

REVIEW PLAN

Melvin Price Segment of Wood River Levee Underseepage

P2 Number: 405925

Madison County, IL

Planning and Implementation Activities

St. Louis District

MSC Approval Date: 12 Sep 14

Last Revision Date: 8 Jun 17



**US Army Corps
of Engineers®**

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Underseepage Design Deficiency Correction Project

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the underseepage design deficiency corrections associated with the Melvin Price Locks and Dam, IL and MO project. The current project will address underseepage along a stretch of Wood River levee that is adjacent to the locks and dam, which is located in Madison County, Illinois. This review plan is intended to cover all study, design and construction activities for the project.

b. References

- (1) Engineering Circular (EC) 1165-2-214, Civil Works Review Policy, 15 Dec 2012.
- (2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
- (3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
- (4) ER 1165-2-119, Modifications to Completed Projects, 20 Sep 1982
- (5) ER 1110-2-1156, Safety of Dams – Policy and Procedures, 31 March 2014
- (6) Melvin Price Wood River Underseepage Design Deficiency, Wood River, IL, Limited Reevaluation Report (LRR), August 2012

c. Requirements. This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is the RMC.

The RMO will coordinate with the Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3. STUDY INFORMATION

a. Decision Document. A Limited Reevaluation Report (LRR) was approved in August of 2012 that recommended a permanent solution to the underseepage design deficiency associated with Mel Price. Additional exploration data was obtained during design that revealed the identified solution would not be adequate to control the underseepage. The

purpose of the current Supplemental Report is to document the design and cost changes from the original LRR. The Environmental Assessment and Finding of No Significant Impact (FONSI) that were prepared for the original LRR will be amended to reflect the changes identified in the current report.

Because this project meets the criteria specified in ER 1165-2-119 for a design deficiency, the corrective action falls within the purview of the original project authorization and no additional Congressional authorization is needed. Approval authority for the original LRR was delegated to the MSC, in this case the Mississippi Valley Division (MVD). Approval authority for the Supplemental Report has been reserved for HQUSACE.

- b. Implementation Documents.** Implementation documents covered by this Review Plan include Design Documentation Reports (DDR) and plans and specifications. A DDR provides the technical basis for the plans and specifications and serves as a summary of the final design. According to ER 1110-2-1150, the approval level for a DDR is at the District Command. Plans and specifications define construction requirements. It is not anticipated that any additional NEPA compliance documentation will be required during the implementation phase.
- c. Project Description.** The Melvin Price Locks and Dam (Mel Price) is located on the Mississippi River two miles below Alton, Illinois. This design deficiency correction project is focused on a section of the Upper Wood River Levee that stretches from the locks and dam to approximately 7,100 feet upstream, adjacent to the permanent navigation pool of Mel Price. This portion of the Wood River Levee experiences uncontrolled underseepage.

In a Limited Reevaluation Report (LRR) completed in August 2012, the district concluded that the uncontrolled seepage is a result of replacing Lock and Dam 26 with the Melvin Price Locks and Dam two miles downstream from the original structure. This replacement resulted in the extension of the navigation pool, which put this section of levee in the navigation pool instead of the old lock and dam tail water. This change resulted in an approximate 15 foot increase in the static head on the levee, which has impacted the levee foundation through uncontrolled underseepage. The uncontrolled underseepage increases the risk of failure, which could result in loss of life and property damages in excess of \$365 million. The area of seepage concern can be seen in Figure 1.



Figure 1: Areas of Seepage Concern

The 2012 LRR recommended a combination of slurry trench cutoff wall for the area downstream of Cpl. Belchik Expy (“downstream reach”) and relief wells for the area upstream of Cpl. Belchik Expy (“upstream reach”). This plan had the least cost and the greatest net benefits of all of the alternatives. The estimated fully funded cost for the recommend plan was [REDACTED]

The design deficiency status was approved by the Chief, Engineering and Construction Division, Directorate of Civil Works (HQUSACE) on March 10, 2012. The report and associated EA went through DQC, ATR, IEPR, and public review. It was approved by the Commander, Mississippi Valley Division on August 31, 2012.

