



REPLY TO
ATTENTION OF

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

CESAD-RBT

MEMORANDUM FOR COMMANDER, WILMINGTON DISTRICT

SUBJECT: Approval of the Implementation Documents Review Plan for the John H. Kerr Dam, Right Wing Dike, Toe Drain Repairs, Mecklenburg County, Virginia

1. References:

a. Memorandum, CESAW-DE, 28 August 2017, Subject: Approval of Review Plan for John H. Kerr Dam, Right Wing Dike, Toe Drain Repairs, Mecklenburg County, Virginia, Implementation Documents (Encl).

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

2. The enclosed subject Review Plan (RP) submitted by the Wilmington District via reference 1.a has been reviewed by this office and is hereby approved in accordance with reference 1.b above.

3. As indicated in the RP, this repair to the toe drain system will be in-situ without excavation of the existing dam structure. Therefore, the South Atlantic Division Office concurs with the District's RP and the determination of the District Chief of Engineering that a Type II Independent External Peer Review (IEPR) is not required on the Design Documentation Report and Scope of Work for Contract Services. The primary basis for our IEPR concurrence is that failure or loss of the features associated with this repair as well as the in-situ method planned for this repair will not pose a significant threat to human life.

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

5. The SAD point of contact is Mr. [REDACTED] CESAD-RBT, 404-562-5121.

Encl

CF:
CESAW-ECP-EC / [REDACTED]
CESAW-ECP-EC / [REDACTED]

HOLLAND.DIANA.
MAUREEN.116875
9696
DIANA M. HOLLAND
Brigadier General, USA
Commanding

Digitally signed by
HOLLAND.DIANA.MAUREEN.1168759696
DN: cn=US, o=U.S. Government, ou=DoD,
ou=PKI, ou=USA,
cn=HOLLAND.DIANA.MAUREEN.116875969
6
Date: 2017.10.12 21:05:29 -0400



DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

CESAW-DE

28 August 2017

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, South Atlantic Division (CESAD-RBT), Attn: [REDACTED], CESAD-RBT, Rm 10M15, 60 Forsyth Street, SW, Atlanta, Georgia 30303-8801

SUBJECT: Approval of Review Plan for John H. Kerr Dam, Right Wing Dike, Toe Drain Repairs, Mecklenburg County, Virginia, Implementation Documents

1. Reference: EC 1165-2-214, Civil Works Review Policy, 15 Dec 2012.
2. I hereby request approval of the enclosed Review Plan for John H. Kerr Dam, Right Wing Dike, Toe Drain Repairs, Mecklenburg County, Virginia, Implementation Documents. The Review Plan complies with applicable policy and includes DQC and ATR plans for this project. Also, SAW-Dam Safety Officer and Chief of Engineering agree with the Review Plan as submitted.
3. The District will post the CESAD approved Review Plan to its website and provide a link to CESAW for its use. Names of Corps/Army employees are withheld from the posted version, in accordance with guidance.

Encl


ROBERT J. CLARK
COL, EN
Commanding



Review Plan

For

**John H. Kerr Dam Right Wing Dike Toe Drain Repairs,
– Implementation Documents**

**Mecklenburg County, Virginia
P2 #: 111638**

**U.S. Army Corps of Engineers
Wilmington District
Wilmington, North Carolina**

August 2017

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

TABLE OF CONTENTS

1. Purpose and Requirements.....	3
1.1 Purpose.....	3
1.2 References	3
1.3 Requirements.....	3
1.4 Review Management Organization (RMO).....	4
2. Project Information and Background.....	4
2.1 Project Description.....	4
2.2 Proposed Work Description	4
3. District Quality Control	5
4. Agency Technical Review	5
4.1 ATR Team Expertise.....	5
4.2 Documentation of ATR.....	6
5. Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Review	7
6. Independent External Peer Review.....	7
6.1 Type I IEPR	7
6.2 Type II IEPR, Determination	7
7. Model Certification and Approval	9
8. Estimated Costs and Schedule	9
8.1 Project Milestones.....	9
8.2 ATR Schedule and Cost.....	9
9. Points of Contact.....	10
10. MSC Approval	10

Attachment 1: Acronyms and Abbreviations

Attachment 2: Completion of Agency Technical Review Form

1. PURPOSE AND REQUIREMENTS

1.1 Purpose

This Review Plan defines the scope and level of review activities for design/construction of the John H. Kerr Right Wing Dike Toe Drain Repairs, located in Mecklenburg County, VA. The work consists of re-establishing proper function of the toe drain perforated pipes by repairing existing faults of separated joints and punctured or deformed pipe segments. A variety of in-situ repair methods will be allowed, but excavation of the toe of the dam will not occur so as to ensure no loss of slope stability of the dam. The review activities consist of District Quality Control (DQC) and Agency Technical Review (ATR). The project is in the design and implementation phase and the related documents are a 95% Design Documentation Report (DDR) and 95% Scope of Work for Contract Services. Upon approval, this review plan will be included into the Project Management Plan.

