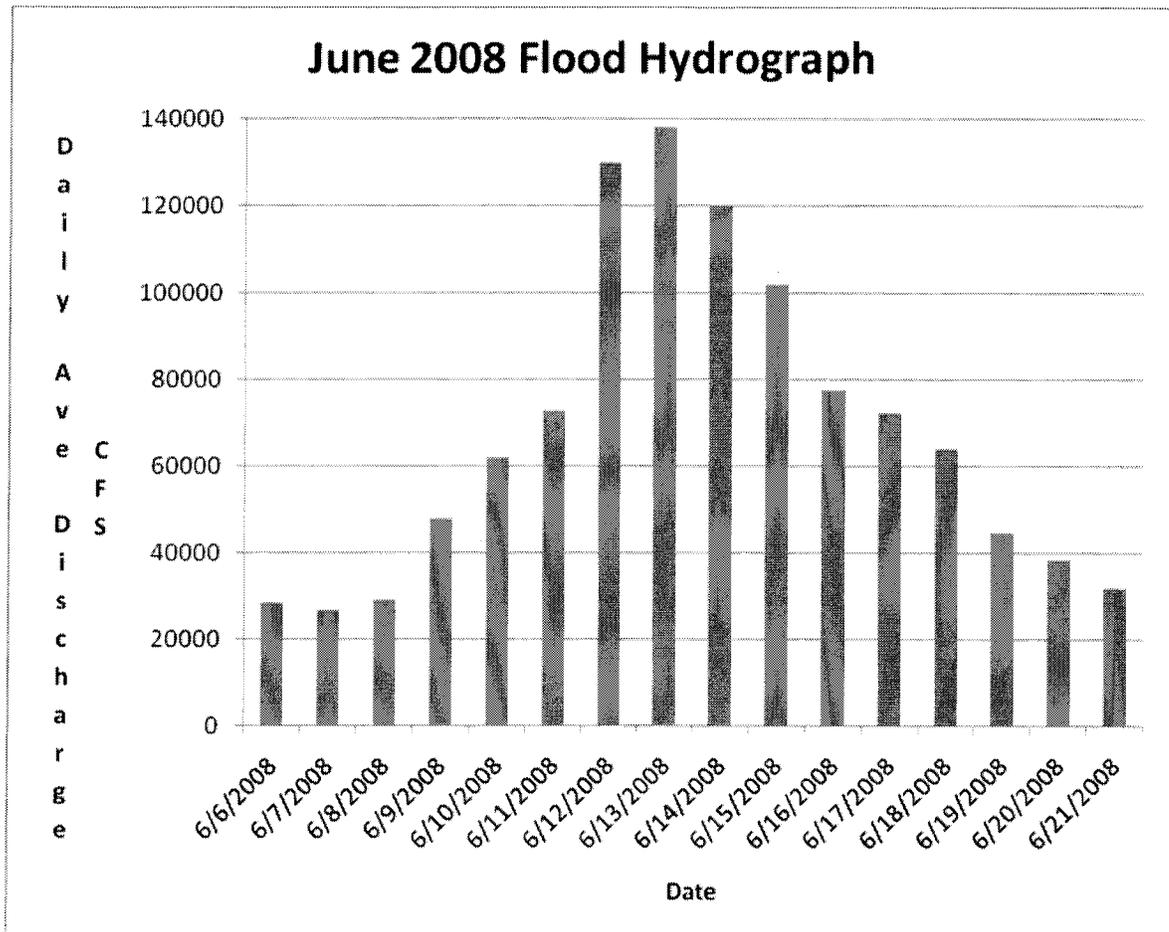


Figure A- 1 Cedar River 2008 Flood Hydrograph at Cedar Rapids

The 1961 flood was the result of the rapid melting snow pack with rainfall. At Cedar Rapids the river crested on March 31st at elevation 721.04 feet NAVD. Based upon the discharge-frequency analysis discussed later this flood (73,000 cfs) is in excess of the 0.04 exceedance probability event yet less

than the 0.02 exceedance probability. Heavy snowfalls on March 7th and 8th deposited 1¼ to 1½ inches of water content. Low temperatures prevented this snow from melting until March 24th when temperatures rose into the 60's (Fahrenheit) and remained high for 3 days. It was mainly this rapid runoff that produced the flood (Reference 5).

The 1993 flood was the result of a single storm falling within the saturated watershed 3 to 4 days before the peak discharge (71,000 cfs) was observed at Cedar Rapids on April 4th. The peak water surface elevation was 720.65 feet NAVD. Rain falling on March 30th and 31st deposited a total of 1.52, 1.78 and 0.65 inches at the Mason City, Waterloo, and Cedar Rapids air ports respectively. No other significant rainfall fell at Mason City or Waterloo after that. However 0.29 inches fell at Cedar Rapids on the 1st of April. Based upon the discharge-frequency analysis discussed later this flood was in excess of the 0.04 exceedance probability event yet less than the 0.02 exceedance probability.

HOUSACE Assessment: Resolved.

8. Alternative Development. The objectives that follow the problems and opportunities need to be linked to the management measures. Recommend using more of the plan formulation appendix in the main body of the report to show how the formulation was done rather than describing how it was done. For example 4.2.5 preliminary alternatives eliminated from further consideration. This should be corrected to state measures and then text describing why they were eliminated by reach in relationship to the objectives. The combining of measures into the final alternatives and their description and figure does not make sense to the reader.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Plan Formulation Section in Chapter 4 is being expanded to include more details. Information from the Planning Appendix is being brought forward to main report.

HOUSACE Assessment: Resolved.

9. NED Plan. The plan formulation section of the main report is very difficult to follow. This is partially because the existing conditions section does not provide enough of the information about the flood impacts that are being formulated against. The plan formulation appendix screens out alternatives that have greater net benefits than other plans that were not screened out. The report must identify a plan that reasonably maximizes net benefits. Which means that if you identify a plan as your NED plan that has less net benefits than another plan then you must make a case for why the selected plan “reasonably maximizes net benefits”. This is usually applied when two plans have similar net benefits but the plan with lower net benefits provides substantially greater outputs or less costs. Although the selected plan does have significantly greater outputs it is hard to make the case that the net benefits are similar. In which case the selected plan is not the NED plan. Our guidance does not say we have to select the NED plan but we do have to identify it. The study can make the case for why the selected plan should be the Federally supported plan but not the NED plan.

CEMVR Response: Concur. Report revisions and the development of a white paper covering this topic were drafted and reviewed by HQ & MVD.

Action Taken: In an effort to provide more clarity to the report, Section 4 – Plan Formulation/Alternatives was revised and re-written to bring the majority of the Planning Formulation- Appendix O into the main report. Also moved forward in this Section were more details on the Plan Formulation Iterations and the development of Alternatives. The Existing Conditions Section 3.1 and Future Without Project Section 3.2 were also revised and updated to include more detailed maps and figures for analysis. By revising these Sections and the development of the White Paper all issues regarding the proper identification of the NED Plan and subsequent plan formulation that went into that decision have been completed.

HOUSACE Assessment: Resolved.

10. Levee Crest Elevation. The formulation section identifies 5 different levee heights based upon an elevation of a flood event plus 3 feet. The way this is formulated gives the appearance of the use of freeboard. The alternatives should be designed and identified by the ability to pass a certain event.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Also the benefits and performance of each alternative will be shown in the main report. These values were determined for the entire array using HEC-FDA. If an alternative has more than one index station the index station with the worst project performance was selected to describe the project performance for that alternative. Results appear in both the Economic Appendix and the H&H appendix.

Every levee alternative was evaluated using an array of five different levee crest elevations. This array of levee crest elevations is summarized at the index station of the most downstream Economic Damage Reach (Reach 5C) in the Table XX below. A detailed discussion of crest elevations used for all index stations appears in Appendix A. The alternatives were evaluated based upon the same array of index levee crest elevations at the downstream Economic Damage Reach 5C. For Alternatives 1 and 1A HEC-FDA project benefits were determined using levee crest elevations upstream of 5C that came from a profile that simulated levees on both east and west banks of the river. For Alternatives 4 the HEC-FDA project benefits were determined using elevations upstream of 5C that came from a profile that simulated a levee on only the east bank of the river.

Table XX Array of Levee Options Evaluated for Each Alternative

Array Name	Index Crest Elev. 5C NAVD (Feet)	Approximate levee height of reach 5C (Feet)	Approximate discharge for 5C index crest elevation (cfs)
Z	722.95	9	103,900
A	724.45	10	114,000
B	726.19	12	125,950
C	728.61	15	143,300
D	731.18	17	168,150

HOUSACE Assessment: Resolved.

11. Incremental Justification. It is not clear that all separable elements of the plans have been incrementally justified. Are steel roller gates the most cost effective means of closure? Are all closures economically necessary? There are 15 closure structures identified did the formulation evaluate alternatives to reduce the number of closures.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Steel roller gates were identified for closures with openings greater than 50 feet. Our district has completed many closure structure designs through the decades. Recently, roller gates have been selected as the value engineering alternative to utilize within a couple of our projects. Steel roller gates work well where space is tight and larger openings exist such as we have in the downtown area of Cedar Rapids.

A minimum number of closure structures are planned for Alternative 4C. Very early in the planning process, the city had consultants on board that reviewed and coordinated transportation issues and opportunities within the entire study area. This transportation study included analysis on streets, railroads and trail systems. Closure structures identified in Alternative 4C respond to maintaining the traffic corridors identified within the city's River Corridor Redevelopment Plan that laid out a similar line of protection.

Text has been added to the main report under Section 4.7.1.3. Closure Structures to state that the closure structures identified in the selected plan correspond to the city's River Corridor Redevelopment Plan when it comes to transportation corridors.

HOUSACE Assessment: Resolved.

12. Comparative Cost Estimates. A comparative cost estimate (screening level) of the selected alternatives is missing in the report. Provide an output report of comparative cost estimates (1, 1A, and 4C) used in formulating the NED Plan.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Comparative cost estimate tables for the final array of Alternatives (1, 1A, and 4C) will be added to the main report under Section 4.4.1.

HOUSACE Assessment: Resolved.

