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, Fort Worth District

SUBJECT: Nueces River and Tributaries Feasibility Study, Texas. (PWI # 081379) Review Plan Approval

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

2. In accordance with reference 1, 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 is pending review by the Ecosystem Planning Center of Expertise (ECO-PCX). An Independent External Peer Review is required. 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 ECO-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

THOMAS W. KULA
Brigadier General, USA
Commanding

REVIEW PLAN

Nueces River and Tributaries Feasibility Study
Nueces River and Tributaries, Texas

Fort Worth District

MSC Approval Date: 7 December 2012
Last Revision Date: 5 December 2012

US Army Corps of Engineers ®

REVIEW PLAN

Nueces River and Tributaries Feasibility Study
Nueces River and Tributaries, Texas

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the Nueces River and Tributaries Feasibility Study, Nueces River and Tributaries Texas.

b. References.

(1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010
(2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
(3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
(4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
(5) Project Management Plan for Nueces River and Tributaries Feasibility Study, 20 August 2004
(6) Feasibility Cost Sharing Agreement, 24 September 2004

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 Ecosystem Planning Center of Expertise for Ecosystem Restoration (ECO-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. Flood Risk Management may have a minor role in the planning of the Nueces River Basin Feasibility Study. The RMO will also coordinate with the Planning Center of Expertise for Flood Risk Management (PCX-FRM). Water supply will also have a role in this study; therefore the RMO will also coordinate with the Planning Center of Expertise for Water Management and Reallocation Studies (PCX-WMRS).

3. STUDY INFORMATION

a. Decision Document. The scope of this multi-purpose feasibility study represents a holistic approach to addressing ecosystem restoration, flood risk management, aquifer recharge, water supply, water quality, brush management, and overall watershed resource management in the Nueces River watershed. The project is a General Investigations Study and the feasibility phase is cost shared 50/50 with the projects non-Federal sponsors.

The Nueces River Basin and Tributaries Study will be conducted according to a Committee Resolution adopted June 23, 2004 by the Senate Committee on Environment and Public Works. The Chief of Engineers is the approval authority for the General Investigations studies. If this decision document is approved by the Chief of Engineers, implementation of the recommended plan will require Congressional authorization.

A Feasibility Cost Sharing Agreement for the Nueces River and Tributaries, Texas Feasibility Study was executed on 24 September, 2004, with five non-Federal sponsors. These sponsors are the Nueces River Authority (NRA); the City of Corpus Christi, Texas (City); the San Antonio Water System (SAWS); the San Antonio River Authority (SARA); and the Guadalupe-Blanco River Authority (GBRA).

b. Study/Project Description. The original authority for analysis of the Nueces River is the Flood Control Act of 1936, dated 22 June 1936 passed by the 74th Congress 2nd session. This act gave the Secretary of War the authorization to perform preliminary examinations and surveys for flood control. Then in the 2002 Conference Report there was specific appropriations language as follows:

> *The conferees have provided $100,000 for the Nueces River and Tributaries, Texas, project for a reconnaissance study of recharge structures located on the Edwards Aquifer Recharge Zone in the Nueces River Basin.*

Based on this language and appropriation, a reconnaissance study was completed in September of 2002 and certification of the 905(b) analysis dated 04 December 2002 was received approving the initiation of a feasibility study for the Nueces River Basin.

Prior to the execution of the Feasibility Cost Share Agreement with the non-Federal sponsors, updated authorization language expanded the scope of the study authority for the Nueces River Basin in a Committee Resolution adopted June 23, 2004 by the Senate Committee on Environment and Public Works which reads as follows:

> *That the Secretary is requested to review the Corps of Engineers' report on the Nueces River, Texas published as House Document 235, Sixty-third Congress, 1st Session and other pertinent reports, to determine the feasibility of measures for the improvements to address water resources need of Texas within the Nueces River basin in the interest of comprehensive watershed and stream corridor management, including flood damage reduction, ecosystem restoration and protection, water conservation and supply, water quality, aquifer recharge, and other allied purposes. The review should coordinate and integrate with ongoing study efforts within the basin.*

