



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

REPLY TO
ATTENTION OF

CESWD-PDP

07 DEC 2012

MEMORANDUM FOR Commander, Forth Worth District

SUBJECT: Brazos River & Tributaries, Elm Creek, Abilene Texas, Interim Feasibility Report 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, CESPDP-PDP, 21 November 2012, subject: Brazos River & Tributaries, Elm Creek Abilene Texas, Interim Feasibility Report Review Plan (Encl 1). FRM-PCX Review Plan Comments and Responses (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).

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. Ken Conley, CESWD-PDP, at 469-487-7104.

2 Encls
as

Handwritten signature of Thomas W. Kula in black ink.

THOMAS W. KULA
Brigadier General, USA
Commanding

REVIEW PLAN

**Brazos River & Tributaries, Elm Creek, Abilene Texas
Interim Feasibility Report**

Fort Worth District

P2#100008

MSC Approval Date: 2 November, 2009

Last Revision Date: 21 November, 2012



**US Army Corps
of Engineers®**

REVIEW PLAN

**Brazos River & Tributaries, Elm Creek, Abilene, TX
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 Brazos River & Tributaries, Elm Creek, Abilene, Texas Interim Feasibility Report and Integrated Environmental Assessment.

b. References

- (1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010, Change #1
- (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) Project Management Plan for the Brazos River Basin, Elm Creek, Abilene, Texas Feasibility Study, last modified 1 November, 2009
- (6) Southwestern Division's Quality 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 the Flood Risk Management (FRM) PCX.

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

The FRM-PCX may request a consult with RMC following Agency Technical Review (ATR) of the draft report, and prior to publishing the draft report for public review. In this event, the involvement of the RMC could be expected to limited to a request to complete a cursory review of documented risks to confirm that, while residual risk does exist, there is not currently a significant life safety risk in the study area, nor is one anticipated to result from the small scale project recommended. Life safety risk will continue to be re-evaluated as the study/project progresses.

3. STUDY INFORMATION

a. Decision Document.

A Feasibility Report is to be prepared for Elm Creek, Abilene, TX as authorized by a resolution by the committee on Public Works, United States Senate, adopted August 12, 1954, quoted below.

"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 13, 1902, be and is hereby requested to review the report of the Chief of Engineers printed in House Document Numbered 181, Seventy-second Congress, first session, and other reports on the Brazos River and tributaries, Texas, with a view to determining whether any modification of the recommendations contained therein should be made at this time."

The authority granted by the resolution is commonly known as the Brazos River and Tributaries Basinwide Study Authority. All studies conducted under this authority serve as an interim response to the basin-wide authority, and do not close out the granted authority.

Additionally, this authority was updated via resolution by the U.S. Senate, Committee on Environment and Public Works. The resolution quoted below was adopted July 31, 2007.

"Resolved by the committee on environment and public works of the United States Senate, That the Secretary of the Army is requested to review the report of the Chief of Engineers on the Brazos River, Texas, published as House Document 535, 81st Congress, 1st Session, and other pertinent reports, to determine whether modifications to the recommendations contained therein are advisable in the interest of comprehensive watershed and stream corridor management, including flood damage reduction, environmental restoration and protection, water conservation and supply, water quality improvement, aquifer recharge, and other related purposes in the Brazos River Basin, Texas."

If this feasibility report and Environmental Analysis recommend a plan, and the report, analysis and plan are approved by the Chief of Engineers, implementation of the recommended plan will require Congressional authorization.

b. Study/Project Description.

The Elm Creek, Abilene Feasibility Study is a flood risk management study of the Elm Creek watershed in and around the city of Abilene, Texas. It is an analysis of the problems, needs and opportunities within the Elm Creek watershed using topographic surveys, updated hydraulic models and economics reflecting current development, land use and the environment within the floodplain. The feasibility study is projected to have a total cost of \$2,382,000; the Sponsor's In-Kind contribution is \$308,000. The city of Abilene is the local cost sharing sponsor for this study.