13. Relocation Assistance Benefits. Paragraph VII, B only reads that "Because of the extent and scope of this valuation, assessment values will be used as the primary source of value to simulate pre flood values where the total property is being acquired." Is that what is meant by "Relocation costs, including differential payments, have been included in the acquisition costs discussed in paragraph VII, B?" How can relocations costs be included in acquisition costs that are only an assessed value? We do not buyout properties at the pre-flood value. Costs of buyouts should be based on the current or expected market value at the time of the purchase. Relocation assistance payments would not be included in the economic evaluation.

CEMVR Response: Concur. Recommended changes have been addressed as proposed.
“VIII. RELOCATION ASSISTANCE BENEFITS

"There will be seven residential properties and five businesses that will have to be relocated as a result of this Study. This level of study and report permits utilizing estimates of value supported by public records, such as assessor records, for improved properties where personal inspection and owner information is not available. Since these properties have been damaged by the 2008 Flood it is assumed that the properties will be rehabilitated to at least the same pre-flood condition and value at the time of acquisition. These values are also being used as the estimated acquisition cost to be compared to the cost of replacement housing or business relocation, with the difference representing differential housing costs. All relocations will be done in accordance with PL 91-646. Relocation costs, including differential payments, have been included in the acquisition costs discussed in paragraph VII, B.

“This is the cost breakdown used within the gross appraisal is identified as estimated costs associated with PL 91-646 Relocation (business and residential). Housing Differential: \$700,000. Relocation Expenses: \$460,000. Total:\$1,160,000.”

The relocation expenses will be removed for the economic evaluation of alternative 4-C. Economics does not have the amount of relocation expenses for the rest of the alternatives.

HOUSACE Assessment: Resolved.

14. WRDA Section 2007. Since this study is focused on flood damage reduction, it will need to comply with WRDA 2007, Section 2033. This requires a feasibility study for a flood damage reduction project to include, as part of the cost/benefit calculation, calculations: (1) of the residual risk of flooding, of loss of human life, and to human safety following completion of the proposed project; (2) of any upstream or downstream impacts; and (3) to ensure that the benefits and costs associated with structural and nonstructural alternatives are evaluated in an equitable manner.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Item 1) (a). Residual Risk of Flooding: The following will be included in the economic appendix and main report:

“Table 1 shows that for Alternative 4C there is a 91.24 percent probability that the target stage (target stage equals top of levee/floodwall) will not be exceeded, given the occurrence of a 500- year flood (.2 percent chance event). Note that target stage is greater than 500year event. On the other hand there is still an 8.76 percent probability (1 - .9124) that the 500-year flood will exceed the target stage. In addition, Table 1 shows that alternative 4C, will have a 1.48 percent chance of target stage exceedance within a period of 30 years. This compares to a without project chance of 65.11 percent. Another way to state this risk is that Alternative 4C would have a 1 in 67.6 chance of target stage exceedance within a period of 30 years. This example data is for reach 5B which is located on the east bank in the downtown area of Cedar Rapids. The levee performance at the index station of this damage reach is summarized in Table 1. This damage reach has the lowest performance statistics of the reaches within the Alternative 4 area of protection.

**Table 1: Performance for Alternative 4C
Levee crest at index station in damage reach 5B.**

Target Stage Annual Exceedance Prob.		Long Term Risk			Conditional Non-Exceedance Probability by Events					
Median	Expected	10-yr	30-yr	50-yr	0.10	0.04	0.02	0.01	0.004	0.002
0.0006	0.0006	0.0060	0.0148	0.0295	1.0000	1.0000	1.0000	0.9999	0.9897	0.9124

Item 1) b. Loss of Human Life and Human Safety: The following will be included in the economic appendix and main report:

“A levee failure of Alternative 4C by overtopping would produce flood elevations close to those observed during the 2008 flood. To obtain an estimate of the population at risk the structural inventory from a profile very close to the crest of Alternative 4C was examined. The results of this data query appear in Table 2. The maximum computed depth of water above a first floor elevation is 16 feet. The ground level could easily be 3 feet lower than the first floor elevation so the maximum water depth would be about 19 feet. This is in approximate agreement with observed maximum flood depth of 20 feet.

Table 2. Elevation of Flood above First Floor in event of Alternative 4C Overtopping

Depth of Flooding	Structures Total	Structures by Category			
		Apartment	Commercial	Public	Residential
-1 to 0	34		12	2	20
0-2	60		25	1	34
2-4	75	1	31	4	39
4-6	87	1	53	1	32
6-8	131	4	50	4	73
8-10	38	2	29		7
10-12	32		29		3
>12	16		16		
TOTALS		(8)	(245)	(12)	(208)

“Two key elements to the severity of the consequences of capacity exceedance are the time of year of flooding and the amount of warning time. The distance from the river bank to high ground varies from 1,000 to 3,700 linear feet. These distances could be walked in 4 to 15 minutes during daylight hours and 8 to 30 minutes during the night. This short evacuation time would still allow a reasonable time for emergency personnel to recognize the threat and issue evacuation orders in the event of levee failure. For the Without-Project condition the warning time is estimated to be 6 to 12 hours. Under normal With-Project conditions for Alternative 4C the warning time for a gradual levee overtop would also be 6 to 12 hours. For the with-project condition of sudden, catastrophic levee failure, warning time would be 1 to 3 hours. Two new stream gages on the Cedar River between Waterloo and Cedar Rapids (part of the without project condition) are used by the national weather service that allow an increase in warning time measured in hours over what was available in 2008. During the 2008 event, the river elevation rose 5.6 feet in 18.5 hours. Several elderly people were removed by boat from their homes, but no injuries or fatalities occurred.

“The most critical time for capacity exceedance of the proposed levee would be at night. About 208 single family residences (estimate of 600 people) and about 650 multifamily units (apartments and condos, estimate of 1000 people) could eventually be surrounded by water. Note that the majority of multifamily units are multi-story structures, and would not have water on first floor of condo unit but residents would still need to evacuate. People living in these residences would likely have the time

necessary to evacuate to safety. Water velocities and damage to homes by moving debris is expected to be minor as compared to a dam failure for both without-project and with-project.

“The capacity exceedance of the proposed levee during the day would involve many more people because of public and commercial activity, but management of the evacuation during the day would be easier because of the formal and informal emergency evacuation networks offered by the City and other employers.”

HOUSACE Assessment: Resolved.

15. Consequences of Project Exceedance. Section does not discuss the consequences of capacity exceedance including quantifying the time that would be needed to repair and reconstruct failed system components and potential lives lost from capacity exceedance. Section does not discuss the consequences of capacity exceedance including quantifying the time that would be needed to repair and reconstruct failed system components and potential lives lost from capacity exceedance.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Specifically, the following text was added to the Main Report. The breach size was estimated from 250 to 500 feet for the purpose of estimating time and resources to repair a levee or flood wall segment.

“A levee failure of Alternative 4C by overtopping would produce flood elevations close to those observed during the 2008 flood. To obtain an estimate of the population at risk the structural inventory from a profile very close to the crest of Alternative 4C was examined. The results of this data query appear in Table A-YY. The maximum computed depth of water above a first floor elevation is 16 feet. The ground level could easily be 3 feet lower than the first floor elevation so the maximum water depth would be about 19 feet. This is in approximate agreement with observed maximum flood depth of 20 feet.

Table A-YY. Elevation of Flood above First Floor in event of Alternative 4C Overtopping

Depth of Flooding	Structures Total	Structures by Category			
		Apartment	Commercial	Public	Residential
-1 to 0	34		12	2	20
0-2	60		25	1	34
2-4	75	1	31	4	39
4-6	87	1	53	1	32
6-8	131	4	50	4	73
8-10	38	2	29		7
10-12	32		29		3
>12	16		16		
TOTALS		(8)	(245)	(12)	(208)

“Two key elements to the severity of the consequences of capacity exceedance are the time of year of flooding and the amount of warning time. The distance from the river bank to high ground varies from 1,000 to 3,700 linear feet. These distances could be walked in 4 to 15 minutes during daylight hours and 8 to 30 minutes during the night. This short evacuation time would still allow a reasonable time for emergency personnel to recognize the threat and issue evacuation orders in the event of levee failure. In the worst case of a massive with-project levee failure it would take 60 to 180 minutes to flood the entire area. With two new stream gages on the Cedar River between Waterloo and Cedar

Rapids it is more likely that 6 to 12 hours at a minimum are available to evacuate after threat of overtop recognition. The future without-project case would most likely resemble the existing case with an increase in warning time. During the 2008 event, the river elevation rose 5.6 feet in 18.5 hours. Several elderly people were removed by boat from their homes but no one drowned.

“The most critical time for capacity exceedance of the proposed levee would be at night. About 208 residences (estimate of 600 people) and 8 apartments could eventually be surrounded by water. People living in about 20 of these residences (60 people) would have the time and the necessary low water depths to easily walk to safety. 10 residences (30 people) would have water depths greater than 8 feet above their first floor making their situation very serious. The people living in the remaining 178 residences (530 people) would probably be safe if they left the area immediately. If the flood were in the summer, people unable to evacuate could survive by going to the second floor or by standing on a desk or appliance until rescued. Water velocities and damage to homes by moving debris is expected to be minor as compared to a dam failure for both without-project and with-project.

“The capacity exceedance of the proposed levee during the day would involve many more people because of public and commercial activity but management of the evacuation during the day would be easier because of the formal and informal social networks offered by the two main commercial centers at Quaker and Cargill. Many of the studies of past floods due to dam breaks have shown that people endanger themselves by staying with their car or trying to reach safety by driving through water. This same behavior would probably occur during evacuation of the area landward of Alternative 4C levee but could be anticipated and overcome by planned evacuation routes and pre-flood evacuation training exercises.”

Alternative 4C is planned to have superiority built into all floodwalls and closure structures. This will tie into having superiority for the system at the upstream since upper end of the project is comprised entirely of floodwalls and closure structures. The superiority built into these features will prevent overtopping of the system where the more expensive project features exist. If overtopping is to occur, the first point in the system to get overtopped will be design to occur where the earthen levee section runs between the Cedar River and the Oakhill Jackson neighborhood near the downstream end of the project. The system itself will be designed to be appropriately resilient according to latest standards.

If damages occur as a result of a flood event, repairs to the system would be completed before the next flood season. Typically this is a nine month process under PL 84-99 authorities with emergency design and contracting measures.

HOUSACE Assessment: Resolved.

16. Operations, Maintenance, Repair, Rehabilitation and Replacement (Section 4.7.5).

Revise to reflect that OMRR&R responsibility begins on project turnover, not when manual is written. Delete discussion of losing levee certification status.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Edited text in main report to read OMRR&R responsibility begins on project turnover. The entire sentence on losing levee certification was deleted.