The Nueces River basin, which lies in the southern part of Texas, has an overall length of approximately 235 miles, a maximum width of 115 miles, and a total drainage area of roughly 17,100 square miles (Figure 1.). The Nueces River flows in a southeasterly direction and enters Nueces Bay near Corpus Christi, Texas. The watershed includes portions of three major aquifers – the Edwards, Carrizo-Wilcox, and Gulf Coast. Poor land use practices, recent near-record droughts, and conflicting water resource management issues have resulted in significant environmental degradation. Limited freshwater inflows into the Nueces estuary system as a result of construction and operation of two upstream reservoirs have resulted in hyper-saline conditions that have severely diminished the habitat suitability of approximately 20,000 acres of the Nueces Delta. In addition, the lowering of water levels in the Edwards Aquifer because of drought conditions and water pumpage has reduced spring flows from the San Marcos and Comal Springs causing degradation of rare and unique habitats, which threatens the continued existence of seven endangered (E) and one threatened (T) species endemic to these habitats, including Fountain Darter *Etheostoma fonticola (E),* Texas Blind Salamander *Typhlomolge rathbuni (E),* San Marcos Gambusia *Gambusia georgei (E),* Texas Wild Rice *Zinania texana(E),* Comal Springs Riffle Beetle

Heterelmis comalensis (E), Comal Springs Dryopid Beetle *Stygoparmus comalensis (E)*, Peck's Cave Amphipod *Stygobromus pecki (E)*, and San Marcos Salamander *Eurycea nana (T)*. The Edwards Aquifer, the major source of water for the City of San Antonio and Bexar County metropolitan areas, accounts for about 20 percent of the basin and is recognized as having high potential for groundwater recharge. The watershed also crosses many political, jurisdictional, and geographical boundaries and pits groundwater systems management against surface water systems management within the same basin. During a Nueces River basin feasibility study workshop held on 28 June 2011, which was attended by over 50 individuals representing 20 Federal, state and local water and environmental resource agencies, all parties agreed that efforts to model the hydraulics and hydrology and the significant ecosystems of the Nueces watershed are extremely important, not only for the watershed study, but also for the region and Texas' State Water Planning efforts.

The Nueces River Basin feasibility study is a continuation into detailed study of the complex relationships between surface water, groundwater and the varying ecosystems and communities dependent on such water. The scope of this multi-purpose feasibility study represents a holistic approach to addressing ecosystem restoration, flood damage reduction, water conservation and supply, aquifer recharge, water quality, brush management, and overall watershed resource management.

The Nueces River Basin FSCA reflects a 10 million dollar multipurpose ecosystem restoration and flood risk management study. The total project cost could be between $60-80 million. The study limits encompass the Nueces River basin in its entirety. The study scope is generally summarized in the three major objectives that were developed for the study based on the identified problems and opportunities which fall within the USACE mission areas and have potential for Federal investment. Ecological soundness is defined as a flow regime to sustain the character of the system over long term, and maintain the plants and species over the long term and for a complete life cycle. These objectives, which continue to be refined as the project delivery team (PDT) continues the feasibility study process, are:

- *Restore to the extent practicable the ecological soundness of the Nueces Delta portion Coastal Bend Bay System to ensure biotic sustainability over the next 50 years.*
- *Restore to the extent practicable the ecological soundness of the Nueces Bay portion of the Coastal Bend Bay System to ensure biotic sustainability over the next 50 years.*
- *Reduce the frequency and duration when spring flows fall below critical thresholds in the Edwards Aquifer for the relevant threatened and endangered species over the next 50 years*

