DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SOUTH ATLANTIC DIVISION
60 FORSYTH STREET SW, ROOM 10M15
ATLANTA, GA 30303-8801

REPLY TO
ATTENTION OF

26 JUL 2017

CESAD-DE

MEMORANDUM FOR COMMANDER, MOBILE DISTRICT

SUBJECT: Approval of Review Plan (RP) for Sweetwater Creek, Cobb County, Georgia Flood Risk Management Feasibility Study

1. References:

a. Memorandum, CESAM-PD-FP, 29 May 2017, subject as above.

b. Engineer Circular 1165-2-214, Civil Works Review, 15 December 2012.

c. Planning Bulletin 2016-02, Civil Works Review, 4 March 2016.

2. Mobile District prepared the enclosed review plan in accordance with Engineer Circular 1165-2-214. Mobile District coordinated preparation of the review plan with the Flood Risk Management Planning Center of Expertise (FRM-PCX) of the South Pacific Division, which is the lead office to execute this review plan. The FRM-PCX recommends approval of the review plan. The review plan includes Type I Independent External Peer Review (IEPR).

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 District public internet website and provide a link to the FRM-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. Patrick O'Donnell at (404) 562-5226 or Patrick.e.odonnell@usace.army.mil.

Encl

DIANA M. HOLLAND
Brigadier General, USA
Commanding

REVIEW PLAN

SWEETWATER CREEK , GEORGIA

FLOOD RISK MANAGEMENT FEASIBILITY STUDY

MOBILE DISTRICT

FRM-PCX Endorsement Date: 25 April 2017
MSC Approval Date: 26 July 2017
Last Revision Date: 7 July 2017

US Army Corps
of Engineers ®

REVIEW PLAN

SWEETWATER CREEK, GEORGIA
FLOOD RISK MANAGEMENT FEASIBILITY STUDY

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan (RP) defines the scope and level of peer review for the Sweetwater Creek, Cobb County, Georgia Feasibility Study. This RP is a component of the Project Management Plan (PMP) dated October 2016 (P2# 403024).

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) Sweetwater Creek, Cobb County, Georgia Feasibility Study Project Management Plan, October 2016
6) ER 1110-1-12, Quality Management, 31 March 2011
7) Cost Schedule Risk Analysis Guidance, 17 May 2009
8) Planning Bulletin 2016-02, Civil Works Review,4 March 2016

c. Requirements. This RP was developed in accordance with Engineer Circular (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, 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 model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The Review Management Organization (RMO) for the peer review effort described in this Review Plan is the Flood Risk Management Planning Center of Expertise (FRM-PCX) managed by the South Pacific Division. 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 will coordinate with the Cost Engineering Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules, and contingencies. The RMO will also coordinate with the Risk Management Center as necessary concerning risk expertise needed/wanted on review teams.

3. STUDY INFORMATION

a. Decision Document. The authorized name of the study is Sweetwater Creek, GA. The decision document will be an integrated Feasibility Report (FR) and National Environmental Policy Act (NEPA) documentation. The NEPA document will be an Environmental Assessment (EA). This report will present planning, engineering, and implementation details of the recommended plan for approval by the Chief of Engineers and subsequent Congressional authorization. The purpose of the FR/EA is to document the Project Delivery Team's evaluation of Federal interest in flood risk management to increase net National Economic Development (NED), and public and life safety benefits. The feasibility phase is cost-shared 50 percent Federal and 50 percent non-federal. The non-federal sponsor is Cobb County.

b. Study Area/Project Description. The authority for conducting the feasibility study is contained in House Resolution 2445 of the Committee on Public Works and Transportation of the United States House of Representatives adopted 28 September 1994:

> *"*Resolved by the Committee on Public Works and Transportation of the United States House of Representatives, That the Secretary of the Army is requested to review the reports of the Chief of Engineers on the Apalachicola, Chattahoochee, and Flint Rivers, Georgia and Florida, published as House Document 342, Seventy-sixth Congress, First Session; the Altamaha, Oconee, and Ocmulgee Rivers, Georgia, published as House Document 68, Seventy-fourth Congress, First Session; Alabama-Coosa Rivers, Alabama and Georgia, published as House Document 414, Seventy-seventh Congress, First Session; and other pertinent reports to determine whether modifications of the recommendations contained therein are advisable at the present time, in the interest of environmental quality, water quality, water supply, flood damage reduction, and other purposes including a comprehensive, coordinated watershed master plan for metropolitan Atlanta, Georgia. Such studies should address water quality and flooding associated with stormwater runoff in Nancy Creek, Utoy Creek, North Peachtree Creek, South Peachtree Creek, and other Watersheds in the Fulton, and DeKalb County area, including identification and evaluation of environmental infrastructure and resource protection needs; flood control needs of the Flint River Basin; and water supply needs of the northwest Georgia area.*"*