As additional data was collected and design efforts progressed in 2013, it became apparent that the recommended relief wells were not implementable. Pump tests and exploratory borings revealed that aquifer permeabilities were much higher than assumed in the 2012 LRR. It was determined that a Supplemental Report would be required to re-examine the alternatives in the 2012 LRR in light of the new data. Alternatives analyzed included a fully-penetrating cutoff wall in both the upstream and downstream reaches; a series of 16-inch relief wells with submersible pumps in each one; and a seepage berm. The relief wells are the recommended plan, for a first cost of approximately [REDACTED]

The costs of the construction of the design deficiency correction will be borne entirely by the Federal government under the Melvin Price project construction appropriation. Operation, maintenance, repair, rehabilitation and replacement of the project features will be the responsibility of the Wood River Drainage and Levee District.

General Site Location and Description. The Melvin Price Lock and Dam is located in Madison County, Illinois, and St. Charles County, Missouri, at Mississippi River Mile 200.8 above the Ohio River, between the mouth of the Missouri River and the Illinois River. See Figure 2 for a project area map.

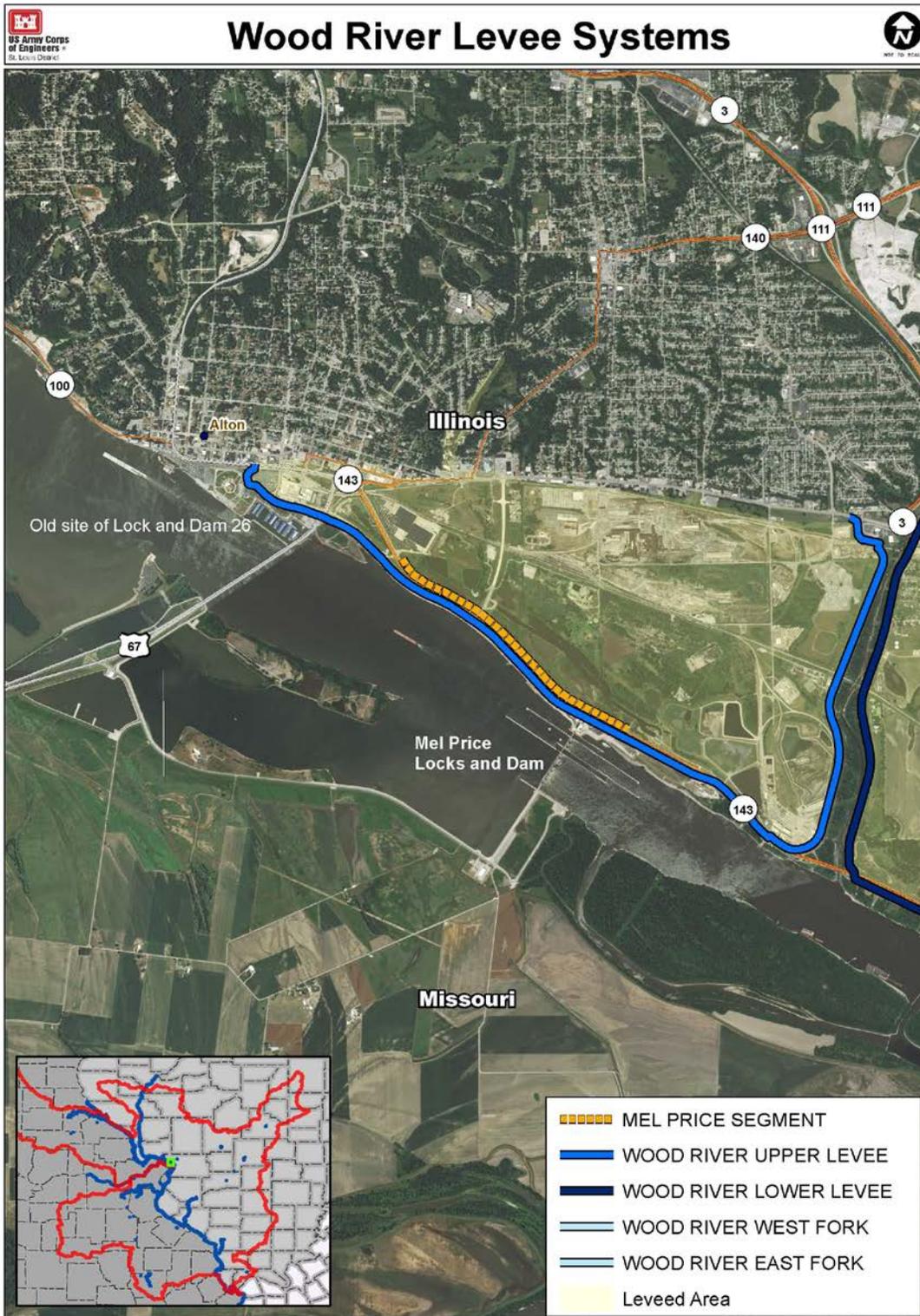


Figure 2: Project Area Map

d. Factors Affecting the Scope and Level of Review.

- A Type I IEPR was conducted as part of the 2012 LRR.
- The study will rely on the analysis from the 2012 LRR as well as other standard engineering analysis. However, newly discovered subsurface conditions may present challenges for both the study and implementation activities.
- The design will not likely be based on novel methods or innovative materials or techniques. It will not present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices. All of the alternative designs utilize conventional methods of flood risk reduction and underseepage control.
- The design effort and construction will utilize conventional techniques and will not require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design construction schedule.
- The Governor of Illinois has not requested peer review.
- The estimated total cost of the project (construction cost including planning, design, and mitigation) is anticipated to be at least [REDACTED]
