



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

REPLY TO  
ATTENTION OF

CESWD-PDP

12 DEC 2012

MEMORANDUM FOR Commander, Fort Worth District

SUBJECT: Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, TX (PWI #013501) - Review Plan Approval

1. References:

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

b. Memorandum, CESPDP-PDP, 29 November 2012, subject: Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, TX Review Plan (encl).

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 recommended for approval by the Flood Risk Management Planning Center of Expertise (FRM-PCX) (Encl). 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 be removed.

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

Encl  
as

Handwritten signature of Thomas W. Kula in black ink.

THOMAS W. KULA  
Brigadier General, USA  
Commanding

# **REVIEW PLAN**

## **Leon Creek Watershed Feasibility Study San Antonio, Bexar County, Texas Feasibility Report**

**Fort Worth District**

Program Code - 013501

**03 December, 2012**

**MSC Approval Date: 12 December 2012**  
Last Revision Date: N/A



**US Army Corps  
of Engineers®**

**REVIEW PLAN**

**Leon Creek Watershed Feasibility Study  
San Antonio, Bexar County, Texas  
Feasibility Report**

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## 1. PURPOSE AND REQUIREMENTS

**a. Purpose.** This Review Plan defines the scope and level of peer review for the review for the Leon Creek Watershed Feasibility Study, San Antonio, Bexar County, TX.

### 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) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
- (4) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
- (5) FCSA Supplemental Agreement, 28 Sep 2005
- (6) Project Management Plan for Leon Creek Watershed Study, 12 Aug 2004
- (7) MSC and/or District Quality Management Plan(s)

**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 for Flood Risk Management (RM) PCX at South Pacific Division in San Francisco, CA. Prior to the approval of the decision document, this review plan will be updated to address peer review of implementation products. Because Type II IEPR is anticipated, the RMC will serve as RMO for implementation. The FRM-PCX will coordinate closely with the RMC to ensure that review teams with appropriate expertise are assembled.

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.

### 3. STUDY INFORMATION

- a. Decision Document.** A Feasibility report is to be prepared for Leon Creek Watershed in Bexar County, TX, as authorized by a resolution by the committee on Transportation and Infrastructure, United States House of Representatives, House Resolution docket 2547 dated March 11, 1998, which reads as follows:

*Guadalupe and San Antonio Rivers, Texas*

*Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, the Secretary of the Army is requested to review the report of the Chief of Engineers on the Guadalupe and San Antonio Rivers, Texas, published as House Document 344, 83<sup>rd</sup> Congress, 2<sup>nd</sup> Session, and other pertinent reports, with a view to determining whether any modifications to the recommendations contained therein area advisable at the present time, with particular reference to providing improvements in the interest of flood control, environmental restoration and protection, water quality, water supply, and allied purposes on the Guadalupe and San Antonio Rivers in Texas*

If this Feasibility report is approved by the Chief of Engineers, implementation of the recommended plan will require Congressional authorization. National Environmental Policy Act (NEPA) documentation will be an Environmental Assessment that will integrated into the Main Report.