The study area encompasses the approximately 112 square mile of Sweetwater Creek Watershed within Cobb County, Georgia. It includes the cities of Marietta, Austell, and Powder Springs as well as a portion of unincorporated Cobb County, Georgia. The Study area was divided up by Hydrologic Unit Code (HUC) into 10 watersheds that were named after key portions of the system shown in Figure 1.

- Upper Sweetwater Creek – Sweetwater Creek West of the Cobb and Paulding County Line up to the Gothards Mill Creek confluence
- Lick Log/Mill Creek
- Gothards Mill Creek
- Sweetwater Creek – The portion of Sweetwater Creek in Cobb County downstream of the Gothards Mill Creek confluence
- Powder Springs Creek
- Noses Creek
- Olley Creek
- Buttermilk Creek
- Lower Sweetwater – Sweetwater Creek south of the Cobb and Douglas County Line

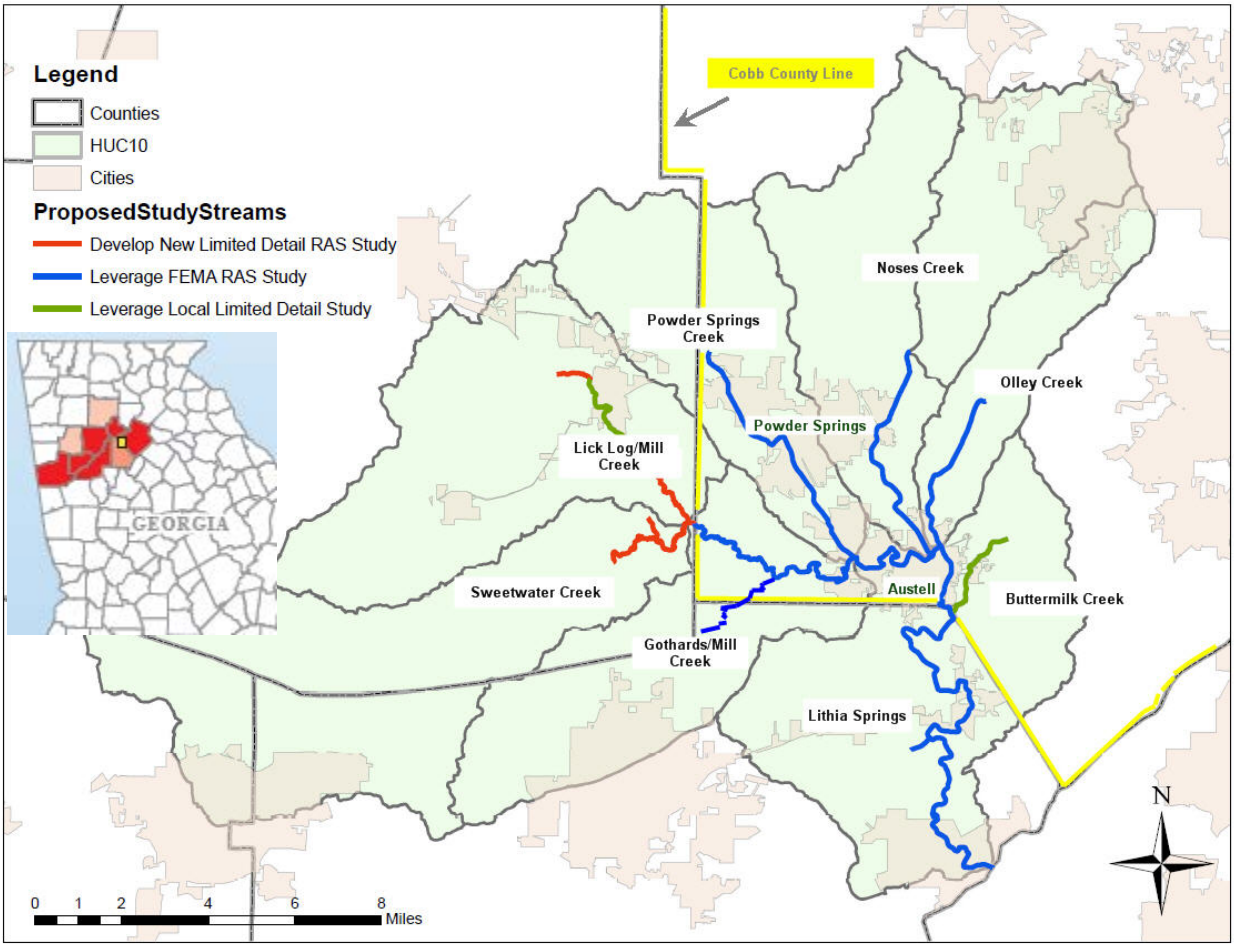

Figure 1 – Study Area Reaches for Sweetwater Creek, Cobb County, Georgia

The study's single purpose is to investigate problems and opportunities and potential alternatives to provide flood risk management (FRM) for Sweetwater Creek. Potential FRM measures include both structural and nonstructural measures. Structural measures may include construction of new levees, channel improvements to increase conveyance capacity, grade control structures, bank stabilization, construction of on-line or off-line detention facilities, widening channels and floodway

areas, dredging, and constructing/modifying weirs and bypasses. Nonstructural floodplain management measures will include assisting the non-Federal sponsor with land acquisitions and relocations in accordance with P.L. 91-646, Uniform Act, as amended, floodplain management and flood warning systems in areas where needed. In addition, flood proofing, retrofitting, dry flood-proofing and/or elevation of structures will be considered. The verticle team has indicated that if the unlikely scenario of voluntary buy-outs are considered over mandatory then benefits should be calculated based on the rate of previous participation in buy-out offers. However, in this case both voluntary and mandatory buyouts will need to be evaluated.

c. Factors Affecting the Scope and Level of Review.

- This study is not expected to encounter technical, institutional, or social challenges over and above a typical feasibility study as the study problems and measures to address the problems are typical to a Flood Risk Management study; and
- A preliminary assessment of project risks (magnitude and uncertainty) include high to medium risk and uncertainty involving assumptions made regarding hydrology inflows into Sweetwater Creek, assumptions about underground conditions including utilities and soils; assumptions regarding accuracy of tax assessor data, as well as limited structure-specific information for non-structural analysis;