- The project area is urbanized and consequently there are public safety concerns. The Wood River Levee is at increased risk during a high water event. Failure could result in loss of life and property damages above \$365 million. The St. Louis District's Chief of Engineering and Construction previously determined that there is life safety risk associated with the project; that determination has not changed.
- The primary project risks (limited subsurface information) have been greatly reduced by the recent acquisition of soils information during design efforts.
- An Environmental Assessment (EA) was prepared and a Finding of No Significant Impact (FONSI) was signed for the original LRR. A supplemental EA will be prepared in support of the Supplemental Design Deficiency Report. An Environmental Impact Statement (EIS) will not be required.
- The project is not likely to involve significant public dispute. The public has expressed support for a permanent fix for the underseepage problem in the area.

e. In-Kind Contributions. All work associated with this project will be at 100% Federal expense. Therefore, no in-kind products are anticipated for this project.

4. DISTRICT QUALITY CONTROL (DQC)

All work products (including supporting data, analyses, environmental compliance documents, etc.) shall undergo District Quality Control. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC.

DQC efforts will include the necessary expertise to address compliance with published Corps policy. Reviews under this heading may include technical reviews performed within the District/Division boundaries; over the shoulder peer reviews; and Bid-ability, Constructability, Operability, Environmental, and Sustainability (BCOES) Reviews.

a. Decision Document

- i. **Documentation of DQC.** DrChecks review software will be used to document all DQC comments, responses and associated resolutions accomplished throughout the review process (See Section 5.c for more information on DrChecks). Documentation of DQC will be provided to the ATR team.
- ii. **Products to Undergo DQC.** Key products for review include the draft and final Supplemental Report.
- iii. **Required DQC Team Expertise:** The contributions of each discipline to the products will be reviewed by another individual representing that discipline. These disciplines include plan formulation, environmental, economics, real estate, cultural, civil design, geotechnical engineering, mechanical engineering, electrical engineering, hydrology and hydraulics, and cost engineering. Quality checks may be performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. However, they should not be performed by the same people who performed the original work, including managing/reviewing the work in the case of contracted efforts.