HOUSACE Assessment: Resolved.

17. LERRDs (Section 4.8.2) Table 15 should provide a much more detailed cost breakdown, to include LERRDs, cost-share percentages, cash contribution, etc.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Recommended changes will be made in the Table.

HOUSACE Assessment: Resolved.

18. Opinions of Compensability (Paragraph XIII). Reword paragraph XIII to make it clearer. Be sure to include a statement that Office of Counsel will do Opinions of Compensability, if utilities will be impacted. The documentation indicated that the opinions will be done before the parties execute the PPA. The RE Annex is not as clear as it could be in several places because it often written in the passive voice.

CEMVR Response: Concur. Recommended changes have been addressed as proposed.
“VIII. RELOCATION ASSISTANCE BENEFITS

“There will be seven residential properties and five businesses that will have to be relocated as a result of this Study. This level of study and report permits utilizing estimates of value supported by public records, such as assessor records, for improved properties where personal inspection and owner information is not available. Since these properties have been damaged by the 2008 Flood it is assumed that the properties will be rehabilitated to at least the same pre-flood condition and value at the time of acquisition. These values are also being used as the estimated acquisition cost to be compared to the cost of replacement housing or business relocation, with the difference representing differential housing costs. All relocations will be done in accordance with PL 91-646. Relocation costs, including differential payments, have been included in the acquisition costs discussed in paragraph VII, B.”

...

“XIII. FACILITY OR UTILITY RELOCATIONS

“There have been no relocations identified for any utilities for this Study. No such relocation has been given to OC and no Opinion of Compensability has been prepared for this Study. The compressed time frame for this Study has not permitted the usual relocation identifications and evaluations. No opinions have been requested or received from OC. OC will complete an Opinion of Compensability for any and all utility relocation once identified. The results of the study will be implemented in the final ROW requirements.”

HOUSACE Assessment: Resolved.

19. Condemnations (Exhibit D). The NFS does not have Quick Take authority. The RE Annex reads that that the City will obtain title in 4 to 8 months after the City files the condemnation action. Does the City get possession at the time it obtains the title? Make that clear so the average reader understands. How long after the City determines that negotiations will not produce an agreement on value will the City file the condemnation action?

CEMVR Response: Concur. Recommended changes have been addressed as proposed.
Edited Exhibit D. ASSESSMENT OF NON-FEDERAL SPONSOR’S REAL ESTATE

ACQUISITION CAPABILITY, inserting the statement that, “(The sponsor does receive immediate possession upon final condemnation resolution, subject to PL 91-646 relocations.)

HOUSACE Assessment: Resolved.

20. LERRD. The REP does not mention the NFS’s responsibility to provide the LERRDs, only that the City already owns some of them. The REP needs to state the NFS’s responsibility clearly.

CEMVR Response: Concur. Recommended changes have been addressed as proposed.
“III. NON-FEDERAL SPONSOR-OWNED LANDS, EASEMENT, RIGHTS-OF-WAY

“The NFS recognizes the responsibility to provide all Lands, Easements, Rights of Way, Relocations, and Disposals (LERRDs) required for the project. The City owns 15 parcels of real estate that are identified with parcel numbers in their records. In addition, the City owns 19 parcels that are not identified with parcel numbers. These non-identified parcels are typically streets, parking lots, sidewalks, bridges, recreational type trails, and other public improvement type parcels. There are 11 non-identified parcels whose ownership is not known. The City may in fact own some or all of these parcels, but that ownership could not be ascertained at this point in the Study process.

HOUSACE Assessment: Resolved.

21. MCACES. The MCACES cost estimate output report as prescribed in ER 1110-2-1302 (see par. 8) is missing in Appendix I. The Appendix contained only the title page of the MCACES report. Provide an MCACES output report to sub-feature level.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. The following items are now inserted into the Cost Estimate Appendix.

- 1) Main body of text write-up on the cost development for the selected plan, Alternative 4C.
- 2) The draft Cost and Schedule Risk Assessment report.
- 3) Total Project Cost Summary spreadsheet.
- 4) A fiscal year schedule on the project engineering & design and construction schedule.

HOUSACE Assessment: Resolved.

22. Total Project Cost Summary (TPCS). The TPCS and Appendix E show conflicting information about real estate costs. The TPCS shows \$12,240,000 whereas Appendix E (see par VIII) stated \$11,700,000. Also, the TPCS shows relocation costs but Appendix F (see par XIII) states “There have been no relocations identified for any utilities for this Study. No such relocation has been given to OC and no Opinion of Compensability has been prepared for this Study.” Clarify.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Revisions have been made to the TPCS and Cost Estimate to be in line with the latest real estate estimate of \$11.7 million to resolve this inconsistency. The \$12.24 million was an earlier real estate estimate that was in both the TPCS and cost estimate when this review occurred.

Relocations of utilities and roadways have been accounted for within the project cost estimate based on the level of detail gained from evaluating as built drawings of all known utilities within the project corridor. These costs comprise a significant percentage of the overall construction cost – around 40%. The paragraph in Appendix F is stated since physical locations of the relocations have not been defined at this time. In lieu of specific ROW limits for each utility and road relocation, a 30-foot wide permanent easement was applied along the entire landside length of the project. The 30-foot of permanent easement was defined from beyond the toe of an earth levee or the face of a floodwall or closure structure. This 30-foot strip of land was utilized as a reasonable way to account for all relocations ROW needs until they are detailed out.

HOUSACE Assessment: Resolved.

23. Real Estate Costs (Appendix E). A detail breakdown of real estate costs is missing. A breakdown of real estate costs (baseline cost estimate) in accordance with the Civil Works WBS should be included in the Appendix.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. A detailed breakdown of RE costs will be inserted.

HOUSACE Assessment: Resolved.

24. Engineering ATR. Dr Checks report dated June 22, 2010 shows several cost engineering comments have not been resolved (“comment open”). Majority of those comments are very critical and could considerably impact the accuracy of the MCACES cost estimates. Confirm all ATR comments have been resolved and closed out.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Open comments from the ATR are dependent upon updates made to the cost engineering appendix and the main report updates being made under this AFB review. It was agreed to by the ATR lead, cost reviewer and our district to address these comments (and new ones) during the submission of the cost estimate for the DX Cost review because many of the comments pertained to portions of the cost estimate that were still being developed at that time the ATR took place. The cost estimate appendix has now been fully prepared for review and posted on July 28th for both DX Cost and CSRA reviewers in Walla Walla District.

HOUSACE Assessment: Resolved.

25. Purpose and Need. The documentation identifies a purpose but not a need. The purpose and need statement should be straightforward, concise and include both the purpose and need.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. A “need” sentence has been added.

HOUSACE Assessment: Resolved.

26. NEPA Compliance. An EA seems like the correct level of NEPA document but consider an EIS if this is going to Congress for authorizing a Federal project as per ER 200-2-2. The finding of no significant impacts necessary for an EA needs to consider all impacts to the human environment not just the environmental impacts. The fact that the project will likely take multiple years of construction in an urban environment indicates there could be a significant impact to the human environment.

CEMVR Response: Concur. If, after the conclusion of public review of the Report, the District decides signing the FONSI is warranted, no further NEPA document on this project would be compiled. If, however, after public review, the District decides that significant impacts would occur, preparation of an EIS would be warranted.

HOUSACE Assessment: Resolved.

27. HTRW. HTRW investigations and compliance with various laws and regulations controlling this issue is incomplete as detailed in the HTRW appendix submitted with the materials (ER 1165-2-132). To select any TSP, this needs to be fully described and in compliance with the ER. An incomplete analysis presents unacceptable risk to the environment and people as well as leaving a potentially expensive cost item for the local sponsor. The PDT needs to clarify the path forward on the selected plan as it related to the HTRW investigations and any response plan and costs. These need to be fully described in an HTRW Appendix and summarized in the appropriate places in the report.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. The path forward involves obtaining the remaining samples identified for required testing under Phase 2 HTRW analyses. Seven properties remain where HTRW test samples are required. Two of the property owners are progressing with required tests through their own internal contracting with the intent to release test results once obtained. Four of the properties the city has negotiated a verbal indication that they will finally go ahead and sign a ROE which will allow our contractor to proceed with required test. The final property the city plans to condemn in order for our testing contractor to proceed. These actions will likely take a few months to accomplish.

Cost and schedule risk associated with this item and its unknowns were accounted for in the Cost and Schedule Risk Assessment. The PDT determined that for HTRW concerns that it was “Likely” to be encountered that would impact both Project Cost and Project Schedule. The rough order of impact determined for project cost was \$4 million resulting in the item to receive a “Marginal” impact equaling a “Moderate” risk level. The rough order of impact for the schedule was determined to be 4.8 months resulting in the item to receive a “Significant” impact resulting in a “High” risk level. These risks weighed into the overall contingency percentage developed and applied to the overall project cost.

Part of the strategy to avoid any HTRW issues is to realign the line of protection around any areas that may require significant clean up costs. To date, no significant HTRW issues have been discovered with the exploratory samples obtained to date.

HQUSACE Assessment: The submittal indicates that the HTRW issues and process have not progressed sufficiently to ensure full compliance with ER 1165-2-132. During a previous review and conference call with the vertical team, it was suggested that the report should attempt to bracket the risk which these unresolved HTRW issue present to the plans as well as any potential costs which may be incurred on the part of the local sponsor as part of their LERRDs responsibility. It is unclear if this was in this version of the report. It is assumed that this would not cause major problems with alignments etc but may be only a project cost risk. This should be confirmed as the HTRW sampling progresses towards closure.

CEMVR Response: Concur. As suggested, since writing the Public Review Draft dated August 2010, the recommended changes have been addressed in various parts of the Study with excerpts below, and are fully detailed in Appendix F. HTRW. For example,

“3.1.12. Hazardous, Toxic, and Radioactive Waste (HTRW). Phase I Environmental Site Assessments (ESAs) were completed throughout the Study area. Phase I ESAs included the entire selected plan and the preferred borrow site areas. Phase II ESA samples were obtained and analyzed for a portion of properties within the selected plan that allowed rights-of-entry for investigation. Phase II samples were obtained and analyzed for the preferred borrow site. There are additional properties identified within the selected plan corridor that merit Phase II sampling but these have not been obtained to date since rights-of-entry have not been granted. See Appendix F, *Hazardous, Toxic, and Radioactive Waste*, for details on findings and identification of several other items that need to be completed prior to the completion of the HTRW analysis.

