



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

27 APR 2017

CESAD-RBT

MEMORANDUM FOR COMMANDER, JACKSONVILLE DISTRICT

SUBJECT: Approval of Review Plan for the Implementation Documents for Upper Legion Dam Repair, Lower Legion Dike Repair, and Twin Dam Removal, Fort Jackson, South Carolina

1. References:

a. Memorandum, CESAJ-EN-Q, 10 March 2017, Subject: Approval of Review Plan for Preconstruction, Engineering, and Design Phase Implementation Documents for Upper Legion Dam Repair, Lower Legion Dike Repair, and Twin Dam Removal, Fort Jackson, South Carolina (Encl).

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

2. The Review Plan (RP) for the Plans and Specifications and Design Documentation Report for the subject project submitted by the Jacksonville District via reference 1.a and endorsed by the Risk Management Center (RMC) has been reviewed by this office and is hereby approved in accordance with reference 1.b above.

3. The RMC will serve as the Review Management Organization for the Upper Legion Dam Repairs, Lower Legion Dike Repair, and Twin Dam Removal Project. SAD concurs with the conclusion of the Jacksonville District and the RMC that a Type II Independent External Peer Review (IEPR) as identified in the RP is not required on the design efforts for this project.

4. The District should take steps to post the approved RP to its web site and provide a link to CESAD-RBT and the RMC Senior Review Manager (██████████). Before posting to the web site, the names of Corps/Army employees should be removed. Subsequent significant changes to this RP, such as scope changes or level of review, should they become necessary, will require new written approval from this office.

CESAD-RBT

SUBJECT: Approval of Review Plan for the Implementation Documents for Upper Legion Dam Repair, Lower Legion Dike Repair, and Twin Dam Removal, Fort Jackson, South Carolina

5. The SAD point of contact is [REDACTED]

Encl

[REDACTED]
[REDACTED]
Brigadier General, USA
Commanding

CF:

[REDACTED]
[REDACTED]
[REDACTED]



DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
701 SAN MARCO BOULEVARD
JACKSONVILLE, FLORIDA 32207-0019

CESAJ-EN-Q

10 MAR 2017

MEMORANDUM FOR Commander, South Atlantic Division (CESAD-RBT), 60 Forsyth Street SW 10M15, Atlanta, GA 30303

SUBJECT: Approval of Review Plan for Preconstruction, Engineering, and Design Phase Implementation Documents for Upper Legion Dam Repair, Lower Legion Dike Repair, and Twin Dam Removal, Fort Jackson, South Carolina

1. I hereby request approval of the enclosed Review Plan and concurrence with the conclusion that a Type II Independent External Peer Review (IEPR) of the subject project is not required. Documents to be reviewed include the plans, specifications, and design documentation report. The Review Plan complies with applicable policy, provides for Agency Technical Review, and has been coordinated with the CESAD. It is my understanding that non-substantive changes to this Review Plan, should they become necessary, are authorized by CESAD.

2. If you have any questions regarding the information in this letter, please feel free to contact me or you may contact [REDACTED]

Encl

*SIR, well synched
plan with Risk Management
Center.*

[REDACTED]
Colonel, EN
Commanding

**Review Plan
U.S. Army Corps of Engineers
SAD Division
SAJ District**

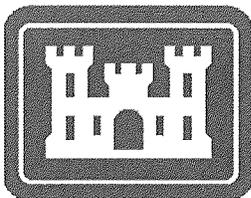
**Upper Legion Dam Repair,
Lower Legion Dike Repair, and
Twin Dam Removal
Fort Jackson, South Carolina**

Plans, Specifications, and DDR

MSC Approval Date: Pending

Last Revision Date: N/A

THE INFORMATION CONTAINED IN THIS REVIEW PLAN IS DISTRIBUTED SOLELY FOR THE PURPOSE OF PREDISSEMINATION PEER REVIEW UNDER APPLICABLE INFORMATION QUALITY GUIDELINES. IT HAS NOT BEEN FORMALLY DISSEMINATED BY THE U.S. ARMY CORPS OF ENGINEERS. IT DOES NOT REPRESENT AND SHOULD NOT BE CONSTRUED TO REPRESENT ANY AGENCY DETERMINATION OR POLICY.



