



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, SOUTH ATLANTIC DIVISION  
60 FORSYTH STREET SW, ROOM 10M16  
ATLANTA GA 30303-8801

CESAD-CG

28 OCT 2016

MEMORANDUM FOR Commander, Jacksonville District

SUBJECT: Loxahatchee River Watershed Restoration Project, Jacksonville District,  
Review Plan – Request for Review Plan Approval

1. References:

- a. Memorandum, CESAJ-PD, 28 April 2015, subject as above.
- b. Engineer Circular 1165-2-214, 15 December 2012, Civil Works Review.
- c. Planning Bulletin PB 2016-02, Civil Works Review, 4 March 2016.

2. Jacksonville District prepared the enclosed review plan for the Project Implementation Report on the Loxahatchee River Watershed Restoration Project in accordance with Engineer Circular 1165-2-214. Jacksonville District coordinated preparation of the review plan with the National Ecosystem Restoration Planning Center of Expertise (ECO-PCX) of the Mississippi Valley Division, which is the lead office to execute this review plan. The ECO-PCX recommended approval of the review plan. The review plan includes Independent External Peer Review. The HQUSACE Model Certification Panel approved the planning models to be used in this study.

3. I hereby approve this Review Plan, which is subject to change as circumstances require, consistent with study development under the Project Management Business Process. Subsequent significant revisions to this Review Plan or its execution will require new written approval from this office. The District shall post the approved Review Plan and a copy of this approval memorandum to the SAJ District public internet website and provide a link to the ECO-PCX for their use. Before posting to the website, the names of Corps employees should be removed.

4. The point of contact for this action is Mr. [REDACTED] at (404) 562-5226 or [REDACTED]@usace.army.mil.

[REDACTED]  
[REDACTED]  
Brigadier General, USA  
Commanding

# **REVIEW PLAN**

**CENTRAL AND SOUTHERN FLORIDA PROJECT  
COMPREHENSIVE EVERGLADES RESTORATION PLAN  
Loxahatchee River Watershed Restoration Project  
Integrated Project Implementation Report and Environmental Impact  
Statement**

**Jacksonville District**

**MSC Approval Date: 28 October 2016  
Last Revision Date: None**



**US Army Corps  
of Engineers®**

**REVIEW PLAN**

**CENTRAL AND SOUTHERN FLORIDA PROJECT  
COMPREHENSIVE EVERGLADES RESTORATION PLAN**

**Loxahatchee River Watershed Restoration Project  
Integrated Project Implementation Report and Environmental Impact Statement**

**TABLE OF CONTENTS**

<b>1. PURPOSE AND REQUIREMENTS .....</b>	<b>1</b>
<b>2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION.....</b>	<b>1</b>
<b>3. STUDY INFORMATION .....</b>	<b>2</b>
<b>4. DISTRICT QUALITY CONTROL (DQC) .....</b>	<b>6</b>
<b>5. AGENCY TECHNICAL REVIEW (ATR).....</b>	<b>7</b>
<b>6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR).....</b>	<b>10</b>
<b>7. POLICY AND LEGAL COMPLIANCE REVIEW .....</b>	<b>13</b>
<b>8. COST ENGINEERING DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION.....</b>	<b>13</b>
<b>9. MODEL CERTIFICATION AND APPROVAL .....</b>	<b>13</b>
<b>10. CONSOLIDATED REVIEW SCHEDULES AND COSTS .....</b>	<b>17</b>
<b>11. PUBLIC PARTICIPATION .....</b>	<b>18</b>
<b>12. REVIEW PLAN APPROVAL AND UPDATES.....</b>	<b>18</b>
<b>13. REVIEW PLAN POINTS OF CONTACT.....</b>	<b>18</b>
<b>ATTACHMENT 1: TEAM ROSTERS .....</b>	<b>1</b>
<b>ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS.....</b>	<b>1</b>
<b>ATTACHMENT 3: REVIEW PLAN REVISIONS .....</b>	<b>1</b>

## 1. PURPOSE AND REQUIREMENTS

**a. Purpose.** This Review Plan defines the scope and level of peer review for the Integrated Project Implementation Report and Environmental Impact Statement for the Central and Southern Florida Project Comprehensive Everglades Restoration Plan Loxahatchee River Watershed Restoration Project (LRWRP). This project was formerly known as North Palm Beach County – Part 1.

### **b. References**

- (1) Engineer Circular (EC) 1165-2-214, Civil Works Review, 15 Dec 2012
- (2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
- (3) Engineer Regulation (ER) 1110-1-12, Quality Management, 21 July 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) Loxahatchee River Watershed Restoration Plan Project Management Plan, Last updated (draft) January 2015
- (6) Enterprise Standard (ES)-08101, Software Validation for the Hydrology, Hydraulics, and Coastal Community of Practice, 01 Jun 2011
- (7) Jacksonville District and South Atlantic Division Quality Management Plans

**c. Requirements.** This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning models are subject to certification/approval (per EC 1105-2-412). Guidance on quality assurance for engineering models is contained in ER 1110-2-1150, Engineering and Design for Civil Works Projects.