- In accordance with EC 1165-2-214, significant threat to human life/safety assurance will be assessed. At this time, the District Chief of Engineering has determined that there are likely to be life safety concerns consistent with most flood risk reduction projects (reference Section 4.d). Structural measures that may be considered can have increased life safety risks in the event of design exceedance or project failure. Project non-performance through exceedance or failure could result in sudden, high velocity floodwaters flowing through an urban area. The potentially impacted area is primarily residential, though it does include some businesses. In addition, since design initiates in the decision document phase, a Safety Assurance Review (SAR) will be incorporated into the Type I IEPR. New water surface elevation/velocity data, including flood warning times, will be developed by the Project Delivery Team (PDT) before the Tentatively Selected Plan (TSP) Milestone to better assess life safety risks.
- If requested by the Governor of Georgia, a peer review of the study by independent experts will occur. The Governor has not requested peer review by independent experts;
- The study is unlikely to involve significant public dispute as to size, nature or effects of the project. The sponsor has been involved with educating the local public and interest groups about future planning for the Sweetwater Creek watershed. The study will include public and stakeholder involvement. Aside from having a potential threat to human life, there is some chance that the study could encounter a high level of public concern, stemming from the high likelihood of cultural resources in the study area. The study will have interagency interest and require close coordination with SHPO and Native

American Tribes. Controversy is not expected; however, may be encountered under cultural resources depending on selected alternative's impact;

- The study is not likely to involve significant public dispute as to economic or environmental cost or benefit to the project since it is not likely to negatively impact the local environment or economy;
- It is not anticipated that the public, including scientific or professional societies, will be asked to nominate potential external peer reviewers.
- The project design is not anticipated to require additional redundancy, resiliency, robustness, or unique construction sequencing.

d. In-Kind Contributions. Products and analyses provided by the non-Federal sponsor as work in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and services to be provided by the non-Federal sponsor include:

- Public involvement; and
- Participation in scoping activities (including public meetings).

A Public Involvement Appendix will be prepared by USACE to document public participation in the study. While the Public Involvement Appendix is not a technical document, it is subject to DQC and ATR, as needed.

