DEPARTMENT OF THE ARMY
US ARMY ENGINEER DIVISION, SOUTHWESTERN
1100 COMMERCE STREET, SUITE 831
DALLAS TX 75242-1317

REPLY TO
ATTENTION OF

CESWD-PDP

27 SEP 2012

MEMORANDUM FOR Commander, Little Rock District

SUBJECT: Jordan Creek, Springfield, MO (PWI # 013714) Review Plan Approval

1. References:

a. Change 1, 31 January 2012 to EC 1165-2-209, Civil Works Review Policy, 31 January 2010.

b. Memorandum, CESPD-PDP, 27 August 2012, subject: Springfield, Missouri, Feasibility Study and Environmental Assessment Review Plan (Encl 1)

c. Email, CESWL-PE, Laura Cameron, 28 August 2012, subject: Final FRM-PCX Comments on Springfield, MO Review Plan (Encl 2).

2. In accordance with reference 1.a., I hereby approve the enclosed Review Plan (RP) for the subject project study.

3. The RP has been prepared in accordance with the referenced guidance and has been reviewed and cleared for approval by the Flood Risk Management Planning Center of Expertise (FRM-PCX) (Encl 1). An Independent External Peer Review is required and public comments received will be incorporated into the plan as the study progresses.

4. Please post the final approved RP with a copy of this memorandum to the District's public internet website and provide the internet address to the FRM-PCX and Southwestern Division. Before posting to the District website, the names of USACE employees should he removed.

5. The SWD point of contact for this action is Mr. Saji Varghese, CESWD-PDP, at 469-487-7069.

Thomas W. Kula

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THOMAS W. KULA
Brigadier General, USA
Commanding

# REVIEW PLAN

**Springfield, Missouri**
**Feasibility Report and Environmental Assessment**

**Little Rock District**

**MSC Approval Date:** 27 September 2012
**Last Revision Date:** 11 September 2012

US Army Corps
of Engineers ®

**REVIEW PLAN**

**Springfield, Missouri**
**Jordan Creek, Springfield, Greene County, Missouri**
**Feasibility Report and Environmental Assessment**

**TABLE OF CONTENTS**

1. **PURPOSE AND REQUIREMENTS**

**a. Purpose.** This Review Plan defines the scope and level of peer review for the Springfield, Missouri , Feasibility Study and Environmental Assessment.

**b. References**

(1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010
(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 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
(5) Springfield, Missouri, Feasibility Study Project Management Plan.

**c. Requirements.** This review plan was developed in accordance with EC 1165-2-209, 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 1165-2-209) 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 Flood Risk Management Center of Expertise (FRM-PCX) located in South Pacific Division.

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies. The FRM-PCX will also coordinate with the National Ecosystem Restoration Planning Center of Expertise to ensure that review teams with appropriate expertise are assembled. The RMO for Type II IEPR reviews is the U.S. Army Corps of Engineers (USACE) RMC. Panel members will be selected using the National Academies of Science (NAS) policy for selecting reviewers.

**3. STUDY INFORMATION**

**a. Decision Document.** The Springfield, Missouri, Feasibility Study will result in an integrated Feasibility Report and Environmental Assessment to assess Flood Risk Management along Jordan/Wilsons Creek. It is expected that a Chief's Report will be prepared and Congressional authorization obtained.

This Feasibility Report is Pilot study testing the five imperatives for change in a concerted effort to transform the pre-authorization feasibility study (planning) process. The core principles of planning will stay the same; however, the Corps is evaluating ways to streamline the feasibility level analysis and decision making to deliver decisions in a more efficient manner. The five imperatives for change are:

1. Effective Vertical Team Integration and Decision Making
2. Determine Federal Interest Based on Identified Problem at Beginning of Study
3. Accept Uncertainty and an Appropriate Level of Detail

4. Use a Multi-criteria Approach in Alternative Selection
5. Commit Necessary Resources – Funding, Human Resources, and Information Resources

**b. Study/Project Description.** The City of Springfield, the Non-Federal Sponsor (NFS), experiences floods as a result of Jordan Creek's insufficient channel flow capacity. The Jordan Creek floodplain is heavily urbanized with areas of high- and low-density housing, commercial and industrial development, and some open spaces. Jordan Creek and its tributaries, North Branch Jordan Creek and South Branch Jordan Creek are classic urban streams. The upstream reaches consist of grass ditches with small culverts that can carry small, frequent storm events, and regional detention.

The middle portion of each branch and below the confluence of the two branches along Jordan Creek has both concrete and natural channels, with some long large-diameter culverts capable of conveying a storm that has a 10% to 20% chance of happening in any given year. When storms occur that exceed the channel capacity, the water flows through the downtown over streets and through buildings moving with it the debris it picks up along the way. The downstream portion of the stream is mostly natural channel that includes bridges, culverts, and grade controls such as utility crossings. The overall objective of the planning study is to improve flood risk management and improve the overall quality of life for the residents of Springfield, Missouri.