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Jacksonville District

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1. Purpose and Requirements

a. Purpose

This Review plan for Upper Legion Dam Repair, Lower Legion Dike Repair, and Twin Dam Removal at Fort Jackson, South Carolina, will ensure a quality-engineering project is developed by the Corps of Engineers in accordance with EC 1165-2-214, "Civil Works Review Policy". The Review Plan shall layout a value added process that assures the correctness of the information shown. This Review Plan describes the scope of review for the current design phase of work only and is included in the Project Management Plan (P2 #456012). The products addressed in this Review Plan are the Plans, Specifications and Design Documentation Report (DDR). This review plan will be updated for any additional project phases assigned to the Corps of Engineers.

b. Guidance and Policy References

- EC 1165-2-214, Civil Works Review Policy, 15 Dec 2012
- ER 1110-1-12, Quality Management, 31 Mar 2011
- ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 Aug 1999
- Engineering and Construction Bulletin, No. 2016-9, 04 Mar 2016
- ER 1110-2-1156, Safety of Dams – Policy and Procedures, 31 March 2014
- ER 1110-2-1806, Earthquake Design & Evaluation for Civil Works Projects, 31 December 2013
- ER 415-1-11, Biddability, Constructability, Operability, Environmental, and Sustainability (BCOES) Review, 1 January 2013
- EM 1110-2-2300, General Design and Construction Considerations For Earth and Rock-Fill Dams, 30 Jul 2004
- EM 1110-2-1901 Seepage Analysis and Control for Dams, 30 Sep 1986
- EM 1110-2-1902, Slope Stability, 31 Oct 2003
- UFC 3-201-01, Civil Engineering, 1 Jun 2013
- UFC 3-250-18FA, General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas, 6 Jan 2006
- Army Regulation 420-1, Facilities Engineering: Army Facilities Management, 24 Aug 2012
- FEMA Federal Guidelines for Dam Safety, Apr 2004
- South Carolina Department of Health and Environmental Control (DHEC) – Dams and Reservoirs Safety Act Regulations, Amended 25 Jul 1997
- Quality Control Plan
- Project Management Plan

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). **However, although the Civil Works review policy in this EC is not required on this project since it not a Civil Works project, it is being applied based on the implementation of Corps of Engineers best practices.** The EC outlines three general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR) and Independent External Peer Review (IEPR). A risk informed decision was made that this project does not pose a significant threat to human life (public safety). Therefore, an IEPR will not be conducted on this project. The RP identifies the most important skill sets needed in the reviews and the objective of the review and the specific advice sought, thus setting the appropriate scale and scope of review for the individual project. This Review Plan shall be provided to PDT, DQC, and ATR Teams.

d. Review Management Organization

The USACE Risk Management Center (RMC) is the Review Management Organization (RMO) for this project. Even though a Type II IEPR is not required as discussed below, the RMC and LRD agreed that the RMC would be the RMO for the project because it is a Dam Safety project. Contents of this review plan have been coordinated with the RMC and the South Atlantic Division, the Major Subordinate Command (MSC). In-Progress Review (IPR) team meetings with the RMC, SAD, and PDT will be scheduled on an “as needed” basis to discuss programmatic, policy, and technical matters. The SAD Dam Safety Program Manager will be the POC for vertical team coordination. Jacksonville District will assist the RMC with management of the ATR review and development of the draft ATR “charges”.

2. Project Description and Information

a. Project Description

The Upper Legion Dam Repair, Lower Legion Dike Repair, and Twin Dam Removal Project is a military funded dam on the military installation of Fort Jackson. During the extraordinary rainfall event of October 2015, the Upper Legion, Lower Legion, and Twin Lake embankment dam and roadway was overtopped and breached. See Attachment 3 for discussion of this event.