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 Mobile District shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Management Plan of the District and MSC.

a. Documentation of DQC. Non-PDT members and/or supervisory staff will conduct DQC review for major draft and final products, including products provided by the non-federal sponsor as in-kind services, following review of those products by the PDT. It is expected that the MSC/District Quality Management Plan (QMP) will address the conduct and documentation of this fundamental level of review. A Quality Control Plan (QCP) is included in the PMP for the subject study and addresses DQC.

The conclusions/agreements reached should be documented, with copies retained by each participant and distributed to the ATR leader and the PDT leader. The documentation shall become part of the project technical review file.

The review team member shall prepare the DQC report that will become part of the review team's records. Specific issues raised in the review shall be documented in a comment, response, discussion, action required, action taken and, if appropriate,

lessons learned format. Unresolved differences between the PDT and review team members shall be documented, along with the basis for the functional Chief's decision on the issue. The software system DrChecks™ will be used for DQC. These reviews shall be completed prior ATR and major decision points in the planning process so that the technical results can be relied upon in setting the course for further study activities.

b. Products to Undergo DQC. All products are subject to DQC. The draft and final FR/EA (decision document), including feasibility level design of the recommended plan and all technical appendices, will undergo DQC prior to release from the District for external review (e.g., ATR, Type I IEPR, Public and Policy Review). There are no technical products, such as models and methodologies, subject to interim DQC prior to their use in the study, but all technical products use, assumptions, and results will undergo DQC. All DQC reviews will be complete and closed out before external reviews are initiated.

c. Required DQC Expertise. Required expertise for DQC will include senior experienced staff from Plan Formulation, Economics, Hydrology & Hydraulics, Environmental and Cultural Resources, Cost Engineering, Geotechnical and Soils Engineering, Civil Design, Real Estate, and Office of Counsel. To ensure this objectivity, the members of the DQC review team must be independent from those who perform the work. DQC reviewers will need to have expertise similar to that outlined for the ATR team in Table 1.

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 U.S. 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 the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR Lead will be from outside the home MSC.

a. Products to Undergo ATR. All products developed in this study will undergo ATR. ATR will be conducted seamlessly, and the ATR team will be engaged early in the study process. Initial study documents include the report synopsis, risk register, and decision management plan. These documents will be provided to the ATR team for informational purposes. Later documents include the draft and final reports, including NEPA documents and supporting technical appendices or memoranda. Where practicable, technical products that support subsequent analyses will be reviewed prior to being used in the study and may include: hydrology & hydraulics,

geotechnical investigations, economic, environmental, cultural, and social inventories, annual damage and benefit estimates, cost estimates, etc. Other than those listed above, there are no interim technical products subject to ATR prior to their use in the study.

b. Required ATR Team Expertise. The Agency Technical Review Team will be comprised of individuals that have not been involved in the development of the decision document and will be chosen based on expertise, experience, and/or skills. The members will roughly mirror the composition of the PDT. The ATR team may consist of as many as 10 reviewers (Table 1). ATR reviewers should be experienced in reviewing products resulting from risk-informed decision making following the SMART Planning process. Not all reviewers will be needed for every stage of review and a single reviewer may serve on the team for multiple disciplines if able. For instance, review of a Real Estate product will not be needed for the without-project documentation. The ATR team members assigned to the study will be included in Attachment 1 once the ATR team is established.

Table 1: Agency Technical Review Team

Discipline	Expertise Needed for Review
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. The ATR lead should also be experienced in the formulation, evaluation, and selection of alternatives for FRM projects. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Plan Formulation	The planning reviewer must be certified to conduct ATR and willbe a senior water resources planner with experience in urban flood risk management.
Environmental Resources	The Environmental Resources reviewer must be certified to conduct ATR and should have extensive experience with environmental evaluation and compliance requirements pursuant to the "Procedures for Implementing NEPA" (ER 200-2-2), national environmental laws and statutes, applicable Executive Orders, and other federal planning requirements for Civil Works projects, including mitigation planning.