“Phase I ESA analysis includes a record search for ownership, land use, etc. and a walking site survey looking for evidence of soil or water contamination. Phase II ESA analysis involves taking soil and ground water samples in the areas that have the potential for contamination based on the findings determined during Phase I.”

Excerpt from 4.7.1.5. Borrow Sites, reads “Three out of 34 HTRW samples had chemical or metal concentrations above the IADNR Statewide Standards. Each of the three samples with high concentrations occurred in soil between 0 and 5 feet deep. The soil layers at these sample locations cannot be used as borrow for the levee.”

Excerpt from 4.7.1.8. Environmental Mitigation. “...The HTRW impacts are still being determined. The Phase I Environmental Site Assessments (ESAs) have been completed and indicated that there are 11 parcels on which recognized environmental conditions (RECs) exist along the alignment for Alternative 4C. The RECs require a Phase II ESA that will entail characterization of soil and groundwater.”

“The 11 parcels requiring Phase II ESAs are concentrated near the northern and southern ends of the alignment. The current list of Phase II parcels RECs range from leaking USTs to abandoned industrial lots and large industries. Three Phase II ESAs have been completed to date out of the 11 parcels identified. Initial sample results indicate three boring locations exceed the statewide standards for benzo(a)pyrene, benzo(a)anthracene, benzo(p)flourene, and dibenzo(a,h)anthracene.

“The path forward involves obtaining samples from the remaining seven parcels identified for Phase II ESAs. The City continues to pursue ROE agreements with the parcel owners. It is likely that the ROE process will take several more months. Collection and analysis of HTRW samples will not be completed until December 2010.”

Excerpt from 5.1.8. “Hazardous, Toxic, and Radioactive Waste. This section summarizes the Phase I Hazardous, Toxic, and Radioactive Waste (HTRW) Environmental Site Assessments (ESA) for the Study, overall, and by alternative. The Phase I ESA was completed in accordance with ER 1165-2-132, *HTRW Guidance for Civil Works Projects*; ER 405-1-12, *Real Estate Handbook*, and ASTM Practice E 1527-05.

Notably, for “**Alignment 4C Study Area.** It is anticipated that contaminant concentrations on parcels where sampling access was not granted will be similar to those already observed. If the type and magnitude of contaminants remains the same, HTRW remedial activities are not anticipated to be detrimental to project schedule, scope and proposed construction methods.”

“**5.1.8.8. HTRW Recommendations.** Based on the Phase 1 ESAs, it is recommended that Phase II ESAs be completed on the parcels of concern within the alignment for the preferred Alternative..., including at least 6 for the Recommended Plan, 4C.”

Action Taken: Final Report dated November 2010 includes the information indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

28. Cultural Resources. The report, although including details on the manner in which we intend to follow the Section 106 process, it is unclear on status of Phase 1 and Programmatic MOA. The EQ account discussion on Page 79 states there are no significant impacts to EQ resources but there is a statement identifying the need for Phase 3 cultural investigations and a MOA being executed to cover those resources. The team should clarify why this statement is made on Page 79, should summarize the detailed discussion in the report and should succinctly identify cultural resource compliance tasks and costs. Also, the cultural resources section dominates the resources section of the main report. Recommend editing it to the relevant information to establish the background for the planning constraints.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. (1) Section 106 portions will be clarified and updated, including Phase 1 and the Programmatic Memorandum of Agreement in the text of the report, (2) The team will clarify the subject statement and the status of the cultural resources tasks, compliance, and cost, and (3) the cultural resources section of the report will be reduced to include the more relevant information.

HOUSACE Assessment: Resolved.

29. Protected Species. At the top of page 106 there appears to be a duplicative bald eagle discussion. The team should also clarify if there are any state listed or protected species or their habitats in the project area.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Numerous discussions were inadvertently duplicated under Section 5.2 and then again under 5.2.1. (birds, mussels/fish, wetlands, endangered and threatened species) and have now been deleted. A sentence has been added as to no state listed species/habitat being present in the Study area.

HOUSACE Assessment: Resolved.

30. Potential Impacts to Airport (Appendix E, Exhibit C). The potential areas around the Eastern Iowa Airport are shown via aerial photo and there appear to be many aquatic resources (small streams) on the parcels identified. The team should indicate what verifications have been conducted to show the potential risk of impacting these resources with the borrow plan. Has the FAA been contacted to ensure this level of excavation and activity has been coordinated with them?

CEMVR Response: Concur.

A. Aerial photos of the borrow areas around the airport show the dendritic pattern of ag field drainage that is common to all Eastern Iowa crop/ag fields. These first and second order “streams” are tile drainage ways and grassed corridors that direct rainwater away from the fields. They run intermittently and have no permanent aquatic faunal community. These drainage ways possess little significant ecological value, aquatic or terrestrial. Early coordination with state, Federal, and private environmental resource agencies has not revealed any concerns over this issue. Following removal of the borrow material, new drainage patterns would be re-established. Standard erosion protection techniques would be employed during removal of the borrow to protect downstream areas. The District considers this a non-issue.

B. Coordination is ongoing with the local Airport Authority who work closely with the FAA on all construction/future development on the proposed borrow areas.

HOUSACE Assessment: Resolved.

31. Air Quality and Noise. Section 5.2.6 Air Quality and section 5.2.11.10 on Noise should be tied back to and based on a description of ambient AQ and Noise in the existing conditions section. The document needs to include in the existing ambient AQ and Noise and compare these with the future condition.

CEMVR Response: Non-Concur. While there is always some more information that could be included, this section of the report provides sufficient information for a reasonably informed decision. It is the District’s position that sufficient data has been gathered/sufficient past, present, and reasonably foreseeable future actions have been evaluated to make an informed decision, as NEPA requires. In addition, Section 5.3 Compliance with Environmental Quality Statutes, under

"Clean Air Act, as amended," the report states, "It is not anticipated that any of the...proposed levee/flood damage reduction project would result in either short- or long-term violations to air quality standards. It is not anticipated that the outdoor atmosphere would be exposed to contaminants/pollutants in such quantities and of such duration as may be or tend to be injurious to

human, plant, or property, or which unreasonably interferes with the comfortable enjoyment of life, or property, or the conduct of business. If implemented, the proposed project would be in full compliance."

Any impacts during construction would be subject to all existing laws and regulations regarding air quality and noise and would be temporary in nature--only for the duration of construction, and only during working hours.

HQUSACE Assessment: The EA has no baseline or existing condition discussion of Noise levels in Decibels or Air Quality (if there are or are not ambient issues). If there is no baseline, and there is no analysis, how can these be dismissed as "minor" by any other means than best judgment? The District should update these sections in the final version of the document.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. In the Policy Review Draft dated October 2010, the following section 3.1.15 was added:

3.1.15. Air Quality and Noise. The City of Cedar Rapids issues an air pollution alert, air pollution warning, or air pollution emergency whenever the Air Pollution Control Officer determines that the meteorological conditions are such that the accumulation of air contaminants in any place is reaching, or has reached, levels which could, if sustained or exceeded, lead to a substantial threat to the health of persons. The City also places restrictions on noise between the hours of 10:00 PM and 7:00 AM and on vehicles producing noise levels greater than 94 decibels.

Likewise, section 5.1.6. Air Quality was replaced with the following:

5.1.6. Air Quality and Noise. The No Action Alternative would not impact air quality or noise. Concerning Alternatives 1C, 1A-C, 4C and 10E minor, temporary increases in airborne particulates and noise levels are anticipated to occur as a result of mobilization and use of construction equipment. Disturbances to nearby residences during workdays would be minimal, and no air quality standard or noise violations are anticipated. This project would be in full compliance.

Action Taken: The Final Report dated November 2010 includes the information indicated in CEMVR Response.

HQUSACE Assessment: There is a dismissal of Noise as an impact with no quantification to support this. Neither the existing conditions nor the affected environment have a quantitative means of dismissal so one must assume this is done by best judgment in a qualitative manner. This was also a comment on the previous submittal for this project. Rather than simply dismissing the issue, one could easily place a Db level table in the existing conditions section and present the urbane nature of the work area as a mean to support the assertion alter in the EA that the project will have minor impacts from a noise generation perspective. Similar to the Noise impacts, there is dismissal of any air quality emissions or quantifiable analysis to support the decision that this is a minor impact for the 1/2 decade long construction duration. The team should document the ambient AQ conditions for the work area and coordinate the construction emissions with the appropriate State or local AQ regulatory office. It is not expected that this will cause any problems but

as such it is also a simple matter of documentation with some sort of analysis to support the "minor impact" decision.

CEMVR Response: Concur. Recommended changes have been addressed as proposed.

In the Policy Review Draft dated October 2010, the following section 3.1.11 was added:

3.1.11 Air Quality and Noise. The City of Cedar Rapids issues an air pollution alert, air pollution warning, or air pollution emergency whenever the Air Pollution Control Officer determines that the meteorological conditions are such that the accumulation of air contaminants in any place is reaching, or has reached, levels which could, if sustained or exceeded, lead to a substantial threat to the health of persons. The City of Cedar Rapids also places restrictions on noise between the hours of 10:00 PM and 7:00 AM and on vehicles producing noise levels greater than 94 decibels.

Likewise, section 5.2.6. Air Quality was replaced with the following:

5.2.6 Air Quality and Noise. The No Action Alternative would not impact air quality or noise. Concerning Alternative 1, 1A, and 4C, minor, temporary increases in airborne particulates and noise levels are anticipated to occur as a result of mobilization and use of construction equipment. Disturbances to nearby residences during workdays would be minimal, and no air quality standard or noise violations are anticipated. This project would be in full compliance.

Action Taken: Policy Review Draft Report dated October 2010 was revised as indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

32. Water Quality (Section 5.2.7). There should be a statement on seeking a Section 401 WQ certification as per ER 1105-2-100. Also, any O&M actions which would fall to the local sponsor once project turnover is achieved should be detailed here to ensure there are minimal regulatory approvals needed for those O&M actions, particularly in aquatic resource areas.

CEMVR Response: Concur. Recommended changes have been addressed as proposed.