The work in this project includes:

- 1) Design of repairs to Upper Legion Dam. Including, but not limited to:
 - a. Primary spillway replacement.
 - b. Secondary spillway replacement.
 - c. Embankment repair.

- 2) Design of repairs to Lower Legion Dike. Including, but not limited to:
 - a. Primary spillway replacement.
 - b. Secondary spillway replacement.
 - c. Embankment repair.



- 3) Design for removal of Twin Dam. Including, but not limited to:
 - a. Regrading dam embankment.
 - b. Removal of primary spillway.

The work sites are in close proximity, and all work will be completed with one contract. In addition, there will be minimal disturbance beyond the footprint of the original dam and dike.

The repairs to Upper Legion Dam will bring the embankment to current Federal, USACE and FEMA dam design standards as referenced in Paragraph 1.b. The repairs to Lower Legion Dike will bring the embankment to normal good engineering standards. The application of full dam design standards is not required per ER 1110-2-1156, since this project is not classified as a dam due to the small size.

b. Project Sponsor

This project is being designed for Fort Jackson, a US Army installation. Military funding is provided by Fort Jackson.

3. District Quality Control

a. Requirements

All implementation documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo a DQC. A DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the PMP. DQC will be performed on the P&S and DDR in accordance CESAJ Engineering Division Quality Management System (EN QMS). The EN QMS defines DQC as the sum of two reviews, Discipline Quality Check and Review (DQCR) and Product Quality Control Review (PQCR).

The DQC will be managed by the Jacksonville District and will include resources from Jacksonville District, Mobile District, Charleston District, and Fort Jackson Directorate of Public Works. Each of the major disciplines involved in the design of the project will be represented in the DQC review team by personnel who did not perform the original work. See Attachment 2 for PDT and DQC members and disciplines .

b. Documentation

DQCRs occur during the design development process and are carried out as a routine management practice by each discipline. Checklists are utilized by each discipline to facilitate the review and to document the DQCR review comments. Certification of the Discipline Quality Check and Review is signed by the Branch Chief certifying that the DQCR on all design analyses and products have been completed in accordance with the EN QMS process prior to release from the Branch.



The PQCR shall ensure consistency and effective coordination across all disciplines and to assure the overall coherence and integrity of the products. Review comments and responses for this review will be documented in DrChecks. The Product Quality Control Review shall be QC certified by the Engineering Technical Lead (ETL) and all applicable Section and Branch Chiefs. This PQCR certification signifies that all Discipline Specific Quality Checks and Review Certification are complete, as well as the Product Quality Control Reviews.

c. Requirements

All computations, drawings or sketches shall undergo a rigorous independent check as part of the standard Quality Control (QC) process. Quality checks may be performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. However, they should not be performed by the same people who performed the original work, including managing/reviewing the work in the case of contracted efforts. Quality Checks include a review of the schedules, budgets, means and methods of construction, and have lessons learned been considered. Additionally, the PDT is responsible to ensure consistency and effective coordination across all project disciplines during project design and construction management.

4. Biddability, Constructability, Operability, Environmental, and Sustainability Review

a. Requirements

The value of a BCOES review is based on minimizing problems during the construction phase through effective checks performed by knowledgeable, experienced personnel prior to advertising for a contract. Biddability, constructability, operability, environmental, and sustainability requirements must be emphasized throughout the planning and design processes for all programs and projects, including during planning and design. This will help to ensure that the government's contract requirements are clear, executable, and readily understandable by private sector bidders or proposers. It will also help ensure that the construction may be done efficiently and in an environmentally sound manner, and that the construction activities and projects are sufficiently sustainable. Effective BCOES reviews of design and contract documents will reduce risks of cost and time growth, unnecessary changes and claims, as well as support safe, efficient, sustainable operations and maintenance by the facility users and maintenance organization after construction is complete. A BCOES Review will be conducted for this project at the Final Design Phase. BCOES will be managed by the Jacksonville District with PDT team members from Jacksonville District, Mobile District, and Charleston District.

d. Documentation

Documentation of BCOES activities is required and should be in accordance with the Quality Manual of the District and the home MSC. DrChecks review software will be the



official system for the continuity of the review record and will be used to document all BCOES comments, responses and associated resolutions accomplished throughout the review process.