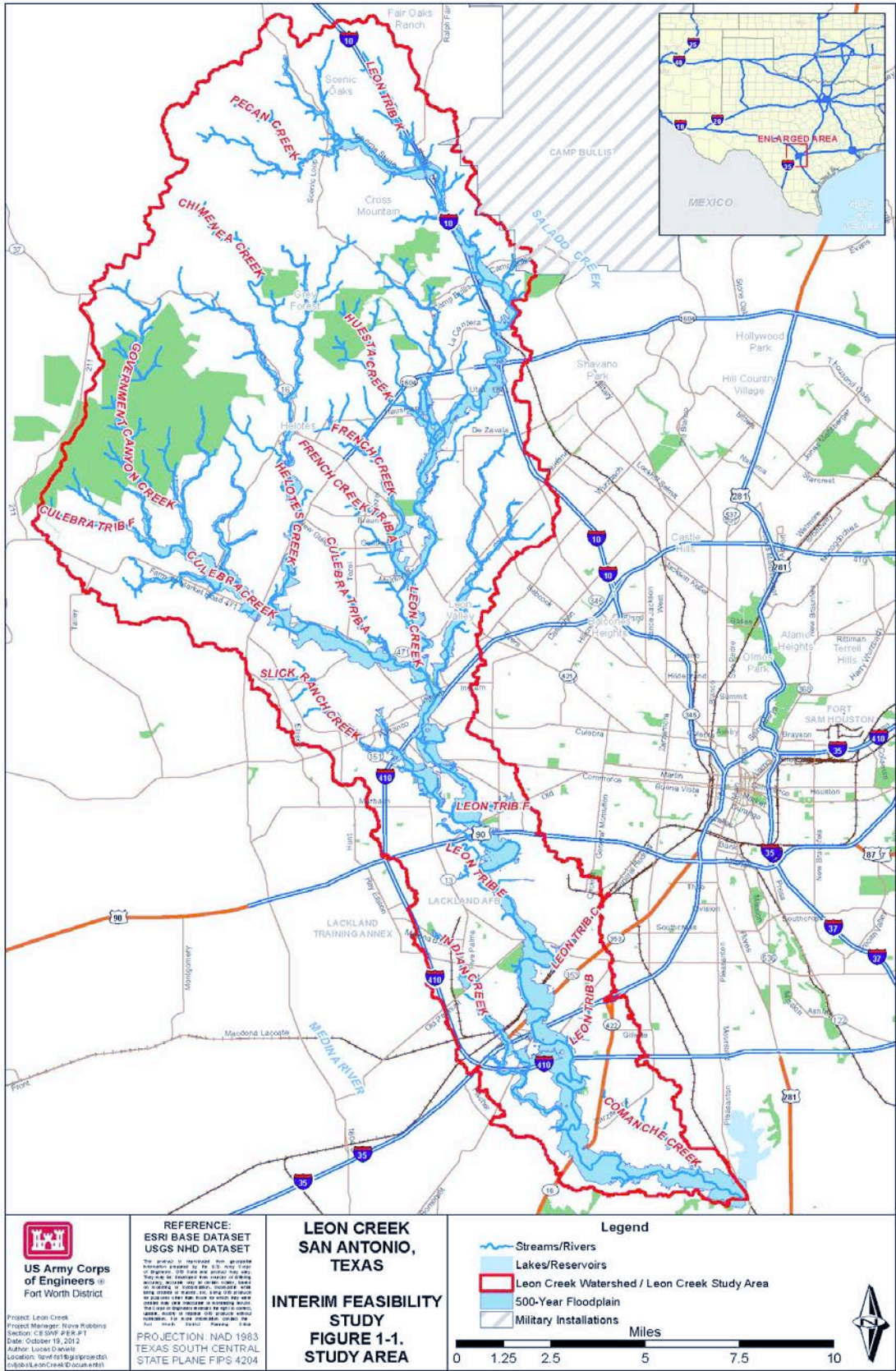
- b. Project Sponsor.** The non-Federal sponsor for the project is the San Antonio River Authority.
- c. Study/Project Description.** Leon Creek originates seven miles northeast of Leon Springs in northwestern Bexar County and runs southeast for 57 miles through Leon Valley and the western portion of San Antonio to its mouth on the Medina River, just west of Cassin. The study area encompasses the entire watershed, as shown in Figure 1-1. The total drainage area of this watershed is approximately 152,320 acres (238 square miles).The Leon Creek Watershed Feasibility Study will be a typical U.S. Army Corps of Engineers feasibility study and will investigate FRM structural measures such as upstream detention, and FRM nonstructural measures such as evacuation of the floodplain. Ecosystem restoration measures will include riparian corridor expansion, aquifer recharge, wetlands and other measures that could be applicable. Multipurpose measures will also be explored to fully utilize project lands if features are compatible.

There are over 6,000 structures located within the 500-year floodplain. Many of these structures are located between the 25-year and 500-year floodplains and are therefore not at risk during low frequency events. Most of the risk associated with flooding is due to damage of the structure. However, flooding does come from area of steep topography and rainfall comes in a short duration, so even at a 25-year event there is not a whole lot of warning time. There have been losses of life in the Leon Creek watershed due to flooding. Most if not all of these have been from people attempting to cross low water crossings in their vehicles and not as a result of flood inundation in their homes.

Due to the fact that the flood damages occur above the 25-year floodplain, detention has been identified as a very practicable alternative. There are several existing quarries in the area that may be converted to off channel detention. The estimated total project costs are \$27.4 million. The current cost estimate for the detention sites is around \$10 million each.