## 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 Ecosystem Restoration Planning Center of Expertise (ECO-PCX) since the primary purpose of the LRWRP is ecosystem restoration.

In cases such as this where the Type I IEPR includes SAR, the PCX will coordinate with the USACE RMC in developing the ATR and IEPR charges.

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to conduct ATR of cost estimates, construction schedules and contingencies. LRWRP is a single-purpose ecosystem restoration project. Therefore, coordination with other centers of expertise is not contemplated at this time.

### 3. STUDY INFORMATION

- a. **Decision Document.** The decision document is the Integrated Project Implementation Report (PIR) and Environmental Impact Statement (EIS) for the Central and Southern Florida Project, Comprehensive Everglades Restoration Plan, Loxahatchee River Watershed Restoration Project (LRWRP). This study will evaluate ecosystem problems and restoration opportunities in portions of Palm Beach County and Martin County, Florida. Approval for the Integrated PIR and EIS will be by the Chief of Engineers. Congressional authorization will be required in order to construct the project components. The Integrated Environmental Impact Statement will be included for compliance with the National Environmental Policy Act (NEPA).
  
- b. **Study/Project Description.** The LRWRP, a single-purpose ecosystem restoration project, was approved by Congress in the Water Resources Development Act of 2000 as a part of the Comprehensive Everglades Restoration Plan (CERP). The non-federal sponsor for LRWRP is the South Florida Water Management District. The project is located in northern Palm Beach and southern Martin Counties, Florida. The study area consists of approximately 753 square miles. The project area is bounded by the C-44 Canal to the north, the C-51 Canal to the south, the L-8 Canal to the west and the Loxahatchee River Estuary and the Lake Worth Lagoon to the east (Figure 1). The LRWRP wetland areas once formed an unbroken hydrologic connection where water was historically captured inland during the rainy season and slowly released to receiving coastal waters, specifically the Northwest Fork of the Loxahatchee River (NWFLR), the Loxahatchee River Estuary and the Lake Worth Lagoon. Channelization of naturally existing water ways for urban growth, agriculture, and flood control has generated unintended adverse effects upon the unique natural environmental that constitutes the Everglades and the south Florida ecosystem. Inland wetlands that once stored large amounts of water for slow release during the dry season have been drained and the regional water table lowered. Without this natural inland storage to supplement dry season flows, coastal areas now receive an excess of water in the wet season and too little in the dry season. The intent of the project is to help restore the project area's ability to capture and store excess surface waters currently lost to tide, and allow this stored water to be released and routed in a manner better resembling predevelopment patterns of surface water flows, in an effort to rehydrate the project area's wetlands, provide adequate flows to the Northwest Fork of the Loxahatchee River, and to reduce impacts to the area's estuarine ecosystems.