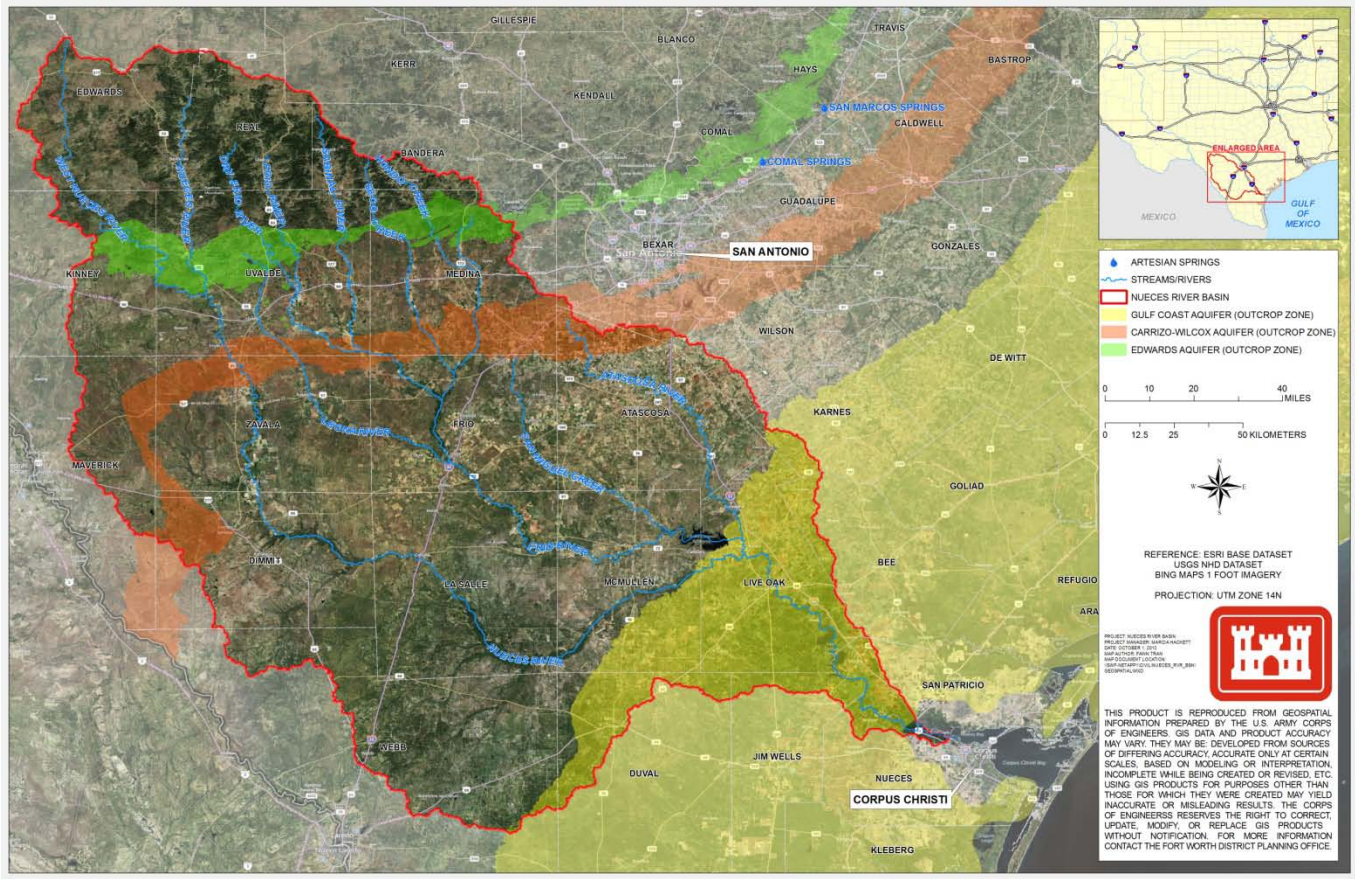
In addition to the individual projects, system wide analyses will be performed to ascertain impacts and for optimization of benefits. Specifically impacts as a whole to the Nueces River basin will be evaluated and an overall systems assessment, value engineering, and optimization of benefits will be undertaken.

Potential study solutions include modification of systems operations of Choke Canyon Reservoir and Lake Corpus Christi as well as augmentation of water supply to allow increased fresh-water to be passed through the system into the Nueces Delta to improve habitat conditions; implementation of recharge structures or other land-based best management practices to increase water levels in the Edwards Aquifer allowing for increased spring-flow to benefit sensitive spring habitats that support endemic T&E species; grading and structural modifications to existing impediments in the delta to help reestablish historical fresh and salt water marsh elevations; recontouring of altered river/delta bathymetry to help restore wetland and shallow water elevations; placement of breakwaters to help protect the delta face from erosion losses caused by wave action; and buy-out of flood prone properties and/or implementation of structure flood damage reduction measures.

The study area lies within the jurisdiction of the Texas U. S. Congressional District 15, Rep. Ruben Hinojosa, District 21, Rep. Lamar Smith, District 23, Rep. Pete Gallego, District 27, Rep. Blake

Farenthold, and District 28, Rep. Henry Cuellar. Current state senators are Sen. John Cornyn (R-TX) and Sen. Ted Cruz (R-TX).