During the feasibility study, additional project risk will be analyzed in detail and disclosed in the Draft and Final Feasibility Reports. However, generalized project risk can be discussed in terms of proposed alternatives that may be evaluated. There are inherent project risks with all project alternatives as it relates to property and population. The alternative with the least amount of project

risk for future damages would be evacuation of the floodplain. This is because if a structure is removed, it can no longer be damaged. With a structural detention alternative, there is an inherent project risk. The structural project in the form of a detention would provide a reduction in flood damages from floods of all magnitudes. In addition, there is a risk of project failure from geotechnical issues, lack of operations and maintenance, etc. This risk cannot be determined until detailed analyses have occurred to determine the associated risk.



There will be district quality control (DQC), Agency Technical Review (ATR) and Independent External Peer Review (IEPR) for this project. Review of submittal packages and feasibility report materials will be required prior to the following major milestones:

- Feasibility Scoping Meeting (FSM)
- Alternative Formulation Briefing (AFB)
- Draft Feasibility Report
- Final Feasibility Report

The timing and scope of these reviews is discussed in the following sections of this PRP.

- d. Factors Affecting the Scope and Level of Review.** The primary review issues for the Leon Creek Feasibility study is the potential for life safety issues related to FRM and the significant environmental impacts. SWF is assuming that an IEPR will be required.

Consistent with EC 1165-2-209, the Chief of Engineering and Construction, would concur with the assessment that there is potential life safety issues at this stage in plan formulation. During plan formulation, the study analyses will determine if the project requires redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design construction schedule to address life safety issues.

- In October 1998 as much as 30 inches of rain occurred in the area in a two day period. The 1998 flood is believed to be the worst flood event experienced. Thirty-two lives were lost, and property damage was estimated to be \$500 million in the region.
- Flash flooding, ongoing development in the Leon Creek watershed and, subsequently, an increase in impervious cover have increased the risk of flood damage.
- Short warning times and high velocity flood flows present significant risk to human safety during flood events.
- Life safety is not a justification for this project but a residual risk to life safety will generally always exist with flood-risk management projects. NED is the justification for the project utilizing a combination between of both structural and non-structural measures. The tentatively selected plan calls for, in one area of interest, a levee that contains the 1% annual exceedance probability event that includes a channel modification for hydraulic mitigation; a detention pond using an existing quarry site with a capacity of 5,000 acre-feet; and a non-structural consisting of 36 structures in the 4% AEP event. Failure of either of these structural components would result, in the case of the levee, primarily commercial damages similar to what is being experienced now, and in the case of the quarry little risk to human life is expected. The primary concern with this feature is the rate to de-water to allow sufficient capacity for the next potential event. These rates are expected to be at rates that will not produce erosive flows to the channel or banks. The non-structural component will have a positive impact on life safety since residential structures are being taken out of the floodplain. No other significant safety issues are expected in relation to the tentatively selected plan.

Other criteria for consideration for IEPR outlined in EC 1165-2-209:

- Several challenges have impacted study efforts. Threatened and endangered species are known to exist in several locations in the study area. Additionally, a jet-engine test cell facility exists in the study area that has potentially posed unique formulation challenges. Also, any proposed alternative would also need to conform the sponsor's requirement that any proposed project must



maintain “zero rise” in the 100-year water surface elevation. Opportunities also exist in the study area such as already-present amenities that can be converted into flood risk management measures saving costs for any proposed alternatives.

- Preliminary analysis has suggested that some of the most effective flood-risk management alternatives were not be pursued due to the presence of threatened and endangered species. This has limited the options for effective flood risk management alternatives.
- There has been no request by the Governor of the State of Texas or by a head of a Federal Agency for peer review by independent experts.
- This study does not contain influential scientific information or assessment, nor does it have significant economic, environmental or social affects to the nation.
- Interagency interest is limited to the coordination required by federal law.
- Currently, there is not a recommended project for this study however the total project cost is estimated to under \$45 million (\$30-40 million).
- Close coordination with the sponsor and public meetings are expected to negate significant public dispute with regard to a recommended plan as are coordination with USFWS and USGS and cultural/archeological interests.
- Methods and models used in this study are typical of all Corps flood risk management studies with little room for interpretation and are not expected to change prevailing practices on this or future flood risk management studies.
- IEPR Type I will occur after a draft report is prepared, but before the Civil Works Review Board and State and Agency Review of the Final Feasibility Report.