(1) **STUDY AUTHORITY**

The study was authorized as an interim response to the White River Basin, Arkansas and Missouri Comprehensive Study Resolution passed on 11 May 1962 by the US Senate Committee on Public Works.

> *Resolved by the Committee on Public Works of the United States Senate, that the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act, approved June 12, 1902, be and is hereby, requested to review the reports on the White River and Tributaries, Missouri and Arkansas, printed in House Document Numbered 499, Eighty-third Congress, second session, and other reports, with a view to determining the advisability of modifying the existing project at the present time, with particular reference to developing a comprehensive plan of improvement for the basin in the interest of flood-control, navigation, hydro-electric power development, water supply, and other purposes, coordinated with related land resources.*

The existing project for the White River Basin includes: Bull Shoals, Table Rock, and Beaver Lake on the White River, Clearwater Lake on the Black River, Greer's Ferry Lake on the Little Red River, and Norfork Lake on the North Fork River.

The Conference Report recommendation accompanying the Energy and Water Development Appropriations Act, 2002, Public Law 107-66, 12 November 2001, included $100,000 for a General Investigation for Watershed Restoration for Springfield, Missouri. The Section 905(b) analysis was initiated 18 March 2002 and completed on 31 October 2002. A feasibility study was recommended that indicated a Federal interest in flood risk management, ecosystem restoration, and recreation. However, it was determined that any ecosystem restoration benefits would be ancillary to the flood risk management benefits.

## (2) PURPOSE AND SCOPE

The purpose of this report is to present the findings of a feasibility investigation that was conducted to determine if there is a federal interest in providing flood risk management improvements to Springfield, Missouri. This report analyzes the problems and opportunities and expresses desired outcomes as planning objectives. Alternatives are then developed to address these objectives. These alternatives include a plan of no action and various combinations of structural and non-structural measures. The economic and environmental impacts of the alternatives are then evaluated and a feasible plan is tentatively selected. The report also presents details on U.S. Army Corps of Engineers (Corps) and sponsor participation needed to implement the plan. The report concludes with a recommendation for authorization.

## (3) LOCATION OF THE STUDY AREA

The study area is within the White River Basin, extending approximately six miles along Jordan Creek. Jordan Creek, including North Branch and South Branch Jordan Creek, at its confluence with Wilsons Creek has a 13.75 square mile drainage basin. The project area is generally centered on Chestnut Expressway between U.S. Highway 65 to the east and U.S. Highway 160 to the west in the northern half of the city of Springfield, Missouri. The study area is shown in Figure 1 - Study Location Map. Wilsons Creek is a tributary to the James River that enters the White River at Table Rock Lake.

All of the water that falls in the Jordan Creek and Fassnight basins is taken into account in the hydrologic analysis. However, according to EP 1165-2-1 Water Resources Policies and Authorities and ER 1165-2-21 Flood Damage Reduction Measures in Urban Areas, only the benefits downstream of where the discharge is greater than 800 cfs (cubic feet per second) for a 10-percent flood (one chance in ten of being equaled or exceeded in any given year) can be used to justify a project. The whole watershed is considered, but only damages downstream of the red triangles as shown on Figure 1 will be used to justify a project.