Figure 1. Nueces River Basin



c. Factors Affecting the Scope and Level of Review. This is an on-going feasibility study, which was recently rescoped to meet the new SMART planning guidance. The PDT is still in the process of updating the Project Management Plan (PMP) based on the new planning milestones and schedule and budget criteria. Based on input from the vertical team at the rescoping charette, the current primary review issues for the Nueces River Basin feasibility study are the complexities of the ground- and surface-water interactions in the Nueces Basin and the complexities of the Edwards Aquifer karst system and whether potential recharge in the Nueces River Basin that would have a beneficial impact on the flows at major springs outside the basin but integral to the Edwards Aquifer system, could be used to quantify and qualify ecosystem restoration benefits for management measures in the upper Nueces Basin. The springs are home to eight T&E species endemic to the springs and dependent upon adequate spring flow for their continued health and survival.

An IEPR is necessary for this project and will generally occur concurrently with the public, ATR and policy reviews. Under the new SMART planning paradigm, analyzing risk is a major factor in reaching decision point milestones. As such, the analysis of risks and the development of a risk register will be an important tool as this study moves forward. An up to date risk register will be maintained on the study SharePoint site, which is currently being established. However, generalized project risks which can be discussed at this time, include:

d. The critical risks relate to existing infrastructure (roads, bridges, railroads and utilities), rights of way, real estate agreements, and accuracy of baseline environmental conditions. Any work in close proximity to infrastructure features may threaten their integrity. Early identification of rights of way will be necessary to clarify any necessary acquisitions and prepare an acquisition schedule that minimizes impacts to the study/project schedule. Furthermore, some public entities utilize real estate agreements that deviate from the Federal government standard. Use of these agreements will adversely impact the study/project schedule. Also risk associated with the complexities of the Edwards Aquifer karst system and whether potential recharge in the Nueces River Basin would have a beneficial impact on the flows at major springs outside the basin but integral to the Edwards Aquifer system, could be used to quantify and qualify ecosystem restoration benefits in the upper Nueces Basin. The springs are home to eight T&E species endemic to the springs and dependent upon adequate spring flow for their continued health and survival. Environmental baseline conditions will need to be continually reassessed as the study progresses since field data collected in the initial surveys may not accurately reflect mean baseline conditions. Several factors influence this risk. First, Texas has suffered a drought lasting approximately 3 years. Finally, with the environmental factors at work (e.g.. evolution, climate change) affecting the variability of estimated future conditions may be high.

It is anticipated that any FRM project identified in the recommended plan would be relatively minor as the three damages centers identified are small and preliminary analysis of the Estimated Annual Damages (EAD) seems to show that a positive Benefit-to-Cost ratio (BCR) is unlikely. That being said, there are inherent project risks with all FRM alternatives as they relate 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 alternative, there is an inherent project risk. A structural project in the form of detention, levees, and/or channelization would provide reduction in flood damages from floods, but would leave a residual risk to properties and populations since they could still potentially be affected by a flooding event. 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. If a substantial risk to the public as a result of a proposed alternative is identified during the feasibility study, the Review Plan will be revised to incorporate the identified risk.

Life safety issues inherently exist in the study area since the basin is partly located in a coastal area that experiences violent hurricanes and tropic storms upon occasion. This study is a multipurpose project with ER and minor components of water supply as primary considerations. None of the alternatives that will be considered for those will pose a significant risk to life safety. The FRM component is anticipated to be minimal and it is questionable whether FRM measures will be carried throughout the planning phase.

Other factors considered affecting the scope and level of review:

- The project involves no new science follows an established institutional process. Consequently, the project is not expected to encounter any technical, institutional, or social challenges.
- The Governor of Texas is not requesting a peer review by independent experts.
- The project is not expected to cause significant public dispute with regard to its size, nature, or effects.
- The project is not expected to cause significant public dispute with regard to its economic or environmental costs and benefits.
- The project design will not involve precedent-setting methods, use innovative materials, or change prevailing practices.

Information in the decision document will not be based on novel methods, present complex challenges for interpretation, contain precedent-setting influential scientific information or assessment, nor have significant methods, or present conclusions that are likely to change prevailing practices.

Interagency interest is high, but close coordination with local, state, and Federal resource agencies along with the non-Federal sponsors throughout the course of the study has served and is expected to continue to negate significant dispute with regards to a tentatively selected plan as are public meetings and NEPA scoping activities.