- e. **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: The sponsor provided topographic surveys/bathymetry and HSPF processor development relevant to the study for an in kind credit of \$594,300.00. These products will be reviewed by the PDT and the district’s survey and imagery expert as required by the SWD Quality Assurance Plan and Corps policy and guidance.

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

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. 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.

- a. **Documentation of DQC.** The DQC will be conducted on the Main Report/Appendices/NEPA documentation and may be done in DrChecks by a Supervisor or delegated reviewer. Once DQC is complete the PDT member and Supervisor/delegated reviewer will sign a certification form, and submit the final product to the Project Manager and Planning Lead. The signed certification form will be included in the pre-conference submittals and will include the DrChecks report, a brief summary of the pertinent points in any discussion, including any vertical coordination, and lastly the agreed upon resolution. The ATR team will be provided with DQC certification and, if requested, comments and subsequent responses.
- b. **Products to Undergo DQC.** The PDT is responsible for a complete reading of the report to assure the overall integrity of the report, appropriate technical appendices and the recommendations before

approval by the District Commander. The Major Subordinate Command (MSC)/District quality management plans address the conduct and documentation of this fundamental level of review. DQC will be completed on the following documentation:

- FSM Documentation
- AFB Documentation
- Draft Feasibility Report
- Final Feasibility Report

c. **Required DQC Expertise.** The expertise and disciplines represented on the DQC team reflect the appropriate disciplines involved in the planning effort. Not all disciplines will be needed for each DQC effort. Technical team leaders and supervisors are ideal participants. The following lists the functional areas typical to a flood risk management project:

DCQ 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. In this case the DQC lead will likely be the SWF Chief of Planning, Environmental and Regulatory.
Planning	The Planning reviewer should be a senior water resources planner with experience in the development of Feasibility documents and expertise in FRM planning.
Economics	The economics reviewer should have experience/credentials in FRM in Texas economies. The reviewer should also be experienced in economic analysis in combined NER/NED evaluations.
Environmental Resources	The environmental reviewer should have environmental regulatory expertise in NEPA. In addition, the environmental expert should be familiar with processes due to implementation of FRM structures. Reviewer must also be experience in Habitat Equivalency Protocol (HEP) site specific ecosystem restoration model to be used to determine requirements (if any) for compensatory mitigation and to evaluate benefits from proposed ecosystem restoration measures.
Hydrology and Hydraulic Engineering	The hydrology and hydraulics engineering reviewer will be an expert in the field of hydraulics and have experience with flash-flood systems in urbanized watersheds. The reviewer should be familiar with application of detention/retention basins, levees and diversion channels, non-structural solutions involving

	flood warning systems and flood proofing, etc and/or computer modeling techniques that will be used such as HEC-RAS, or Hydraulics and HEC-HMS.
Geotechnical Engineering	The geotechnical engineering reviewer should have an extensive experience in geotechnical evaluation of FRM structures such as static and dynamic slope stability evaluation, evaluation of the seepage through the foundation of the FRM structures, including detention structures, levees, and in settlement evaluation of the structures.
Civil/Structural Engineering	The civil/structural engineering reviewer should have an extensive experience in FRM structures, including detention structures, levees, and in settlement evaluation of the structures.
Cost Engineering	Reviewer must be experienced in design requirements for standard flood risk management measures.
Real Estate	Reviewer must be experienced in civil work real estate laws, policies and guidance and experience working with sponsor real estate issues.

## 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 the home MSC.

- a. **Products to Undergo ATR.** ATR will occur prior to major decision points in the planning process so that the technical results can be relied upon in setting the course for further study. An in-depth review of the report and all appendices will be coordinated and documented by the PDT leader prior to HQUSACE policy compliance review. As mentioned throughout the PMP, all ATR will be coordinated with the Planning Center of Expertise for Flood Risk Management (PCX). The ATR will be accomplished by an independent entity outside the Fort Worth District, within USACE, as designated by the PCX. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices of all project decision documents. The intent is for an ATR to not only ensure technical analyses are correct, but also ensure compliance with all pertinent USACE guidance in or to high quality products early in the study prior to HQUSACE review. ATR will be completed on the following documentation:

- **FSM Documentation**
- **AFB Documentation**
- **Draft Feasibility Report**
- **Final Feasibility Report**

Additional Issue Resolution Conferences (IRCs) may be required throughout the study when significant policy issues arise. If these require documentation for major decision making, then additional ATR of this documentation may be required; however, no IRCs are expected at this time. This quality control will occur prior to the decision event so that a firm technical basis for making decisions will be established. As a result, the decision event is free to address critical outstanding issues and set the direction for the next step of the study.