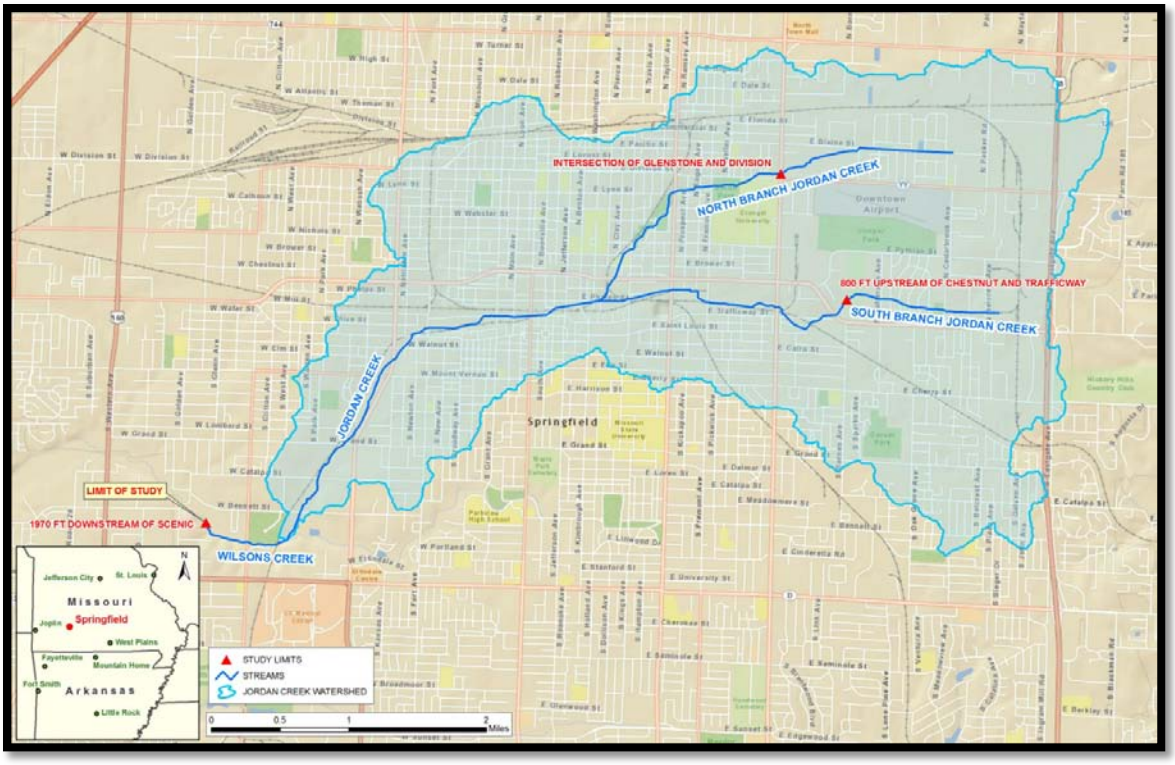


**Figure 1 - Study Location Map**

c. **Factors Affecting the Scope and Level of Review.** Quality control will be conducted through DQC, ATR, and IEPR. Questions that must be considered in determining the scope and level of review are identified in column 1 of the following table. The Project Delivery Team's (PDT) assessment of these questions in relation to this study is listed in column 2 of the table.

| Questions to Determine Scope | Jordan Creek – Springfield Feasibility Study |
|---|---|
| Will parts of the study be challenging? | Many aspects of the Jordan Creek – Springfield study will be challenging for the PDT and reviewers. The study is one of the first two Pilot Studies; therefore, the PDT and reviewers will be involved in a new process which will require a change from business as usual. Reviewers must understand the intent and goals of the Pilot Program and accept a lower level of detail, higher level of uncertainty, and abbreviated review times. |
| What are the likely study risks and the magnitude of the risks? | The greatest study risk identified by the PDT is the evolving pilot study process. This project is ahead of others in completing the process. There may be schedule delays as we determine how to proceed through the process. |

| Questions to Determine Scope | Jordan Creek – Springfield Feasibility Study |
|---|---|
| Will the study have significant threat to human life/safety assurance? | The study area includes urbanized areas and roadways subject to flooding and thus presents a threat to human life/safety. Analysis on the selected plan will need to occur to determine the significance of the threat.<br><br>Jordan Creek is an urban stream that is prone to flash flooding. The time to peak flood heights for a critical 1 hour storm is 30 minutes. This means that almost simultaneously, the water is rising in the urban areas as the rain is falling. The flooding events are quick and unpredictable; preventing the City of Springfield from constructing a flood warning system. The water stacks up along the creek and spreads throughout the flood plain rapidly. Significant costs are incurred during emergency flood fighting efforts. During large flood events, the city has to block busy thoroughfares occupying large amounts of police, fire, and street department resources. Businesses, residents, federal agencies, local and state governments, all contribute to the flood fight, rescue, and clean-up efforts. These costs average approximately $200,000 annually.<br><br>Over the last decade, Springfield has a flood that causes significant damages to its downtown and its infrastructure every few years. From the existing conditions modeling, it is estimated that the flows through downtown are between five and six feet deep with a velocity of about six feet per second. At this velocity it takes less than 14 inches of water to push a full size truck off the road.<br><br>A project in Springfield MO will likely consist of detention basins, channel modifications, and widening of bridge openings. Because of the static nature of the system, the only probable failure mode of the system is a failure of a detention pond levee. Should that happen, the water flowing through that pond would reach points further down stream faster. This will cause a slight rise in water level which may cause damage to buildings. Failure of the system in this way will not be worse than the existing conditions because the channel conveyance and bridge openings will allow more water to flow through them at any given time.<br><br>There is a very real chance that the system will encounter a rainfall event greater than for what it was designed. In that instance, there is a chance for overtopping of bridges and sustained flooding on the roadways which may be pose a life safety risk depending on the scale of the project and the scale of the rainfall event. More analysis on the selected plan will need to occur.<br><br>The District Chief of Engineering concurs that there is a life safety threat, but we do not know the significance of it until a plan is selected. |