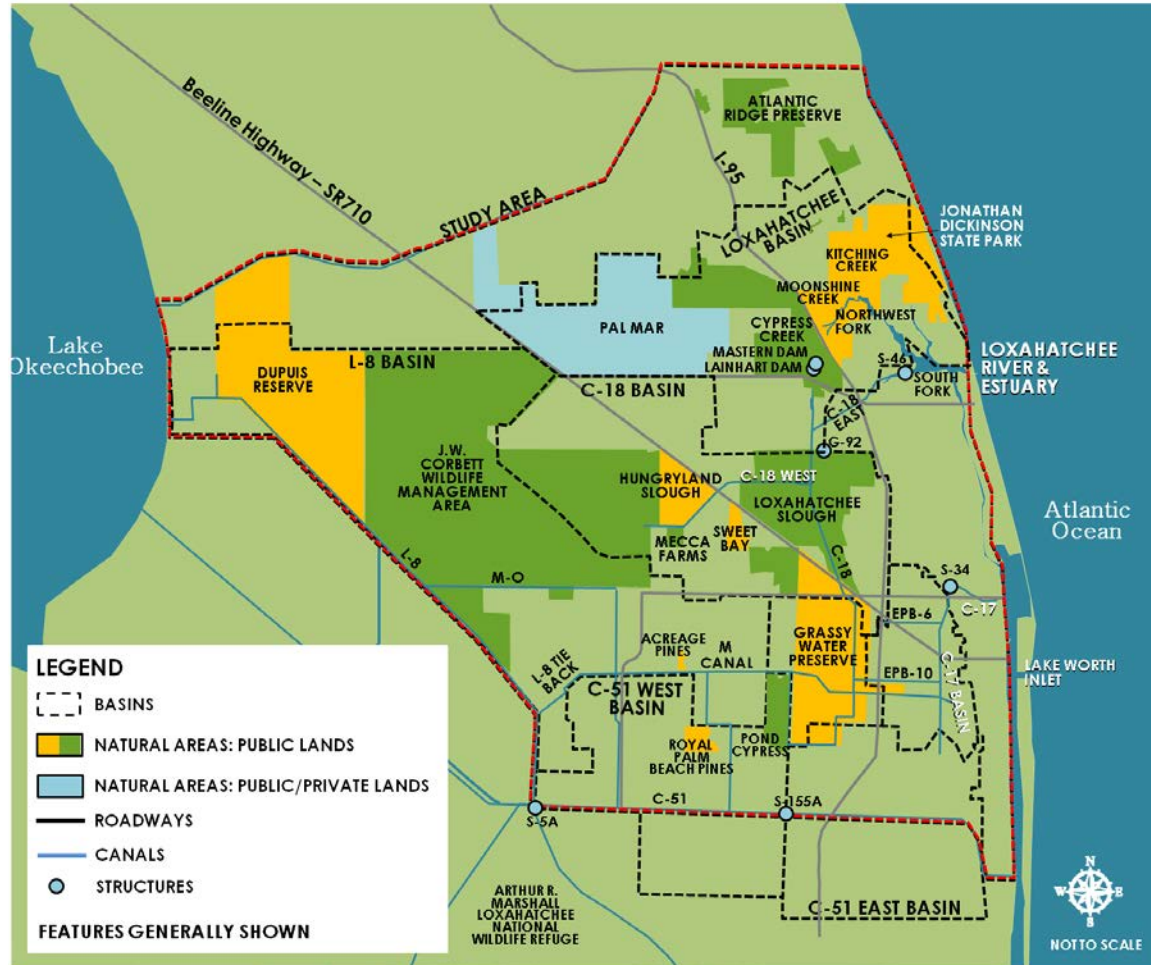


Figure 1. Loxahatchee River Watershed Restoration Plan study area

**c. The general overall purposes of the LRWRP are as follows:**

- Improve the quantity and timing of freshwater deliveries to the North West Fork Loxahatchee River and Loxahatchee Slough by capturing and storing excess fresh water flows inland.
- Reduce ecologically harmful, high discharges and sedimentation loading to the Loxahatchee Estuary.
- Restore hydrologic and spatial connectivity to increase the extent of natural areas within the Loxahatchee River Watershed.

The earlier planning effort, North Palm Beach County - Part 1, identified nearly 200 preliminary Management Measures to explore all potential possibilities to meet project goals and objectives. Management measures fell into four categories; areas of reservoir/wetland water storage; water treatment via storm water treatment areas and wetlands; water conveyance improvements via canal improvements, pump stations and sheet flow restoration; and supplemental features including sediment capping, sediment trapping, and artificial oyster reef associated with estuarine restoration. Prior planning efforts screened the management measures to identify several alternatives. Final alternatives have not been formulated. Cost for a recommended plan is estimated to be between \$150M and \$700M.

**d. Factors Affecting the Scope and Level of Review.** This section discusses factors pertinent to the risk informed decisions on the appropriate scope and level of review. The discussion is intended to be detailed enough to assess the level and focus of review needed to support the PDT, PCX, and vertical team decisions. The discussion will help to determine the types of expertise required on the various review teams to adequately review the document. The

- Is total project cost estimated to exceed \$200M?

Yes, between \$150M-\$700M.

- Does the project pose significant technical, institutional, social, or other challenges?

Yes. This is a technically complex, multi-component project with significant institutional interest, typical of any geographically large complex ecosystem restoration project.

- Where are significant project risks likely to occur and at what magnitude (e.g., what are the uncertainties and how might they affect the success of the project)?

Risks associated with maintenance of existing authorized levels of flood damage reduction will be modeled and subjected to adaptive management, such that the level of risk is expected to be low. Water treatment via wetlands, as well as water conveyance improvements via canal modifications and pump stations is routine, proven aspects of the operation and modification of the existing Central and Southern Florida Project, offering insignificant additional risk. Economic, environmental and social effects are expected to be positive, in that more water will be available to manage the ecosystem, with improved operational capability and flexibility to balance and adaptively manage the project benefits.

- The project faces water quality constraints with water routed around Grass Waters Preserve.
  - Grassy Waters Preserve: Concerns have been expressed about routing large flows of water northward through, via M canal, and/or around this wetland system. Grassy Waters Preserve exhibits low levels of phosphorus (10 to 20 parts per billion (ppb)) in the interior with higher concentrations along the M canal. Phosphorus concentrations in the proposed flow may be influenced by L-8 basin runoff and Lake Okeechobee flows. Prior Watershed Assessment Model (WAM) modeling has indicated that a sustained flow of 60 cubic feet per second (cfs) meets target concentrations of 10 ppb in the interior, but this sustained flow does not allow for project targets, dry season minimum flow of 69 cfs at Lainhart Dam, to be met in the northern restoration areas (Loxahatchee Slough and North West Fork Loxahatchee River).

- Is the project likely to have significant economic, environmental, and/or social effects to the Nation?

Yes. However, significant effects are expected to be positive ecosystem restoration benefits. Any negative environment and social effects are expected to be insignificant and short-term, associated with construction activities.

- Does the project likely involve significant threat to human life/safety assurance?

A Tentatively Selected Plan (TSP) may change flow patterns for environmental restoration of wetlands in the north eastern project area. However, it is anticipated that the local communities will benefit from the incidental reduction of flooding events due to lowered canal stages and fewer inputs avoiding significant threat to human life/safety.

- Is the project/study likely to have significant interagency interest?

Yes.

- Is the project/study highly controversial (with some discussion as to why or why not and, if so, in what ways)?