**b. Required ATR Team Expertise.** The expertise and disciplines represented on the ATR team reflect the significant disciplines involved in the planning effort. Not all disciplines will be needed for every ATR. The ATR for the AFB for example will only require those disciplines that impact formulation of a potential project, namely Economics, Environmental, H&H, Plan Formulation, and Cost. ATRs for subsequent study milestones may need broader review teams. ATR teams may consist of as many as 10 team members outside of the Fort Worth District in the following functional areas:

<b>ATR Team Members/Disciplines</b>	<b>Expertise Required</b>
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 plan formulation subject matter expert, have extensive experience in the USACE planning process, and be knowledgeable of USACE policies and guidelines. He or she should be familiar with flood risk management projects, water resources, and watershed planning and have experience relevant to both structural and non-structural plan formulation.
Economics	The Economics reviewer will have extensive experience in flood risk management projects and a thorough understanding of HEC-FDA.
Environmental Resources	The Environmental Resources reviewer will be familiar with similar studies and projects.
Cultural Resources	The Cultural Resources reviewer will be familiar with similar studies and projects.
Hydrology and Hydraulic Engineering	Hydrology and Hydraulic Engineering reviewer will be an expert in the field of urban hydrology and hydraulics, have a thorough understanding of open channel systems, the effects of management practices and low impact development on hydrology, the use of levees and floodwalls within the space constraints of an urban environment, the use of non-structural systems as they apply to flood proofing, warning systems, and evacuation, and the use of HEC computer modeling systems.

Geotechnical Engineering	Geotechnical Engineering reviewer will have extensive experience in levee and floodwall design, pre- and post-construction evaluation, and rehabilitation. A certified professional engineer is strongly recommended.
Civil Engineering	Civil Engineering reviewer will have experience with utility relocations, positive closure requirements, interior drainage requirements, and application of non-structural flood risk management measures. A certified professional engineer is suggested.
Structural Engineering	Structural Engineering reviewer will have a thorough understanding of both structural and non-structural measures to include, but not be limited to, retaining walls, gate structures, bridges and culverts, utility penetrations, and stoplog and sandbag gaps. A certified professional engineer is suggested.
Cost Engineering	Cost Engineering reviewer will be familiar with cost estimating for similar projects in MCACES. Review includes construction schedules and contingencies for any document requiring Congressional authorization. The team member will be a Certified Cost Technician, a Certified Cost Consultant, or a Certified Cost Engineer. As the Cost Engineering Center of Expertise, Walla Walla District will assign this team member as part of a separate effort coordinated by the ATR or IEPR team lead in conjunction with the geographic district's project manager.
Real Estate	Real Estate reviewer will be familiar with similar studies and projects, and must be selected from the approved list of RE ATR members.
Hazardous, Toxic and Radioactive Waste (HTRW)	HTRW reviewer will be familiar with similar studies and projects.
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.

**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 been 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.** This study does not have significant economic, environmental or social affects to the nation. Interagency interest is limited to the coordination required by federal law, and mild interest in the potential for NRCS detention projects. Since there are no significant threats to human life and no other significant safety issues have been presented in relation to this study or are expected in relation to any recommended project. Currently, there is no recommended project for this study. Costs for the tentatively selected plan is currently estimated at \$27.4 million. An Environmental Assessment will be the required NEPA documentation. Close coordination with the sponsor and public meetings are expected to negate significant public dispute with regard to a recommended plan as are coordination with USFWS and EPA and cultural/archeological interests. Methods and models used in this study are typical of all Corps flood risk management studies with little room for interpretation and are not expected to change prevailing practices on this or future flood risk management studies. The project will have design features that will warrant a Type I IEPR. A Type II IEPR may be required during implementation as well since the project is tentatively recommending two significant structural measures in its recommended plan. Although the consequences of due to a potential failure are relatively low, there could be impacts to loss-of-life. Therefore, a Type II Safety Assurance Review is appropriate. In addition, safety assurance will be addressed during the Type I IEPR.
- b. **Products to Undergo Type I IEPR.** An in-depth review of the report and all appendices will be coordinated and documented by the PDT leader prior to HQUSACE policy compliance review. As mentioned throughout the PMP, an IEPR will be coordinated with the Planning Center of Expertise for Flood Damage Reduction (PCX). The IEPR will be accomplished by an independent entity outside USACE (an Outside Eligible Organization). The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices of all project decision documents. IEPR will be completed on the following documentation:
- Draft Feasibility Report
- c. **Required Type I IEPR Panel Expertise.** The expertise and disciplines represented on the IEPR team reflect the significant disciplines involved in the planning effort. The PDT will make the initial assessment of what expertise is needed based on the PMP and the factors affecting the scope and level of review outlined in Section 3 of the review plan and may suggest candidates. The Outside Eligible Organization (OEO) will determine the final participants on the panel. The IEPR team will consist of the following functional areas:

IEPR Panel Members/Disciplines	Expertise Required
Economics	The Economics Panel Member should have extensive experience in large scale flood risk management projects and a thorough understanding of HEC-FDA
Environmental	The Environmental Panel Member should be familiar with the habitat, fish and wildlife that may be affected by the project alternatives.
Hydrology and Hydraulic Engineering	The Hydrology and Hydraulics Engineering reviewer should be an expert in the field of urban hydrology and hydraulics, have a thorough understanding of open channel systems, the effects of management practices and low impact development on hydrology, the design of earthen dams and detention ponds, the use of non-structural systems as they apply to flood proofing, warning systems, and evacuation, and the use of HEC computer modeling systems
Plan Formulation	The Planning reviewer should be a plan formulation subject matter expert, have extensive experience in the USACE planning process, and be knowledgeable of USACE policies and guidelines. He or she should be familiar with flood risk management projects, water resources, and watershed planning and have experience relevant to both structural and non-structural plan formulation.

**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.

## 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).

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

<b>Model Name and Version</b>	<b>Brief Description of the Model and How It Will Be Applied in the Study</b>	<b>Certification / Approval Status</b>
HEC-FDA 1.2.4 (Flood Damage Analysis)	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 the Wild River near River City to aid in the selection of a recommended plan to manage flood risk.	Certified
(HEP) (USFWS, 1980)	The United States Fish and Wildlife Service Habitat Evaluation Procedure (HEP) (USFWS, 1980) was used to evaluate habitat conditions that would result from alternative plans. A habitat	Certified