The Elm Creek, Abilene, Texas Interim Feasibility Study is a typical U.S. Army Corps of Engineers flood risk management feasibility study. As such, it investigates structural measures such as levees, floodwalls, channel modifications, and upstream detention; and nonstructural measures such as flood warning systems, raising structures in place, and evacuation of the floodplain. Ecosystem restoration is currently not a high priority project output by the sponsor and therefore is not currently being pursued as part of this study. Recreation development is explored only when it is compatible with flood risk management

alternatives and supported by the sponsor. The recommended plan for this study is a combination of floodplain evacuation and small scale temporary retention. It has an estimated cost of \$47 million.

c. Factors Affecting the Scope and Level of Review.

The following influence the review decisions:

- Hydrology was challenging due to the extremely flat terrain and the flashy nature of flooding in the study area. With assistance from HEC the HMS model was adapted to produce existing condition results consistent with historical events. This adaption was incorporated into HMS in later versions, and is now part of the USACE preferred engineering models.
- Project risks are documented in the Cost-Schedule Risk Analysis. The key risks affecting project scope and level of review include: the ability to set up a temporary on site plant to produce the concrete weir for the emergency spillway; availability of suitable fill material and top soil in the quantities needed for the embankment in the vicinity of the project area; availability of resources with experience in construction management on this type of project in the area;
- With Flood Risk Management projects, there always remains a residual risk to life safety. Loss of one life was recorded in the August 2007 flood event due to a vehicle being washed from a roadway. The recommended plan is also the National Economic Development Plan. This plan is a combination floodplain evacuation and small scale temporary retention. If the temporary retention is at maximum capacity (15,300 acre feet at the top of the dam), it could take as much as 2 weeks to drain completely. With the maximum flow of 5000 cfs through the 10'x10' box culverts at the existing channel invert, depths of water ranging 8-10 feet may be held behind the dam of the temporary detention area for up to 3 days. These depths are based on the channel invert elevation of the incised channel. For purposes of the feasibility study, the maximum pool is assumed to be at the top of the dam with no freeboard. Most of the population of 67,000 people that could be expected to be in the flood plain are located 3-8 miles downstream. In the event of dam failure, flooding could be expected at depths of 2-6 feet. The floodplain evacuation would occur for frequently flooded residential structures for which the temporary detention would not provide risk reduction. The ultimate result of the recommended plan is fewer people and structures at risk, and a reduced residual risk to the structures and population that remain. No other significant safety issues have been presented in relation to this study or are expected in relation to the recommended project. The District's Chief of Engineering and Construction concurs with this assessment of life safety.

Brian Giacomozzi

Fort Worth District, Chief of Engineering and Construction

Date

- This project lies completely within the state of Texas, and has no influence on other states. There is no request from the Governor of Texas for peer review by independent experts, nor is one anticipated.
- 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.
- 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, and mild interest in the potential for NRCS detention projects. 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 .

- Based on what is known at the feasibility phase, the scope and scale of the project design are not anticipated to require redundancy, resiliency, robustness, unique construction sequencing, or design and construction schedules that overlap.

The precedent set by HQUSACE and the FRM-PCX is that nearly all FRM projects will undergo Independent External Peer Review (IEPR), including those containing non-structural elements. As such, the Project Management Plan and Review Plan have been revised to include IEPR because residual risk to life safety is inherent to all flood risk management operations. IEPR will occur after a draft report is prepared, beginning concurrent with the start of the public review period, and concluding no less than 30 days after the last response to public comments is submitted.

- 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: aerial imagery, and project management. The sponsor provided aerial imagery of the city limits and additional upstream aerial imagery relevant to the study for an in kind credit of \$253,000.00. This imagery was reviewed by the PDT and the district’s survey and imagery expert and deemed acceptable for purposes of this study. Additionally the FCSA allows the sponsor to submit \$55,000.00 of in kind credit for project management to include expenses for travel, meetings and review of project management and decision documents associated with this study. Imagery will be submitted via DVD as supporting documentation for the draft and final reports 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 section chief represented the technical discipline shall submit to the PM a written statement that the technical product has been reviewed by the section chief or his/her representative and is technically complete and accurate for this phase of the study and the associated level of detail. DQC will be conducted in Dr. Checks and the final comment report shall be included in the package provided to the Division Chief in charge of planning. Following DQC, the Division Chief over Planning will be required to sign a memorandum stating DQC has been conducted and the document provided for Agency Technical Review (ATR) is technically complete and accurate for this phase of the study and the associated level of detail.
- b. Products to Undergo DQC.** All technical work products shall undergo a supervisory technical review prior to being provided to planning for inclusion in the Report package for the decision document. DQC shall then be conducted on the completed decision document package to ensure consistency across disciplines.
- c. Required DQC Expertise.** DQC is ultimately the responsibility of the technical supervisors at the section chief level. The section chief may delegate this review to qualified candidates. The DQC