5. Agency Technical Review

a. Requirements

For this project, the ATR team members will be actively engaged and provide review support beginning with conceptual stages of the design. ATR will be a continuous review throughout the entire duration of the design phases and with regular interaction between the design and ATR teams.

In addition to the continuous reviews, a formal ATR Review Period will be executed at the completion of the 95% design milestones. These Reviews will be performed on the Plans, Specifications and Design Documentation Report (DDR). Any comments discussed and documented before such milestones will also be resolved during those formal Review Periods.

The following specific Review Milestones have been identified by the RMC:

- 1) Reviewed during Continuous ATR:
 - a. Applicable Design Criteria
 - b. Data Review and Loading Studies
 - c. Concept Development and Screening

- 2) Formal ATR Review Periods:
 - a. 95% Design Plans, Specs, Cost Estimates and DDR

An initial ATR Review kickoff meeting will be scheduled at the beginning of the project in order for the design and ATR teams to concur on the scope and execution of the continuous and the formal reviews.

The objective of ATR is to ensure consistency with established criteria, guidance and procedures. The ATR will assess whether the analyses presented are technically correct and presented in a clear manner, went through robust DQC, and comply with published USACE guidance. The PDT should obtain ATR agreement on key data such as hydraulic and geotechnical parameters early in design process. The goal is to have early involvement of ATR team, especially when key decisions are made. The ATR Lead should be invited virtually to all PDT meetings, in order to understand the design efforts and to know when to engage other ATR members for concurrence on key decisions. Value added Lessons Learned from the ATR team should be shared early on to have the best chance of being adopted by the PDT. Most of the ATR effort should be accomplished midway through the design effort; after completion of design the ATR effort will check that the effort agreed to at midpoint was accomplished. This is consistent with the requirement that the ATR members shall not be involved in the day-to-day production of the project/product.



b. Documentation of ATR

DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process, both during the continuous review and at the formal review periods. Comments will be limited to those that are required to ensure adequacy of the product. ATR comments will be captured throughout the entire design process. ATR members will work with the design team members to input comments anytime key assumptions and decisions are reached and documented during the design process. A 95% ATR review will be set up in DrChecks.

The four key parts of a quality review comment will normally include:

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

c. Comment Resolution

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist. The ATR documentation in DrChecks includes 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.

d. Products to Undergo ATR

The products that will undergo ATR will be the Plans, Specifications, DDR, DQC documentation and any other design information. The DDR will include appendices documenting hydraulics and hydrology, geotechnical design, civil design, cost engineering, dam safety plans and surveys.

e. Required ATR Team Expertise and Requirements

ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC. The ATR team will be chosen based on each individual's qualifications and



experience with similar projects. All EC reviewers will be certified in CERCAP:
https://team.usace.army.mil/sites/ERDC-CRREL/PDT/atr_certification/default.aspx .

The ATR Team will be composed of four (4) members for disciplines. Disciplines 1 thru 4 from the RMC and discipline 5 from the USACE Huntington District. **The complete ATR Team will be composed of five (5) Members** as follows:

(See Attachment 2 for member names)

1) **ATR Lead and Geotechnical Engineer:**

One team member will perform the combined duties of ATR Lead and Geotechnical Engineer.

ATR Lead: The ATR team lead shall be senior professional outside the home MSC with extensive experience in preparing Civil Works documents and conducting ATRs. The lead shall have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline, in this case the geotechnical reviewer.

Geotechnical Engineer – Reviewer shall have experience in the field of geotechnical engineering, analysis, design, and construction of embankment dams. The geotechnical engineer shall have experience in subsurface investigations, rock and soil mechanics, internal erosion (seepage and piping), slope stability evaluations, erosion protection design, and earthwork construction. The geotechnical engineer shall be familiar with identification of subsurface hazards, exploration techniques, field and laboratory testing and instrumentation. The geotechnical engineer shall have knowledge and experience in the forensic investigation of seepage, settlement, stability, and deformation problems associated with high head dams and appurtenances constructed on rock and soil foundations.

