



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

CESAJ-EN-QC

17 December 2012

MEMORANDUM FOR Commander, South Atlantic Division (CESAD-RBT)

SUBJECT: Approval of Review Plan for Indian River Lagoon South, C-44, Martin County, Florida

1. References.

- a. EC 1165-2-209, Civil Works Review Policy, 31 January 2012
- b. WRDA 2007 H. R. 1495 Public Law 110-114, 8 November 2007

2. I hereby request approval of the enclosed Review Plan and concurrence with the conclusion that Type II Independent External Peer Review (IEPR) of this project is required. The Type II IEPR determination is based on the EC 1165-2-209 Risk Informed Decision Process as presented in the Review Plan. Approval of this plan is for the Plans and Specifications and DDR Implementation Documents. The Review Plan complies with applicable policy, provides Agency Technical Review and has been coordinated with SAD. It is my understanding that non-substantive changes to this Review Plan, should they become necessary, are authorized by SAD. Attached is an endorsement of the Review Plan by the Risk Management Center, dated 12 December 2012.

3. The district will post the approved Review Plan to its website and provide a link to SAD for its use. Names of Corps/Army employees will be withheld from the posted version, in accordance with guidance.

FOR THE COMMANDER:

Encl


LAUREEN A. BOROCHANER, P.E.
Chief, Engineering Division



DEPARTMENT OF THE ARMY
RISK MANAGEMENT CENTER, CORPS OF ENGINEERS
13952 DENVER WEST PARKWAY SUITE 200
GOLDEN, CO 80401

REPLY TO
ATTENTION OF
CEIWR-RMC-WD

CEIWR-RMC

12 December 2012

MEMORANDUM FOR: Commander, Jacksonville District, ATTN: CESAJ-EC

SUBJECT: Risk Management Center Endorsement - Review Plan for Indian River Lagoon South C-44 Reservoir / Storm Water Treatment Area (STA) Project

1. The Risk Management Center (RMC) has reviewed the Review Plan (RP) for the Indian River Lagoon South C-44 Reservoir / Storm Water Treatment Area Project (dated November 2012), and concurs that this RP provides for an adequate level of peer review and complies with the current peer review policy requirements outlined in EC 1165-2-209 "Civil Works Review Policy", dated 31 January, 2010.

2. This RP was prepared by Jacksonville District, reviewed by South Atlantic Division and the RMC, and all review comments have been satisfactorily resolved.

The design for this project is being developed by an external AE firm (HDR Inc.), and the AE will perform Quality Checks and Internal QC on all products they develop. This RP outlines four levels of review: District Quality Control, Agency Technical Review, Independent External Peer Review and Policy and Legal Review; and defines the scope and level of the Jacksonville District's District Quality Control Review and Agency Technical Review. To that end, this RP identifies the most important skill sets required for each level of review and the objectives of each review, thus setting the appropriate scale and scope of review for the Project.

3. The RMC endorses this document to be approved by the MSC Commander. Upon approval of the RP, please provide a copy of the approved RP, a copy of the MSC Commander's approval memorandum, and a link to where the RP is posted on the District website to Tom Bishop, RMC Senior Review Manager (tom.w.bishop@usace.army.mil).

4. Thank you for the opportunity to assist in the preparation of this RP. Please coordinate all future changes to this review plan, all aspects of the ATR and IEPR efforts or other RMO-related activities defined in the RP with Tom Bishop at (303) 0963-4556.

Sincerely,

COLIN W. KRUMDIECK, P.E.
Senior Review Manager
Risk Management Center

CF:
CEIWR-RMC-ZA (Mr. Snorteland)
CESAD-CE (Division Quality Manager)

REVIEW PLAN

For

C-44 RESERVOIR/STORMWATER

TREATMENT AREA (STA) PROJECT

Martin County, Florida

Jacksonville District

December 2012

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 FORMARLLY DISSEMINATED BY THE U.S. ARMY CORPS OF ENGINEERS, JACKSONVILLE DISTRICT. IT DOES NOT REPRESENT AND SHOULD NOT BE CONSTRUED TO REPRESENT ANY AGENCY DETERMINATION OR POLICY.



**US Army Corps
of Engineers®**

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of review activities for the C-44 Reservoir/Storm Water Treatment Area (STA) Project. The reservoir will be considered a dam; being inventoried and designed to dam safety requirements. Review activities consist of District Quality Control (DQC), Agency Technical Review (ATR), Type II Independent External Peer Review (IEPR) and Policy and Legal Review. The project is in the Pre-Construction, Engineering and Design (PED) Phase. The related documents are Implementation Documents that consist of Plans and Specifications (P&S) and a Design Documentation Report (DDR). Upon approval, this review plan will be included into the Project Management Plan as an appendix to the Quality Management Plan.

b. References.

- (1). ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 Aug 1999
- (2). ER 1110-1-12, Engineering and Design Quality Management, 31 March 2011
- (3). FCA 1968, WRDA 1974, and WRDA of 1986 (Project Authorization)
- (4). EC 1165-2-209, Civil Works Review Policy, 31 January 2012
- (5). EC 1156-2-210, Water Resources Policies and Authorities Water Supply Storage and Risk Reduction Measures for Dam Safety, 09 April 2010

c. Requirements. This review plan was developed in accordance with EC 1165-2-209, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R). The EC 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 four levels of review: District Quality Control, Agency Technical Review, Independent External Peer Review and Policy and Legal Review. Refer to the EC for the definitions and procedures for the four levels of review.

d. Review Plan Approval and Updates. The South Atlantic Division 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. Like the PMP, the Review Plan is a living document and may change as the project progresses. The Jacksonville District is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment "A". Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, will be posted on the Jacksonville District's webpage. The latest Review Plan will be provided to the RMO and home MSC.

e. Review Management Organization (RMO). The Review Management Organization (RMO) is the Risk Management Center (RMC) and recognized as a technical center within the USACE Institute for Water Resources. The RMO will provide a vetted Architect-Engineer firm to manage and execute Type II IEPR outside USACE in accordance with National Academy of Sciences procedures. RMO will also provide technical oversight for both the ATR and Type II IEPR processes. In addition, the RMO,

in cooperation of the vertical team, the appropriate PCXs, and the division will determine/select the ATR team members.

2. PROJECT INFORMATION AND BACKGROUND

The C-44 Project is located on approximately 12,000 acres of land in Marion County, Florida, as part of the Indian River Lagoon-South (IRLS) Project Implementation, under the Comprehensive Everglades Restoration Plan (CERP). The C-44 project is broken out into three (3) contracts.

The objectives of the project, as defined in its decision document, are to capture local runoff from the C-44 Basin, treat some or all of it via sedimentation and natural transformation of nutrients, and return it to the C-44 Canal when there is a need. The components are designed for flow attenuation of the St. Lucie Estuary, water quality benefits from reduced loading of nutrients, pesticides, herbicides, and other pollutants contained in runoff presently discharged to the estuary, and water supply benefits. Additional benefits include the ability to remove the increased phosphorus load in the C-23 Basin diverted water.

It is important to clearly note that the authorized project features are not for flood control, but for environmental reclamation. The project consists of diverting storm water flow in the C-44 Canal through an intake canal, to a pump station, which routes flow to a Reservoir (See Contract 2), the reservoir embankment is classified as a dam. The estimated cost range of the features to service the scope of the project is 400 to 600 million dollars.