| Questions to Determine Scope | Jordan Creek – Springfield Feasibility Study |
|---|---|
| Will the study have significant interagency interest? | The study has local, state, and Federal agency interest. |
| Will the study be highly controversial? | This project is not expected to be highly controversial. There may be some isolated issues with real estate acquisitions, but as a whole, the project is expected to be accepted. We are affecting 114 different parcels along the stream. There may be issues with access to land or the city being allowed easements. The city will be required to provide easements for the work. It is expected very few properties will be purchased outright. |
| Will the study report contain influential scientific information or be a highly influential scientific assessment? | It is not anticipated that the study will include influential scientific information. |
| Will the information in the decision document be based on novel methods, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices? | The study is one of the first two Pilot Studies; therefore, the PDT and reviewers will be involved in a new process which will require a change from business as usual. The team will be using MCDA to help determine a plan.<br>The pilot process will be especially challenging for reviewers as they will have to manage and balance an adequate level of detail and uncertainty throughout the pre-authorization planning process, eliminating unnecessary data collection and analyses while maintaining quality of analysis and outcome. |
| Will the proposed project design require redundancy, resiliency, and/or robustness? | It is anticipated that one or more of the project alternatives will require redundancy, resiliency, and/or robustness. |
| Will the proposed project have unique construction sequencing or a reduced or overlapping design construction schedule? | Yes. The project schedule has contaminated site clean up and rights- of-way acquisition during a phased construction. It will require tight coordination with the city, USACE, and Missouri Department of Natural Resources. Also, there is overlapping design and construction. |
| Will the project have significant economic, environmental, and/or social effects to the Nation? | Depending upon the final array of alternatives, the project may have significant economic effects. Environmental effects could result due to the cleanup of HTRW prior to project construction. An EA is anticipated to be done for this study. |

**d. In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsor include: project management, public involvement, coordination and outreach,

surveys, cultural resource analysis, hydraulic and hydrologic analysis. The city is doing HTRW coordination and assessment outside of the feasibility study scope.

**4. DISTRICT QUALITY CONTROL (DQC)**

DQC is the most direct of the technical reviews. It is as internal district review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). This review shall be robust to include training and coaching of the PDT, review of PDT products by senior leaders, and after action reviews. Senior district leaders overseeing planning, engineering, real estate, and project management (and other disciplines as necessary) are responsible for and expected to be directly involved in DQC. Quality checks and reviews occur during the development process and are carried out as routine management practice. All civil works planning, engineering, and Operation & Maintenance (O&M) products undergo DQC. Documentation of DQC activities should be in accordance with the Quality Manual of the Little Rock District and Southwestern Division. The DQC team members are listed in Attachement 1. At a minimum the DQC team member shall have the following expertise as listed below -

| DQC Team Members/Disciplines | Expertise Required |
|---|---|
| DQC Lead | The DQC lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting DQC. The lead should also have the necessary skills and experience to lead a virtual team through the DQC process. The DQC lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc). |
| DQC Plan Formulation | Team member will be experienced in Civil Works Planning and Policy. Team member should be experienced in Flood Risk Management Projects. |
| DQC Geotechnical Reviewer | Team member will be experienced in levee & floodwall design and bridge foundations. A licensed professional engineer is recommended. |
| DQC NEPA Biology/Envir | Team member will be experienced in NEPA/CEQA process and analysis, and have a biological or environmental background that is familiar with the project area and ecosystem restoration. |
| DQC Cultural & Tribal | Team member will be experienced in cultural resources and tribal issues, regulations, and laws. |
| DQC HTRW | Team member will have expertise in assessing HTRW to determine the nature and extent of HTRW materials within the project area. |
| DQC Hydraulics/Hydrology | Team member will be an expert in the field of urban hydrology & hydraulics, have a thorough understanding of the dynamics of the both open channel flow systems, enclosed systems, application of detention / retention basins, effects of best management practices and low impact development on hydrology, approaches that can benefit water quality, application of levees and flood walls in an urban environment with space constraints, non-structural measures especially as related to multipurpose alternatives including ecosystem restoration, non-structural solutions involving flood warning systems, and non-structural |

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|---|---|
| | alternatives related to flood proofing. The team member will have an understanding of computer modeling techniques that will be used for this project (HEC-HMS, HEC-RAS, UNET, and TABS). A certified flood plain manager is recommended but not required. |
| DQC Economics | Team member will be experienced in civil works and related flood risk reduction projects, and have a thorough understanding of HEC-FDA. |
| DQC Cost Engineering | Team member will be familiar with cost estimating for similar civil works projects using MCACES. A separate process and coordination is also required through the Walla Walla District DX for cost engineering. |
| DQC Civil Design | This discipline may require a dedicated team member, or may be satisfied by structural or geotechnical reviewer, depending on individual qualifications. Team member will have experience in utility relocations, drainage channels, roads and sidewalk, detention ponds, and application of non-structural flood damage reduction. A certified professional engineer is suggested. |
| DQC Structural Design | Team member will have a thorough understanding of levee, flood wall, and retaining wall design, box culverts, sheet piles, foundation shoring, and bridges. A certified professional engineer is recommended though not required. |
| DQC Risk Analysis | The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. |
| DQC Real Estate | Team member will be experienced in Federal civil work real estate laws, policies and guidance. Members shall have experience working with respective sponsor real estate issues. |

**a. Documentation of DQC.** A comment-response document in Microsoft Word will be used to document DQC comments, responses, and associated resolutions done throughout the review process. This documentation will be supplied to the ATR Team upon initiation of each ATR event.