b. Implementation Documents

- i. **Documentation of DQC.** DrChecks review software will be used to document all DQC comments, responses and associated resolutions accomplished throughout the review process.
- ii. **Products to Undergo DQC.** Key products for review include plans, specifications, design documentation reports, and cost estimate for the final design review.
- iii. **Required DQC Team Expertise:** The contributions of each discipline to the products will be reviewed by another individual representing that discipline. These disciplines include environmental, real estate, civil design, geotechnical engineering, mechanical engineering, electrical engineering, structural engineering, construction, and cost engineering. Quality checks may be performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. However, they should not be performed by the same people who performed the original work, including managing/reviewing the work in the case of contracted efforts.

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all decision documents implementation documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE

guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC; once the project reaches the implementation phase, a new lead will be selected.

a. Decision Document

- i. **Products to Undergo ATR.** The Draft Report of the Supplemental Design Deficiency Report (including NEPA documentation) will undergo ATR.
- ii. **Required ATR Team Expertise.** ATR expertise will be comprised of senior USACE personnel (Regional Technical Specialists (RTS), Subject Matter Experts, etc.) and may be supplemented by outside experts as appropriate. The disciplines represented on the ATR team will reflect the significant disciplines involved in the planning, engineering, and design effort. The table below describes the ATR expertise required for the Supplemental Report. The ATR team for this project has not been finalized yet, but the team composition will be coordinated with the RMO.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Planning	The Planning reviewer should be a senior water resources planner with experience in flood risk management studies.
Economics	The Economics reviewer should be a senior economist with experience in flood risk management studies.
Environmental Resources	The environmental reviewer should be experienced in National Environmental Policy Act (NEPA) process and analysis, and have a biological or environmental background
Hydraulic Engineering	The hydraulic engineering reviewer will be an expert in the field of hydraulics and have a thorough understanding of interior drainage analysis.
Risk Analysis	The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1110-2-1156 and other related guidance, including familiarity with how information from the various

	disciplines involved in the analysis interact and affect the results.
Geotechnical Engineering	The geotechnical reviewer should have experience with issues related to underseepage controls. A certified Professional Engineer is recommended.
Civil Engineering	The civil engineering reviewer should have experience in civil works and flood risk management studies.
Cost Engineering	The cost reviewer will be Cost DX Staff or a Cost DX Pre-Certified Professional with experience preparing cost estimates for flood risk management studies.
Cultural Resources	Team member will be experienced in cultural resources and tribal issues, regulations, and laws
Real Estate	The Real Estate Reviewer will be a Senior Real Estate Specialist with experience in flood risk management studies.

iii. **Documentation of ATR.** DrChecks review software will be used to document all ATR comments, responses, and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

1. The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
2. The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;
3. The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
4. The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed, based on work reviewed to date. A sample Statement of Technical Review is included in Attachment 2.

b. Implementation Documents

- i. **Products to Undergo ATR.** The Design Documentation Report (DDR), and all plans and specifications will undergo ATR.
- ii. **Required ATR Team Expertise.** ATR expertise will vary based on the particular needs of each product, but will be comprised of senior USACE personnel (Regional Technical Specialists (RTS), Subject Matter Experts, etc) and may be supplemented by outside experts as appropriate. The ATR team and the review itself will be scaled to the size and complexity of the individual products being reviewed. The disciplines represented on the ATR team will reflect the significant disciplines involved in the engineering, design and construction of each project feature. The table below describes the potential ATR expertise required for the implementation documents. The ATR team for this project has not been finalized yet, but the team composition will be coordinated with the RMO.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also

	serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Environmental Resources	The environmental reviewer should be experienced in National Environmental Policy Act (NEPA) process and analysis, and have a biological or environmental background
Geotechnical Engineering	The geotechnical reviewer should have experience with issues related to underseepage controls. A certified Professional Engineer is recommended.
Civil Engineering	The civil engineering reviewer should have experience in civil works and flood risk management studies.
Cost Engineering	The cost reviewer will be Cost DX Staff or a Cost DX Pre-Certified Professional with experience preparing cost estimates for flood risk management studies.
Real Estate	The Real Estate Reviewer will be a Senior Real Estate Specialist with experience in flood risk management studies.