2) **Hydraulic Engineer** – Reviewer shall have experience in the analysis and design of hydraulic structures related to dams including the design of hydraulic structures (e.g., spillways, outlet works, and stilling basins). The hydraulic engineer shall be knowledgeable and experienced with the routing of inflow hydrographs through multipurpose flood control reservoirs utilizing multiple discharge devices, Corps application of risk and uncertainty analyses in flood damage reduction studies, and standard Corps hydrologic and hydraulic computer models used in drawdown studies, dam break inundation studies, hydrologic modeling and analysis for dam safety investigations.

3) **Structural Engineer** – Reviewer shall have experience and be proficient in performing stability analysis, finite element analysis, seismic time history studies, and external stability analysis including foundations on



high head mass concrete dams. The structural engineer shall have specialized experience in the design, construction, and analysis of concrete dams.

- 4) **Construction Engineer** – Reviewer shall be a senior level, professionally registered engineer with extensive experience in the engineering construction field with particular emphasis on dam safety projects. The Construction Engineer should have a minimum of 10 years of experience.
- 5) **Cost Engineer** – Reviewer shall be a senior level engineer with extensive experience in cost engineering with particular emphasis on dam safety projects.

f. Completion and Certification of the ATR

At the conclusion of the formal 95% ATR effort, the ATR team will prepare a ATR Review Report summarizing the review. The Review Report will be considered an integral part of the ATR documentation and shall:

- (1) Identify the document(s) reviewed, and the purpose of the review;
- (2) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- (3) Include the charge to the reviewers;
- (4) Describe the nature of their review and their findings and conclusions;
- (5) Identify and summarize each unresolved issue (if any); and
- (6) 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 completion of ATR and Certification of ATR. It will certify that the issues raised by the ATR team have been resolved (or elevated to the vertical team). The completion and certification should be completed based on the work reviewed to date for the project. A Sample Completion of ATR and Certification of ATR are included in Attachment 1.6.



6. Type II Independent External Peer Review/Safety Assurance Review

a. Decision on Type II IEPR

A Type II IEPR is not required. The decision not to conduct an IEPR is based on the judgement that a failure of Upper Legion Dam does not pose a significant threat to human life. Two failure scenarios were considered in the determination of likelihood of loss of life:

1. Sunny Day Failure:

A sunny day failure would include the Upper Legion normal pool storage, estimated at 60 acre-ft and the Lower Legion normal pool storage, estimated at 25 acre feet. Impacts would likely include: the overtopping, but not failure, of Knight Rd., Washington Rd., Lee Rd. and Ewell Rd., with possible flooding of a few buildings upstream of Washington Rd, because of ponding behind the road embankment. Although some damage to infrastructure would be possible/likely, no loss of life would be expected, because of the relatively small volume of water, the attenuation of the Upper Legion flood waters by the time it would take for an overtopping breach of the Lower Legion dam to form, and by the attenuation provided by the low, wooded flood plain above Washington Rd. Also, if the total estimated volume of 85 acre-ft was placed behind the old railroad embankment, with no accounting for flow attenuation and flow through the embankment culvert, the resulting pond would reach an estimated elevation of 177.5 NAVD88, which would not impact any of the homes in the King's Grant subdivision directly downstream of the military reservation.

2. Event Failure:

If Upper Legion had failed during the downstream peak of the October flooding event, which was estimated for this analysis to be near elevation 190 NAVD 88, it would have added an estimated volume of 110 acre-ft of water to Wild Cat Creek. Without accounting for attenuation caused by breach formation, breach size, Lower Legion breach size, and the multiple downstream roads, this volume of water, if placed at the downstream railroad embankment, would cause an estimated increase in water elevation of 1 foot. Although life loss was possible from the approximate 0.001 ACE extreme event that was occurring, the addition of the water from Legion Lake would not likely have been a direct cause of life loss.