**5. AGENCY TECHNICAL REVIEW (ATR)**

ATR is mandatory for all decision 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 SWD.

**a. Products to Undergo ATR.** Documentation for Decision Point (DP) #1, DP #2, and DP #3 will undergo an ATR. Per EC 1165-2-209, Paragraph 8d, for each ATR event, the ATR Team will examine relevant DQC records and provide written comments in the ATR review report as to the apparent adequacy of the DQC effort.

**b. Required ATR Team Expertise.** The ATR Team is comprised of individuals that have not been involved in the development of the decision document and will be chosen based on expertise, experience, and/or skills. The members roughly mirror the composition of the PDT. Although the team consists of 12 members, it is not anticipated that all team members will be involved in every review. The lead PCX for FRM is responsible for identifying the ATR Team members. The names, organizations, contact information, credentials, and years of experience of the ATR members are included in Attachment 1.

| 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). |
| ATR Plan Formulation | Team member will be experienced in Civil Works Planning and Policy. Team member should be experienced in Flood Risk Management Projects. |
| ATR Geotechnical Reviewer | Team member will be experienced in levee & floodwall design and bridge foundations. A licensed professional engineer is recommended. |
| ATR NEPA Biology/Envir | Team member will be experienced in NEPA/CEQA process and analysis, and have a biological or environmental background that is familiar with the project area and ecosystem restoration. |
| ATR Cultural & Tribal | Team member will be experienced in cultural resources and tribal issues, regulations, and laws. |
| ATR HTRW | Team member will have expertise in assessing HTRW to determine the nature and extent of HTRW materials within the project area. |
| ATR Hydraulics/Hydrology | Team member will be an expert in the field of urban hydrology & hydraulics, have a thorough understanding of the dynamics of the both open channel flow systems, enclosed systems, application of detention / retention basins, effects of best management practices and low impact development on hydrology, approaches that can benefit water quality, application of levees and flood walls in an urban environment with space constraints, non-structural measures especially as related to multipurpose alternatives including ecosystem restoration, non-structural solutions involving flood warning systems, and non-structural alternatives related to flood proofing. The team member will have an understanding of computer modeling techniques that will be |

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|---|---|
| | used for this project (HEC-HMS, HEC-RAS, UNET, and TABS). A certified flood plain manager is recommended but not required. |
| ATR Economics | Team member will be experienced in civil works and related flood risk reduction projects, and have a thorough understanding of HEC-FDA. |
| ATR Cost Engineering | Team member will be familiar with cost estimating for similar civil works projects using MCACES. Team member will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer. A separate process and coordination is also required through the Walla Walla District DX for cost engineering. |
| ATR Civil Design | This discipline may require a dedicated team member, or may be satisfied by structural or geotechnical reviewer, depending on individual qualifications. Team member will have experience in utility relocations, drainage channels, roads and sidewalk, detention ponds, and application of non-structural flood damage reduction. A certified professional engineer is suggested. |
| ATR Structural Design | Team member will have a thorough understanding of levee, flood wall, and retaining wall design, box culverts, sheet piles, foundation shoring, and bridges. A certified professional engineer is recommended though not required. |
| ATR Risk Analysis | The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. |
| ATR Real Estate | Team member will be experienced in Federal civil work real estate laws, policies and guidance. Members shall have experience working with respective sponsor real estate issues. |

**c. 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, for the AFB, draft report, and final report. A sample Statement of Technical Review is included in Attachment 2.

**6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)**

IEPR may be required for decision 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 1165-2-209, 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 1165-2-209.

- 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.** The Feasibility Report/EA will be subject to Type I IEPR, including Safety Assurance Review factors, and Type II IEPR during the subsequent Design and Implementation Phase if a project is recommended for construction. This decision is based on the information presented in EC 1165-2-209 and Section 3, including the presence of life safety issues and complexity of the project (including potential robustness measures). No requests to conduct IEPR have been received from a head of a Federal or state agency charged with reviewing the project. Type II IEPR is anticipated to be required. Safety Assurance will also be addressed during the Type I IEPR per Paragraph 2.c.(3) of Appendix D of EC 1165-2-209.