- A. The following sentence has been added to Section 5.2.7: "Clean Water Act Section 401 Water Quality Certification from the State of Iowa would be obtained prior to any construction."
- B. The following maintenance requirements which would fall to the local sponsor once project turnover is achieved will be developed in detail in the OMRR&R Manual:
 - regular mowing of grass areas
 - maintaining a 15-foot clear zone out from toe of levees and from face of floodwalls
 - eradicating burrowing animals and repair any damage

- spraying and removal of woody brush and trees in riprap areas
- regular maintenance on pump stations per manufacturer guidelines
- removing siltation in drainage ways and detention ponds
- repairing any other deficiencies permanent levees, interior drainage facilities, and recreation facilities

These O&M actions pose minimal regulatory requirements typical of most levee projects.

HOUSACE Assessment: Resolved.

33. Cumulative Effects. As per 1105-2-100, ER 200-2-2 and CEQs guidance on cumulative effects, this section should be expanded. Other agencies should also be consulted for their plans and past projects such as Federal highways, local and State roads and bridges, waste water and water treatment plants and facilities and other projects which may be or have occurred along the river corridor.

CEMVR Response: Non-concur. The District feels the existing write-up for Cumulative Impacts (Section 5.2.10) is technically sufficient with NEPA requirements. A list of agencies with which the District has coordinated is found in Main Report Section 5.9 in addition to agencies listed under section 5.8. It is the District's position that sufficient data has been gathered/sufficient past, present, and reasonably foreseeable future actions have been evaluated to make an informed decision, as NEPA requires.

HQUSACE Assessment: The cumulative effect section of the report is meager. The 404(b)(1) analysis and the report give short shrift to any other action taking place in the Cedar Rapids area. With no itemization or discussion of other actions in the downtown area and some analysis of how these are all transforming downtown, it appears our small levee project is the only thing the Feds, State or locals are doing. This traditionally is a weaker part of any agency's NEPA effort but in this case, the discussion seems centered solely on this project.

CEMVR Response: Non-concur. The District feels the existing write-up for Cumulative Impacts (Section 5.2.10) is technically sufficient with NEPA requirements. A list of agencies with which the District has coordinated is found in Main Report Section 5.9 in addition to agencies listed under section 5.8. It is the District's position that sufficient data has been gathered/sufficient past, present, and reasonably foreseeable future actions have been evaluated to make an informed decision, as NEPA requires.

Action Taken: Final Report dated November 2010 remains as submitted in the Public Review Draft.

HQUSACE Assessment: Resolved.

34. Climate variability (Section 4.6.1). It is unclear why this section is in the report. It adds very little to the discussion. Either a more clear explanation as to the context should be added or this section should be removed. Consider explaining a trend such as on the Fargo FRM project where there is more data but the effect is in the same region.

CEMVR Response: Concur. Section 4.6.1. of the draft report was removed; this section of the report had been requested by the non-Federal sponsor. As still described in the H&H Appendix, page A-8, the USACE hydrologic record for the study area was examined without finding any significant changes in the range or climatological trends of variability.

HOUSACE Assessment: Resolved.

C. RESOLUTION OF REVIEW COMMENTS FROM THE AUGUST 2010 DRAFT FEASIBILITY REPORT.

1. District Counsel Legal Review. The report does not appear to reflect MVD and MVR counsel review and certification of the legal sufficiency of the report. These reviews and certifications should be provided to ensure that the feasibility report adequately addresses all legal requirements for the project. See EC 1105-2-410 paragraph 7.d. (requiring that “decision documents [] be reviewed throughout the study process for their compliance with law and policy”) and ER 1105-2-100 Appendix H, page H-2.d.3. (“District and Division Counsel are responsible for ensuring the legal sufficiency of each decision document”) (“District Counsel is responsible for the legal review of each decision document and signing a certification of legal sufficiency.”).

CEMVR Response: Concur. The District’s Office of Counsel signed the Legal Certification on 8 Oct 2010, as forwarded to Division and the MVD-RIT electronically Friday, 15 Oct 2010. The Counsel representative served on the PDT, attending meetings and actively engaged in project discussions, and including reviewing project documentation including the construction cost estimate and real estate estimates.

Action Taken: Final Report dated November 2010 includes information indicated in CEMVR Response, adding the Legal Certification as directed by the OWPR.

HOUSACE Assessment: Resolved.

2. Locally Preferred Plan. It is not clear from the report which alternative will be recommended. Part 4.7 on page 207 and the recommendations section of the report both identify Alternative 4C as the selected plan. However, part 4.3.2.3 on page 194 of the report states that the City has requested an exception to allow Alternative 1A-C to be identified as the recommended plan. This would differ substantially from the Federally Supportable Plan in a number of respects – including the geographic footprint of construction (for example, unlike Alternative 4C, Alternative 1A-C involves construction on both sides of Cedar River) as well as cost sharing and local cooperation requirements (for instance, unlike Alternative 4C, Alternative 1A-C apparently includes recreation features). The Report should clarify this discrepancy, and if the sponsor in fact does support an alternative other than the Federally Supportable Plan, further explain how it will address the sponsor’s preference for Alternative 1A-C (such as seeking an ASA(CW) waiver) in order to bring the report to a place where the sponsor can endorse the recommended plan.

CEMVR Response: Concur. The Executive Summary, Section 4.5. and the Recommendation of the Policy Review Draft dated October 2010 clearly state “Alternative 4C is the Recommended Plan.” As indicated in the City’s Letter of Intent dated 14 Jun 2010, the sponsor continues to fully support Alternative 4C, which is a portion of the City’s Preferred Flood Management System. As described in Section 4.3.2.1 of the Policy Review Draft dated October 2010, the City’s June 22, 2010 letter further states the City’s support for Alternative 4C as an integral portion of the City’s Preferred Flood Management System. Alternative 4C is consistent with their Preferred Flood Management System and reduces risk for the predominantly commercial and industrial properties on the east bank of the river.

Action Taken: Final Report dated November 2010 includes information indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

3. Letter of Intent. The report does not appear to include a letter of intent expressing the sponsor’s support for the recommended plan for the project. While there is a reference in part 4.3.2.3 on page 194 of the report, this letter does not appear to have been included in the report package, and also apparently expresses support for a different alternative to the recommended plan. A letter explicitly supporting the recommended plan is required by ER 1105-2-100, Appendix G, at G-9 (“The non-Federal sponsor’s acceptance of, or desired departures from, the terms of the applicable model PCA must be presented, including: 1) applicable cost sharing and financial policies; 2) policies regarding provision and valuation of non-Federal lands, easements, rights-of-way, and disposal areas provided by non-Federal sponsors; 3) policies governing non-Federal project construction; and, 4) other provisions required by law and policy for new start construction projects.”). The District should address this letter of intent requirement.

CEMVR Response: Concur. As indicated in the City’s Letter of Intent dated 14 Jun 2010, the sponsor continues to fully support Alternative 4C, which is a portion of the City’s Preferred Flood Management System. As described in Section 4.3.2.1 of the Policy Review Draft dated October 2010, the City’s June 22, 2010 letter further states the City’s support for Alternative 4C as an integral portion of the City’s Preferred Flood Management System. Alternative 4C is consistent with their Preferred Flood Management System and reduces risk for the predominantly commercial and industrial properties on the east bank of the river. Both letters have been added to Appendix L. Pertinent Correspondence, page L-153 and 154-155.

In addition, on 12 Oct 2010, Casey Drew, Finance Director for the City of Cedar Rapids signed the NON-FEDERAL SPONSOR’S SELF-CERTIFICATION OF FINANCIAL CAPABILITY FOR AGREEMENTS, which has been added to Appendix B. Economics, as Exhibit 4.

Action Taken: Final Report dated November 2010 was revised as indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

4. Recreation. The items of local cooperation in the recommendations section of the report (following page 271) include item H., which requires the sponsor to maintain recreation features, including public use and access. However, page ES-III of the report states that recreation features were eliminated from consideration as part of the Federally Supportable Plan due to lack of economic justification. The District should clarify this discrepancy.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Item H has been deleted from the Recommendations.

Action Taken: Final Report dated November 2010 was revised as indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

5. Historic Preservation. The following should be added as a new item of cooperation in the recommendations section of the report (following page 271):

S. Provide the non-Federal share of that portion of the costs of mitigation and data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for the project.

CEMVR Response: Concur. Recommended change has been addressed as proposed, by adding the above paragraph near the bottom of page 278 in the Policy Review Draft dated October 2010.

Action Taken: Final Report dated November 2010 includes information indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

6. Plates. This office appreciates the inclusion of plates to illustrate Alternative 4C, the Federally Supportable and currently recommended plan. The legend on these plates indicates that levees are depicted with a purple shaded block with a red border. However, the plates themselves appear to depict these levees with a hash-marked black line. This discrepancy should be clarified.

CEMVR Response: Non-Concur. The legend is correct for the symbol used to depict where the earthen levee footprints exist for the project. Earth levee portions only exist on plates C-101-4C (a small segment across the water), C-103-4C and C-104-4C. The rest of the project is comprised of floodwalls and closure structures. Plan notes call out the beginnings and endings of each floodwall and closure structure. These features are shown as a solid black line along the centerline of this alignment. Two thirds of the project is comprised of floodwalls and closure structures.

Action Taken: Final Report dated November 2010 remains as submitted in Public Review Draft.

HOUSACE Assessment: Resolved.

7. Recommendations and Draft Finding of No Significant Impact. These sections of the report do not appear to have numbered pages or assigned part references. These should be added to aid both agency and public reviewers in referencing any concerns or comments on these parts of the report.

CEMVR Response: Concur. Recommended changes have been addressed as proposed.

Action Taken: Final Report dated November 2010 includes information indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

8. Residual Risk. There is very little discussion about the residual risk associated with the TSP including time for evacuation and identification of rescue areas. There should be extensive discussion about flood emergency operations, emergency planning including preparedness and recovery efforts. Flood fighting capacity as it relates to installing flood walls that are components of the selected plan should be described and the reliability issues associated with relying on management systems to deploy them. Potential loss of life should be evaluated in this section as well.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. The following was added to section 4.6 Risk and Uncertainty of the main report:

“During the 2008 event, the river elevation rose 5.6 feet in 18.5 hours. Several elderly people were removed by boat from their homes and no one drowned. Two key elements to the severity of the consequences of capacity exceedance are the time of year of flooding and the amount of warning time. The distance from the river bank to high ground varies from 1,000 to 3,700 linear feet. These distances could be walked in 4 to 15 minutes during daylight hours and 8 to 30 minutes during the night.