- iii. Documentation of ATR. The documentation of ATR for the implementation documents will be handled in the same manner as documentation of ATR for the decision document. Please refer to Section 5.a.iii for information regarding this process.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

IEPR may be required for decision documents and implementation documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- Type I IEPR. Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.

- **Type II IEPR.** Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

- a. Decision on IEPR.** Based on the guidance in EC 1165-2-214, the current LRR meets the following mandatory triggers for Type I IEPR: significant threat to human life and cost estimate over \$45 million. Although a Type I IEPR was conducted for the 2012 LRR and five panel members reviewed the geotechnical engineering, civil engineering, economics, costs, and environmental aspects of the study, the current LRR is expected to recommend a solution that will differ from the original recommendation and have significantly higher costs. As a result, a Type I IEPR is recommended for the Supplemental Report. Additionally, due to the life safety risk, Safety Assurance will also be addressed during the Type I IEPR.

According to EC 1165-2-214, a Type II IEPR (SAR) shall be conducted on design and construction activities for any project which poses a significant threat to human life. This applies to new projects and to the major repair, rehabilitation, replacement, or modification of existing facilities. Because this project fits this criteria, a SAR will be conducted for design and construction work. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities for the purpose of assuring that good science, sound engineering, and public health, safety, and welfare are the most important factors that determine a project's fate.

For Type I IEPR, the RMO will be the RMC.

- b. Products to Undergo Type I IEPR.** The Supplemental Report, along with associated appendices and Environmental Assessment, will undergo Type I IEPR.
- c. Products to Undergo Type II IEPR.** External panels will conduct reviews of the design and construction activities prior to the initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule, and before substantial completion of construction activities. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health, safety, and welfare. It is anticipated that SAR would be conducted following each ATR and during each construction contract, with the exception of the mitigation design and contract, which is not anticipated to involve any concerns related to public health, safety, or welfare.

d. Required IEPR Panel Expertise.

The composition and qualifications for both the Type I and Type II IEPR panels will depend on the nature of the recommended solution and the specific features that will be designed and

constructed. At a minimum, the Type I IEPR panel will review the planning, economics, environmental compliance, and engineering aspects of the supplemental design deficiency report. The panel members will be comprised of individuals that have not been involved in the development of the decision document or designs, meet the National Academy of Sciences guidelines for independence, and will be chosen by an outside organization. The IEPR teams and the reviews themselves will be scaled to the size and complexity of the individual products being reviewed.

The following types of expertise are anticipated for the Type I IEPR team:

- i. Engineering. The engineering panel member shall hold a professional license in civil or geotechnical engineering with a MS degree or higher civil or geotechnical engineering. The IEPR leader shall have a minimum of 20 years of design experience and experience with multi-million dollar, flood risk management projects. Panel member should be familiar with or have experience with USACE Civil Works policy and procedures.
- ii. Environmental. Panel member will have a master's degree or higher education in biology or a related field and work experience of 20 + years in the discipline. Panel member will have knowledge and experience with National Environmental Policy Act (NEPA) processes and analysis. Panel member should be familiar with or have experience with USACE Civil Works policy and procedures.
- iii. Economics. Panel member will have a master's degree or higher education from a University with an accredited program in the discipline of economics and/or specific work experience of 20 + years in the discipline. Panel member will be familiar with the USACE Civil Works benefit-cost process and it would be beneficial for the panel member to have knowledge of the USACE HEC-FDA (Flood Damage Analysis) model. Panel member should be familiar with or have experience with USACE Civil Works policy and procedures.
- iv. Planning. Panel member will be a plan formulation subject matter expert, have extensive experience in the USACE civil works planning process, and be knowledgeable of USACE policies and guidelines. Reviewer should be familiar with the plan formulation and selection process for flood risk management projects.
- v. Additional panel expertise, such as construction cost analysis, may be needed.