The collected storm water is then discharged from the Reservoir to a series of Storm water Treatment Area (STA) Cells (See Contract 3) which consist of small embankments with operating ranges of water depths between 0.5 feet to 3 feet. The average operating depth in the Stormwater treatment Areas is estimated to be 1.5 feet. The treated flow leaves the STAs and eventually discharges back into the C-44 Canal downstream of the intake canal, with the water treated and some peak attenuation according to the project objective. The project execution will be in three contracts for design. All design efforts will be performed by an A-E firm. The three design contracts are described below.

Contract One(1) is presently under construction. Contract 1 had previously (prior to EC 1165-2-209) been identified as a “shovel ready” contract and later identified to receive ARRA funds. An assessment was done to determine if any of the Contract 1 features presented a significant life safety risk. The assessment determined that work to be constructed under Contract 1 were non reservoir/storm water treatment area features and that none of the features presented a significant life safety risk and could proceed using ARRA funds. This assessment was documented in a “Preliminary Review Plan Assessment” document which is attached as Attachment “B”.

Contract 1 consists of constructing preparatory site features including:

- Intake Canal: 20,000 Linear Feet (ft)
- Electrical Adjustments
- Offsite Drainage Interception from Bar “B” Ranch (C133A/C-133 Canals)
- Bridge Construction at CR 726 (Citrus Boulevard)
- C133 Spillway
- Project Access Road
- New box culvert.

Because of the type of features being constructed, a review plan was scheduled for latter preparation as evidenced by the attached review plan assessment (Attachment B).

Contract Two(2) consists of the Reservoir, Pump Station, Discharge Tower, redesign of the wildlife entrapment, and a temporary outlet system for the reservoir to discharge to until the STA is completed.

- Reservoir
 - Acreage: 3,400 acres (ac)
 - Water Depth: 15 feet (ft)
 - Reservoir Storage Volume: 50,600 acre-feet (ac-ft)
 - Reservoir Embankment Length: 48,600 linear feet (ft)
 - Typical profile: Trapezoidal section
 - Bottom: 103.5 ft
 - Top: 14 ft
 - Height: 34.5 ft
 - Side Slopes: 1:3
 - Pump Station Capacity (C-44 Canal to Reservoir): 1,100 cubic feet per second (cfs)
- Discharge Canal: 39,000 linear feet (ft)

Contract (3) Three consists of the STA Cell Construction and subsequent final site work. Contract 3 will be scheduled at a future date and will be addressed by a revision to this review plan.

- 6 STAS:
 - Acreage: 6,300 acres (ac)
 - Water Depth: 1.5 feet (ft)
 - Typical profile: Trapezoidal section,
 - Bottom: Variable depending on site conditions.
 - Top: 14 ft
 - Height: Variable depending on site conditions.
 - Side Slope: 1:3

Perimeter canals: 57,000 linear feet (ft)

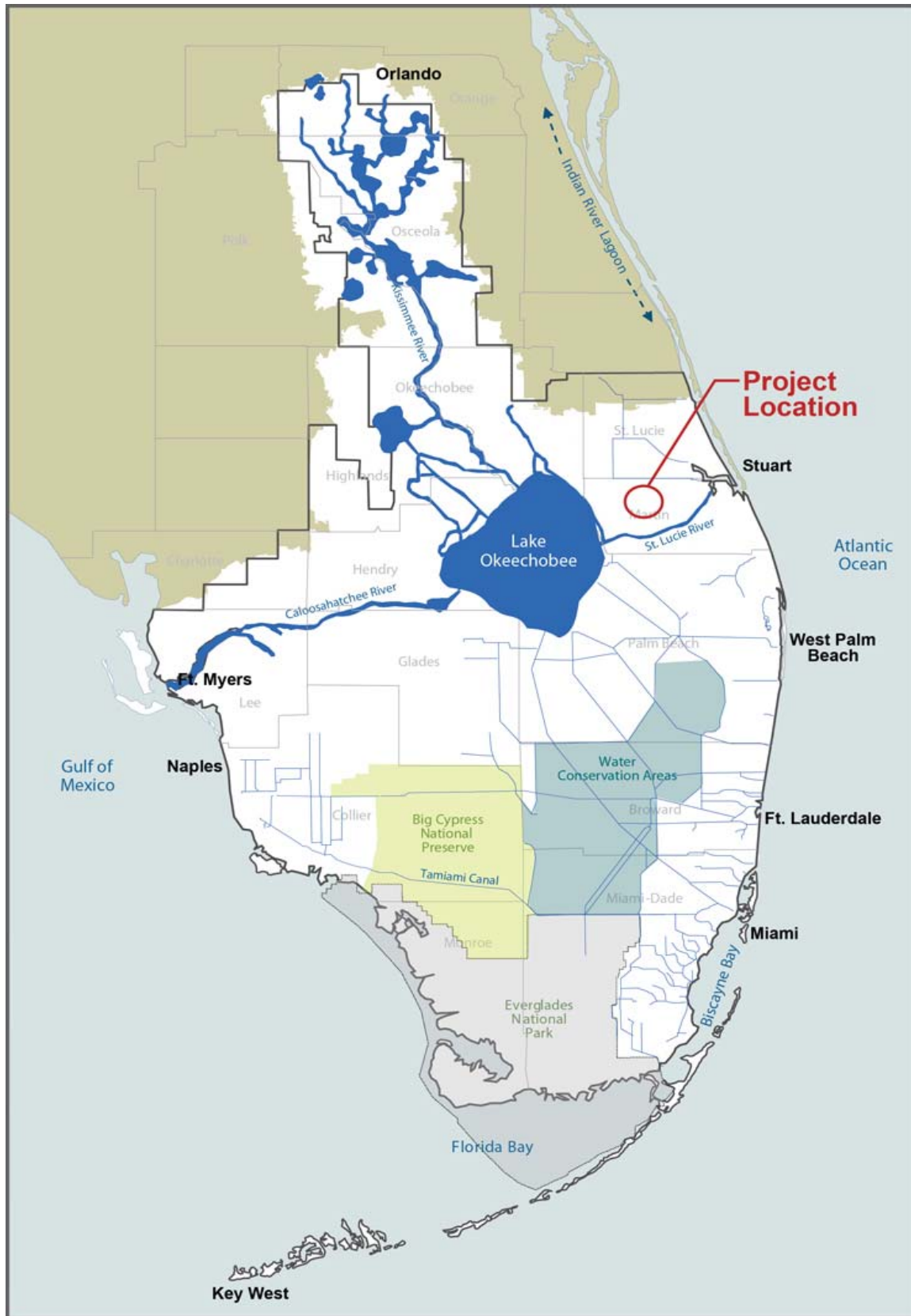
Conveyance/Control Structures: 23

Long-term project schedule shows CNT 3 to start in 2017 with PED phase and closing with construction award in 2018 extending over a period of 2.5 years.