“For the Without-Project condition the warning time is estimated to be 6 to 12 hours. Under normal With-Project conditions for Alternative 4C the warning time for a gradual levee overtop would also be 6 to 12 hours. For the with-project condition of sudden, catastrophic levee failure warning time would be 1 to 3 hours. Two new stream gages on the Cedar River between Waterloo and Cedar Rapids are part of the without project used by the national weather service that allow an increase in warning time measured in hours over what was available in 2008. The amount of warning time was not considered in the content damage curve. The assumption for the without project and the with-project condition was that contents were left in place and were not elevated above the damage zone.

“A levee failure of Alternative 4C by overtopping would produce flood elevations close to those observed during the 2008 flood. To obtain an estimate of the population at risk the structural inventory from a profile very close to the crest of Alternative 4C was examined. The results of this data query appear in Table A-YY. The maximum computed depth of water above a first floor elevation is 16 feet. The ground level could easily be 3 feet lower than the first floor elevation so the maximum water depth would be about 19 feet. This is in approximate agreement with observed maximum flood depth of 20 feet.

“Table A-YY Elevation of Flood above First Floor in event of Alternative 4C Overtopping

Depth of Flooding	Structures Total	Structures by Category			
		Apartment	Commercial	Public	Residential
-1 to 0	34		12	2	20
0-2	60		25	1	34
2-4	75	1	31	4	39
4-6	87	1	53	1	32
6-8	131	4	50	4	73
8-10	38	2	29		7
10-12	32		29		3
>12	16		16		
TOTALS		(8)	(245)	(12)	(208)

“Two key elements to the severity of the consequences of capacity exceedance are the time of year of flooding and the amount of warning time. The distance from the river bank to high ground varies from 1,000 to 3,700 linear feet. These distances could be walked in 4 to 15 minutes during daylight hours and 8 to 30 minutes during the night. This short evacuation time would still allow a reasonable time for emergency personnel to recognize the threat and issue evacuation orders in the event of levee failure. In the worst case of a massive with-project levee failure it would take 60 to 180 minutes to flood the entire area. With two new stream gages on the Cedar River between Waterloo and Cedar Rapids it is more likely that 6 to 12 hours at a minimum are available to evacuate after threat of overtop recognition. The future without-project case would most likely resemble the existing case with an increase in warning time. During the 2008 even, the river elevation rose 5.6 feet in 18.5 hours. Several elderly people were removed by boat from their homes but no one drowned.

“The most critical time for capacity exceedance of the proposed levee would be at night. About 208 residences (estimate of 600 people) and 8 apartments could eventually be surrounded by water. People living in about 20 of these residences (60 people) would have the time and the necessary low water depths to easily walk to safety. 10 residences (30 people) would have water depths greater than 8 feet above their first floor making their situation very serious. The people living in the remaining 178 residences (530 people) would probably be safe if they left the area immediately. If the flood were in the summer, people unable to evacuate could survive by going to the second floor or by standing on a desk or appliance until rescued. Water velocities and damage to homes by moving debris is expected to be minor as compared to a dam failure for both without-project and with-project.

“The capacity exceedance of the proposed levee during the day would involve many more people because of public and commercial activity but management of the evacuation during the day would be easier because of the formal and informal social networks offered by the two main commercial centers at Quaker and Cargill. Many of the studies of past floods due to dam breaks have shown that people endanger themselves by staying with their car or trying to reach safety by driving through water. This same behavior would probably occur during evacuation of the area landward of Alternative 4C levee but could be anticipated and overcome by planned evacuation routes and pre-flood evacuation training exercises.

“The City of Cedar Rapids currently maintains a Flood Response Manual that is updated on a regular basis. Major items contained within this manual include: emergency points on contact; Cedar River flood response tasks and maps; inundation maps; excavation route maps; flash flood response for local creeks; and supplemental flood fighting materials. This manual will be updated as appropriate after

construction of the selected plan. In addition to the Flood Response Manual, an OMRR&R Manual will be written specifically for the selected plan. All closure structures contained within the selected plan are permanent in nature and can be erected and closed in advance of a coming flood on the Cedar River. The local sponsor will be required to execute periodic closure of all structures at least once every 3-years as part of the operation and maintenance schedule. Periodic installation exercises will ensure erection crews remain trained and are at appropriate numbers to assure closures can be made in a timely matter.”

Action Taken: Final Report dated November 2010 was revised as indicated in CEMVR Response.

HQUSACE Assessment: The response to this comment does not address the concern about the feasibility of flood fighting capacity, for example, the installation of floodwalls. What are the operational and management procedures and infrastructure requirements that will be established that would insure installation reliability prior to or during a flood event? The Report should describe the commitment by the Sponsor to provide facilities similar to fire station operations that insure materials are stored, maintained and crews trained and available for implementation. Recommend that a draft OMRR&R plan be included with the Final Report that would include some of the details necessary to insure reliability and the benefits from those facilities will be achieved.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. The following was added to section 4.6 Risk and Uncertainty of the main report:

“During the 2008 event, the river elevation rose 5.6 feet in 18.5 hours. Several elderly people were removed by boat from their homes and no one drowned. Two key elements to the severity of the consequences of capacity exceedance are the time of year of flooding and the amount of warning time. The distance from the river bank to high ground varies from 1,000 to 3,700 linear feet. These distances could be walked in 4 to 15 minutes during daylight hours and 8 to 30 minutes during the night.

“For the Without-Project condition the warning time is estimated to be 6 to 12 hours. Under normal With-Project conditions for Alternative 4C the warning time for a gradual levee overtop would also be 6 to 12 hours. For the with-project condition of sudden, catastrophic levee failure warning time would be 1 to 3 hours. Two new stream gages on the Cedar River between Waterloo and Cedar Rapids are part of the without project used by the national weather service that allow an increase in warning time measured in hours over what was available in 2008. The amount of warning time was not considered in the content damage curve. The assumption for the without project and the with-project condition was that contents were left in place and were not elevated above the damage zone.

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>12	16		16		
TOTALS		(8)	(245)	(12)	(208)

2.

“Two key elements to the severity of the consequences of capacity exceedance are the time of year of flooding and the amount of warning time. The distance from the river bank to high ground varies from 1,000 to 3,700 linear feet. These distances could be walked in 4 to 15 minutes during daylight hours and 8 to 30 minutes during the night. This short evacuation time would still allow a reasonable time for emergency personnel to recognize the threat and issue evacuation orders in the event of levee failure. In the worst case of a massive with-project levee failure it would take 60 to 180 minutes to flood the entire area. With two new stream gages on the Cedar River between Waterloo and Cedar Rapids it is more likely that 6 to 12 hours at a minimum are available to evacuate after threat of overtop recognition. The future without-project case would most likely resemble the existing case with an increase in warning time. During the 2008 event, the river elevation rose 5.6 feet in 18.5 hours. Several elderly people were removed by boat from their homes but no one drowned.

“The most critical time for capacity exceedance of the proposed levee would be at night. About 208 residences (estimate of 600 people) and 8 apartments could eventually be surrounded by water. People living in about 20 of these residences (60 people) would have the time and the necessary low water depths to easily walk to safety. 10 residences (30 people) would have water depths greater than 8 feet above their first floor making their situation very serious. The people living in the remaining 178 residences (530 people) would probably be safe if they left the area immediately. If the flood were in the summer, people unable to evacuate could survive by going to the second floor or by standing on a desk or appliance until rescued. Water velocities and damage to homes by moving debris is expected to be minor as compared to a dam failure for both without-project and with-project.

“The capacity exceedance of the proposed levee during the day would involve many more people because of public and commercial activity but management of the evacuation during the day would be easier because of the formal and informal social networks offered by the two main commercial centers at Quaker and Cargill. Many of the studies of past floods due to dam breaks have shown that people endanger themselves by staying with their car or trying to reach safety by driving through water. This same behavior would probably occur during evacuation of the area landward of Alternative 4C levee but could be anticipated and overcome by planned evacuation routes and pre-flood evacuation training exercises.

“The City of Cedar Rapids currently maintains a Flood Response Manual that is updated on a regular basis. Major items contained within this manual include: emergency points on contact; Cedar River flood response tasks and maps; inundation maps; excavation route maps; flash flood response for local creeks; and supplemental flood fighting materials. This manual will be updated as appropriate after construction of the selected plan. In addition to the Flood Response Manual, an OMRR&R Manual will be written specifically for the selected plan. All closure structures contained within the selected plan are permanent in nature and can be erected and closed in advance of a coming flood on the Cedar River. The local sponsor will be required to execute periodic closure of all structures at least once every 3-years as part of the operation and maintenance schedule. Periodic installation exercises will ensure erection crews remain trained and are at appropriate numbers to assure closures can be made in a timely matter.”

Action Taken: Final Report dated November 2010 was revised as indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

9. EO 11988. The EO requires federal agencies to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of flood plain development wherever there are practicable alternatives. To demonstrate compliance this section would benefit by directly responding to the eight questions asked in EO 11988 rather than referencing indirectly in the responses including expectations about long term growth in the protected area, measures to reduce residual risk like land use planning, building codes etc.

CEMVR Response: Concur. This section has been updated to reflect the eight EO 11988 questions, as follows:

“The following are the general procedures to be followed for implementing EO 11988. These procedures are the “decision making process.” The general procedures are to be incorporated in the planning, design and construction of civil works projects.