reviewers must be GS 12 or higher, and must have worked on civil works studies within the FRM business line for no less than 2 years. DQC disciplines should mirror those of the PDT. If the technical supervisor elects to delegate the DQC review, the reviewer must not have completed technical work on this study since the previous study milestone completed with the vertical team.

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 be completed on the following documentation:

- FSM Documentation, completed August 2008
- AFB Documentation, completed August 2012
- Draft Feasibility Report, anticipated April 2013
- Final Feasibility Report, anticipated September 2013

b. Required ATR Team Expertise.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Planning	Team member should have extensive experience in the Corps planning process and be knowledgeable of Corps policies and guidelines. He or she should be familiar with flood risk management projects, water resources and watershed planning and have experience relevant to issues associated with perched banks and flat topography.
Economics	Team member will have extensive experience in flood risk management projects and a thorough understanding of HEC-FDA.
Environmental Resources	Team member will be familiar with similar studies and projects.
Cultural Resources	Team member will be familiar with similar studies and projects.
Hydrology & Hydraulics	Team member 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 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	Team member 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	Team member 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	Team member will have a thorough understanding of both structural and nonstructural 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	Team member 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	Team member will be familiar with similar studies and projects.
Hazardous, Toxic and Radioactive Waste (HTRW)	Team member 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 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.

In accordance with the documentation in section 3c of this review plan, this study will undergo Type I and Type II IEPR. Because this project is over the \$45 million dollar threshold identified in Paragraph 11.d.(1) of EC 1165-2-209 and is a FRM project with inherent residual risks to life safety, Type I IEPR is required. Type II IEPR will be required for the design and follow on project implementation. Safety Assurance will be addressed and life safety risks re-evaluated for each IEPR.

This review is expected to commence with the beginning of the public review period, and shall continue for 30 calendar days following the last response to public review comments.

b. Products to Undergo Type I IEPR.

In accordance with guidance from the MSC and the FRM-PCX, IEPR will be conducted on the Draft Interim Feasibility Report with an Integrated Environmental Assessment. This review is expected to commence with the beginning of the public review period, and shall continue for 30 calendar days following the last response to public review comments. Anticipated dates are 28 June 2013 through 12 September 2013.

c. Required Type I IEPR Panel Expertise.

IEPR Panel Members/Disciplines	Expertise Required
Economics	The Economics Panel Member should be familiar with practices and potential solutions for managing flood risk in arid areas with exceptionally flat topography as well as the concept of streams with perched banks and the resulting impacts on the analysis. The panel member should be an expert in cost-benefit analysis, preferably with a graduate degree in economics.
Environmental	The Environmental Panel Member should have extensive experience with the NEPA, process. In particular the reviewer should understand the coordination process with Federal, State

	and local agencies and the general public; how habitat models are used make inferences regarding specific attributes that have an overall impact on the environmental suitability for multiple species.
Hydrologic/Hydraulic Engineer	The hydrology and hydraulics panel member should have extensive experience in arid environments with flat topography, and understand the hydrologic and hydraulic implications of streams with perched banks. The review panel member should have extensive experience in evaluation of flood risk management structures such as in stream channel work, diversion and detention, as well as flood plain evacuation.
Geotechnical Engineer	The geotechnical engineering panel member should have extensive experience in evaluation of flood risk management structures such as static and dynamic slope stability evaluation, evaluation of the seepage through earthen embankments and underseepage through the foundation of the flood risk management structures, including dam embankments, floodwalls, closure structures and other pertinent features, and in settlement evaluation of the structure.

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).