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 sponsors include: project management; environmental data collection, analysis, and modeling; hydrologic and hydraulic data collection and modeling; and topographic survey data collection and analysis. To date work-in-kind products have included develop of the original nine HSPF subbasin models of the Edwards Aquifer that serve as the basis for the updated models currently being completed under government contract; precipitation monitoring of measured rainfall at discrete locations and estimations of areal distribution of rainfall using regional radar data calibrated using precipitation gauge data (data is being used to update recharge calculation figures in Edwards Aquifer subbasin HSPF models), correlation analyses of precipitation to groundwater elevations and spring discharges to improve understanding of the regional water balance that affects the upper Nueces River basin; geophysical studies of floodplain sediments and analyses to quantify surface water losses and subsurface flow in river floodplain sediments of the upper Nueces River basin; LiDAR topographic survey data collection and processing for the Nueces Delta; development of a hydro-dynamic circulation model for the Nueces Delta, ecological field data collections in the Nueces Delta documenting vegetation composition, vegetative productivity, sediment pore salinity measurements, and quantification of loss of the delta face over time.

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). SWF 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 documentation system will be DrChecks for the continuity of the review record. DrChecks will be used to document all comments, responses and associated resolutions accomplished through the DQC 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.

DQC shall be conducted and documented in a two phased approach. Table 1 on the following page summarizes the approach below.

The first phase of DQC shall be conducted by the technical supervisor for the section in which the original work product was produced. This is a check for technical sufficiency and completeness commensurate with scope and scale of the project, and may be delegated to qualified senior personnel in the area of expertise. DQC shall not be performed by the same District personnel who performed the original work including managing/reviewing the work in the case of contracted effort. After the first phase of DQC is complete, both the DQC reviewer and Section Supervisor will be required to sign a certification form (Attachment 3) prior to submittal to the Lead Planner or Project Manager. The signed certification form will be provided as part of the technical appendix and be included in any reports prepared for ATR and Headquarters Planning and Policy review.

Technical products submitted for WIK credit shall be reviewed by the District's appropriate PDT member for technical sufficiency and completeness. The PDT member and Section Supervisor will sign the DQC certification form and provide this to the Lead Planner or Project Manager prior to incorporating the documentation into study work products.

The second phase consists of review by a qualified DQC reviewer and the PDT member. The second phase shall begin once the Lead Planner has integrated the technical appendices and main report into one report and the report is ready for ATR. Technical supervisors shall provide a team member name for DQC to the Lead Planner and/or Project Manager a minimum of two weeks prior to the start of the second phase of DQC. The Lead Planner or Project Manager for the study will supply the DQC team member and the PDT member a link to the electronic file one full business day prior to the start of the second phase of DQC.

During the second phase of the DQC, the reviewers will be responsible for a complete reading of the report and accompanying appendices supplied by the Lead Planner and/or Project Manager. After the second phase of DQC is complete, both the DQC member, PDT member and Section Supervisor will be required to sign a certification form (Attachment 3) prior to submittal of the interim report for ATR and Headquarters Planning and Policy review. The DrChecks documentation and signed certification form will be provided with the interim report prepared for ATR and Headquarters Planning and Policy review.

Table 1. Summary of DQC Activities

Phase	Responsible Party	Product	Documentation	Timeline
Phase 1	Technical Section Chiefs; may be delegated to work leaders, team leaders, or other qualified senior personnel	All models and write ups as well as any supporting data or documentation; includes any WIK submittals	Signed certification form and any track changes or DrChecks comments	Prior to providing to planning for inclusion in the main report; prior to submitting any interim technical products to ATR
Phase 2	PDT and DQC team	Completed Draft Report with Integrated Environmental	Signed certification form and Dr Checks	Prior to submitting for ATR; Anticipated 1-21 November 2012

	Assessment and supporting appendices	comment report

b. Products to Undergo DQC. The following technical products for the study will undergo DQC prior to being submitted to the planner for ATR and incorporation into the main report in advance of major milestones.

- All existing conditions and future without project conditions discipline specific models and narratives;
- All technical calculations & drawings in support of plan formulation;
- All technical calculations, drawings and write ups for the tentatively selected plan;
- All items provided as Work In Kind;
- All contracted deliverables;
- Any new or changed information in the working draft of the Feasibility Report with integrated Environmental Assessment (EA);

The planner will maintain a glossary of terms and acronyms used by the PDT for inclusion in the main report and to ensure consistency between agencies and disciplines.

c. Required DQC Expertise. The following expertise is needed for DQC. The first and second phase of DQC shall be conducted by senior level section personnel (GS 12 or higher grade) from the section in which the original work product was produced. Additional quality checks are performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. The technical components of the DQC team should mirror the PDT.