Yes. A storage reservoir will likely be needed for some of the project alternatives. The size and location has not been determined. There may be landowner resistance. There is concern based on the earlier NPBC-1 analysis that the LRWRP may not be able to produce as much restoration in the coastal estuaries as some stakeholders expect. There may also be concerns that the project will only maintain existing levels of flood damage reduction but will not decrease the level of flood risk for communities within the project area. Additionally, there may be concern regarding water supply needs identified in the Comprehensive Everglades Restoration Plan (CERP).

- Is the project/study likely to contain influential scientific information or be a highly influential scientific assessment (with some discussion as to why or why not and, if so, in what ways)?

No. It is not anticipated that the project/study has, or will have, a clear and substantial impact on important public policies or private sector decisions.

- Is there information in the decision document or proposed project design that will likely be based on novel methods, involve the use of innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices (with some discussion as to why or why not and, if so, in what ways)?

No. Existing methods and techniques were adopted to develop and evaluate the alternatives.

- Will the proposed project design require redundancy, resiliency, and/or robustness (with some discussion as to why or why not and, if so, in what ways – see EC 1165-2-214, Appendix E, Paragraph 2 for more information about redundancy, resiliency, and robustness)?

The project design would also require redundancy; throughout the entire system “backup” structures may be implemented to ensure operations of critical structures, and will be established in the Design phase. Designs will also comply with the USACE/SFWMD Design Criteria Memorandum 2, Wind and Precipitation Design Criteria for Freeboard.



- Does the proposed project have unique construction sequencing or a reduced or overlapping design construction schedule (with some discussion as to why or why not and, if so, in what ways)?

Yes. Some project features that may be part of the TSP have already been designed and constructed by SFWMD. This work was initiated after the start of the NPBC-1 study but before approval of the PIR. These features were part of the restoration plan at that time. They may be considered creditable under the CERP Design Agreement, if required as part of the TSP:

- G-161 and G-160 Water Control Structures – SFWMD completed construction of these two structures before 2007. Purpose: G-161 allows flows from Grassy Waters Preserve into the triangle area to the north and then to the C-18 canal. G-160 is located within the C-18 canal south of its confluence with C-18W. It allows for control of stages within Loxahatchee Slough, and the release water northward for flow through G-92 to Lainhart Dam via SIRWCD canal C-14.

However, the project does not anticipate an unusual timeline for construction of the remainder of the project features. Currently, the Project Implementation Report is scheduled to be approved in 2018, construction to initiate in 2021 and construction to be completed in 2026.

- e. **In-Kind Contributions.** Products and analyses provided by the non-Federal sponsor as in-kind services are subject to DQC and may be subject to ATR and IEPR. The non-Federal sponsor, the South Florida Water Management District, will perform the majority of the hydrologic modeling and the ecological benefits calculations. The Jacksonville District will provide or manage DQC; the ECO PCX will manage ATR and IEPR services. All products, regardless of attributions will be subjected to the full range of quality control that is appropriate for the product.

#### 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. DQC will not be performed by the same people who perform the original work. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District.

- a. **Documentation of DQC.** DQC will usually be documented by memorandum for record (MFR). DQC documentation will be provided to the ATR and IEPR teams at each review.
- b. **Products to Undergo DQC.** At a minimum, the Draft and Final Project Implementation Reports and EIS, with technical appendices, will be submitted to DQC prior to formal ATR. DQC of interim products, in a “continuous” process, will be documented at least by memorandum. Continuous DQC will generally be of limited scope and managed by the office generating the work product.
- c. **Required DQC Expertise.** Experienced Jacksonville District team members, representing all pertinent disciplines, will participate in DQC, including: plan formulation, economics,

environmental compliance, engineering design, hydraulics and hydrology, geotechnical engineering, cost engineering and real estate.

**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 US Army Corps of Engineers (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 a designated Review Management Organization (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. To assure independence, the leader of the ATR team shall be from outside the home MSC.

**a. Products to Undergo ATR.** ATR will be performed, at a minimum, on all products subjected to formal review outside of the Jacksonville District, in this case, including the Draft Integrated PIR/EIS and Final Integrated PIR/EIS. Leading up to review of the Draft PIR, where practicable, technical products that support subsequent analyses will be reviewed prior to being used in the study and may include: Study Area Description, Purpose and Scope, Study Authority, Federal Interest and USACE Interest, Future Without Project condition, Problems and Opportunities, Plan Formulation including Modeling Strategy and Formulation Strategy, geotechnical investigations, economic, environmental, cultural, and social inventories, cost estimates, etc.

**b. Required ATR Team Expertise.** The ATR team will be finalized by the ECO-PCX and is comprised of individuals from all the technical disciplines that were significant in the preparation of the report. Proposed ATR team members are listed in Attachment 1. Technical disciplines determined to be appropriate for this review include: Plan Formulation, Economics, Environmental Resources, NEPA Compliance (e.g., NEPA documentation preparation), Hydrology and Hydraulics (H&H), H&H Modeling, Geotechnical Engineering, Civil Engineering Design, Cost Estimating, Water Control, and Real Estate. The following table provides a description of suggested expertise.