1. Determine if the proposed action is in the base floodplain. The action is located in the base floodplain.
2. If the action is in the base floodplain, identify and evaluate practicable alternatives to the action or to location of the action in the base floodplain describing advantages and disadvantages based on many factors. No practicable alternative has been identified and evaluated to locating the action outside the base floodplain.
3. If the action must be in the floodplain, advise the general public in the affected area and obtain their views and comments. The general public will be advised/informed of the proposed action through public meetings, newsletters, distribution of this Study for public review, and through a Public Notice. To date, the public and environmental agencies have been coordinated with via letter, newsletters, public meetings, open houses, and through the District website. These comments will be considered and summarized in a Statement of Findings.
4. Identify beneficial and adverse impacts due to the action and any expected losses of natural and beneficial floodplain values. Where actions proposed to be located outside the base floodplain will affect the base floodplain, impacts resulting from these actions should also be identified. Beneficial impacts if this project were to be implemented would be reduced flood damages. Adverse impacts would be slight increase in flood heights. There are no expected losses of natural and beneficial floodplain values, as the floodplain is heavily urbanized.
5. If the action is likely to induce development in the base floodplain, determine if a practicable non-floodplain alternative for the development exists. Since the project area is the large urban area of Cedar Rapids, and already fully developed, neither large scale new development, nor significant improvements to existing developments are anticipated behind the proposed levee/floodwall system. No practicable non-floodplain alternative has been identified.
6. As part of the planning process under the Principles and Guidelines, determine viable methods to minimize any adverse impacts of the action including any likely induced development for which there is no practicable alternative and methods to restore and preserve the natural and beneficial floodplain values. No viable methods to minimize the slight increase in future flood heights that would result from construction of Alternative 4C have been identified.
7. If the final determination is made that no practicable alternative exists to locating the action in the floodplain, advise the general public in the affected area of the findings. The general public will

be advised that no practicable alternative to locating the proposed action in the floodplain exists, as indicated in Item No. 3 above.

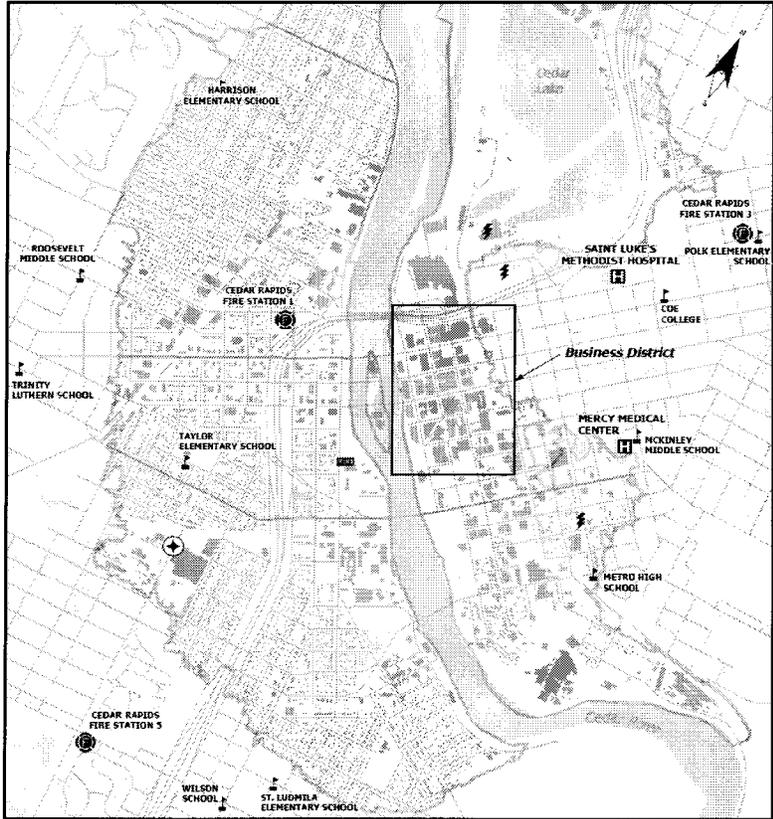
8. Recommend the plan most responsive to the planning objectives established by the Study and consistent with the requirements of the EO. The Recommended Plan, Alternative 4C, is the plan most responsive to the planning objectives established by the Study and consistent with this EO. The proposed project would be in full compliance with EO 11988.”

Action Taken: Final Report dated November 2010 includes information indicated in CEMVR Response.

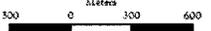
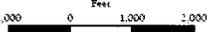
HOUSACE Assessment: Resolved.

10. Critical infrastructure Assessment. Critical infrastructure exists on both sides of the study area. Are there infrastructure components that are dependent on each other on both sides? For example, the hospital that would support the evacuation in the TSP area exists may be in an area outside of the TSP that is not protected and inaccessible during the flood. Has the project accounted for infrastructure dependencies in the accounting of the residual risk associated with the TSP? Recommend that the critical infrastructure dependencies be described and a graphic developed.

CEMVR Response: Concur. Recommended changes are in Section 3.1.7.2, Infrastructure and Utilities, on pages 90-92 of the Policy Review Draft dated October 2010, including the following figure, Figure 49 on page 91. Critical Infrastructure facilities for each Damage Reach are mentioned the descriptions in Section 3.1.4, pages 23-81.



CRITICAL INFRASTRUCTURE
 CEDAR RIVER, CITY OF CEDAR RAPIDS FEASIBILITY STUDY

 Hospitals	 Electric Power Plants	 Meters	 US Army Corps of Engineers Rock Island District
 Schools	 Sewage Treatment Facilities		
 Fire Stations	 2008 Flood	 Feet	
 Local Police	 Parks		

The following section describes the interdependencies of public and municipal services on pages 109-110 of the Public and Policy Review Drafts, dated August and October 2010:

“Public Facilities and Services. Major City services including City Hall, the County Courthouse, the Central Fire Station, the Police Department, the animal control building, the public works building, the ground transportation center, and the main public library sustained billions of dollars in damages. Cedar Rapids Community School District central offices and Taylor Elementary School were flooded and displaced. Cultural icons, including museums, theaters and cultural centers, were destroyed.

“All of the City’s primary municipal buildings were evacuated and eventually flooded. In all, 310 municipal facilities were damaged. The wastewater treatment facility was submerged and lost power, and all but one raw potable water supply well were taken out of service, dropping water production to 25 percent of what was necessary to supply uninterrupted residential and industrial service to the community. However, by the heroic and tireless efforts of many, services that the citizens of Cedar Rapids rely upon continued.

“Major east-west connectors across the river were closed, severely compromising traffic flow for citizens, emergency and City vehicles, and school buses. Freight connections were disrupted by damaged railroad connections, heavily impacting two major industries.”

During the week of the 2008 Flood, only one bridge within about 50 miles, Interstate 380, was usable and its use was restricted to emergency vehicles only. Both Cedar Rapids hospitals are on the east side of the river and one of these was evacuated during the flood. Other critical public facilities affected by the flood include the Federal Courthouse, City Hall, the City Administration Building, the Ground Transportation Center, the Science Museum, the Library, the Linn County Courthouse and Jail, and the US Cellular Events Center.

Action Taken: Final Report dated November 2010 modified as indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

11. Locally Supportable Plan and Letter of Intent: The report needs to clarify what the views are of the non-federal sponsor and whether they support the federally supportable plan. The report does not resolve the discrepancy between the local and federal objectives and only indicates their request for a waiver.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. The views of the sponsors are listed in Section 4.3.2.1 expressing their support of Alternative 4C as an integral portion of the City’s Flood Management System. The letter of support was added to Appendix L. Pertinent Correspondence. In Section 2.4, the water and related land resource problems and opportunities are stated as specific planning objectives to provide focus for the formulation of alternatives. These planning objectives reflect the problems and opportunities in the Study area and represent desired positive changes from the Future Without Project Condition. There are four planning objectives:

- Reduce flood damages to private and public infrastructure caused by Cedar River flooding greater than the 1 percent chance event in the City through 2060.
- Improve the response by local, state, and Federal agencies to the all flood events along the Cedar River in the City.
- Increase public awareness to the risk of flooding from the Cedar River in the City through 2060.
- Increase recreational opportunities in the City along the Cedar River that is compatible with an implementable FRM plan.

Action Taken: Final Report dated November 2010 includes information as indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

12. Cost and Schedule Risk Assessment. The report states that the contingency for TSP was reduce from 25% to 20%. Was the schedule risk contingency included in the total contingency? What was the basis for the contingency reduction? How has the uncertainty associated with the HTRW evaluation taken into consideration in developing the contingencies?

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Before the Cost and Schedule Risk Assessment (CSRA) was run, all estimates for the project utilized a 25% contingency for all the alternatives that were screened. Once the tentatively selected plan (TSP) was determined, a draft CSRA run produced a contingency of 17%. The Directory of Expertise from Walla Walla indicated that the 17% contingency seemed low and they recommended elevating it to at least a 20% contingency. Final Report Appendix I. Cost Estimate has been updated to match the Cost DX certified CSRA contingency. The CSRA report, specifically the PDT Risk Register for Alternative 4C - Conducted on 2010-03-30, captures all the identified items and their perceived risk and associated impact to the project. Ultimately, the final CSRA contingency produced by the Cost Engineering Directory of Expertise was used on the certified cost estimate.

The existing text from the main report section 4.6 was edited as provided below.

“Cost and Schedule Risk Assessment. In compliance with Engineering Regulation (ER) 1110-2-1302 Civil Works Cost Engineering, a Cost and Schedule Risk Assessment (CSRA) was conducted on the selected 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. The purpose of this assessment was to establish an overall project contingency by indentifying and measuring the cost and schedule impact of project uncertainties with respect to the estimated total project cost.

The draft CSRA report, as contained within the Cost Estimate Appendix I, resulted in a contingency amount of 17.23%. However, based on historical experience and reasonable prudence, the Cost DX recommended utilizing a contingency value of 20% in lieu of the calculated 17.23%. The product delivery team agreed with this assessment and applied a 20% contingency to each line item listed on Total Project Cost Summary that is contained in Appendix I. One exception to application of the 20% contingency amount was on the line item for Lands and Damages. A 35% contingency was applied against this line item. The 35% contingency for Lands and Damages was separately developed based on real estate incremental costs assessment completed by a real estate appraiser.

Economic analysis for Alternative 4C was re-calculated based on the refined cost estimate from that of the initial screening cost estimate that utilized a 25% contingency. The benefit cost ratio increased from 1.08 to 1.15 as a result. The new ratio will be used for budgeting and authorization purposes.”

The entire text provided below was added to the main report within section 4.6 following the first paragraph.

“The drop in contingency for Alternative 4C is attributed to the CSRA taking into consideration items such as conservative design development, additional field data collection and development of a contracting acquisition strategy. The following bullets outline some of the major items impacting the overall project contingency.