1.2 References

- ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 Aug. 1999
- ER 1110-1-12, Engineering and Design Quality Management, 31 March 2011
- EC 1165-2-214, Civil Works Review, 15 Dec. 2012
- Engineering and Construction Bulletin, No. 2016-9, 04 Mar 2016
- ER 415-1-11, Biddability, Constructability, Operability, Environmental, and Sustainability (BCOES) Review, 1 January 2013
- ER-1110-2-1156, Safety of Dams – Policy & Procedures, 31 March 2014
- EC-1165-2-216, Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408, 31 July 2014
- Quality Control Plan
- Project Management Plan

1.3 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 provides the procedures for ensuring the quality and credibility of U.S. Army Corps of Engineers (USACE) decision, implementation, and operations and maintenance documents and other work products. The EC outlines three levels of review for implementation documents: District Quality Control, Agency Technical Review, and Independent External Peer Review. Refer to the EC for the definitions and procedures for the three levels of review.

1.4 Review Management Organization (RMO).

The South Atlantic Division is designated as the RMO for this effort.

2. PROJECT INFORMATION AND BACKGROUND

2.1 Project Description

John H. Kerr Dam is a concrete gravity water control structure with earthen left wing, right wing, and four saddle dikes. The wing and saddle dikes have a total length of 19,300 feet and a maximum height of 52 feet. The crest elevation of right wing dike is 331.5 feet Mean Sea Level (MSL). The earthen dikes were constructed of compacted impervious clay and sand placed on residual soils. The residual soils consist of a clay and sand layer overlying more permeable layers of sandy silt and weathered rock. 12-inch perforated, asbestos coated, Corrugated Metal Pipe (CMP) was used in the original toe drain system. The 12-inch CMP toe drain system was placed at the interface of the silt and sand and the weathered rock layers to relieve pressure on the foundation from under-seepage. Ten outfall pipes were also installed with the toe drain system to provide an exit for the collected seepage. The upstream slope is protected with dumped rock, riprap. Additional riprap protection was added to the upstream slope of the right wing dike and part of the left wing dike up to elevation 320 feet MSL in 1985. Additional embankment material was placed on the downstream slope of the right wing dike in 1997 to increase stability. A 6-inch Polyvinyl Chloride (PVC) drain system, intended to capture seepage through the dam and augment the original toe drain system, was included in the 1997 modification.

The 2012 video inspection of the toe drain indicated a number of separated joints, corroded, punctured or deformed pipe segments. Earthen material was also noted at various points in both the old and new drain systems. Ten damaged locations were deemed priority for repair and consisted of six pipe sections with separated joints or corrosion and four sections of punctured pipe. In 2015 Lyttle Utilities performed repairs to the 12-inch CMP toe drain using a flexible fiber-glass Cured in Place Pipe (CIPP) product produced by Steven's Technologies. Repairs were completed in approximately 3 months.

Four sections of the damaged CMP were not repaired in 2015. Damage consisted of large punctures within the pipes.

Alternative methods of repair are being analyzed in order to effectively repair the function of the toe drain system without any actions (such as excavations into the wing dike toe) which would compromise the stability of the dam. The Design Documentation Report (DDR) addresses the repair alternatives. A Scope of Work for Contract Services will be developed for the repair construction.

2.2 Proposed Work Description

The approach for this design is to be proactive with available Operations & Maintenance funding and provide a repair for a permanent remedy to the remaining defective portions of the toe drain system on the Right Wing Dike. The project cost is expected to be less than \$1M. The project

will repair the toe drain system in-situ without excavation of the existing dam structure. There is no negative impact to the stability of the dam during the construction period and when constructed, the toe drain system will function as required.

3. DISTRICT QUALITY CONTROL

District Quality Control (DQC) and Quality Assurance activities for implementation documents (DDRs and P&S) are stipulated in ER 1110-1-12, Engineering & Design Quality Management. The subject project Design Documentation Report (DDR) and Plans and Scope of Work for Contract Services (SOW) will be prepared by the Wilmington District using the SAW procedures and will undergo DQC at 95% completion. DQC Certification will be verified by the Agency Technical Review Team.