Skilled and experienced personnel who have not been associated with the development of the study products perform the ATR. ATR team members may be employees of U.S. Army Corps of Engineer Districts, other Federal agencies, state or local government agencies, universities, private contractors or other institutions. The key factor is extensive, expert knowledge in their field of expertise. One of the engineering disciplines will include a person qualified to conduct Safety Assurance Review.

<b>ATR Team Members/Disciplines</b>	<b>Expertise Required</b>
ATR Lead	The ATR lead will 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. Typically, the ATR lead will also serve as a reviewer for a

ATR Team Members/Disciplines	Expertise Required
	specific discipline (such as planning, economics, environmental resources, etc.).
Planning	The Planning reviewer will be a senior water resources planner with a minimum of 5 years demonstrated experience in large scale component based ecosystem restoration and benefit development.
Economics	The economics reviewer will be a senior economist with a minimum of 10 years demonstrated experience evaluating ecosystem restoration project benefits and costs. Experience with evaluating the appropriateness of cost effectiveness and incremental cost analysis (CE/ICA), as applied to dollar costs & ecosystem restoration benefits; familiarity with the USACE tool IWR-PLAN is required. Experience in identifying incidental benefits (preferably flood risk management and water supply) is required.
Environmental Resources/NEPA Compliance	Environmental Resources reviewer will be a senior biologist/ecologist/environmental engineer, preferably with a minimum of 10 years demonstrated experience in ecosystem restoration and familiarity with freshwater, coastal and estuarine systems. Should be able to review for NEPA compliance (including cultural resources coordination) and quality and applicability of ecosystem benefits evaluations.
Hydrology, Hydraulic Engineering and Modeling	This reviewer will be a senior hydraulic engineer with a minimum of 10 years demonstrated experience in the field of hydrology, hydraulics and H&H modeling, including a general knowledge of south Florida hydrology and water management. The reviewer(s) should have a thorough understanding of water storage and conveyance and sediment control and be knowledgeable of associated hydrologic and hydraulic model applications, with the ability to understand the application of LECsR (MODFLOW-based with custom packages), S2DMM, HEC RAS, SMS, RMA2, RMA4, WAM to south Florida conditions.
Geotechnical Engineering	Experience in geotechnical aspects of water storage and conveyance features, with familiarity of south Florida geology. An understanding of local geology, including aquifer characteristics and ground water quality, would be ideal. A minimum of 10 years demonstrated experience is required.
Civil Engineering	Experience in engineering/construction management for water storage and conveyance in both structural and non-structural systems, wetland restoration, and sediment control. A minimum of 10 years demonstrated experience is required.
Cost Engineering	Approved by the Cost DX
Real Estate	Senior real estate specialist experienced in contributing to large civil works projects to include environmental restoration projects. A minimum of 5 years demonstrated experience is preferred. The Real Estate reviewer must have expertise in the real estate planning process for cost shared and full federal civil works projects, relocations, report preparation and

ATR Team Members/Disciplines	Expertise Required
	acquisition of real estate interests. The reviewer should have a full working knowledge of EC 405-2-12, Real Estate Planning and Acquisition Responsibilities for Civil Works Projects, the portions of ER 405-2-12 that are currently applicable, and Public Law 91-646. The reviewer should be able to identify areas of the REP that are not in compliance with the guidance set forth in EC 405-2-12 and should make recommendation for bringing the report into compliance. All estates suggested for use should be termed sufficient to allow project construction, and the real estate cost estimate should be validated as being adequate to allow for real estate acquisition.
Water Quality	The panel member should be familiar with large, complex civil works projects with high visibility to the public with competing interests amongst various stakeholders and regulatory agencies. The member should be experienced with Florida State and Federal laws and regulations related to air, water quality, nutrient loading and TMDLs. Additionally, the member should have technical experience with the subject matter, water quality modeling/analysis (Watershed Assessment Model – developed by the Environmental Protection Agency), downstream effects due to water quality and some familiarity of salinity intrusion and how this may impact freshwater impoundments.

**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 when there appears to be incomplete or unclear information, ATR team members 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 draft report and final report. A sample Statement of Technical Review is included in Attachment 2.

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

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

- **Type I IEPR.** Type I IEPR is required for all decision documents except where no mandatory triggers apply, criteria for an exclusion are met, and a risk-informed recommendation justifies exclusion. 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 an biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all the underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during

project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.

- Type II IEPR. Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.
- a. **Decision on IEPR.** A Type I IEPR will be conducted for this Integrated PIR and EIS. A Safety Assurance Review will also be addressed during the Type I IEPR and will address the questions in Paragraph 2.c.(3) of Appendix D of EC 1165-2-214. This is a large, technically complex, multi-component ecosystem restoration project with significant institutional interest and involves impacts to flood damage reduction. The project cost is estimated to be between \$150M and \$700M. This decision on Type II IEPR for the design and construction phase of this project will be reassessed prior to the start of the design phase in an updated Implementation Phase Review Plan..
  - b. **Products to Undergo Type I IEPR.** The Draft Integrated Project Implementation Report and EIS including technical appendices will be reviewed.
  - c. **Required Type I IEPR Panel Expertise.** Each panel member will be a professional from academia, a public agency, consulting firm, or similar vocation with a minimum of 10 years demonstrated experience in his/her area of expertise. Panel members should be familiar with large, complex civil works projects with high public and interagency interests.