The type of expertise needed on the Type II IEPR team will depend on the features that will be designed and constructed. In general, the following types of expertise may be represented on the Type II IEPR team:

- (1) IEPR team leader. The IEPR team leader shall hold a professional license in structural or civil engineering with a MS degree or higher civil or structural engineering. The IEPR leader shall have a minimum of 20 years of design experience and experience with multi-million dollar, flood risk management projects. The team leader shall be a recognized leader with good communication skills to lead a diverse review team comprised of individuals located across the nation.
- (2) Hydraulics. The reviewer for hydraulics shall be a registered professional engineer with a minimum of a MS degree or higher in engineering science. The reviewer shall

- have a minimum of 20 years experience in hydrologic analysis and design of hydraulic structures as it relates to riverine flood risk management projects. Reviewer should have experience in the analysis and design involving interior drainage and riverine models using HEC-RAS and hydrology models using HEC-HMS. This member should also be knowledgeable in coincidence of frequency and the application of USACE risk and uncertainty analyses on flood risk management projects. Reviewer should be experienced with similar projects in an urban setting and participated in review of riverine flood risk management projects.
- (3) Civil. The reviewer for civil features shall be a registered professional engineer with a minimum MS degree or higher in civil or construction engineering. The reviewer shall have a minimum of 20 years of experience in the design, layout, and construction of a large urban flood risk management projects to include knowledge regarding levees, interior drainage facilities, earthwork, concrete placement, design of access roads, and relocation of underground utilities. The reviewer must be familiar with USACE regulations and standards.
- (4) Geotechnical. The reviewer for geotechnical features shall be a registered professional engineer with a minimum BS degree or higher in civil or geotechnical engineering. Reviewer shall have a minimum of 20 years of experience in subsurface investigations, floodwall and levee design, seepage and slope stability evaluations, erosion protection design, and construction and earthwork construction. The reviewer must be familiar with USACE regulations and standards.

e. Documentation of IEPR.

- vi. **Type I IEPR.** The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-214, Appendix D. Panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. Dr Checks review software will be used to document both Type I and Type II IEPR comments and aid in the preparation of the Review Report. Comments should address adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. IEPR comments should generally include the same four key parts as described for ATR comments in Section 5.c. The Contractor will be responsible for compiling and entering comments into Dr Checks. The IEPR team will prepare a Review Report that will accompany the publication of the final report for the project and shall:
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
 - Include the charge to the reviewers;
 - Describe the nature of their review and their findings and conclusions; and
 - Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

For Type I IEPR, the final Review Report will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

For Type II IEPR, The MSC Chief of Business Technical Division will approve the final report. After receiving the report from the panel, the District Chief of Engineering and Construction Division shall consider all comments contained in the report and prepare a written response for all comments and note concurrence and subsequent action or non-concurrence with an explanation. The District Chief of Engineering and Construction Division shall submit the panel's report and District responses to the MSC for final MSC Commander approval and then make the report and responses available to the public on the District's website.

ii. Type II IEPR. The Type II IEPR panel is responsible for preparing a review report. All review panel comments shall be entered as team comments representing the group not a specific individual. The team lead is to seek consensus, but where there is a lack of consensus, note the non-concurrence and why. A suggested report outline includes the following:

- Introduction
- Composition of the review team
- Summary of the review during design
- Summary of the review during construction
- Lessons learned in both the process and/or design and construction
- Appendices for disclosure of conflict forms and for comments to include any appendices for support analyses and assessments of the adequacy and acceptability of the methods, models, and analyses used

All comments in the report will be finalized by the panel prior to their release to the District for each Type II IEPR review milestone.

The host District Chief of Engineering is responsible for coordinating with the RMO, for attending review meetings with the Type II IEPR panel, communicating with the agency or contractor selecting the panel members, and for coordinating the approval of the final report with the MSC Chief of Business Technical Division.