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 daily 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. All ATRs will be coordinated with the PCX-ER, and PCX-FRM and/or PCX-WMRS, if applicable. 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 to ensure compliance with all pertinent USACE guidance and delivery of high quality products early in the study prior to HQUSACE review.

Technical products developed in preparation of the IPRs and milestones will be considered for incremental product review by the ATR team or selected team members as those products are developed.

ATR will be completed on the following documentation:

- Milestone 1 – Final Array of Alternatives
- Milestone 2 – Tentatively Select Plan
- 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. The ATR team consists of at least seven team members outside of the Fort Worth District in the functional areas presented in the table below. The appropriate RMO, in cooperation with the PDT, vertical team, and other appropriate centers of expertise, will determine the final composition of the ATR team. The names, organizations, contact information, credentials, and years of experience of the ATR members should be included in Attachment 1 once the ATR team is established.

ATR Team Members/Disciplines	*Expertise Required*
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.).
Planning	The Planning reviewer should be a senior water resources planner with extensive experience in the Corps planning process, be knowledgeable of Corps policies and guidelines, and be current on the new planning paradigm objectives and methodologies. He or she should be familiar with ecosystem restoration, flood risk management projects, and recreation planning and have experience relevant to issues associated with planning water resources projects in an urban setting.
Economics	The Economics reviewer should have extensive experience in other social effects and an understanding of those effects on national and regional social dynamics.
Environmental Resources	The team member or members should be an environmental subject matter expert, have experience in basin, delta and estuary environmental resources, and be familiar with preparing, processing, and reviewing NEPA documents.
Hydrology and Hydraulic Engineering	The team member or members should be an expert in the three areas that are being formulated for: basin, delta and estuary

	hydrology and hydraulics, have a thorough understanding of open channel systems, the effects of management practices and low impact development on hydrology, the use constrained space in an urban environment, and the use of HEC computer modeling. A registered professional engineer (PE) is preferred.
Cultural Resources	The team member should demonstrate experience with historic architecture and have experience with archeological resources. The team member should also be familiar with preparing, processing, and reviewing cultural resource law compliance documentation.
Geotechnical Engineering	The geotechnical engineering reviewer should be a subject matter expert and should have extensive experience in urban channel design, pre- and post- construction evaluation and rehabilitation. A registered PE is preferred.
Civil Engineering	The team member should be a civil design subject matter expert and have experience with natural channel design, utility relocations, and interior drainage requirements. A registered PE is preferred.
Structural Engineering	TBD
Electrical/Mechanical Engineering	N/A
Cost Engineering	The team member should be familiar with cost estimating for ecosystem restoration projects in MCACES. Review includes construction schedules and contingencies for any document that requires Congressional authorization. The team member will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer. The Cost Engineering Directory 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 District Project Manager.
Real Estate	The team member should have experience with similar civil works projects and should also be familiar with preparing, processing, and reviewing Real Estate Plans. The team member must be selected from the approved list of RE ATR reviewers.
Hazardous, Toxic and Radioactive Waste (HTRW)	The team member should have experience with similar civil works projects and should also be familiar with preparing, processing, and reviewing Phase I Environmental Site Assessments per USACE regulations.

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 be followed. See four comment structure discussed under DQC.

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.

Decision on IEPR. Type I IEPR will be required for this study, since this study meets the mandatory triggers for Type I IEPR described in Paragraph 11.d.(1) and Appendix D of EC 1165-2-209. A Type II IEPR is not required for the design and follow-on project implementation since this is primarily an ecosystem restoration project and the project area does not have a history of life safety threats.

a. Products to Undergo Type I IEPR. IEPR will occur after Milestone 2 – Tentatively Selected Plan. It will start concurrent with public review and complete within 30 days following the incorporation of public review comments into the Draft Feasibility Report and Integrated Environmental Assessment. The IEPR comments and responses will be presented and discussed at the Civil Works Review Board prior to approval by HQUSACE for the 30-day state and agency review of the final report. The IEPR will be accomplished by an Eligible Outside Organization, 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 draft Feasibility Report with integrated EA as distributed for public review will be provided to the IEPR panel as well as documentation of previous reviews and any applicable vertical team guidance.