| C 1165-2-209 Criteria | Jordan Creek - Springfield Feasibility Study |
|---|---|
| Is there significant threat to human life? | The study area includes urbanized areas and roadways subject to flooding and thus presents a threat to human life/safety. Analysis on the selected plan will need to occur to determine the significance of the threat.<br><br>Jordan creek is an urban stream that is prone to flash flooding. The time to peak flood heights for a critical 1 hour storm is 30 minutes. This means that almost simultaneously, the water is rising in the urban areas as the rain is falling. The flooding events are quick and unpredictable; preventing the City of Springfield from constructing a flood warning system. The water stacks up along the creek and spreads throughout the flood plain rapidly. Significant costs are incurred during emergency flood fighting efforts. During large flood events, the city has to block busy thoroughfares occupying large amounts of police, fire, and street department resources. Businesses, residents, federal agencies, local and state governments, all contribute to the flood fight, rescue and clean-up efforts. These costs average approximately $200,000 annually.<br><br>Over the last decade, Springfield has a flood that causes significant damages to its downtown and its infrastructure every few years. From the existing conditions modeling, it is estimated that the flows through downtown are between five and six feet deep with a velocity of about six feet per second. At this velocity it takes less than 14 inches of water to push a full size truck off the road. |

| C 1165-2-209 Criteria | Jordan Creek - Springfield Feasibility Study |
|---|---|
| | A project in Springfield MO will likely consist of detention basins, channel modifications, and widening of bridge openings. Because of the static nature of the system, the only probable failure mode of the system is a failure of a detention pond levee. Should that happen, the water flowing through that pond would reach points further down stream faster. This will cause a slight rise in water level which may cause damage to buildings. Failure of the system in this way will not be worse than the existing conditions because the channel conveyance and bridge openings will allow more water to flow through them at any given time.<br><br>There is a very real chance that the system will encounter a rainfall event greater than for what it was designed. In that instance, there is a chance for overtopping of bridges and sustained flooding on the roadways which may be pose a life safety risk depending on the scale of the project and the scale of the rainfall event. More analysis on the selected plan will need to occur.<br><br>The District Chief of Engineering concurs that there is a life safety threat, but we do not know the significance of it until a plan is selected. |
| Is the total project cost more than $45 million? | Yes, the 905(b) analysis estimated a project cost of more than $45 million. |
| Has the Governor of Arkansas requested a Type I IEPR? | The Governor has not requested a Type I IEPR. |
| Has the head of a Federal or state agency charged with reviewing the project study requested a Type I IEPR? | No requests have been received for a Type I IEPR for this study. |
| Will there be significant public controversy as to size, nature, or effects of the project? | Public controversy is not expected. |
| Will there be significant public controversy as to the economic or environmental cost or benefit of the project? | Public controversy is not expected. |

| C 1165-2-209 Criteria | Jordan Creek - Springfield Feasibility Study |
|---|---|
| Will the study be based on information from novel methods, present complex challenges or interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices? | The study is one of the first two Pilot Studies; therefore, the PDT and reviewers will be involved in a new process which will require a change from business as usual. The team will be using Multi-Criteria Decision Analysis (MCDA) to help determine a plan.<br><br>The pilot process will be especially challenging for reviewers as they will have to manage and balance an adequate level of detail and uncertainty throughout the pre-authorization planning process, eliminating unnecessary data collection and analyses while maintaining quality of analysis and outcome. |

**b. Products to Undergo Type I IEPR.** The full IEPR panel will receive the entire draft Feasibility Report and Environmental Assessment and all technical appendices concurrent with public and agency review. The final review report to be submitted by the IEPR panel must be submitted to the PDT within 20 days of the conclusion of public review. The Little Rock District will draft a response to the IEPR final report and process it through the vertical team for discussion at DP #3. An IEPR panel member must attend the DP #3. Following the DP #3, the Corps will issue final response to the IEPR panel and notify the public.

**c. Required Type I IEPR Panel Expertise.** The IEPR Team will be selected by a qualified Outside Eligible Organization (OEO). The FRM PCX will identify an IEPR manager, who will work with the PDT to write a scope of work for the OEO that includes developing a charge to reviewers that outlines the scope and requirements of the review, identifying potential reviewers, contracting them, managing the review, and documenting the review. Due to the nature and complexity of the study, it is expected that multiple team members will be needed for certain disciplines. The team will consist of approximately 6 reviewers.

| IEPR Panel Members/Disciplines | Expertise Required |
|---|---|
| Economics | The Economics Panel Member should be experienced in civil works and related flood risk management projects. Must have a thorough understanding of HEC-FDA |
| Environmental | Team member will be experienced in NEPA/CEQA process and analysis, and have a biological or environmental background that is familiar with the project area and ecosystem restoration. |
| Civil/Structural Engineer | Team member will have experience in levee, floodwall, box culvert and drainage structure design, and utility relocations. Experience with design and construction of flood control structures in areas of karst geology is recommended. A certified professional engineer is highly recommended. |
| Hydrology and Hydraulic Engineer | Team member will be an expert in the field of urban hydrology & hydraulics, have a thorough understanding of the dynamics of the both open channel flow systems, enclosed systems, application of detention / retention basins, effects of best management practices and low impact development on hydrology, approaches that can benefit water quality, application of levees and flood walls in an urban environment with space constraints, non- |

| | |
|---|---|
| | structural measures especially as related to multipurpose alternatives including ecosystem restoration, non-structural solutions involving flood warning systems, and non-structural alternatives related to flood proofing. The team member will have an understanding of computer modeling techniques that will be used for this project (HEC-HMS, HEC-RAS, UNET, and TABS). A certified flood plain manager is recommended but not required. |

**d. Documentation of Type I IEPR.** The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-209, 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. IEPR comments should generally include the same four key parts as described for ATR comments in Section 4.d above. The OEO will prepare a final Review Report that will accompany the publication of the final decision document 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.