Discipline	Expertise Needed for Review
Cultural Resources	The Cultural Resources reviewer (i.e., Archaeologist) will have extensive experience with cultural resource survey methodology, area of potential effects, Section 106 of the National Historic Preservation Act, and state and federal laws/executive orders pertaining to American Indian Tribes.
Hydrology and Hydraulics	The Hydrologist/Hydraulics reviewer will be proficient with river hydraulics, HEC-GeoRAS, HEC-RAS, HEC-HMS and associated one and/or two-dimensional models, floodplain delineation, hydrologic statistics, sediment transport analysis, channel stability analysis, risk and uncertainty analysis, and a number of other closely associated technical subjects.
Geotechnical Engineering and Soils	The Geotechnical reviewer must be familiar with Seep/w and Slope/w models, sampling and laboratory testing, channel/embankment stability and seepage analyses, planning analysis, and a number of other closely associated technical subjects.
Economics	The Economics reviewer must be certified to conduct ATR will have experience with analysis of demographics, land use, and flood damage assessments using HEC-FDA; use of RECONS model to address regional economic development (RED) associated with a project; discussion of other social effects (OSE) associated with flood risk; and economic justification of FRM projects in accordance with current USACE policy.
Civil Design	The Civil Design reviewer will have experience in designing FRM measures and evaluating alternatives in an urban environment.
Cost Engineering[1]	The Cost Engineering reviewer will be identified by the Cost MCX and should have SMART Planning cost estimating experience using required software; working knowledge of construction and FRM; capable of making professional determinations based on experience.
Real Estate	The Real Estate reviewer will have experience in development of SMART Planning Real Estate Plans and have experience in real estate fee/easement acquisition and residential/business relocations for Federal and/or Federally-Assisted Programs as needed for implementation of Civil Works projects.

Discipline	Expertise Needed for Review
Risk Analysis	The Risk Analysis reviewer should be an interdisciplinary team member who can ensure that the decision document includes appropriate identification, analysis and written communication of risk and uncertainty. This discipline may be combined with another review discipline if the reviewer is qualified for both.
Inland Hydrology Climate Change	The climate change assessment reviewer should be experienced in performing and presenting qualitative assessments of climate change information in hydrologic analyses in accordance with ECB 2016-25, Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects and other relevant guidance. This discipline may be combined with another review discipline if the reviewer is qualified for both.

[1]Coordination with the USACE Mandatory Center of Expertise (MCX) located in the Walla Walla District will be conducted as required by EC 1165-2-214.

c. Documentation of ATR. DrChecks™ review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

1) The review concern – identify the product's information deficiency or incorrect application of policy, guidance, or procedures;
2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;
3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, federal interest, or public acceptability; and
4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, 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, ATR Lead, 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) for the Draft and Final FR/EA. A sample Statement of Technical Review is included in Attachment 2.

d. Role of ATR Lead. In addition to facilitating ATR of individual study products, the ATR Lead will be involved throughout the study process. The ATR Lead will review all key study management documents (e.g., risk register, decision management plan, review plan, etc.); participate in all In-Progress Reviews (IPRs) and milestone meetings; advise the PDT on FRM planning policy; and recommend if/when to conduct ATR of products other than those included in the draft and final decision documents.

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 1165-2-214, is made as to whether IEPR is appropriate. Type I IEPR reviews are managed outside the USACE. Panel members will be selected using the National Academies of Science (NAS) policy for selecting reviewers. 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 analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and any models used in the evaluation of environmental impacts of proposed projects. 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 1165-2-214.

- **Type II IEPR.** Type II IEPR, or Safety Assurance Review (SAR), is managed outside the USACE and is 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.

Based on the project as currently envisoned, the District Chief of Engineering, as the Engineer-In-Responsible-Charge, anticipates that a Type II IEPR is expected to be required during the Pre-Construction and Design (PED) and Construction phases of this project. A risk-informed decision concerning the timing and the appropriate level of reviews for the project implementation/construction phases will be prepared and submitted for approval in an updated Review Plan prior to initiation of the design/implementation phase of this project. The District Chief of Engineering, will ensure that any Type II IEPR that is conducted is in accordance with EC 1105-2-214, and will fully coordinate with the Chief of Construction, the Chief of Operations, and the Project Manager through the Pre-Construction Engineering and Design (PED) and Construction phases.

a. Decision on IEPR. Based on a risk-informed decision process, Type I IEPR will be required and will include a SAR. EC 1165-2-214 sets forth thresholds that trigger IEPR. Details of the Type I IEPR risk informed decision summary is provided below:

- The project may involve significant threat to human life (see Section 4.d);
- The NEPA document will be an EA, with no anticipated mitigation;
- The estimated total project cost is not likely to be greater than $200 million;
- The Governor of Georgia has not requested peer review by independent experts;