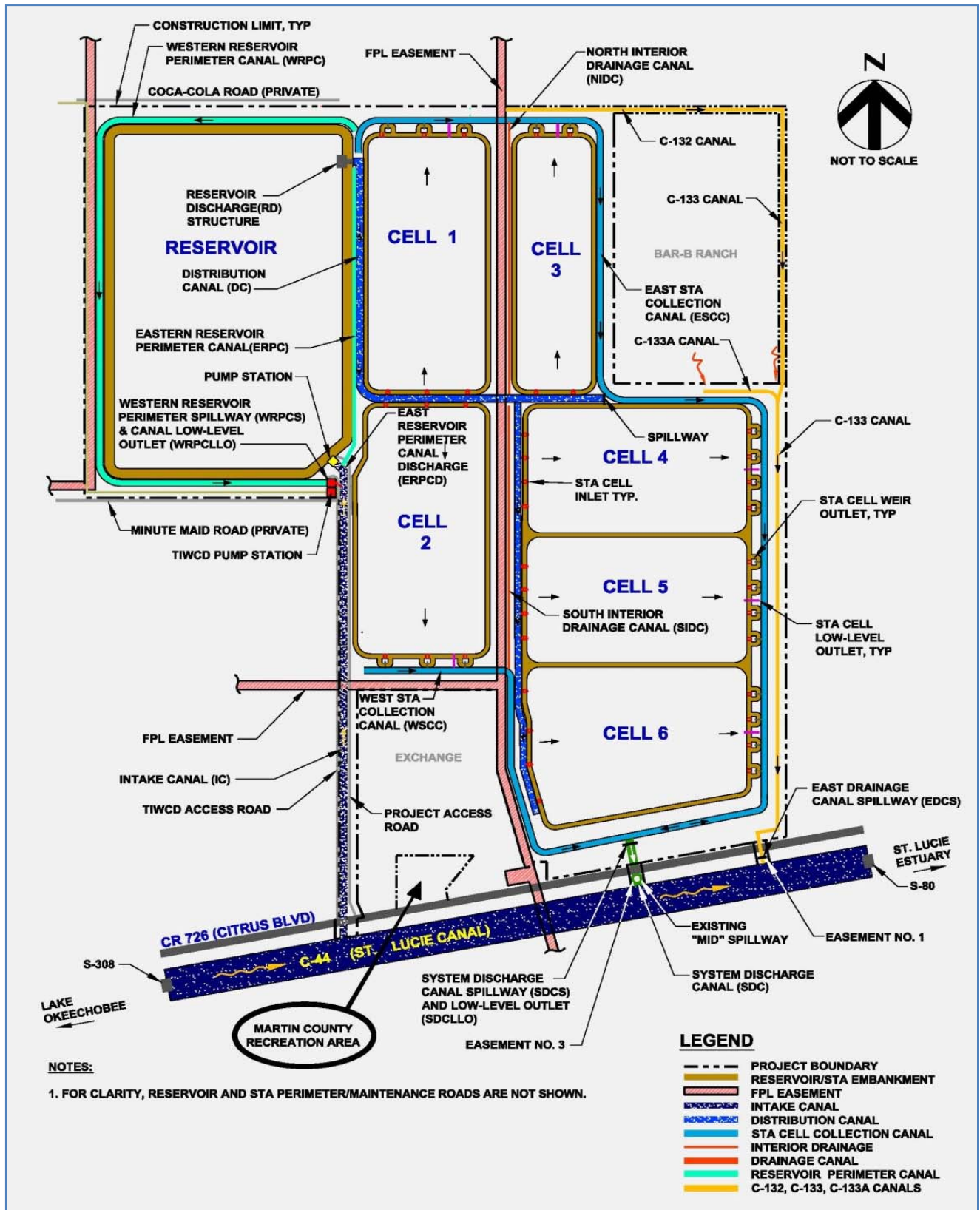
| | |
|----------------------|----------|
| CNT 3 NTP PED Phase: | Feb 2017 |
| ATR and BCOE: | May 2018 |
| Const Award: | Sep 2018 |
| NTP (Construction) | Oct 2018 |
| Const Completion: | Apr 2021 |

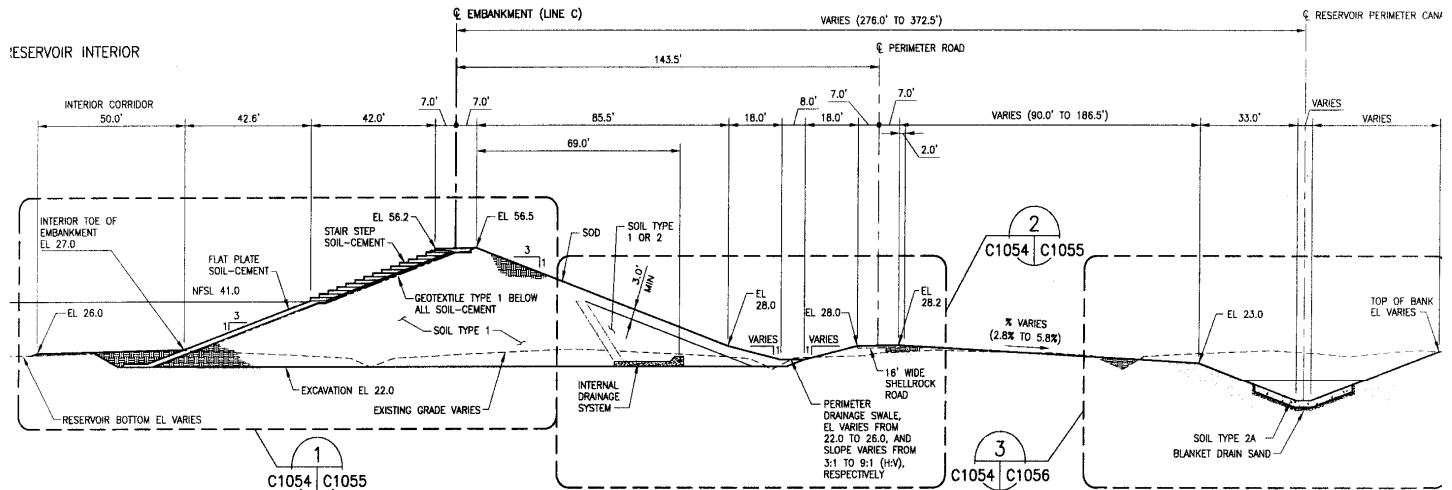
As noted above per contract, the project components include a reservoir, a pump station, storm water treatment area, canals, embankments, structures, roads, and the temporary reconfiguration of water control district canals, as shown on the following figure, and listed as follows (all values approximate):

C-44 Project Location Map:



C-44 Reservoir/STA Project Site Plan:





TYPICAL EMBANKMENT AND PERIMETER CANAL DETAIL SECTION
SEE NOTE 1

Public Participation

The Jacksonville District Corporate Communications Office continually keeps the affected public informed on Jacksonville District projects and activities. There are no planned activities, public participation meetings or workshops that could generate issues needing provision to review teams. The project review plan will be posted on the Jacksonville District Internet. Any comments or questions regarding the review plan will be addressed by the Jacksonville District.

In-Kind-Contributions by Project Sponsor

There are no required additional in-kind sponsor contributions that could affect this review plan or related reviews. There are sponsor in-kind contributions that are supplied in accordance with the Project Partnership Agreement.

Cost Engineering Directory of Expertise (DX) Review And Certification

The cost related documents associated with this contract does not require external peer review or certification. Therefore, no additional review requirements will be executed by the Cost Engineering Directory of Expertise (DX) for the implementation documents addressed by this review plan.

3. DISTRICT QUALITY CONTROL

District Quality Control (DQC) activities for engineering products are stipulated in ER 1110-1-12, Engineering & Design Quality Management and EC 1165-2-209. DQC will be performed on the P&S and DDR in accordance CESAJ Engineering Division Quality Management System (EN QMS; more specifically, "02612-SAJ Quality Assurance of Outsourced (AE) Engineering Products: Civil Work PED". The EN QMS defines Quality Assurance (QA) measures the Jacksonville District's Engineering Division utilizes to insure the design quality of outsourced Engineering products, through Architect-Engineer (AE) services for Civil Works Projects during the Preconstruction Engineering and Design (PED) Phase. DQC consists of two reviews, Discipline Quality Control Review (DQCR) and Product Quality Control Review (PQCR). Product Quality Control Review is the DQC Certification that will precede ATR. The following EN QMS Procedures define related DQC activities for CESAJ-EN.