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.

The official USACE response to the IEPR panel recommendations will be provided to the final Review Report only. Initial responses to IEPR panel recommendations will be developed and documented by the PDT and provided to the vertical team for consideration in developing the official USACE response. DrChecks will be used to document the IEPR comments and initial District responses.

## 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.

## 8. COST ENGINEERING DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering DX, located in the Walla Walla District. The DX 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 DX will also provide the Cost Engineering DX certification. The RMO is responsible for coordination with the Cost Engineering DX.

## 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 |
|---|---|---|
| HEC-FDA Version 1.2.5 | 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 along Jordan Creek to aid in the selection of a recommended plan to manage flood risk. | Certified |
| IWR-Planning Suite (Certified). | This software assists with the formulation and comparison of alternative plans. While IWR-PLAN was initially developed to assist with environmental restoration and watershed planning studies, the program can be useful in planning studies addressing a wide variety of problems. IWR-PLAN can assist with plan formulation by combining solutions to planning problems and calculating the additive effects of each combination, or "plan." IWR-PLAN can | Certified |

| | | |
|---|---|---|
| | assist with plan comparison by conducting cost effectiveness and incremental cost analyses, identifying the plans which are the best financial investments and displaying the effects of each on a range of decision variables | |
| HEC - FIA Version 2.1 | The Hydrologic Engineering Center's Flood Impact Analysis (HEC-FIA) program provides the capability for integrated hydrologic engineering and economic analysis for evaluating flood risk impacts on a single-event level. The program will be used to calculate the population at risk (PAR) and the loss-of-life potential along Jordan Creek in Springfield, MO to aid in the selection of a recommended plan to manage flood risk. | Corperate Model in the Initial Stages of Model Review |
| Emergency Benefits Spreadsheet | Flood Damage Report for Frankfort, Kentucky, July 1981, provides procedures and the basis for estimating costs by spreadsheet for protection, evacuation and reoccupation, emergency care and preparedness, and administrative costs for Springfield. | Not Certified - will need to be reviewed per EC 1105-2-412 |

**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 |
|---|---|---|
| HEC-RAS 4.0 (River Analysis System) | 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. HEC-RAS is a next generation software replacement to HEC-2 and UNET models. . These models will be used to model a suite of water surface profiles. | HH&C CoP Preferred Model |
| MCACES or MII: | These are cost estimating models. | CoP Preferred |
| HEC-1 | This is a watershed program model that simulates the precipitation-runoff process. Precipitation runoff, channel routing. Reservoir routing, diversions, and hydrograph combinations are used to estimate hydrographs at various locations. Other capabilities include automatic parameter estimation and flood damage analysis. This model is limited to single event analysis and does not account for downstream backwater conditions. | Allowed for Use |
| Hydraflow | This model is used to calculate the rating curves for the Future Conditions basins. The model uses standard weir equations in its calculations. | Validation pending. |

**10. REVIEW SCHEDULES AND COSTS**

**a. ATR Schedule and Cost.** The PDT district shall provide labor funding by cross charge labor codes. Funding for travel, if needed, will be provided through government order. The project manager will work with the ATR Team Lead to ensure that adequate funding is available and is commensurate with the level of review needed. The current cost estimate for this review is $100,000 to $150,000. Any funding shortages will be negotiated on a case by case basis and in advance of a negative charge occurring. The team lead shall provide organization codes for each team members and a responsible financial point of contact (CEFMS responsible employee) for creation of labor codes. Reviewers shall monitor individual labor code balances and alert the ATR Team Lead to any possible funding shortages.

ATR for Decsion Point 1 – Existing and WO Project Conditions – Completed August 2011
ATR for Decision Point 2 – Formulation and Methods of Analysis – Completed July 2012
ATR of Draft Report – Review of Report – Scheduled for November 2012

**b. Type I IEPR Schedule and Cost.** The FRM-PCX will identify someone independent from the PDT to scope the IEPR and develop an Independent Government Estimate. The Little Rock District will provide funding to the IEPR panel and for PCX support for the IEPR. The next milestone review for IEPR will follow the release of the Draft report and is estimated to occur in October 2012 due to the complex and unique nature of the study the estimated cost for the IEPR is estimated to be in the range of $100,000 and $150,000.

**c. Model Certification/Approval Schedule and Cost.** Planning and engineering models to be used in this study have not all been certified. The RMO will coordinate with the Hydraulics, Hydrology and Coastal CoP to validate the use of Hydraflow in accordance with Corps of Engineers Enterprise Standard (ES)-08101 Software Validation for the Hydrology, Hydraulics and Coastal Community of Practice. A sound ATR is sufficient to validate the model.