4. AGENCY TECHNICAL REVIEW

Agency Technical Review (ATR) is undertaken to "ensure the quality and credibility of the government's scientific information" in accordance with EC 1165-2-214 and ER 1110-1-12. An ATR will be performed on the 95% Scope of Work for Contract Services and 95% Design Documentation Report.

ATR will be conducted by individuals and organizations that are external to the Wilmington District (SAW). The ATR Team Leader will be a Corps of Engineers employee outside the South Atlantic Division. The required disciplines and experience are described below.

4.1 ATR Team Expertise

As stipulated in ER 1110-1-12, ATR members will be sought from the following sources: regional technical specialists (RTS); appointed subject matter experts (SME) from other districts; senior level experts from other districts; Center of Expertise staff; appointed SME or senior level experts from the responsible district; experts from other U.S. Army Corps of Engineers Districts; contractors; academic or other technical experts; or a combination of the above. The ATR will be conducted for the 95% DDR and 95% SOW. The ATR Team will be comprised of the following disciplines; knowledge, skills and abilities; and experience levels.

ATR Team Leader. The ATR lead will be a senior registered professional with experience in earthen dam safety matters 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 specific discipline (such as geotechnical, site engineering, planning, etc).

Geotechnical Engineering. Team member will be a registered professional familiar with design of earthen dams and evaluations of existing earthen dams. Team member will have a thorough understanding of the specific requirements based on study objectives and proposed measures – for example, slope stability and seepage modeling, to assure that the project meets proper engineering practice and dam safety requirements.

Civil/Site Engineering. Team member will be a registered professional engineer and have experience with Civil/Site design and construction that includes drainage design for dams.

4.2 Documentation of ATR

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

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

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist. The ATR documentation in DrCheckssm will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical coordination, and lastly the agreed upon resolution. The ATR team will prepare a Review Report which includes a summary of each unresolved issue; each unresolved issue will be raised to the vertical team for resolution. Review Reports will be considered an integral part of the ATR documentation 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 an overview for the project information in which the ATR members were charged to review;
- 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 ATR may be certified when all ATR concerns are either resolved or referred to U.S. Army Corps of Engineers South Atlantic Division (CESAD) for resolution and the ATR documentation is complete. Certification of ATR should be completed, based on work reviewed for the 95% DDR and 95% SOW. A sample certification is included in this Review Plan (see attachment 2).

5. BIDDABILITY, CONSTRUCTABILITY, OPERABILITY, ENVIRONMENTAL, AND SUSTAINABILITY REVIEW

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.

6. INDEPENDENT EXTERNAL PEER REVIEW (WRDA 2007 Section 2035 Safety Assurance Review)

EC 1165-2-214 provides implementation guidance for both Sections 2034 and 2035 of the Water Resources Development Act (WRDA) of 2007 (Public Law (P.L.) 110-114). The EC addresses review procedures for both the Planning and the Design and Construction Phases (also referred to in USACE guidance as the Feasibility and the Pre-construction, Engineering and Design Phases). The EC defines Section 2035 Safety Assurance Review (SAR), Type II Independent External Peer Review (IEPR). The EC also requires Type II IEPR be managed and conducted outside the Corps of Engineers.

6.1 Type I IEPR

A Type I IEPR is associated with decision documents. No decision documents are addressed/covered by this Review Plan. A Type I IEPR is not applicable to the implementation documents covered by this Review Plan.

6.2 Type II IEPR, Determination

This toe drain repair project does not trigger WRDA 2007 Section 2035 factors for Safety Assurance Review (termed Type II IEPR in EC 1165--2-214) and therefore, a Type II IEPR review under Section 2035 and/or EC 1165-2-214 is not required. The factors in determining whether a review of design and construction activities of a project is necessary, as stated under

Section 2035 and EC 1165-2-214 along with this review plans' applicability statement which follows.

- (1) The failure of the project would pose a significant threat to human life.

The repair of the toe drain system will reduce the threat to human life. The existing dam will be more stable and seepage will be better monitored and measured, reducing the likelihood of a breach and thus reducing risk to human life. Construction would incorporate existing engineering standards/methods and will lower risk below tolerable risk guidelines.

- (2) The project involves the use of innovative materials or techniques.

The toe drain repair will utilize materials and construction methods familiar to in-situ pipe repair contractors.

- (3) The project design requires redundancy, resiliency and robustness.

The repaired toe drain system will increase the stability of the current dam (wing dike). During construction, the stability of the wing dike will not be affected and the dam and reservoir will operate as normally required with full functionality.

- (4) The project has unique construction sequencing or a reduced or overlapping design construction schedule.