- 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 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 Elm Creek in Taylor County to aid in the selection of a recommended plan to manage flood risk.	Certified
HEP, Barred Owl	This model was used to evaluate the quality and composition of deciduous woodlands, specifically in riparian areas in the	Certified

	study area.	
HEP, Fox Squirrel	This model was used to evaluate food, cover, and breeding resources present in the study area for the fox squirrel.	Certified

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

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
HEC-HMS 2.2.2 (Hydrologic Modeling System)	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 flat terrain present in Abilene, which requires the development of routing data for approximately 190 reaches to address cross flow areas between Elm Creek and Cat Claw Creek.	HH&C CoP Model
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. The program is used for steady flow analysis to evaluate the future without- and with-project conditions along Elm Creek and its tributaries.	HH&C CoP Preferred Model

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost.

- FSM Documentation, completed August 2008 - \$20,500 (actual)
- AFB Documentation, completed August 2012 - \$41,323 (actual)
- Draft Feasibility Report, anticipated April 2013 - \$15,000 (estimated)
- Final Feasibility Report, anticipated September 2013 - \$10,000 (estimated)

b. Type I IEPR Schedule and Cost. IEPR will be conducted on the Draft Feasibility Report and Integrated Environmental Assessment as provided for public review. This review is expected to commence when the report is published for public review on or about 28 June 2013. The IEPR will remain active for 30 calendar days following the resolution of the last response to public comments. This review is not yet scoped, but based on historical accounts the review is expected to cost approximately \$150,000.

c. Model Certification/Approval Schedule and Cost. All the models anticipated to be used are already certified or approved for use.

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 was held in July 2012 to discuss findings to date and the array of alternatives under consideration. Following the AFB, there will be a

public meeting 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 occurring approximately April 2011. Documentation of the environmental assessment began after plan formulation was complete and prior to the AFB. 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: Elm Creek, Abilene TX 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 to the draft report. These comments cover the period from the first ATR in July-August 2008 through Washington D.C. level review of the final feasibility report expected November 2013. 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) 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: Elm Creek, Abilene TX Project Manager, CESWF-PM-C
P.O. Box 17300
Fort Worth, TX. 76102-0300
817-886-1787

U.S. Army Corps of Engineers, Southwestern Division
ATTN: Chief of Planning & Policy Division, CESWD-PDS-P
1100 Commerce St.

Dallas, TX. 75242-1317
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 94103-1398
415-503-6852

ATTACHMENT 1: TEAM ROSTERS

PDT Roster

Discipline	PDT Member	PDT member email	PDT member phone
Plan Formulation			
H&H			
Civil Design			
Structural Design			
Geotechnical			
Cost Estimating			
Economics			
Cultural			
Environmental			
Real Estate			
HTRW			
Recreation			

DQC Roster

Discipline	DQC Member	DQC member email	DQC member phone
Plan Formulation			
H&H			
Civil Design			
Structural Design			
Geotechnical			
Cost Estimating			
Economics			
Cultural			
Environmental			
Real Estate			
HTRW			

ATR Roster

Discipline	ATRT member	ATRT member email	ATRT member Phone
ATR Lead			
Plan Formulation			
H&H			
Civil Design			
Geotechnical			
Cost Estimating			
Economics			
Cultural			
Environmental			

Real Estate			
Recreation			
Risk & Uncertainty			

Vertical Team Roster

Discipline	Team Member	E-mail	Phone
Regional FRM PCX POC			
Director FRM PCX			
MSC			
RIT			

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 DrCheckssm.

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

SIGNATURE _____ Date _____
Name
Project Manager
Office Symbol

SIGNATURE _____ Date _____
Name
Architect Engineer Project Manager¹
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
Nov 2012	Additional discussion on life safety	p. 3
Nov 2012	Risk Analysis Team member added to ATR	p. 5
Aug 2012	Old RP content placed in latest approved RP format	all
8/20/12	Team Rosters updated	p. 14-15
8/20/12	IEPR added to scope	p. 7-9
8/20/12	Update Public Participation	p. 11
8/20/12	Update review dates to reflect currently scheduled milestone dates	p. 4 & 10
9/26/12	Document Actual Review Costs for AFB ATR	p. 10

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/MS	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