After receiving a report on a project from the peer review panel, the District Chief of Engineering, with full coordination with the Chiefs of Construction and Operations, shall consider all comments contained in the report and prepare a written response for all comments and note concurrence and subsequent action or non-concurrence with an explanation. The District Chief of Engineering shall submit the panel's report and the District's responses to the MSC Chief of Business Technical Division for final

review and concurrence. The final report is then presented to the MSC Commander for approval. After MSC Commander approval, the report and responses shall be made available to the public on the District's website.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents. Implementation documents are not subject to the same level of policy and legal compliance review required for decision documents.

8. COST ENGINEERING AND ATR MANDATORY CENTER OF EXPERTISE (MCX) REVIEW AND CERTIFICATION

All decision documents and construction cost estimates shall be coordinated with the Cost Engineering and ATR MCX, located in the Walla Walla District. The MCX will assist in determining the expertise needed on the ATR team and Type I IEPR team (if required) and in the development of the review charge(s). The MCX will also provide the Cost Engineering certification. The RMO is responsible for coordination with the Cost Engineering MCX.

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, for the purposes of the EC, are defined as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of the planning product. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

- a. Planning Models.** The following planning models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
Hydrologic Engineering Center Flood Damage Assessment (HEC-FDA) Risk Based Model Version 1.2.4	The Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA) program provides the capability for integrated hydrologic engineering and economic analysis for formulating and evaluating flood risk management plans using risk-based analysis methods. The program will be used to evaluate and compare the future without- and with-project plans to aid in the selection of a recommended plan to manage flood risk.	Certified

- b. Engineering Models.** The following engineering models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
The Hydrologic Engineering Center's River Analysis System (HEC-RAS)	The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for steady flow analysis to evaluate the future without- and with-project conditions.	CoP Preferred Model
TRACES MII 4.1 (Tri-Service Automated Cost Engineering Systems)	TRACES is an integrated suite of cost engineering tools designed to support the cost engineers throughout the USACE, Air Force, and Navy. MCACES (Micro-Computer Aided Cost Estimating System) MII is a second generation module of TRACES used by the USACE for the preparation of detailed construction cost estimates. MCACES MII will be used to evaluate capital costs for the Recommended Plan.	CoP Preferred Model
GeoStudio product Seep/W	This product will be utilized to examine the needs for seepage controls and to design the relief well and seepage berm solutions	CoP Allowed Model
GeoStudio product Slope/W	This product will be utilized to examine the slope stability of the existing levee sections for the slurry trench cutoff wall alternative.	CoP Allowed Model

WASH 123D	WASH 123D is 3-dimensional groundwater modeling software developed by ERDC. This software will be used to model the underseepage and help identify the requirements for the solutions.	CoP Preferred Model
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10. REVIEW SCHEDULES AND COSTS

- a. ATR Schedule and Cost.** The estimated cost per ATR is \$40,000, but will vary based on the product being reviewed and the complexity of the project feature being reviewed. The ATR will occur for the draft Supplemental Report and during key stages in the P&S for each feature completed following this review plan.

<u>Design Package</u>	<u>Start Date</u>
Draft Supplemental Report	3 rd Q FY15 (Actual)
Reach 1 Plans and Specifications and DDR	2 nd Q FY18
Reach 2 Plans and Specifications and DDR	1 st Q FY19
Mitigation Plans and Specifications and DDR	4 th Q FY17

- b. Type I IEPR Schedule and Cost.** The Type I IEPR will occur once the ATR for the draft Supplemental Report has been certified. The Type I IEPR was conducted in the 2nd quarter of fiscal year 2016.
- c. Type II IEPR Schedule and Cost.** Milestones to consider for a Type II IEPR (SAR) are at the record of final design in the Design Documentation Report; at the completion of the plans, specifications, and cost estimate; at the midpoint of construction for a particular contract, prior to final inspection, or at any critical design or construction decision milestone. The IEPR schedule is established by the RMO in conjunction with the District (PM and PDT).