02612 - SAJ Quality Assurance for Outsourced (AE) Engineering Products: Civil Works PED
02600 - QCP QAP Approval
02612 - QA Certification for AE
02612 - QAP Approval for AE
02612 - QC Certification for AE
02625 - SAJ Sample Quality Assurance Plan

HDR Inc. will prepare products, including the plans and specifications, updating the DDR, preparing the Engineering Considerations and Instructions (ECI) Report, and OMRR&R for the C-44 Reservoir/STA Project and those products are classified by SAJ as Products Prepared by Others. HDR will perform quality control (QC) per ER 1110-1-12 and SAJ will perform quality assurance (QA) per ER 1110-1-12. HDR Deliverables will be reviewed by SAJ PDT members and management per our QAP. SAJ reviews will include Discipline Quality Control Review (DQCR), on intermediate and final deliverables, ATR on intermediate and final Deliverables, IEPR (SAR) on intermediate deliverables, Sponsor on Intermediate and Final Deliverables, BCOE on Corrected Final Deliverables. The section chiefs will certify that the review is complete (Attachment C).

4. AGENCY TECHNICAL REVIEW

a. Scope. Agency Technical Review (ATR) is undertaken to "ensure the quality and credibility of the government's scientific information" in accordance with EC 1165-2-209 and ER 1110-1-12. An ATR will be performed on the intermediate and pre-final Plans and Specification, DDR, and ECI.

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

ATR comments are documented in the DrCheckssm model review documentation database. DrCheckssm is a module in the ProjNetsm suite of tools developed and operated at ERDC-CERL (www.projnet.org).

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 organization affiliations, and include a short paragraph on both the credentials and relevant expertise of each reviewer;
- Include the charge to the reviewer;
- Describe the nature of their review and their findings and conclusions; including if the comment is considered to be an error, omission, oversight, conflicts within the documents, coordination issues, QA/QC, discrepancies, deficiencies, etc.
- Identify and summarize each unresolved issues (if any); and

Include a verbatim copy of each reviewers comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

b. ATR Disciplines. As stipulated 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 USACE commands; contractors; academic or other technical experts; or a combination of the above. The ATR Team will be comprised of the following disciplines; knowledge, skills and abilities; and experience levels.

Environmental Engineer. The team member should be an environmental engineer with 10 or more years experience in conducting and evaluating soil remediation activities.

Hydrogeology and Geology. The team member will review subsurface geologic data and interpretations to support embankment and foundation design and integrity. The team member also will review hydrogeologic data and interpretations to support hydrologic and seepage modeling, and an evaluation of characteristics of the surficial aquifer at the site. The team member should possess Professional Geologist certification; have a minimum of 10 years professional experience, especially focused in South Florida applications. Experience with the Dam Safety Program is desired.

Water Management (Project Operating Manual). The team member should have 10 or more years experience in water resources engineering with heavy emphasis on water management. Experience should include preparation and review of water management operating criteria for reservoir/impoundment projects, and knowledge of real-time water control activities based on approved water control plans and regulation schedules at multi-purpose water resource projects. The team member should also be familiar with the regulations concerning the format and content of water control plans and project operating manuals.

Hydrology and Hydraulics. One to three team members will be required to review the hydraulic design, hydrologic-hydraulic modeling, and wind/wave analyses. The team member(s) should be registered professionals with 10 or more years experience in conducting and evaluating hydrologic and hydraulic analyses for flood risk management projects. Experience with flood routing methodologies in reservoirs and channels, seepage flow processes, hydrologic-hydraulic modeling, surface water-groundwater interaction modeling, wind/wave analysis, and performance of risk assessments is required. Knowledge on hydrologic and hydraulic analyses in terms of water quantity and quality in a water resources system is expected. Experience with the Dam Safety Program is desired.

Geotechnical Engineering. The team member should be a registered professional engineer and have 10 or more years experience in geotechnical engineering. Experience needs to include geotechnical evaluation of flood risk management structures. Experience needs to encompass static and dynamic slope stability evaluation; evaluation of the seepage through earthen embankments and under seepage through the foundation of the flood risk management structures, including dams, levee embankments, floodwalls, closure structures and other pertinent features; and settlement evaluations. Experience with the Dam Safety Program is desired.

Structural Engineering. The team member should be a registered professional engineer and have 10 or more years experience in structural engineering. Experience needs to include the engineering and design of flood risk management project features such as pump stations, conveyance culverts, and spillways. Experience with the Dam Safety Program is desired.

Mechanical and Electrical Engineering. The team members should have 10 or more years experience in mechanical and electrical engineering. Experience needs to include engineering and design of flood risk management project features such as pump stations, related systems, components and instrumentation and control. . Experience with the Dam Safety Program is desired.

Civil Engineering. The team member should be a registered professional engineer and have 7 or more years experience with civil/site work projects to include embankments, roads and highways, relocations, paving and drainage.

NEPA Compliance. The team member should have 7 or more years experience in NEPA compliance activities and preparation of Environmental Assessments and Environmental Impact Statements for complex civil/site work projects.

ATR Team Leader. The ATR Team Leader should have 10 or more years experience with Civil Works Projects and have performed ATR Team Leader duties on complex civil works projects. The ATR Team Leader should have experience with the Dam Safety Program. ATR Team Leader can also serve as one of the review disciplines. Professional registration is as a requirement for the ATR leader.