	<p>suitability index (HSI) for indicator species is derived by aggregating suitability indices (SIs) critical for habitat variables. These SIs are based on field measurements for existing conditions and on professional judgment for future conditions under alternative plans. The index ranges from 0.0 to 1.0, with 1.0 representing the highest habitat quality possible. A habitat unit (HU) is the product of the HSI multiplied by an area (acre) of available habitat. HSIs and HUs were developed for different times during the period of analysis (at year 1, 15, 25, and 50), and HUs are annualized to estimate an average annual habitat unit (AAHU).</p> <p>In this system, future habitat conditions can be estimated for both baseline (without project) and design (with project) conditions. Projected long-term effects of the project can be predicted using Average Annual Habitat Unit (AAHU) values. Based on the AAHU outcomes, alternative designs can be formulated and trade-off analyses can be simulated to promote environmental optimization. AAHUs are determined by multiplying the HSI by the number of acres in the study area, and therefore, HEP provides information for two general types of wildlife habitat comparisons. The first is the relative value of different areas at the same point in time. The second is the relative value of the same area at future points. Therefore, the impact of land and water use changes on wildlife habitat can be estimated.</p> <p>The USFWS, with assistance from the Texas Parks and Wildlife Department (TPWD) and the USACE Fort Worth District, completed the HEP for the without-project (existing and future) condition of riparian natural resources. Because the resource agencies are most concerned in the restoration of lost aquatic and riparian habitat functions, the focus was to use models that contain variables that measure important components of riparian corridor structure. The team decided it was appropriate to measure the existing habitat value of the current vegetation state, even though the restoration measures were for converting or restoring existing vegetation to riparian woodlands. The following species, indicative of healthy ecosystems within the Leon Creek Watershed, were used for the habitat evaluations.</p> <ul style="list-style-type: none"><li>• Riparian Woodlands: raccoon, barred owl, fox squirrel, green heron</li><li>• Grasslands: red-tailed hawk, meadowlark, scissor-tailed flycatcher, eastern cottontail</li></ul> <p>While these species are relatively common, their HSI models, when averaged cumulatively, serve as good indicators of a healthy, functioning ecosystem and therefore provide a good basis for comparing outputs from alternatives plans. However, they should not be used to judge the importance or significance of these habitats as discussed in the Introduction. This model was initially envisioned to be used to evaluate ecosystem</p>	
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	restoration opportunities but will now be used to evaluate mitigation requirements for the tentatively selected plan.	
EPA Habitat Assessment Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers	<p>The EPA Habitat Assessment is described in depth in Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrate, and Fish, Second Edition (Manuel Barbour 1999). <a href="http://www.epa.gov/owow/monitoring/rbp/index.html">http://www.epa.gov/owow/monitoring/rbp/index.html</a>. There are several protocols that can be used to complete an in-depth analysis, but only the Habitat Assessment Field Data Sheet was completed for this habitat analysis. There are forms for high or low gradient stream, with a few minor measurement differences. The analysis measures ten parameters including the epifaunal substrate/available cover, embeddedness or pool substrate characterization (depending on whether it is a high or low gradient stream), velocity/depth combinations or pool variability, channel flow status, channel alteration, frequency of riffles or channel sinuosity, bank stability, bank vegetation protection, and riparian zone width. Each parameter is given a score from 1-20 for a total score of 200 possible points. Each survey point has a score from 0 to 200; these scores are then averaged to compose a segment value for the existing condition. For the projection of Future without-Project condition, the team predicted expected changes for years 1, 15, 25, and 50 and completed additional field data sheets to document those expected changes. This will also be done after project features are developed for the future with-project projections. Using the Ultimate Land Use data provided by the sponsor, our projections held true, in that the remaining segments will experience a similar degradation pattern as Leon Creek. Each segments score was then normalized to produce a Rapid Bioassessment Protocol Index (RBPI), which is similar to the Habitat Stability Index (HSI) using HEP, where scores range from 0.0 to 1.0, with 1.0 representing the highest habitat quality possible. The RBPI was then multiplied by acres of stream to obtain aquatic RBPU's. The remaining runs of the model were accomplished similar to HEP with culmination of Average Annual Rapid Bioassessment Protocol Units (AARBPU). This model also was initially envisioned to be used to evaluate ecosystem restoration opportunities but may be used to evaluate mitigation requirements for the tentatively selected plan.</p>	<i>Not Certified</i>

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

<b>Model Name and Version</b>	<b>Brief Description of the Model and How It Will Be Applied in the Study</b>	<b>Approval Status</b>
HEC-RAS 4.0 (River Analysis System)	The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to perform one-	Preferred Model

	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 along Leon Creek and its tributaries.	
HEC-HMS 2.2.2	The Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) simulates precipitation-runoff processes. Version 2.2.2 was chosen over the newer version, 3.3, for its efficiency and reliability in modeling the terrain present in Bexar County, which requires the development of routing data for approximately 190 reaches to address cross flow areas between Leon Creek. Some testing was done with the alpha and beta models of HEC-HMS 3.4 as HEC	Preferred Model

## 10. REVIEW SCHEDULES AND COSTS

**a. ATR Schedule and Cost.** ATR will be completed prior to submission of documentation to the vertical team for a decision. ATR cost for the FSM is expected to be \$30,000. Additional ATR costs for the AFB and draft feasibility report are currently estimated to be \$40,000. An ATR for the final feasibility report may not be necessary but costs are expected to be somewhat less than the estimate for the draft report. These costs are cost-shared with the study's non-federal sponsors. ATR will be completed on the following documentation:

- FSM Documentation, August 2009
- AFB Documentation, October 2012
- Draft Feasibility Report, anticipated May 2013
- Final Feasibility Report, anticipated April 2014

**b. Type I IEPR Schedule and Cost.** IEPR will be completed prior to submission of documentation to the vertical team for a decision. IEPR cost for the Draft Report is expected to be \$150,000. It is anticipated the IEPR on the Draft Feasibility Report will be initiated in June 2013, following completion of ATR. Coordination, prior to completion of the Draft report, with the OEO will aide in solidifying a cost and schedule.