The repair project is not anticipated to require unique construction sequencing, or a reduced or overlapping design construction schedule. The construction sequence has been used successfully by the Corps of Engineers on other similar works.

As indicated above, this project does not pose a significant threat to human life, and does not trigger any of the EC 1165-2-214 factors for Type II IEPR. Therefore, the District Chief of Engineering, as the Engineer in Responsible Charge has determined that a Type II IEPR of these implementation documents (DDR and P&S) is not needed.

7. 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
Geostudio SEEP/W	Certified
MII 4.3 Build 7 (Microcomputer Aided Cost Engineering System)	Certified

8. ESTIMATED COSTS AND SCHEDULE

8.1 Project Milestones

DDR and Scope of Work for Contract Services Review:

District Quality Control (complete)	10/10/2017
ATR (complete)	11/7/2017
Finalize Solicitation	11/27/2017
Issue RFP Date	11/28/2017
Bid Opening	12/29/2017
Construction Contract Award 1	1/16/2018

8.2 ATR Schedule and Cost

The ATR's will be conducted in FY18. It is envisioned that each reviewer will be afforded 28 hours review plus 4 hours for coordination. It is envisioned that the ATR Leader will be allowed 40 hours if also serving as a reviewer. The estimated cost range is \$10k - \$25k. The estimated ATR schedule follows.

ATRT Selected and Resourced	10/2/2017
ATR Kickoff and ATR Start	10/11/2017
ATRT Completes Comments	10/24/2017
PDT Completes Evaluations	10/31/2017
ATRT Completes Back Checks	11/7/2017
ATR Certification	11/7/2017

9. POINTS OF CONTACT

Per guidance, the names of the following individuals will not be posted on the Internet with the Review Plan. Their titles and responsibilities are listed below.

Wilmington District POCs:

Review Plan, ATR and QM Process, **910-251-4440**

Dam Safety Program Manager **910-251-4918**

Project Manager (PM): **910-251-4257**

Chief of Geotechnical,
and Dam Safety: **910 251-4742**

Chief of Engineering Branch,
and Dam Safety Officer: **910 251-4767**

South Atlantic Division POC: **404-562-5121**

10. MSC APPROVAL

The MSC that oversees the home district is the South Atlantic Division and it is responsible for approving the review plan. Approval will be provided by the MSC Commander. The commander's approval should reflect vertical team input (involving district, MSC, and HQUSACE members) as to the appropriate scope and level of review for the pre-construction and engineering design phase of this effort. Like a PMP, the Review Plan (RP) is a living document and may change as work progresses. Significant changes to the RP should be approved by following the process used for initially approving the RP. In all cases the MSCs will review the decision on the level of review and any changes made in updates to the project scope.

Attachment 1

ACRONYMS AND ABBREVIATIONS

ATR – Agency Technical Review
ATRT – Agency Technical Review Team
BCOE – Biddability, Constructability, Operability and Environmental
CESAD – U.S. Army Corps of Engineers South Atlantic Division
DCP – District Control Plan
DDR – Design Documentation Report
DQC – District Quality Control
EC – Engineer Circular
EIS – Environmental Impact Statements
ER – Engineer Regulations
HQUSACE – Headquarters U.S. Army Corps of Engineers
IEPR – Independent External Peer Review
MSC – Major Subordinate Command
PDT – Project Delivery Team
PMP – Project Management Plan
P&S – Plans and Specifications
RMC – USACE Risk Management Center
RMO – Review Management Organization
RP – Review Plan
RTS – Regional Technical Specialists
SAD – South Atlantic Division
SAW – Wilmington District
SAR – Safety Assurance Review
SME – Subject Matter Expert
USACE – U.S. Army Corps of Engineers
WRDA – Water Resources Development Act

Attachment 2

COMPLETION OF AGENCY TECHNICAL REVIEW

The _____ District has completed the *(type of product)* of *(project name and location)*. Notice is hereby given that an Agency Technical Review, appropriate to the level of risk and complexity inherent in the project, has been conducted as defined in the project's Review Plan. During the Agency Technical Review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, 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 Corps policy. The review also assessed the DQC documentation and made the determination that the DQC activities employed appear to be appropriate and effective. The Agency Technical Review was managed by *(RMO)*. All comments resulting from ATR have been resolved and the comments have been closed in DrCheckssm.

_____ (Signature) RMO representative	_____ (Date)
_____ (Signature) ATR Team Leader	_____ (Date)
_____ (Signature) Project Manager	_____ (Date)

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows:

(Describe the major technical concerns, possible impact, and resolution)

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

(Signature)
Chief, Engineering, Construction and Planning Division

(Date)