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

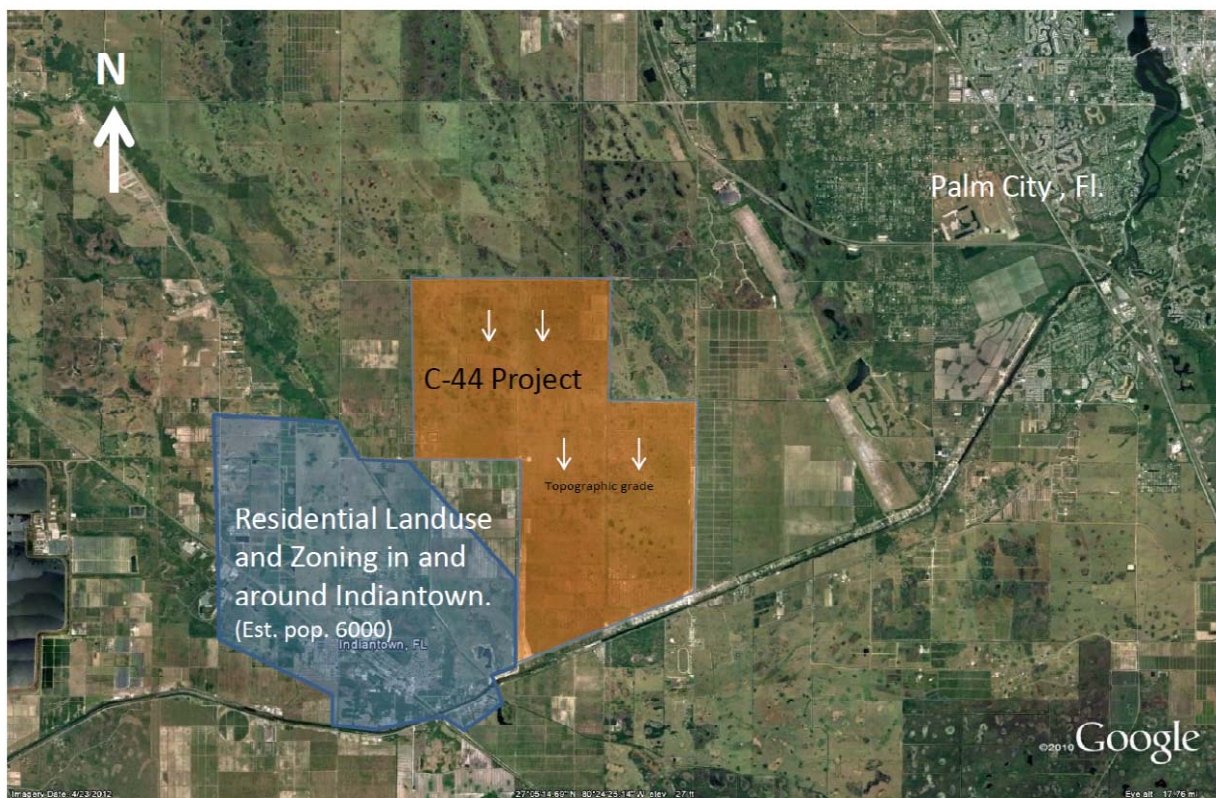
a. General. EC 1165-2-209 provides implementation guidance for both Sections 2034 and 2035 of the Water Resources Development Act (WRDA) of 2007 (Public Law (P.L.) 110-114). Sections 2034 and 2035 call for peer review procedures for both the Planning and the Design and Construction (PED) phases. The EC terms the Section 2034 Independent Peer Review, Type I Independent External Peer Review and the Section 2035 Safety Assurance Review, Type II Independent External Peer Review.

b. Type I Independent External Peer Review (IEPR) Determination (Section 2034). Type I IEPR is generally for decision documents. No decision documents or other applicable Section 2034

products are addressed by this Review Plan. Therefore Type I IEPR is not applicable to the implementation documents addressed by this Review Plan.

c. Type II Independent External Peer Review (IEPR) for CNT 2. The major project component of CNT 2 is a reservoir that pulls water from the C-44 canal and temporarily stores this water until it is slowly released into the Stormwater Treatment Areas that will be designed under CNT 3. The reservoir is a component of this ecosystem project that presents significant risk to human life and therefore, a Type II IEPR is recommended by the District Engineering Chief. A Type II IEPR will be conducted under the supervision of the Review Management Organization (RMO). The RMO will provide a vetted Architect-Engineer firm to manage and execute the Type II IEPR outside USACE, in accordance with National Academy of Sciences peer review procedures. To insure independence and to obtain the required expertise, the Type II IEPR Independent Experts will be provided by the selected Architect-Engineer firm. Independent Experts will submit and comply with National Academy of Sciences, Background Information and Confidential Conflict Of Interest Disclosure, BI/COI FORM 3, dated May 2003. RMO will also provide technical oversight for both the ATR and Type II IEPR processes.

The exhibit below shows the potential life safety aspects of the area as related to the surrounding community of Indiantown. The C-44 project site topographic grade extends to the south. The entire area contains a network of ditches and canals that collects runoff and transports it to the C-44 canal. The dam break analysis is scheduled to be performed after the start of FY14.



C- 44 Reservoir – Potential Life Safety Impacts

d. Type II IEPR Determination for CNT3. The project components designed under CNT 3 are Stormwater Treatment Areas (STAs) and a discharge canal back to the C-44 downstream of the intake canal. Stormwater Treatment Areas (STAs) is an ecosystem component of the C-44 project and does not trigger WRDA 2007 Section 2035 factors for Safety Assurance Review (termed Type II IEPR, as defined in EC 1165-2-209). Based upon the below factors, the District Engineering Chief does not recommend an Type II IEPR be performed for CNT3 design. The factors in determining whether peer reviews (IEPR) of design and construction activities are necessary are stated under Section 2035. Review plans applicability statements follow for CNT3.

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

The STA is a low head (18 inches) water polishing area ecosystem project component. The containment embankments are 6 feet in height. Failure of the embankment would not pose a significant threat to human life.

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

This project will utilize methods and procedures used by the Corps of Engineers and the project sponsor on other similar works.

(3) The project design lacks redundancy.

The low head STA design does not require the addition of redundant project features or redundancy design considerations beyond those required of professional certification.

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

This project's construction does not have unique sequencing or a reduced or overlapping design. The installation sequence and schedule has been used successfully by the Corps of Engineers and the project sponsor on other similar works.

e. Type II Independent External Peer Review (IEPR) Methodology. A Type II IEPR will be conducted for each of the remaining phases of the project features designed under CNT2, to include design and construction, through the O&M Phase. EC 1165-2-209 will be used to manage and develop the charges for the IEPR independent experts. Type II IEPR reports will be completed for all reviews. Type II IEPR report approvals are addressed below.

f. Type II IEPR Experts. The Design Phase Type II IEPR Hydrology and Hydraulics Independent Expert will review the design phase only. The Geotechnical Engineering and Structural Engineering Panel members will review the design. The Operation and Maintenance Phase Type II IEPR Independent Expert and O&M Phase Hydrology and Hydraulics expert will conduct their review near the midpoint of FY12. Panel members of similar disciplines such as Structural Engineer & the Civil Design & Construction or Geotechnical Engineer & the Engineering Geologist may perform two functions. However, they must meet all the criteria of both experts' experience requirements.

Hydrology and Hydraulics (H&H) Independent Expert.

The H&H Independent Expert should be a registered professional from academia, a public agency, or an Architect-Engineer or consulting firm with 15 or more years experience in conducting and evaluating hydrologic and hydraulic analyses for flood risk management projects. Experience with flood routing methodologies in reservoirs and channels, seepage flow processes, hydrologic-hydraulic modeling analyses, surface water-groundwater interaction modeling analysis, wind/wave analysis, and performance of risk assessments is required. Knowledge on hydrologic and hydraulic analyses in terms of water quantity and quality in a water resources system is expected. Experience with the Dam Safety Program is desired. Active participation in related professional societies is encouraged.

Geotechnical Engineering Independent Expert. The Geotechnical Engineering Independent Expert should be a registered professional engineer from academia, a public agency, or an Architect-Engineer or consulting firm with 15 years experience in conducting and evaluating geotechnical and geologic analyses for levees, dams and impoundments. Experience needs to include geotechnical evaluation of flood risk management structures. Experience needs to encompass static and dynamic slope stability evaluations; evaluation of the seepage through earthen embankments and under seepage through the foundation of the flood risk management structures, including dams, levee embankments, floodwalls, closure structures and other pertinent features; and settlement evaluations. Experience with the Dam Safety program is desired. Active participation in related professional societies is encouraged.

Engineering Geologist Independent Expert. The Engineering Geologist Independent Expert should be a registered professional engineer from academia, a public agency, or an Architect-Engineer or consulting firm with 15 or more years. The Geologist shall be proficient in assessing seepage and piping through and beneath dams constructed on or within various geologic environments, including but not limited rock formations, fractured & faulted rock. The Geologist shall be familiar with identification of geological hazards, exploration techniques, field & laboratory testing, and instrumentation. The Geologist shall be experienced in the design of grout curtains & cutoff walls and must be knowledgeable in grout rheology, concrete mix designs, and other materials used in foundation seepage barriers. Experience with Federal Dam Safety Programs and participation in related professional societies are desired.