Additional factors considered and outlined in EC 1165-2-214, Appendix E, Section 2 (a) thru (c):

- a) The repair does not require the use of innovative materials or techniques, and we expect to use common, accepted materials and techniques for the repair. There are no complex challenges for interpretations, precedent



setting methods or modes, or any proposed changes to prevailing practice.

- b) Although not specifically required, the design of the repair will include considerations of robustness, redundancy, and resiliency. Where practical, measures to provide these features will be included.
- c) The repair does not have a unique construction sequencing. The design and construction schedules do not overlap, and the project does not include design build or early contractor involvement.

7. Policy and Legal Compliance Review

All implementation documents will be reviewed throughout the project for their compliance with law and policy. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies.

The Charleston District Office of Counsel will review the environmental documents for legal sufficiency in accordance with Engineer Federal Acquisition Regulation Supplement 1.602-2 Responsibilities. The subject implementation documents and supporting environmental documents will be reviewed for legal sufficiency prior to advertisement.

8. Review Schedule and Costs

a. Schedule of Reviews

To the extent practical, reviews should not extend the design schedule but should be embedded in the design process. Reviewers should be involved at key decision points and are encouraged to provide timely over the shoulder comments. The table below provides an overall review schedule that shows timing and sequence of all reviews.

PROJECT PHASE/SUBMITTAL	START DATE	END DATE
Continuous ATR (1)	01 September 2016 <i>(path forward date)</i>	17 July 2017 <i>(RTA date)</i>
DQC of Preliminary Design	17 October 2016	28 October 2016
DQC of 95% Design	2 February 2017	15 February 2017
ATR of 95% Design	27 March 2017	14 April 2017
BCOES Review	18 May 2017	1 June 2017
BCOES Certification	N/A	17 July 2017



Ready to Advertise (RTA)	N/A	17 July 2017
Issue Solicitation	N/A	TBD
Award Construction Contract	N/A	TBD

For this project, the RMC/ATR team members will be actively engaged and provide review support beginning with conceptual stages of design and last throughout the entire design process. The "Continuous ATR Review" will commence at the "path forward date" and end when final RTA is achieved.

b. ATR Schedule and Cost

The preliminary review schedule is provided in the table in paragraph a. of this section. The cost for the ATR is estimated at \$15,000 per ATR Team Member and **five (5) members** have been designated. Total Estimated Cost of **\$ 75,000**. This estimate includes services for all milestones as listed under paragraph 5.a.

An updated schedule and cost report will be provided to RMC and stakeholders on a monthly basis.

9. Review Plan Approval and Updates

The MSC for this is the South Atlantic Division. The MSC Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving the Jacksonville, Mobile, Charleston Districts, MSC, and RMC) as to the appropriate scope and level of review for the study and endorsement by the RMC. The Review Plan is a living document and may change as the study progresses; the district is responsible for keeping the Review Plan up to date. The Commander's approval will be documented in an attachment to this plan. Significant changes to the Review Plan (such as changes to the scope and/or level of review) will be re-endorsed by the RMC and re-approved by the MSC Commander following the process used for initially approving the plan. See Attachment 4 for a listing of revisions to the Review Plan. The latest Review Plan should be provided to the RMO and home MSC.

10. Engineering Model Certification and Approval

The use of certified or approved engineering models is required for all activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. 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. 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). The following engineering models are anticipated to be used:



MODEL	STATUS
HEC-RAS	Certified
HEC-HMS	Certified
MII 4.3 Build 7 (Microcomputer Aided Cost Engineering System)	Certified
Geostudio SLOPE/W and SEEP/W	Certified

11. Review Plan Points of Contact

NAME/TITLE	ORGANIZATION	EMAIL/PHONE
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]



ATTACHMENT 1: COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Upper Legion Dam Repair, Lower Legion Dike Repair, and Twin Dam Removal Project, Fort Jackson, South Carolina. 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 DrChecksSM.

Date

Date

Date

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.

Date

Date