<b>IEPR Panel Members/Disciplines</b>	<b>Expertise Required</b>
Economics	The panel member will be familiar with large, complex civil works projects with high public and interagency interests; experienced with evaluating the appropriateness of cost effectiveness and incremental cost analysis (CE/ICA), as applied to dollar costs & ecosystem restoration benefits; familiar with the USACE tool IWR-PLAN; able to ascertain computational accuracy of spreadsheets and able to identify incidental non-ecosystem restoration benefits or be familiar with separable cost/separable benefits analyses.
Aquatic Ecology	The Panel Member will be familiar with large, complex civil works projects with high public and interagency interests; familiar with the ecology of shallow freshwater systems, coastal wetlands and estuarine environments in South Florida and familiar with methods for evaluating ecological benefits in those environments.

<b>IEPR Panel Members/Disciplines</b>	<b>Expertise Required</b>
Design and Construction Cost Engineering	The Panel Member will have demonstrated experience in performing cost engineering/construction management for water storage and conveyance and sediment control. Team member should be familiar with similar projects across US and related Cost Engineering. Experience in associated contracting procedures, total cost growth analysis and related cost risk analysis is desired. Panel member should be familiar with construction industry and practices used in Florida and/or the Southeastern United States.
Hydrology, Hydraulic Engineering and Modeling	This Panel Member will have demonstrated experience in the field of hydrology, hydraulics and H&H modeling. Expertise in all of these areas may require more than one expert to obtain the appropriate mix of skills. The Panel Member(s) should have a thorough understanding of water storage and conveyance and sediment control and be knowledgeable of associated hydrologic and hydraulic model applications, with the ability to understand the application of LECsR (MODFLOW-based with custom packages), S2DMM, HEC RAS, SMS, RMA2, RMA4, WAM to south Florida conditions. This panel member must be qualified to conduct Safety Assurance Review.
Water Quality	The panel member should be familiar with large, complex civil works projects with high visibility to the public with competing interests amongst various stakeholders and regulatory agencies. The member should be experienced with Florida State and Federal laws and regulations related to air, water quality, nutrient loading and TMDLs. Additionally, the member should have technical experience with the subject matter, water quality modeling/analysis (Watershed Assessment Model), downstream effects due to water quality and some familiarity of salinity intrusion and how this may impact freshwater impoundments.

**d. Documentation of Type I IEPR.** The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-214, Appendix D. Panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. 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 work products 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 determine whether the recommendations in the reports, 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 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). Additional guidance pertaining to the process applied by the Hydrology, Hydraulics, and Coastal Community of Practice (HH&C CoP) to use



and validate engineering software for use in planning studies and to satisfy the requirements of the SET initiative are documented in ES-0801.

- a. Planning Models.** The following table contains a comprehensive list of planning models and performance measures, to date, that may be used to evaluate, compare and select a plan. Full details of the methodology were included in the model approval plan provided to the ECO-PCX for review and approval for individual use. The ECO-PCX reviewed the Loxahatchee River Watershed Restoration Project Planning Model and endorsed it for approval on 27 July 2016. USACE HQ Model/IEPR Panel reviewed the Loxahatchee River Watershed Restoration Project Planning Model and approved it for use on 26 August 2016. Schedule and cost is provided in Section 10, below.

<b>Model Name and Version</b>	<b>Brief Description of the Model and How It Will Be Applied in the Study</b>	<b>Certification / Approval Status</b>
Wetlands Benefit Calculation	<p>Habitat units for wetlands in the watershed are based on two performance measures related to habitat connectivity and using the wetland rapid assessment procedure.</p> <p>The habitat connectivity performance measure relates to a number of possible connections made between separate wetlands and relating to various criteria of importance (historic hydrologic linkages, leads to restored hydroperiods, protects water quality, contains natural buffer around connection, contributes to fish and wildlife populations, improves flood management options).</p> <p>The wetland rapid assessment procedure (WRAP) is an index that establishes a numerical ranking for individual ecological and anthropogenic factors (variables) that can influence functionality of a natural system and, in turn, the success of environmental projects. Variables used in the index include wildlife utilization, wetland overstory/shrub canopy, wetland vegetative ground cover, adjacent upland/wetland buffer, field indicators of wetland hydrology, and water quality input and treatment systems. Scores range from 0-3, with 3 being the best score possible. Literature data or model runs on pre-development conditions or non-impacted reference sites were used as the ultimate target to identify a complete functioning wetland (e.g., score of 3). Once scores for all points in a wetland area are identified they are totaled and divided by the total highest score possible to get a value of 0-1. The WRAP scores are then scaled to fit 1.0, .75, .5, .25, and .10 values that can be multiplied by the acreage to determine the habitat units.</p>	<p>Uncertified as of 3 Mar 2016. Approved for single use by USACE HQ Model/IEPR panel on 26 August 2016. Approach is approved by EPA and similar to UMAM that has been approved by USACE.</p>