Hydrogeology Independent Expert. The Hydrogeology & Geology Independent Expert must be a registered professional geologist from academia, a public agency, or an Architect-Engineer or consulting firm with 15 years experience in conducting and interpreting hydrogeologic data from aquifer performance tests, ground water monitoring projects, and similar studies and analyses in unconfined aquifers. The Expert must also be familiar with engineering geology concepts related to foundation design, including geologic interpretations of cores, borings, and geotechnical data associated with rock analyses. The Expert must have knowledge in soil contamination remediation.

Structural Engineering Independent Expert. The Structural Engineering Independent Expert should be a registered professional engineer from academia, a public agency, or an Architect-Engineer or consulting firm with 15 years experience in conducting and evaluating

structural analyses for project features such as pumping stations, conveyance culverts, and spillways. Active participation in related professional societies is encouraged.

Civil/Construction Engineering Independent Expert. The Civil/Construction Engineering Independent Expert should be a professional from academia, a public agency, or an Architect-Engineer or consulting firm with 10 years experience in the design, layout, and construction of flood control structures including dams. The Civil/Construction Engineer shall have demonstrated knowledge regarding hydraulic structures, erosion control, earthwork, concrete placement, design of access roads, and relocation of underground utilities. Panel member should be familiar with similar projects across US. Experience with Federal Dam Safety Programs and participation in related professional societies are desired.

Mechanical and Electrical Engineering. The team members should have 15 or more years experience in mechanical and electrical engineering. Experience needs to include engineering and design of flood risk management project features such as pump stations, related systems, components and instrumentation and control. Experience with the Dam Safety Program is desired.

f. Type II IEPR Report Approval. The approval authority for Type II IEPR Reports is the South Atlantic Division (SAD). Approval activities and responsibilities are stipulated in EC 1165-2-209.

6. POLICY AND LEGAL COMPLIANCE

The Jacksonville District Office of Counsel reviews all contract actions 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. Once approved, SAJ will post the approved review plan on the SAJ web site for viewing by the public.

7. ENGINEERING MODELS UTILIZED

Engineering Models. The C-44 CNT 2 Project does not use any engineering models (listed below) that have not been approved for use by USACE.

- **HEC-RAS 4.0.:** The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to perform one-dimensional unsteady flow river hydraulics calculations. The program was utilized to model maximum inundation extent to help establish MIKE-21 mesh domain.
- **ACES (Version 4.03):** ACES is run through the CEDAS platform and is an integrated collection of coastal engineering design and analysis software. It provides a comprehensive environment for applying a broad spectrum of coastal engineering technologies. These technologies include functional areas such as wave prediction, wave theory, wave transformation, structural processes, wave run-up, littoral processes, inlet processes, and harbor design. ACES was originally developed by the U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, USA. Additional codes have been added by Veri-

Tech, Inc. The ACES/CEDAS platform, as well as ACES source code equations (defined in the ACES User's Manual and converted to Fortran code by SAJ), were used to determine wave run-up and over-wash rates.

- ICPR (Interconnected Channel and Pond Routing) Model: The ICPR model utilizes the SCS type rainfall-runoff parameters such as Curve Number, Time of Concentration, Directly Connected Imperviousness, Rainfall, Area, etc. to generate the hydrology of the subject watershed. The hydraulics of canals and contributing surface areas were evaluated using the ICPR model. This model is a nationally accepted hydraulic model with FEMA.
- HEC-HMS: Used for PMP rainfall analysis to determine peak IDF reservoir elevation and service spillway design.
- Groundwater Modeling System (GMS) version 6.5. Department of Defense. GMS provides an integrated and comprehensive computational environment for simulating subsurface flow, contaminant fate/transport, and the efficacy and design of remediation systems. This program is used to model the flow of water through embankment, foundation, and other features as required in pursuit of solutions that adequately address factors of safety against piping and uplift.

8. PROJECT DELIVERY TEAM DISCIPLINES

| Discipline/Expertise |
|---|
| Construction Quality Assurance |
| Contracting |
| Project Manager |
| Cost Estimation |
| Specifications and Procurement Packages |
| Geomatics & Survey |
| Civil Site Design |
| Engineering Technical Lead |
| Mechanical Engineering |
| Electrical Engineering |
| Structural Engineering |
| Environmental Engineering |
| Hydrogeology & Geology |
| Geotechnical Engineering |
| Reservoir Modeling |
| Hydraulic & Hydrologic Engineering |
| Hydrodynamic Engineering |
| Water Mgt (Project Operations Manual) |
| NEPA Compliance |
| Planning Technical Lead |
| Real Estate |

9. SCHEDULE AND BUDGET

| CONTRACT 2 SCHEDULE | Start | Finish |
|---|-------------------|-------------------|
| IEPR Proposal Preparation & Award | 9/28/2012 | 1/22/2013 |
| Request | 9/28/2012 | 10/30/2012 |
| Obtain KO authority from RMC for A-E contract | 9/28/2012 | 10/12/2012 |
| Prepare Task Order SOW / IGE | 10/15/2012 | 10/19/2012 |
| Route RFP for Approval | 10/22/2012 | 10/24/2012 |
| CT processes RFP | 10/25/2012 | 10/30/2012 |
| CT Issues RFP | 10/30/2012 | 10/30/2012 |
| Proposal | 10/31/2012 | 1/22/2013 |
| Type II IEPR A-E Provides Proposal | 10/31/2012 | 11/14/2012 |
| EN-TA Prepares POM and Routes for Approval | 11/15/2012 | 11/26/2012 |
| SAJ CT Reviews and Approves POM | 11/27/2012 | 12/5/2012 |
| SAJ Negotiates RFP with A-E | 12/6/2012 | 12/19/2012 |
| EN-TA Completes PNM and Routes for Approval | 12/20/2012 | 1/10/2013 |
| CT Processes Award Package | 1/11/2013 | 1/22/2013 |
| TYPE II IEPR A-E TASK ORDER ISSUED | 1/22/2013 | 1/22/2013 |
| QAR/Sponsor/ATR/IEPR Review | 2/6/2013 | 6/27/2013 |
| IEPR Team Performs Site Visit | 2/6/2013 | 2/8/2013 |
| Government Reviews | 4/15/2013 | 5/3/2013 |
| A-E Comment Evaluation | 5/6/2013 | 6/3/2013 |
| A-E Workshop to resolve review Comments | 6/4/2013 | 6/5/2013 |
| Government Comment Backcheck / Close | 6/6/2013 | 6/26/2013 |
| Finalizes IEPR Report | 6/27/2013 | 6/27/2013 |
| IEPR REPORT SUBMITTED TO SAJ | 6/27/2013 | 6/27/2013 |
| A-E Incorporate Review Changes (submit with the Final Review Submittal) | 6/27/2013 | 6/27/2013 |
| Prepare final submittal | 6/28/2013 | 8/9/2013 |
| QAR/ATR/SPONSOR | 8/26/2013 | 12/2/2013 |
| QAR/ATR/SPONSOR Review | 8/26/2013 | 9/16/2013 |
| QAR/ATR/SPONSOR Review Comment | | |
| Evaluation | 9/17/2013 | 9/30/2013 |
| A-E conference to resolve review conference (work shop) | 10/1/2013 | 10/2/2013 |
| QAR/ATR/SPONSOR Review Comment | | |
| Backcheck / Close | 10/3/2013 | 10/17/2013 |
| Incorporate ATR/sponsor comments | 10/18/2013 | 11/15/2013 |
| TRB and Review Verification Conf. | 11/18/2013 | 11/22/2013 |
| QAR & ATR certification | 11/25/2013 | 12/2/2013 |
| QAR & ATR CERTIFIED | 12/2/2013 | 12/2/2013 |