- It is not anticipated that the public, including scientific or professional societies, will be asked to nominate potential external peer reviewers. This study is not expected to contain influential scientific information nor be a highly influential scientific assessment. The study is unlikely to involve novel methods, present complex challenges to interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing flood risk management practices;
- The project design is not anticipated to require additional redundancy, resiliency, robustness, or unique construction sequencing. The final FR/EA and supporting documentation will contain standard engineering, economic, and environmental analyses and information. The NEPA document will be an EA, with no anticipated mitigation. The estimated total project cost is not likely to be greater than $200 million.
- Aside from having a potential threat to human life, there is some chance that the study could encounter a high level of public concern.

b. Products to Undergo Type I IEPR. Type I IEPR will be performed for the Draft Feasibility Report with integrated NEPA documentation and the supporting technical appendices and analyses concurrent with public and agency review.

c. Required Type I IEPR Panel Expertise. The following provides a description of the proposed IEPR panel members and expertise. The proposed six member panel includes the necessary expertise to assess planning, engineering, environmental, and economic adequacy of the decision document, as required by EC 1165-2-214, Appendix D. Reviewers will be selected by an Outside Eligible Organization (OEO). The likely disciplines and expertise for IEPR are presented in Table 2. Each discipline will review products related to their expertise and focus their review on the previously listed items. Additional technical areas requiring IEPR may be identified during the study/review process. As the time for IEPR approaches, the PDT will further evaluate what expertise is needed based on the PMP and the factors affecting the scope and level of review outlined in Section 3 of the review plan.

Table 2: IEPR Panel Disciplines and Expertise

IEPR Panel Members/Disciplines	Expertise Needed for Review
Plan Formulation	The Plan Formulation panel member should also be an expert in the USACE plan formulation process, procedures, and standards with experience in the evaluation of alternative plans for flood risk management. (Possibly combined with Economics team member)

IEPR Panel Members/Disciplines	Expertise Needed for Review
Economics	The Economics panel member should be a senior Economist with extensive knowledge of cost/benefit analysis for flood risk management. Candidate should be familiar with the USACE flood risk management analysis and economic benefit calculations, including use of standard USACE computer programs including Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA). (Possibly combined with Plan Formulation as one team member)
Environmental Resources	Panel Member should be familiar with the habitat, fish and wildlife species, and tribal cultures and archeology that may be affected by the project alternatives in this study area. Additionally, the panel member should be an expert in compliance with additional environmental laws, policies, and regulations, including compliance in Fish and Wildlife Coordination Act, Endangered Species Act, Section 106 of the National Historic Preservation Act, and state and Federal laws/executive orders pertaining to American Indian Tribes.
Hydrology and Hydraulics	Panel member will be familiar with floodplain mapping, hydrologic statistics, sediment transport analysis, channel stability analysis, and risk and uncertainty analysis. Panel member should also be knowledgeable of southeast riverine hydrology. The team member will be proficient with the Hydraulic Engineering Center River Analysis System (HEC-RAS), Hydrologic Modeling System (HEC-HMS), and HEC-GeoRAS (a set of procedures, tools, and utilities for processing geospatial data in ArcGIS using a graphical user interface (GUI)) models.
Geotechnical Engineering and Soils	The Geotechnical panel member must be familiar with sampling and laboratory testing, channel/embankment stability and seepage analyses, planning analysis, and a number of other closely associated technical subjects.
Civil Design/Cost Engineer	The Civil panel member should be experienced in designing channel modifications, levee systems, earthwork, structural diversion on riverine systems; have working knowledge of construction; and capable of making professional determinations based on experience.

IEPR Panel Members/Disciplines	Expertise Needed for Review
Risk Assessment	The Risk Analysis reviewer should be an interdisciplinary team member who can ensure that the decision document includes appropriate identification, analysis and written communication of risk and uncertainty. This discipline may be combined with one of the other disciplines, such as H&H or Economics.

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 5.c 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.

e. Type II IEPR (SAR). The SAR will be incorporated into the Type I IEPR As required by EC 1105-2-214, Appendix D, paragraph 1.b(1). The Review Panel will consider the following during the Type I IEPR:

1) Is the quality and quantity of the surveys, investigations, and engineering sufficient for a concept design?
2) Are the models used to assess hazards appropriate?
3) Are the assumptions made for the hazards appropriate?
4) Does the analysis adequately address the uncertainty given the consequences associated with the potential for loss of life for this type of project?