<b>Model Name and Version</b>	<b>Brief Description of the Model and How It Will Be Applied in the Study</b>	<b>Certification / Approval Status</b>
Loxahatchee River Floodplain Benefit Calculations	HUs based on matching preferred salinity range for several valuable ecosystem components (Tidal swamp, freshwater submerged aquatic vegetation, fish larvae, oysters, and seagrasses) at specific river mile segments consistent with the Northwest Fork of Loxahatchee River Restoration Plan.	Uncertified as of 3 Mar 2016. Approved for single use by USACE HQ Model/IEPR panel on 26 August 2016.
IWR-PLAN Decision Support Software	IWR-PLAN assists with plan formulation by combining user-defined solutions to planning problems and calculating the effects of each combination, or "plan." The program can assist with plan comparison by conducting cost effectiveness and incremental cost analyses, identifying the plans which are best financial investments and displaying the effects of each on a range of decision variables.	USACE Approved: Allowed for Use

- b. Engineering Models.** This is a comprehensive list of engineering models that may be used to evaluate, compare and select a plan. For the final subset, full details of the methodology will be provided to the USACE SET team for review and approval for individual use if not already approved for use. The following engineering models are anticipated to be used in the development of the decision document.

<b>Model Name and Version</b>	<b>Brief Description of the Model and How It Will Be Applied in the Study</b>	<b>Certification / Approval Status</b>
LECsR-NP: SFWMD model software	SFWMD MODFLOW-96 based model with custom packages for south Florida hydrology - 3D groundwater flow and 2D overland flow. Applied during plan formulation for alternative evaluations (relative comparisons). Flows and stages provided for project area for 36 year period of record. Model outputs are provided as inputs to the wetland (stage) and floodplain (flow) benefit planning models.	USACE Approved: Allowed for Use.

<b>Model Name and Version</b>	<b>Brief Description of the Model and How It Will Be Applied in the Study</b>	<b>Certification / Approval Status</b>
S2DMM: Tomasello Consulting Engineers, Version 8Q7S	S2DMM: S2DMM combines two predecessor models, SHEET2D and MASSMOD, which were developed to meet specific needs for south Florida flood routing and water budget analyses. MASSMOD is a water budget routing program that uses MODFLOW and routines from the SFWMD surface water MBR (Multi-Basin Routing) model. The SHEET2D model simulates sheet-flow conditions during design storm conditions in natural and man-made systems. S2DMM may be applied during plan formulation for alternative evaluations (relative comparisons) within the northern portions of the study area. S2DMM will provide flows and stages for the northern hydropattern restoration areas. Model outputs are provided as inputs to the wetland (stage) and floodplain (flow) benefit planning models. Review of the model calibration and applications will be conducted by the Interagency Modeling Center (IMC).	USACE Approved for one time use. Recommend IMC review of application report.
HEC-HMS and HEC-RAS: USACE model software	The HEC-HMS model may be used to simulate the rainfall runoff response within the project area. The HEC-RAS model may be utilized to evaluate natural and manmade channels within the project area. Output from HEC-HMS can be used as input to HEC-RAS to simulate the stages and flows in the C-18 or other waterways under specific design storm events. Outputs from these models are utilized during engineering design to ensure adequate sizing of canals and water control structures.	USACE Approved: Endorsed as Community of Practice (CoP) Preferred.
SMS, RMA2, RMA4	SMS is a graphical user interface for performing surface water simulations. RMA2 and RMA4 are included in SMS. RMA2 is a 2D depth averaged finite element hydrodynamic model while RMA4 is applied for tracking constituent flow in 2D models. These models can be used to evaluate the total phosphorus and total nitrogen in Grassy Waters Preserve under specific flow regimes. These models may be used for screening and design of alternatives but not necessarily for plan comparison.	USACE Approved: Allowed for Use.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
WAM	Primarily a surface water hydrology and water quality tool used to generate pollutant loadings based on watershed hydrology, land use and constituent concentrations. Applied initially with steady state flows; work underway for transient flows. Measures total phosphorus and total nitrogen. Applied for “do no harm” to water quality assessment for total phosphorus and total nitrogen. This model was not used for plan comparison. Review of the modeling products will be conducted by the Interagency Modeling Center (IMC).	Not currently USACE Approved. Model to be used to assess WQ compliance but will not be used during plan comparison. Recommend that it be reviewed by IMC.
OPTI	The OPTI model optimizes integrated sizing and operation of a proposed reservoir in the C-18 basin to meet target restoration flows. The OPTI model was developed with support by the SFWMD to serve as a general decision support tool to replace “trial and error” adjustments to storage capacity and operation. OPTI model input is obtained from LECsR-NP output. The model simulates downstream routing of return flows from the reservoir, and operation of Aquifer Storage Recovery wells and Stormwater Treatment Areas connected to the reservoir.	Model has been USACE approved for one-time use only on this project.