It is anticipated that the SAR will occur following ATR of each set of Plans and Specifications and continue through the end of construction. It is anticipated that this review will cost between [REDACTED]

- d. Model Certification/Approval Schedule and Cost.** Not Applicable

11. PUBLIC PARTICIPATION

As required by EC 1165-2-214, the approved Review Plan will be posted on the District public website (<http://www.mvs.usace.army.mil/Missions/ProgramsProjectManagement/PlansReports.aspx>). Information will be conveyed to the public through the use of press releases and media interviews, as necessary, and through the use of posting information to the St. Louis District's website. There is no formal public review for the DDR, plans and specifications and construction

phases. However, the EA for the Supplemental Design Deficiency Report will undergo a 30-day public review period concurrently with the Type I IEPR. The public will have 30 days to provide comments on the documents; after all comments have been submitted, the comments will be provided to the technical reviewers and responses will be given to the public.

12. REVIEW PLAN APPROVAL AND UPDATES

The Mississippi Valley Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the project. Like the PMP, the Review Plan is a living document and may change as the study progresses. The home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this review plan can be directed to the following points of contact:

- St. Louis District Project Manager 314-331-8169
- Mississippi Valley Division District Support Team 601-634-5293
- Flood Risk Management PCX Deputy Director 415-503-6852
- Risk Management Center Review Manager 304-399-5217

ATTACHMENT 1: TEAM ROSTERS

Project Delivery Team (PDT):

**Removed from public document.*

District Quality Control (DQC):

**Removed from public document.*

Agency Technical Review (ATR):

Agency Technical Review members will vary by review. The below lists include the reviewers that will be required for the decision and implementation documents. Names will be added as reviewers are selected.

Decision Document ATR Team:

**Removed from public document.*

Implementation Document ATR Team:

ATR Team Members/Disciplines	Expertise Required
ATR Lead – TBD	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Environmental Resources – TBD	The environmental reviewer should be experienced in National Environmental Policy Act (NEPA) process and analysis, and have a biological or environmental background
Geotechnical Engineering – TBD	The geotechnical reviewer should have experience with issues related to underseepage controls. A certified Professional Engineer is recommended.
Civil Engineering – TBD	The civil engineering reviewer should have experience in civil works and flood risk management studies.
Cost Engineering – TBD	The cost reviewer will be Cost DX Staff or a Cost DX Pre-Certified Professional with experience preparing cost estimates for flood risk management studies.
Real Estate – TBD	The Real Estate Reviewer will be a Senior Real Estate Specialist with experience in flood risk management studies.

Type II Independent External Peer Review (IEPR) Panel:

The selection of the IEPR panel will be coordinated by the RMC.

NAME	ROLE/DISCIPLINE	EDUCATION AND EXPERIENCE
To be independently selected		

Vertical Team:

The Vertical Team consists of members of the HQUSACE and CEMVD Offices. The Vertical Team plays a key role in facilitating execution of the project in accordance with the PMP. The Vertical Team is responsible for providing the PDT with Issue Resolution support and guidance as required. The Vertical Team will remain engaged seamlessly throughout the project via monthly teleconferences, as required, and will attend In Progress Reviews and other key decision briefings. The CEMVD District Support Team Liaison is the District PM's primary Point of Contact on the Vertical Team.

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ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the [<type of product>](#) for [<project name and location>](#). The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrCheckssm.

**Removed from public document.*

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number
23 May 16	With concurrence from MVD and the RMC, removed ATR of final Supplemental Report. Also updated ATR review schedule and ATR roster.	Page 18, Section 10.a. Page 8, Section 5.a.i. Attachment 1, ATR roster.
8 June 17	With concurrence from MVD and the RMC, updated description of recommended plan, description of products to undergo ATR and IEPR, ATR and IEPR schedule, contact information.	Page 3, Section 3.c. Page 12, Section 6.c. Page 18, Sections 10.a-c