| | | |
|---|------------------|------------------|
| ETL PROVIDES PROJECT INFORMATION SHEET TO ENDC | 9/17/2013 | 9/17/2013 |
| PM SUPPLIED PROCUREMENT PACKAGE ITEMS PROVIDED TO EN-DC | 9/18/2013 | 9/18/2013 |
| PROCUREMENT PACKAGE TO CT | 9/19/2013 | 9/19/2013 |
| CT prepares draft contract clauses | 9/20/2013 | 10/3/2013 |
| RECEIVE FRONTS FROM CT | 10/4/2013 | 10/4/2013 |
| BCOE Review | 12/6/2013 | 1/14/2014 |
| BCOE Review, incl. Workshop | 12/6/2013 | 12/27/2013 |
| Evaluate BCOE comments | 12/30/2013 | 1/6/2014 |
| BCOE conference | 1/7/2014 | 1/7/2014 |
| Backcheck & close BCOE comments | 1/8/2014 | 1/14/2014 |
| Incorporate comments (include with the Corrected Final Submittal) | 1/14/2014 | 1/14/2014 |
| Corrected Final Submittal | 1/15/2014 | 2/24/2014 |
| Prepare and Submit Corrected Final | 1/15/2014 | 2/12/2014 |
| Verification/Government Review | 2/13/2014 | 2/20/2014 |
| BCOE Verification Conference | 2/21/2014 | 2/21/2014 |
| BCOE CERTIFIED | 2/24/2014 | 2/24/2014 |
| Corrected Final Submittal (Post Verification Review) | 2/25/2014 | 3/24/2014 |
| Prepare and Submit Corrected Final | 2/25/2014 | 3/24/2014 |
| PARC Review | 3/25/2014 | 5/5/2014 |

Construction award is presently scheduled to occur before the end of FY 14. The construction length of the contract will be dependent upon annual funding availability.

b. Contract No. 2 Review Cost. The cost for ATR will range \$70,000 to \$90,000 and the Design Phase Type II IEPR will range \$200,000-\$250,000.

c. Contract No. 3 STA Cell Construction and subsequent final site work. This contract will be scheduled in FY2018. The cost for ATR will range from \$40,000 TO \$60,000. Type II IEPR for construction of CNT 2 design will be for approximately \$100,000.

10. POINTS OF CONTACT

Their titles and responsibilities are listed below.

Jacksonville District POCs:

| | |
|----------------------------------|--|
| Review Plan, ATR and QM Process, | William E. Schaefer II, PE 904-232-2617 William.E.Schaefer@usace.army.mil |
|----------------------------------|--|

Project Information (PM) & (ETL),

Wiener Cadet, PE
904-232-1716
Wiener.Cadet@usace.army.mil

Gordon Grimes, PE
904-232-1123
gordon.e.grimes@usace.army.mil

Risk Management Center

Thomas Bishop, PE
303-963-4556
Thomas.W.Bishop@usace.army.mil

A/E Point of Contact:

Contract Manager

Ms. Katie Duty
HDR Engineering, Inc.
Associate Vice President
5426 Bay Center Drive, Suite 400
Tampa, FL 33609
813.282.2352
katie.duty@hdrinc.com

ATTACHMENT A: APPROVED REVIEW PLAN REVISIONS

| Revision Date | Description of Change | Page / Paragraph Number |
|----------------------|------------------------------|------------------------------------|
| | | |
| | | |
| | | |
| | | |
| | | |

Attachment B

Preliminary Review Plan Assessment

Contract 1 - C-44 Reservoir/Stormwater Treatment Area (STA) Project

Preliminary Review Plan Assessment

Contract 1 - C-44 Reservoir/Stormwater Treatment Area (STA) Project

Indian River Lagoon South (IRL-S) Project

Martin County, Florida

This preliminary assessment addresses EC 1165-2-209 project requirements. The subject contract is the first of three contracts for the C-44 Reservoir/Stormwater Treatment Area (STA) Project. This assessment summarizes that EC 1165-2-209 does not require a Type II IEPR for Contract 1 but does require both Agency Technical Review and a Type II IEPR for the remaining contracts and total project. The overall project and Contracts 2 and 3 will be addressed in a review plan per EC 1165-2-209 Appendix B, paragraph 3.b. submittal requirements.

Project Description

As shown the attached plate, project components include a reservoir, a pump station, stormwater treatment areas, canals, embankments, structures, roads, and the temporary reconfiguration of TIWCD canals. The project will be constructed in three contracts. The Plans and Specifications and the Design Documentation Report for Contract 1 were prepared by HDR for the South Florida Water Management District under agreement with the Corps of Engineers for Comprehensive Everglades Restoration Project. The Jacksonville District is currently completing conversion of P&S for features in Contract 1 to Corps standards. Design modifications are expected for Contract 2 (reservoir) and Contract 3 (STA) features. Contract 1, remaining engineering and design, and Contracts 2 and 3 will be implemented by the Jacksonville District.

Contract 1 Description

The purpose of Contract No.1 project is to construct the following elements of the C-44 Reservoir/STA project. Those features are shown on the attached plate.

- Intake Canal from the existing C-44 Canal extending approximately 20,000 feet north to the future C-44 Reservoir using the alignment of the existing Troup Indiantown Water Control District Irrigation (TIWCD) Canal.
- A new bridge structure at the southwest corner of the Citrus Boulevard and Intake Canal crossing. At this location, Citrus Boulevard will transition from a two-lane roadway to a two-lane bridge spanning the Intake Canal
- Project Access Road from Citrus Boulevard extending approximately 20,000 feet running north parallel to and east of the Intake Canal
- C-133A (running parallel to and south of the Bar B Ranch south property line) and C-133 (from the Bar B Ranch south-east corner extending south to the existing C-44 Canal) Canals improvements

Preliminary Review Plan Assessment

Contract 1 - C-44 Reservoir/Stormwater Treatment Area (STA) Project

Indian River Lagoon South (IRL-S) Project

Martin County, Florida

- A new shell rock Bar-B Ranch Access Road, located west of the C-133 Canal, running north and parallel to the existing Bar-B-Ranch Road. The first 1,600 feet of road off Citrus Boulevard will be paved.
- A new box culvert at the southeast corner of the C-44 Reservoir/STA Project property to channel off-site drainage directly into the C-44 canal. Improvements of Citrus Boulevard at this location include a new pavement section, safety railing, striping, general roadway shoulder and slope re-grading.
- C-133 Canal Spillway

Contract 1 Type II Independent External Peer Review (Safety Assurance Review) Assessment

The work to be constructed under Contract 1 are none reservoir/storm water treatment area features. Contract 1 does not trigger the requirements in WDRA 2007 Section 2035. Section 2035 excerpt is below. The basic reasoning is that failure of Contract 1 would not pose a significant threat to human life.

“(b) Factors- In determining whether a review of design and construction of a project is necessary under this section, the Chief of Engineers shall consider whether--

(1) the failure of the project would pose a significant threat to human life;

(2) the project involves the use of innovative materials or techniques;

(3) the project design lacks redundancy; or

(4) the project has a unique construction sequencing or a reduced or overlapping design construction schedule.”