- Two thirds of Alternative 4C alignment is comprised of floodwalls. Conservative assumptions exist in the cost estimate quantities. This includes rounding up heights of all floodwalls to the next 3-foot interval. For example, if the design profile height indicated a 3.5-foot high floodwall, it was rounded up to a 6-foot high floodwall in the construction cost estimate. No floodwalls were rounded down.
- A conservative estimate of six feet of over excavation and fill replacement was estimated for all floodwall and closure structure foundations.
- All levee earthwork was computer modeled off of surface models generated from 2-foot contour mapping data. Thus, earthwork quantities should be very consistent with final construction amounts.
- As-builts of all existing utilities were obtained for the selected alignment. All impacted utilities were identified and accounted for within the final cost estimate based off as-built data.
- A suitable borrow material as the Eastern Iowa Regional Airport was identified as the study advanced. The site has more than an ample supply of lean clay needed for construction of earthen levees that is readily available on lands owned by the City of Cedar Rapids controlled by the airport authority.
- Construction work is considered to be routine in nature with no work being unique from projects that have been constructed in the past.
- Location of work is higher up in the floodplain so it is at a lower risk from river flooding during construction.
- An acquisition strategy was developed in coordination with Contracting Division. The strategy is to minimize cost by awarding one large construction contract. The contract will be advertised unrestricted Request for Proposals. The lowest price technically acceptable source selection process will be used to evaluate the Request for Proposals.
- Given the total construction cost of the project, it was determined that funding would not come through regular USACE funding sources but instead would come from congressional action. It was further decided that congressional funding would only likely come within the first two years after the project receives authorization. If funding does not come within the first couple of years, then it is very unlikely that the impetuous to fund this project would exist within congress.”

Action Taken: Final Report dated November 2010 was revised as indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

13. Risk Management Plan. The submittal package did not include a project risk management plan? Has this been completed? What are the major risk factors that the team identified that could impact the project implementation and have they been identified in the cost and schedule risk analysis?

CEMVR Response: Information. The final Cost and Schedule Risk Analysis (CSRA) is contained as a sub-appendix, Appendix I-A within the Cost Estimate, Appendix I. The CSRA contains a risk register that was populated by the product delivery team and analyzed

by the Cost Engineering Directory of Expertise for the Recommended Plan, Alternative 4C. The risk register in Appendix I begins on page 36 and continues through page 38.

The risk register contains the following major headings - Project & Program Management; Contract Acquisition Risks; Technical Risks; Lands and Damages Risks; Regulatory and Environmental Risks; Construction Risks; and Programmatic Risks. Each major heading has multiple specific risks and opportunities identified underneath it that are specific to the selected plan, Alternative 4C. All the listed risks were taken into account along with factors for the unknowns to determine an overall project contingency amount of 21.11%. In addition, Section 12 of the Project Management Plan (PMP) provides a Risk Management Plan for the overall project.

“12. Risk Management Plan. Risk Management is the systematic process of identifying assessing, making risk decision implementing controls, and analyzing risk decisions during the entire project life cycle. Monthly reviews by the PDT of progress and deliverables will assess potential problems and develop appropriate actions. Risk will be minimized through the use of schedules, metrics, and assignment of specific responsibilities. Contingencies to manage financial risk have been incorporated in the cost estimates. Following is a list of key risk factors to be considered in managing the project:

- Lack of feasibility phase funding
- Changes to Federal enabling legislation and authorization
- Changes in federal and local regulations and policies”

Action Taken: Final Report dated November 2010 was revised to include the CSRA in Appendix I. as indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

14. Project Schedule. The project schedule appears in two fragments in this report. In Section 6.9 (Page 269) there appears a schedule snapshot of major milestones for the remainder of the project planning phase. In Section 4.8 (Page 220), there are four major milestones from Dec 2011 authorization to construction completion. It is recommended that these be combined, mentioned in both places if needed but this would give a better reflection of the time it will take to get to project turnover to the local sponsor. It is also recommended that the team look into the time allocated for PED phase. Currently it appears that there may not be sufficient time allocated in the project schedule for the PED effort on this size of project. It is also recommended that a bullet be inserted for the acquisition of RE for the project, especially in light of the HTRW ROE issues currently being experienced.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Edited Milestone schedule in 4.8.1. Institutional Requirements and 6.9. Project Schedule to match:

Milestone	Start Date	Finish Date
Review of Public Review Draft	Aug 2010	Sep 2010
Issue Public Notice for Permit	Aug 2010	Sep 2010
Review of Policy Review Draft	Sep 2010	Oct 2010
District Commander's Submittal	Oct 2010	----
Civil Works Review Board	Nov 2010	----
Review of State and Agency Review Draft	Nov 2010	Dec 2010
Execute Design Agreement	Jan 2011	----
Sign the Report of the Chief of Engineers	Jan 2011	----
Chief's Report sent to the ASA (CW)	Feb 2011	----
PED Phase	Jan 2010	Aug 2012
Real Estate Acquisition	Jan 2010	Aug 2012
Construction Contract Advertising and Award	Sep 2012	Dec 2012
Project Construction	Jan 2013	Dec 2016

“6.9. Project Schedule * Project construction is estimated to be complete in December 2016. The remaining milestones leading up to project completion are presented in the following schedule:

Milestone	Start Date	Finish Date
Review of Public Review Draft	Aug 2010	Sep 2010
Issue Public Notice for Permit	Aug 2010	Sep 2010
Review of Policy Review Draft	Sep 2010	Oct 2010
District Commander's Submittal	Oct 2010	----
Civil Works Review Board	Nov 2010	----
Review of State and Agency Review Draft	Nov 2010	Dec 2010
Execute Design Agreement	Jan 2011	----
Sign the Report of the Chief of Engineers	Jan 2011	----
Chief's Report sent to the ASA (CW)	Feb 2011	----
PED Phase	Jan 2010	Aug 2012
Real Estate Acquisition	Jan 2010	Aug 2012
Construction Contract Advertising and Award	Sep 2012	Dec 2012
Project Construction	Jan 2013	Dec 2016”

Edited Section 4.8.1. to read “At the completion of construction, the entire flood control system will be turned over to the City; the City will then be fully responsible for the OMR&R of the system.”

Action Taken: Final Report dated November 2010 was revised as indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

15. Plan Formulation. Section 4.2.3.5 Evaluation and Comparison of Alternatives uses the wrong criteria. The criteria identified are not evaluation criteria but criteria to be considered during the formulation process. The criteria established for evaluation are the four accounts NED, EQ, RED, and OSE. During the formulation process the plans need to be complete, meaning that everything necessary for the plan to achieve its outputs is included in the plan. All plans should be complete. In this case alternative 10 is complete in that the plan includes everything necessary to provide the identified flood risk management reduction. Alternative 4 and Alternative 1 are also complete for the same reason. During the formulation process

you need to consider effectiveness. Are the plans effective at alleviating a specified problem? Again, alternative 10 is does a good job of reducing flood damages for the area it was formulated to protect. Does it alleviate most of the flood problems? No. That is why you also formulate other plans. You “consider” the effectiveness of plans when you formulate. Efficiency is the extent to which an alternative plan is the most cost effective means of alleviating the specified problems. When formulating plans you avoid plans that are obviously not cost effective. This relates to the requirement to formulate a plan that maximizes net NED benefits. To formulate a plan that maximizes net NED benefits you must consider the cost effectiveness of plans. Acceptability is the workability and viability of the alternative plan with respect to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies. This relates to the requirement to consider alternative plans not limited to those the Federal planning agency could implement directly under current authorities. Plans that could be implemented under the authorities of other Federal agencies, State and local entities, and nongovernment interest should also be considered. These criteria are established so that “alternative plans are to be formulated in a systematic manner to insure that all reasonable alternatives are evaluated”. This process is to help identify a full suite of alternatives to evaluate not for the purpose of eliminating alternatives. Once the full suite of alternatives is identified the evaluation process can begin. Because this study is flood risk management study the evaluation of these alternatives with the four evaluation criteria will focus on the NED analysis. However the other evaluation criteria, EQ, RED and OSE should be considered.

CEMVR Response: Concur. Recommended changes have been addressed as proposed in the Policy Review Draft: Figure 59, pg 145 Study Planning Process, Sections 4.2.3.5, Table 34 pg 180, Section 4.2.4.3, Table 44 pg 195, Section 4.3.2.1, 4.3.2.2, 4.4.2, 4.4.4, 4.5. As result of this and other Public Review comments, most of Chapter 4 was re-written and addresses this comment.

Action Taken: Final Report dated November 2010 was revised as indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

16. Relocation Costs. E-5, paragraph E: recommend not printing a partial list of what is included in relocation costs. Paragraph M is a sufficient statement.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Removed E-5, paragraph E and adjusted report sequencing as necessary.

Action Taken: Final Report dated November 2010 includes the information indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

17. Relocations. E-5, para. I: Have any relocations been identified? Who is responsible to do the relocations?

CEMVR Response: Concur. Recommended changes have been addressed as proposed. The following items are now inserted into the text: “At this time no utility relocations have been identified and no Attorney’s Opinion of Compensability issued.”

Action Taken: Final Report dated November 2010 includes the information indicated in CEMVR Response.

18. Quick-Take Authority. E-7, para. XI: Recommend mentioning that NFS does not have quick-take.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. In addition to the clear statement with other pertinent information within Exhibit D to Appendix E of the Policy Review Draft, the following sentence has been inserted in Section XI. NON-FEDERAL SPONSOR ASSESSMENT, “The City does not have ‘Quick Take’ authority.”

Action Taken: Final Report dated November 2010 includes the information indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

D. RESOLUTION OF COMMENTS FROM REVIEW OF THE NOVEMBER 2010 FINAL REPORT

1. Aquatic Impacts/404 Analysis: In the report/EA and in the 404(b)(1) analysis there is differing information as to the actual footprint impacts of the project. In the report on Page...it states that there will be both impacts to Clear Lake and to the Cedar River from construction activities and in the 404 analysis it only mentions Clear Lake. It is assumed that there will in fact be impact in the river from the construction of this large project and this should be documented in both places. Also, it would be good to document any O&M activities which the sponsor may need to undertake in aquatic areas.

CEMVR Response: Concur. Recommended changes have been addressed as proposed. Although Alternatives 1C, 1A-C, 4C and 10 would result in placing dredged or fill material in the waters of the United States, subject to CWA 404 regulations, only Alternative 1C would result in impacts to jurisdictional wetlands. This project would be in full compliance if the NED plan (Alternative 4C) were to be implemented.”

Action Taken: Final Report dated November 2010 includes the information indicated in CEMVR Response.

HOUSACE Assessment: Resolved.

Thomas Hughes

Policy Compliance Review Manager