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 of 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 & ATR MANDATORY CENTER OF EXPERTISE (MCX) REVIEW & CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering MCX, located in the Walla Walla District. The MCX will assist in determining the expertise needed on the ATR team, and in the development of the review charge(s). The MCX will also provide the Cost Engineering MCX ATR certification. The RMO is responsible for coordination with the Cost Engineering MCX.

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.

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.

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

Table 3: Planning Models*

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
HEC-FDA 1.4 (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 Lower Santa Cruz River to aid in the selection of a recommended plan to manage flood risk.	Certified
IWR-Planning Suite	This software assists with the formulation and comparison of alternative plans. While IWR-PLAN was initially developed to assist with environmental restoration and watershed planning studies, the program can be useful in planning studies addressing a wide variety of problems. IWR-PLAN can assist with plan formulation by combining solutions to planning problems and calculating the additive effects of each combination, or "plan." IWR-PLAN can assist with plan comparison by conducting cost effectiveness and incremental cost analyses, identifying the plans which are the best financial investments and displaying the effects of each on a range of decision variables.	Certified
RECONS	RECONS (Regional ECONomic System) is a Corps corporate model specifically developed to assess the Regional Economic Development (RED) impacts of Corps civil works projects. This model will be used to support discussion of the RED benefits associated with project implementation. The RECONS model will estimate the impacts to the local economy, in terms of income, employment and tax revenues, resulting from project construction.	Certified

* Initial formulation will strive to avoid environmental impacts and, therefore, no mitigation model is included in this table. If environmental impacts are determined to be unavoidable, a mitigation model will be added.

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

Table 4: Engineering Models

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
HEC-HMS v. 4.2	The Hydrologic Modeling System (HEC-HMS) is designed to simulate the complete hydrologic processes of dendritic watershed systems. The software includes many traditional hydrologic analysis procedures such as event infiltration, unit hydrographs, and hydrologic routing. HEC-HMS also includes procedures necessary for continuous simulation including evapo-transpiration, snowmelt, and soil moisture accounting. Advanced capabilities are also provided for gridded runoff simulation using the linear quasi-distributed runoff transform (ModClark). Supplemental analysis tools are provided for parameter estimation, depth-area analysis, flow forecasting, erosion and sediment transport, and nutrient water quality.	H&H Community of Practice (CoP) Preferred Model
HEC-RAS v. 5.0.3 (River Analysis System)	The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for steady flow analysis to evaluate the future without and with-project conditions along the LSCR.	H&H Community of Practice (CoP) Preferred Model
HEC-GeoRAS v. 10.2	HEC-GeoRAS is a set of procedures, tools, and utilities for processing geospatial data in ArcGIS using a graphical user interface (GUI).	H&H Community of Practice (CoP) Preferred Model
Seep/W (if needed)	Seep/W is a finite difference seepage modeling tool. The tool is used to estimate exit seepage gradients due to channel loading and also to estimate pore pressures used in the seepage analysis. Inputs for the tool include cross section geometry and hydraulic boundary conditions, as well as soil layer hydraulic conductivity (including anisotropic ratios, and material property orientation).	Geotechnical CoP Recommended H&H CoP Allowed
Slope/W (if needed)	Slope/W is used to calculate slope stability factors of safety using limit equilibrium methods. Cross section geometry, soil engineering properties and pore water pressures (calculated from Seep/W) are	Geotechnical CoP Recommended

	required inputs to calculate stability factors of safety. The program uses an iterative approach to evaluate thousands of potential slip surfaces that meet input criteria, and the surface with the lowest factors of safety are reported.	Not on the H&H CoP list. Commonly used for Corps projects.
MCACES/Mii	Mii is the second generation of the Micro-Computer Aided Cost Estimating System (MCACES) which is a detailed cost estimating software application used to estimate cost of alternatives and the recommended plan.	Enterprise Model

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost. ATR will be conducted seamlessly throughout the study. During Fiscal Year 2017, the ATR team will be engaged and review documents in advance of the Tentativley Selected Plan Milestone per Table 6 below. After review of the Draft Report (which follows the Tentatively Selected Plan milestone), the ATR Lead will prepare the ATR Review Report. The tentative feasibility study schedule is shown in Table 5 below. The schedule and cost for ATR activities is presented in Table 6. The current cost estimate for both ATR's is $80,000. The ultimate cost for ATR will be negotiated with the PCX and the ATR team.