b. Required Type I IEPR Panel Expertise. The following IEPR expertise is required for this project. The expertise and disciplines represented on the IEPR team reflect the significant disciplines involved in the planning effort. The ER-PCX, as the RMO, will identify the final make-up of the IEPR team in coordination with the PM, vertical team, and other appropriate centers of expertise. The panel will include the necessary expertise to assess the engineering, environmental, and economic adequacy of the decision document as required by EC 1165-2-209, Appendix D. The IEPR panel members for this study and a brief description of their credentials will be included in Attachment 1 once they are identified.

IEPR Panel Members/Disciplines	***Expertise Required***
Planning	The planning panel member should have experience/credentials in water resources and be familiar with large systems analysis and formulation. Additional experience in ecosystem restoration, flood risk management projects and recreation planning.
Economics	The economics panel member should have experience/credentials in multipurpose planning in Texas economies. Additional experience in applying Cost Effectiveness/Incremental Cost Analysis for quantification of ecosystem restoration benefits and alternative plans evaluations and in development of combination NED/NER plans.
Environmental	The environmental panel member should have expertise in Gulf Coast estuaries and a clear understanding of the dynamics of karst aquifer systems, springs, and associated T&E species. In addition, the environmental expert should have expertise in the preparation, process, and document review associated with NEPA.
Hydraulic Engineering	The hydraulic engineering reviewer should be an expert in the field of hydrology and hydraulics, have a thorough understanding of ground- and surface-water interactions associated with aquifers, including karst aquifers, the use of non-structural systems as they apply to flood proofing, warning systems, and evacuation, and the use of HSPF computer modeling systems.

c. 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:

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 the Nueces River near Crystal City, the City of Three Rivers, and a damage reach on County Road 72 to aid in the analysis plan to manage flood risk.	Certified
(HEP) (USFWS, 1980)	The United States Fish and Wildlife Service Habitat Evaluation Procedure is being used to evaluate habitat conditions that would result from alternative plans. A habitat suitability index (HSI) for indicator species is derived by aggregating suitability indices (SIs) critical for habitat variables. The species specific HSI models being considered are American Oyster, Atlantic Croaker (Juvenile), Blueback Herring, Black-bellied Whistling Duck, Diamondback Terralpin, Gulf Menhaden, Least Tern, Eastern Brown Pelican, Mottled Duck, Mallard Duck, Brown Shrimp, White Shrimp and Lesser Snow Goose (Wintering), which are all approved for use.	Approved for use.
Wetlands Value Assessment (WVA)	WVA is a quantitative, habitat-based assessment methodology that quantifies changes in fish and wildlife habitat quality and quantity projected to develop as a result of wetland restoration projects.	Model has been approved for use, but might need modifications specific to the Nueces Delta.

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

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
HEC-RAS 4.1.	The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for steady flow analysis to evaluate the future without- and with-project conditions in the Nueces River Basin watershed.	HH&C CoP Preferred Model
HSPF 12 - Hydrologicial Simulation Program–FORTRAN	A mathematical model developed under U.S. Environmental Protection Agency sponsorship to simulate hydrologic and water-quality processes in natural and man-made water systems. HSPF uses a time history of rainfall, temperature, evaporation, and parameters related to geology, soils, and land use to simulate hydrological processes in a watershed. The result of an HSPF simulation is a time history of quantity of water transported over the land surface to stream channels and through various soil zones down to the groundwater aquifers. HSPF can produce a time history of water quantity at any point in the watershed. HSPF will be used in the Nueces River Basin watershed to simulate streamflow and groundwater recharge for current and possible future scenarios that include flood-control/recharge-enhancement structures.	HH&C CoP 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. Documents will be submitted to the ATR team leader and appropriate technical discipline as soon as they are available. The completed package submitted prior to milestones shall be provided concurrently to the ATR team and vertical team two weeks (14 days) in advance of the milestone meeting.

There will be DQC, ATR, and IEPR for the feasibility report and integrated EA. The timing and scope of these reviews is yet to be determined, but will be documented in the Project Management Plan that is currently being updated to follow the new SMART planning guidance. DQC and ATR of submittal packages and feasibility report materials will be required prior to major milestones. The following table shows preliminary cost estimates to conduct the ATR.