EC 1165-2-209 Appendix E, Paragraph 2. Risk Informed Decision, lists additional factors. Contract 1 does not trigger the additional factors. Contract 1 construction uses existing methods and technologies that are not novel or unique.

EC 1165-2-209 Appendix E, Paragraph 2. Risk Informed Decision, does state: “... any other project where the Federal action is justified by life safety or the failure of the project would pose a significant threat to human life requires a Type II review.” As stipulated therein, a Type II IEPR is required.

C-44 Reservoir/Stormwater Treatment Area Project Review Plan Assessment

EC 1165-2-209 requires review plans be prepared for all projects within 90 days of EC 1165-2-209 issuance, 31 Jan 2010. A Review Plan for the C-44 Reservoir/Stormwater Treatment Area (STA) Project is required and will be prepared and submitted as part of the Jacksonville District Review Plan Submittals.

Preliminary Review Plan Assessment

Contract 1 - C-44 Reservoir/Stormwater Treatment Area (STA) Project

Indian River Lagoon South (IRL-S) Project

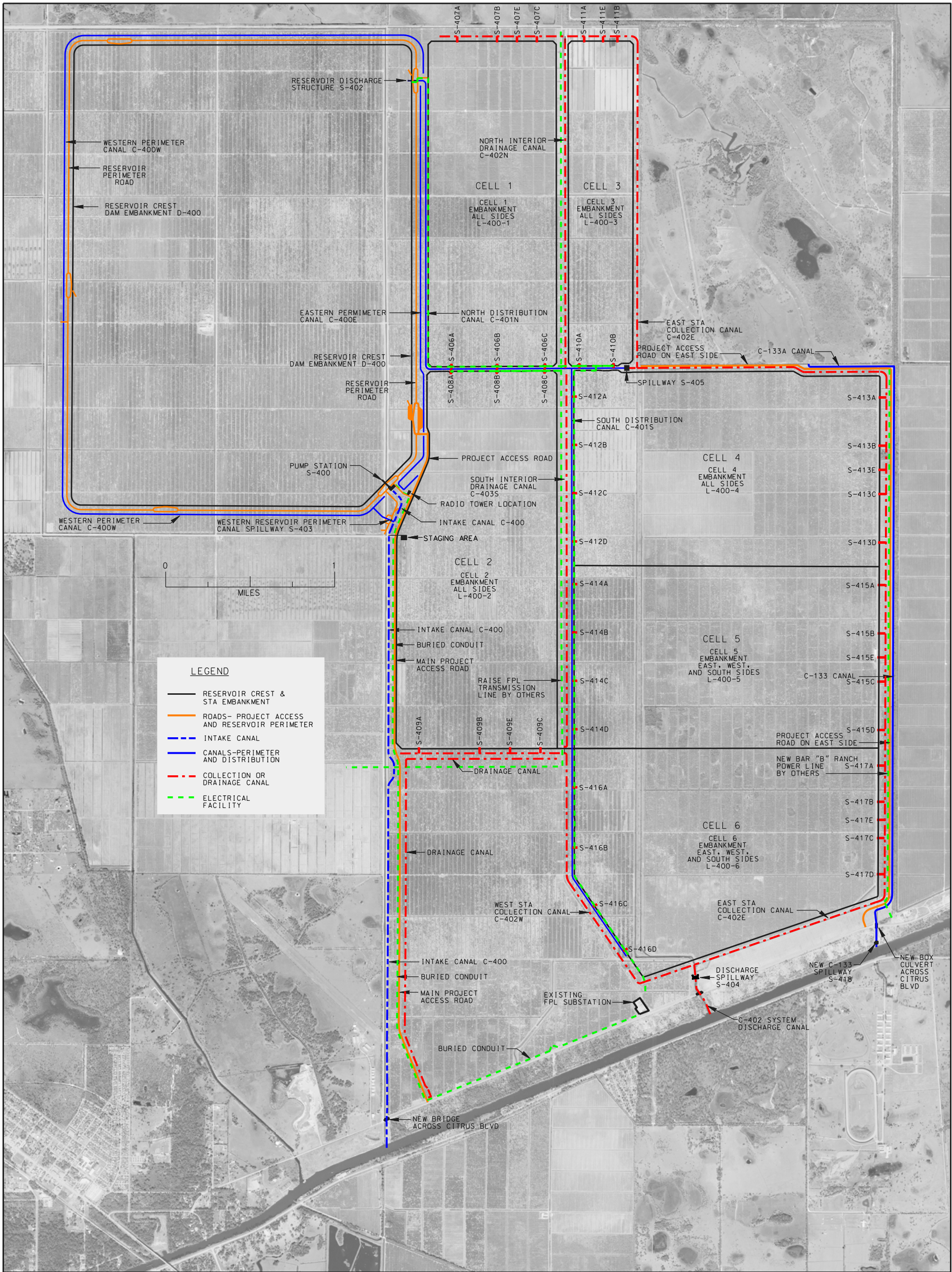
Martin County, Florida

The review plan will address all engineering and design for the remaining contracts and the total project. A Type II IEPR will be scoped and scheduled with the Review Management Organization.

Agency Technical Review (Independent Technical Review) & District QC/QA

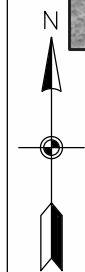
The Plans and Specifications and the Design Documentation Report for Contract 1 were prepared by HDR for the South Florida Water Management District under agreement with the Corps of Engineers for Comprehensive Everglades Restoration Project. Programmatic QC activities equivalent to ITR were conducted by agreement and the Jacksonville District performed QA on previous work. ITR equivalent to the requirements of ER 1110-1-12 E&D Quality Management were conducted.

EC 1165-2-209 ATR requirements will be implemented for all remaining engineering and design and Contracts 2 and 3. ATR and District QC/QA will be addressed in the Review Plan. The Review Plan will be submitted for approval to the SAD and RMC.



LEGEND

- RESERVOIR CREST & STA EMBANKMENT
- ROADS- PROJECT ACCESS AND RESERVOIR PERIMETER
- INTAKE CANAL
- CANALS-PERIMETER AND DISTRIBUTION
- COLLECTION OR DRAINAGE CANAL
- ELECTRICAL FACILITY



Attachment C

“Draft” ATR Format and Certification C-44 RESERVOIR/STORMWATER TREATMENT AREA (STA) PROJECT Review of Plans and Specifications (P&S), Design Documentation Report (DDR) And Engineering Considerations and Instructions Report (ECI)

ATR REPORT FORMAT

- 1. Introduction:**
- 2. ATR Team Members:**
 - Environmental Engineer.**
 - Hydrogeology and Geology.**
 - Water Management.**
 - Hydrology and Hydraulics.**
 - Geotechnical Engineering.**
 - Structural Engineering.**
 - Mechanical and Electrical Engineering.**
 - Civil Engineering.**
 - NEPA Compliance.**
 - ATR Team Leader.**
- 3. ATR Objective:**
- 4. Documents Reviewed:**
- 5. Findings and Conclusions:**
- 6. Unresolved Issues:**

ATR Certification

The Agency Technical Review (ATR) has been completed for Contract ___ of the C-44 Reservoir Stormwater Treatment Area (RSTA) Project, including the design documents, plans and specifications, DDR and ECI. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-209 and ER 1110-1-12. 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.

NAME
ATR Team Leader

Date

Wiener Cadet, P.E.
Project Manager

Date

Nathan Snorteland, P.E.
Director of Risk Management

Date