Table 5: Milestone Schedule

Milestone	Timing
FCSA Execution	25 May 2016
Alternatives Milestone (CW261)	6 Dec 2016
Tentatively Selected Plan (CW262)	17 Oct 2017
Agency Decision Milestone (CW263)	30 May 2018
Division Commander's Transmittal (CW260)	30 Nov 2018
Civil Works Review Board (CW245)	30 Jan 2019
Chief's Report (CW270)	29 Apr 2019

Table 6: Schedule and Cost for Agency Technical Review

Task	Date	Estimated Cost
ATR of draft FR/EA Prior to Agency Decision Milestone (ADM)	OCT 2017	$60,000*
ATR of final FR/EA (After ADM and at conclusion of Feasibility Level Design)	AUG 2018	$20,000

* Note: This cost includes the ATR Lead involvement in milestones and in-progress reviews prior to the ATR of the draft FR/EA.

b. Type I IEPR Schedule and Cost. The IEPR schedule and cost estimate is presented in Table 7.

Table 7: Schedule for IEPR

Task	Date	Estimated Cost
FRM-PCX Initial Coordination of IEPR	NOV 2016	$3,000
RMO Management of IEPR	SEP 2017 - FEB 2018	$25,000
Type I IEPR of draft FR/EA (prior to Agency Decision Milestone)	OCT 2017	$120,000

c. Model Certification/Approval Schedule and Cost. At this time there are no models requiring certification for this study.

11. PUBLIC PARTICIPATION

The public will be invited to comment directly to the PDT through informal and formal public scoping meetings, workshops/open houses, and public review comment periods programmed into the feasibility schedule. This includes a public review of the draft FR/EA. Public review occurs concurrently with ATR, IEPR, and HQUSACE policy reviews. Public input will be made available to the IEPR team to ensure public comments have been considered in development of the draft and final FR/EA. Public workshops will be held during the public and agency review period. Formal State and Agency review will occur following the Civil Works review Board Milestone. Upon completion of the review period, comments will be consolidated in a matrix and addressed, if needed. A summary of the comments and resolutions will be included in the Public Involvement Appendix.

This Review Plan will be posted to the District web site for public review once it is approved by the MSC.

12. REVIEW PLAN APPROVAL AND UPDATES

The South Atlantic Division (SAD) 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 will be documented using Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) will be 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 will 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:

- Mobile District: Senior Planner, (251) 694-3863
- South Atlantic Division: Senior Plan Formulator, South Atlantic Division, (404) 562-5226
- Flood Risk Management Planning Center of Expertise: Program Manager, PCX Flood Risk Management, (415) 503-6852

ATTACHMENT 1: TEAM ROSTERS

PROJECT DELIVERY TEAM

Name	Discipline	Phone	Email
	Project Manager		
	Lead Planner		
	Environmental/Biologist		
	Hydrology & Hydraulics / Project Engineer		
	Economics		
	Cost Engineer		
	Value Engineering Officer		
	Real Estate Specialist		
	Cultural Resources		
	Geotechnical Engineer		
	Structural Engineer		
	Office of Counsel		
	Office of Counsel - RE		

AGENCY TECHNICAL REVIEW TEAM

Name	Discipline	Phone	Email
TBD	ATR Lead		
TBD	Plan Formulation		
TBD	Environmental Resources		
TBD	Cultural Resources		
TBD	Hydrology & Hydraulics		
TBD	Geotechnical Engineering		
TBD	Economics		
TBD	Civil Design		
TBD	Cost Engineering MCX		
TBD	Real Estate/Lands		
TBD	Risk Analysis		

INDEPENDENT EXTERNAL PEER REVIEW PANEL

Name	Discipline	Phone	Email
TBD	Plan Formulation		
TBD	Environmental Resources		
TBD	Hydrology and Hydraulics		
TBD	Geotechnical Engineering		
TBD	Economics		
TBD	Civil Design/Cost		

VERTICAL TEAM

Name	Discipline	Phone	Email
	Senior Plan Formulator, South Atlantic Division (SAD)		
	Regional Integration Team (RIT)		

PLANNING CENTER OF EXPERTISE FLOOD RISK MANAGEMENT

Name	Discipline	Phone	Email
	Program Manager, PCX Flood Risk Management		

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 and, subsequently, 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[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 Date
Chief, Planning Division
Office Symbol

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

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number