**c. Model Certification/Approval Schedule and Cost.**

- 1) Engineering (HEC) models are not certifiable by planning.
- 2) Environmental Protection Agency's (EPA) Habitat Assessment Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers has a package under development to initiate the certification effort. At this time schedule and cost are not known. The Fort Worth District is currently trying to ascertain what coordination with the Ecosystem Restoration (ER) PCX has been initiated. Since this model is used by other districts, there was to be a coordinated certification effort among the districts using this model. This model was developed by EPA in 1999 and has been used multiple studies completed by multiple districts in subsequent years. It is not expected to have certification complete prior to issuing the final feasibility report for this study. Coordination with U.S. Fish and Wildlife Service on several independent studies currently underway with similar aquatic habitat conditions has led the district to pursue authorization for use as part of the ATR process for each independent study.

## 11. PUBLIC PARTICIPATION

The public will be able to comment on the feasibility study during the decision making process. Several public meetings will be held throughout the study. A public workshop will be held during the development of alternatives, which will be held after the FSM and prior to the AFB. In addition, after a tentatively selected plan is determined, a public meeting will be held to solicit public comment on the plan. Finally, a public meeting is normally held during the public review process of the draft feasibility report.

The public will have an opportunity to review and provide comments on the draft feasibility report and environmental assessment for 30 days. The environmental assessment will most likely begin after plan formulation is complete and prior to the AFB. In addition, the public can provide comments at anytime during the feasibility study process to the study's project manager at the following address:

U.S. Army Corps of Engineers, Fort Worth District  
ATTN: Leon Creek Project Manager, CESWF-PM-C  
P.O. Box 17300  
Fort Worth, TX, 76102-0300

Comments and responses are documented by the date the comment was received, and provided as an attachment which follows the document from the first ATR in August-September 2009 through Washington D.C. level review of the final feasibility report. This includes comments from all ATRs and comments received from the public throughout the study process.

All published reports can be found at the Fort Worth District's website ([www.swf.usace.army.mil](http://www.swf.usace.army.mil)) as well as directions for obtaining any information that may be disclosed under the Freedom of Information Act (Public Law 89-554, 80 Stat. 383; amended 1996, 2002, 2007).

## **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:

- U.S. Army Corps of Engineers, Fort Worth District  
ATTN: Leon Creek Project Manager, CESWF-PM-C  
P.O. Box 17300  
Fort Worth, TX. 76102  
817-886-1858
- U.S. Army Corps of Engineers, Southwestern Division  
ATTN: Chief of Planning & Policy Division, CESWD-PDS-P

1100 Commerce St.  
Dallas, TX. 75242  
469-487-7069

- U.S. Army Corps of Engineers, South Pacific Division  
ATTN: FRM-PCX Program Manager, CESPDPDS-P  
1455 Market St.  
San Francisco, CA 94103  
415-503-6852

**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 1165-2-209. 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<sup>sm</sup>.

*SIGNATURE*

Name  
ATR Team Leader  
Office Symbol/Company

\_\_\_\_\_  
Date

*SIGNATURE*

Name  
Project Manager  
Office Symbol

\_\_\_\_\_  
Date

*SIGNATURE*

Name  
Architect Engineer Project Manager<sup>1</sup>  
Company, location

\_\_\_\_\_  
Date

*SIGNATURE*

Name  
Review Management Office Representative  
Office Symbol

\_\_\_\_\_  
Date

**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*

Name  
Chief, Engineering Division  
Office Symbol

\_\_\_\_\_  
Date

*SIGNATURE*

Name  
Chief, Planning Division  
Office Symbol

\_\_\_\_\_  
Date

<sup>1</sup> Only needed if some portion of the ATR was contracted

**ATTACHMENT 3: REVIEW PLAN REVISIONS**

<b>Revision Date</b>	<b>Description of Change</b>	<b>Page / Paragraph Number</b>
October 2012	Implemented latest RP template.	All
November 2012	Additional discussion on life safety	p. 7
November 2012	Additional discussion on project challenges	p. 7
November 2012	Revised discussion on model certification	p. 19
November 2012	Minor revisions	All



**ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS**

<b><u>Term</u></b>	<b><u>Definition</u></b>	<b><u>Term</u></b>	<b><u>Definition</u></b>
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/MSD	The District or MSD 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