## 11. PUBLIC PARTICIPATION

The public and agencies will have opportunities to participate in this study. The earliest opportunity will be as part of the public scoping process during the first year of the study. Public review of the draft feasibility report will occur after concurrence by HQUSACE that the document is ready for public release. As such, public comments other than those provided at any public meetings held during the planning process will not be available to the ATR team reviewing the draft Report. Public review of the draft report will be concurrent with ATR, policy compliance, and IEPR. The period will last a minimum of 30 days as required for an EA. One or more public workshops will be held during the public and agency review period. The final public meeting on the draft report is scheduled for November 2012. Comments received during the public comment period for the draft report would be provided to the IEPR team prior to completion of the final Review Report and to the ATR Team before review of the final Decision Document. The public review of necessary State or Federal permits will also take place during this period. A formal State and Agency review will occur. However, it is anticipated that intensive coordination with these agencies will have occurred concurrent with the planning process. Upon completion of the review period, comments will be consolidated in a matrix and addressed, if needed. A comment resolution meeting will take place if needed to decide upon the best resolution of comments. A summary of the comments and resolutions will be included in the document. A plan for public participation will be developed early in the study which might identify informal as well as additional formal forums for participation in the study.

## 12. REVIEW PLAN APPROVAL AND UPDATES

The Southwestern 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 decision document. 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:

- District Point of Contact: Laura Cameron, Study Manager, 501-324-5037
- Southwestern Division: Saji Varghese, 469-487-7069
- FRM-PCX Point of Contact: Eric Thaut, Program Manager, 415-503-6852 or Eric.W.Thaut@usace.army.mil

**ATTACHMENT 1: TEAM ROSTERS**

## ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECSION 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 1165-2-209. 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 DrChecks[sm].

*SIGNATURE* _____ Date _____
*Name*
ATR Team Leader
*Office Symbol/Company*

*SIGNATURE* _____ Date _____
*Name*
Project Manager
*Office Symbol*

*SIGNATURE* _____ Date _____
*Name*
Architect Engineer Project Manager[1]
*Company, location*

*SIGNATURE* _____ Date _____
*Name*
Review Management Office Representative
*Office Symbol*

### CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: *Describe the major technical concerns and their resolution.*

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

*SIGNATURE* _____ Date _____
*Name*
Chief, Engineering Division
*Office Symbol*

*SIGNATURE* _____ Date _____
*Name*
Chief, Planning Division
*Office Symbol*

[1] Only needed if some portion of the ATR was contracted

**ATTACHMENT 3: REVIEW PLAN REVISIONS**

| Revision Date | Description of Change | Page / Paragraph Number |
|---|---|---|
| 23 March 2010 | Original Review Plan | |
| | | |
| | | |
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**ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS**

| Term | Definition | Term | Definition |
|---|---|---|---|
| AFB | Alternative Formulation Briefing | NED | National Economic Development |
| ASA(CW) | Assistant Secretary of the Army for Civil Works | NER | National Ecosystem Restoration |
| ATR | Agency Technical Review | NEPA | National Environmental Policy Act |
| CSDR | Coastal Storm Damage Reduction | O&M | Operation and maintenance |
| DPR | Detailed Project Report | OMB | Office and Management and Budget |
| DQC | District Quality Control/Quality Assurance | OMRR&R | Operation, Maintenance, Repair, Replacement and Rehabilitation |
| DX | Directory of Expertise | OEO | Outside Eligible Organization |
| EA | Environmental Assessment | OSE | Other Social Effects |
| EC | Engineer Circular | PCX | Planning Center of Expertise |
| EIS | Environmental Impact Statement | PDT | Project Delivery Team |
| EO | Executive Order | PAC | Post Authorization Change |
| ER | Ecosystem Restoration | PMP | Project Management Plan |
| FDR | Flood Damage Reduction | PL | Public Law |
| FEMA | Federal Emergency Management Agency | QMP | Quality Management Plan |
| FRM | Flood Risk Management | QA | Quality Assurance |
| FSM | Feasibility Scoping Meeting | QC | Quality Control |
| GRR | General Reevaluation Report | RED | Regional Economic Development |
| Home District/MSC | The District or MSC responsible for the preparation of the decision document | RMC | Risk Management Center |
| HQUSACE | Headquarters, U.S. Army Corps of Engineers | RMO | Review Management Organization |
| IEPR | Independent External Peer Review | RTS | Regional Technical Specialist |
| ITR | Independent Technical Review | SAR | Safety Assurance Review |
| LRR | Limited Reevaluation Report | USACE | U.S. Army Corps of Engineers |
| MSC | Major Subordinate Command | WRDA | Water Resources Development Act |
| MCDA | Multi-criterea decision analysis | | |