*Note: This study was just rescoped so the PDT is in the process of updating the PMP to incorporate SMART planning guidance. The information for these next two tables will be filled in as details are known.

Product	Status	Date	Est. Cost
Milestone 1		15 Feb	$ 5,000

	2013	
Milestone 2	15 Jan 2014	$ 60,000
Milestone 3	15 May 2014	$ 5,000
Milestone 4	15 Oct 2014	$ 1,000

b. Type I IEPR Schedule and Cost. IEPR Schedule and Cost. IEPR will be completed concurrent with public review following Milestone 2 and upon approval of the vertical team. Type I IEPR is 100% Federal cost, but is included in the project budget. IEPR will be completed on the following documentation:

Product	**Status**	**Date**	**Est. Cost**
Draft Feasibility Report and Integrated Environmental Assessment		13 May 2014	$ 200k

c. Model Certification/Approval Schedule and Cost. PDT has not identified models to be used for the habitat analysis. When models are subsequently identified, the Review Plan will be modified to explain the certification process that will be required.

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 Milestone 1 and prior to Milestone 2. 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 occurring around September 2014. 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: Nueces River Basin 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 through Washington D.C. level review of the final feasibility report expected in late 2015. This includes comments from all ATRs, IEPR 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 SWF 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.

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: Nueces River Basin Project Manager, CESWF-PM-C
  P.O. Box 17300
  Fort Worth, TX 76102

- U.S. Army Corps of Engineers, Southwestern Division
  ATTN: Chief of Planning & Policy Division, CESWD-PDS-P
  1100 Commerce St.
  Dallas, TX 75242

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

- U.S. Army Corps of Engineers, Mississippi Valley Division
  ATTN: ER-PCX Program Manager, CEMVD-PDS-P
  1400 Walnut St.
  Vicksburg, MS 39180

- U.S. Army Corps of Engineers, Southwestern Division
  ATTN: WMRS-PCX Program Manager, CESWD-PDS-P
  1100 Commerce St.
  Dallas, TX 75242

ATTACHMENT 1: TEAM ROSTERS

a. Fort Worth District PDT Members

Discipline	PDT Member	Contact Information
Project Management		
Planning		
H&H		
Civil Design		
Structural Design		
Geotechnical		
Cost Estimating		
Economics		
Recreation		
Cultural		
Environmental		
Environmental		
Real Estate		
HTRW		
Contracting		
Operations		
Regulatory		
Office of Counsel		
GIS		
Mechanical		
Electrical		
Landscape Architect		

c. Non-Federal Sponsor PDT Members

Discipline	PDT Member	Contact Information
Project Management		
Project Management		
Project Management		
Project Management		
Project Management		
H&H		
H&H		
H&H		
H&H		
H&H		
Engineering		
Engineering		
Engineering		
Engineering		
Engineering		
Environmental		

Discipline	PDT Member	Contact Information
Environmental		
Environmental		
Environmental		
Environmental		
Environmental		
Environmental		

d. District Quality Control Team Members (Includes the PDT and the additional personnel listed below.)

Discipline	DQCT Member	Contact Information
Planning		
H&H		
Civil Design		
Structural Design		
Geotechnical		
Cost Estimating		
Economics		
Recreation		
Cultural		
Environmental		
Real Estate		
HTRW		
Regulatory		
GIS		

ATR Team

Discipline	PDT Member	Contact Information
Review Manager		
ATR Lead		
Plan Formulation		
Geotechnical		
H&H		
Civil Design		
Structural Design		
Cost Estimating		
Economics		
Cultural Resources		
Environmental		
Real Estate		
HTRW		

c. IEPR Panel Members

Discipline	PDT Member	Contact Information
Economics	TBD	
Environmental	TBD	

Discipline	PDT Member	Contact Information
Hydraulics	TBD	

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECSION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the *<type of product>* for *<project name and location>*. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-209. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks[sm].

SIGNATURE _____ _____

Name Date
ATR Team Leader
Office Symbol/Company

SIGNATURE _____ _____

Name Date
Project Manager
Office Symbol

SIGNATURE _____ _____

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

SIGNATURE _____ _____

Name Date
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 _____ _____

Name Date
Chief, Engineering Division
Office Symbol

SIGNATURE _____ _____

Name
Chief, Planning Division
Office Symbol

Date

[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	Update using latest PCX approved template	All

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

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