## 10. CONSOLIDATED REVIEW SCHEDULES AND COSTS

- DQC of formulation of alternatives, Completed Mar 2016 (Est. Cost \$10K)
- Planning Model Certification/Approval for Use, Completed Aug 2016 (Est. Cost \$30K)
- Engineering Model Certification/Approval, Completed Jan 2016
- DQC of selection of the TSP, Mar 2017 (Est. Cost \$15K)
- ATR-1: selection of the TSP, Apr 2017 (Est. Cost \$60K)
- DQC of the Draft Report, Jun 2017 (Est. Cost \$25K)
- District Legal Review of the Draft Report, Jun 2017 (Est. Cost \$5K)
- ATR-2: Draft Report, Sep-Oct 2017 (Est. Cost \$70K)
- Public and Agency review of Integrated Draft Report and EIS, Sep-Oct 2017
- Policy and Legal Review by USACE Headquarters and South Atlantic Division, Sep-Oct 2017
- Independent External Peer Review (IEPR), Sep-Oct 2017 (Est. Cost \$200K)
- DQC of the Final Report, Feb 2018 (Est. Cost \$15K)
- District Legal Review of the Final Report, Feb 2018 (Est. Cost \$5K)

- ATR-3: Final Report, Mar 2018 (Est. Cost \$35K)
- Policy and Legal Review by USACE Headquarters and South Atlantic Division, May-Jul 2018
- State and Agency review of the Integrated Final Report and EIS, Sep-Oct 2018

## **11. PUBLIC PARTICIPATION**

As required by EC 1165-2-214, the approved Review Plan will be posted on the District public website (<http://www.saj.usace.army.mil/Missions/CivilWorks/ReviewPlans.aspx>).

The Corps and its local sponsor have continued to engage the public and resource agencies (US Fish and Wildlife Service, Florida Fish and Wildlife Commission, Florida Department of Environmental Protection, etc.) through the planning process. Public reviews of the Draft PIR and Final PIR are listed in Section 10. Availability of the Draft and Final PIR documents will be noticed using the Federal Register, press releases, email notifications, and posting to the Jacksonville District's website and the Everglades Restoration website. The public will have 45 days to provide comments on the Draft report. Comments and PDT responses will be provided to the technical reviewers. The review period for the Final report will be 30 days.

The IEPR final report will be posted to the Jacksonville District website. After responses to IEPR comments have been approved by USACE HQ, the approved responses will be posted to the Jacksonville District website.

## **12. REVIEW PLAN APPROVAL AND UPDATES**

The South Atlantic Division (SAD) Commander is responsible for approving this Review Plan. The MSC 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 will be documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) must 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, will 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:

- Project Manager, Jacksonville District, 904-232-1716
- Everglades Program Manager, South Atlantic Division, 404-562-5206
- Review Management Organization POC, ECO-PCX, 309-794-5448

**ATTACHMENT 1: TEAM ROSTERS**

**PROJECT DELIVERY TEAM (PDT)**

<b>Discipline</b>	<b>Agency</b>	<b>Team Member Name</b>
Project Management	U.S. Army Corps of Engineers (USACE)	
Plan Formulation	USACE	
Real Estate	USACE	
Project Assurances	USACE	
Economics	USACE	
Archaeology/ Cultural Resources	USACE	
Biology/NEPA	USACE	
Hydrologic/Hydraulic Modeling	USACE	
Water Control/Operations	USACE	
Civil Engineering Design	USACE	
Geology	USACE	
Cost Engineering	USACE	
Water Quality	USACE	
Value Engineering	USACE	
Office of Counsel	USACE	
Project Management	South Florida Water Management District (SFWMD)	
Planning, Project Assurances	SFWMD	
Ecology	SFWMD	
Water Quality	SFWMD	
State Compliance	SFWMD	
Hydrologic/Hydraulic Modeling	SFWMD	
Civil Engineering Design	SFWMD	
Water Control	SFWMD	
Biology/Project Assurances	U.S. Fish and Wildlife Service (USFWS)	
Biology/Water Quality	Florida Department of Environmental Protection (FDEP)	

**ATR TEAM**

<b>Discipline/Expertise</b>	<b>Name</b>	<b>District/Division</b>
Eco-PCX Operational Director		MVD
District ATR Coordinator		Jacksonville/SAD
Eco-PCX Account Manager		MVP/MVD
<b>Agency Technical Review Team</b>		
ATR Lead/Eco Rest Plan Formulation		
Environmental Compliance		
Restoration Biologist		
Real Estate		
Civil Design		
Geotechnical		
Hydrology and Hydraulics		
Cost Engineering		

## ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

### COMPLETION OF AGENCY TECHNICAL REVIEW

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

SIGNATURE

Name

ATR Team Leader

Office Symbol/Company

Date

SIGNATURE

Name

Project Manager

Office Symbol

Date

SIGNATURE

Name

Architect Engineer Project Manager<sup>1</sup>

Company, location

Date

SIGNATURE

Name

Review Management Office Representative

Office Symbol

Date

### CERTIFICATION OF AGENCY TECHNICAL REVIEW

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

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

SIGNATURE

Name

Chief, Engineering Division

Office Symbol

Date

SIGNATURE

Name

Chief, Planning Division

Office Symbol

Date

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



