



**DEPARTMENT OF THE ARMY**  
**U. S. ARMY CORPS OF ENGINEERS, GREAT LAKES AND OHIO RIVER DIVISION**  
**550 MAIN STREET**  
**CINCINNATI, OH 45202-3222**

CELRD-PD-S

20 April 2020

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Huntington District, 502 Eighth Street, Huntington, WV 25701-2070

SUBJECT: Winfield Locks and Dam Major Rehabilitation Evaluation Report (MRER) Review Plan – Great Lakes and Ohio River Division Commander (LRD) Approval

1. References:

a. Memorandum, CELRH-DE, dated 24 March 2020, Subject: Winfield Locks and Dam Major Rehabilitation Evaluation Report (MRER)-Review Plan - LRH Transmittal Memo.

b. Winfield Locks and Dam MRER Review Plan, Red House, Kanawha County, West Virginia, dated March 2020.

2. The attached Review Plan was prepared in accordance with Engineer Circular (EC) 1165-2-217 dated 20 February 2018, and Engineering and Construction Bulletin (ECB) 2016-9 dated 4 March 2016.

3. I approve the enclosed subject Review Plan. The District is authorized to post Review Plan on the Huntington District public website.

4. The point of contact for the MSC's approval is Roscoe Bright; he can be reached at 513-684-3159 or at [roscoe.c.bright@usace.army.mil](mailto:roscoe.c.bright@usace.army.mil).

Encl

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EN.G.1230591454 DURRETT.STEPHEN.G.123059145  
Date: 2020.04.21 07:11:10 -04'00'  
STEPHEN G. DURRETT, P.E., SES  
Regional Programs Director



**DEPARTMENT OF THE ARMY**  
**HUNTINGTON DISTRICT, CORPS OF ENGINEERS**  
**502 EIGHT STREET**  
**HUNTINGTON, WEST VIRGINIA 25701-2035**

REPLY TO  
ATTENTION OF

CELRH-PCXIN-NC

24 March 2020

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Huntington District  
(CELRH-PD-F/Natalie McKinley) 502 Eighth Street, Huntington, West Virginia 25701

SUBJECT: Winfield Lock and Dam Major Rehabilitation Evaluation Report

1. The National Planning Center of Expertise for Inland Navigation (PCXIN) has reviewed the draft Review Plan (RP) for the subject study and concurs that the RP complies with current peer review policy requirement contained in Engineer Circular 1165-2-217, entitled "Review Policy for Civil Works".
2. This RP was prepared by CELRH-PD, reviewed by PCXIN, and all review comments have been satisfactorily resolved.
3. PCXIN endorses this RP to be approved by the Major Subordinate Command (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.
4. Thank you for the opportunity to assist in preparation of this RP. Please coordinate all aspects of the required review efforts as defined in the RP. Please contact Beth Adkins Cade at 304.399.5848 should you have any questions or require additional information.

Encl

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**PATRICK J. DONOVAN**  
Chief  
PCX for Inland Navigation

# REVIEW PLAN

Prepared: March 2020

**Project Name:** Winfield Locks and Dam, Red House, Kanawha County, West Virginia

**P2 Number:** 114125

**Decision Document Type:** Major Rehabilitation Evaluation Report

**Project Type:** Single Purpose Navigation

**District:** Huntington District

**District Contact:** Natalie McKinley, Lead Planner, 304-399-5842

**Major Subordinate Command (MSC):** Great Lakes & Ohio Rivers Division

**MSC Contact:** Roscoe Bright

**Review Management Organization (RMO):** Planning Center of Expertise – Inland Navigation

**RMO Contact:** Beth Cade, Senior Planner, 304-399-5848

## Key Review Plan Dates

**Date of RMO Endorsement of Review Plan:** 24 March 2020

**Date of MSC Approval of Review Plan:** 20 April 2020

**Date of IEPR Exclusion Approval:** N/A

**Has the Review Plan changed since PCX Endorsement?** N/A

**Date of Last Review Plan Revision:** None

**Date of Review Plan Web Posting:** (Once MSC Approval Received)

**Date of Congressional Notifications:** (enter date the RIT notified Congress of IEPR)

## Milestone Schedule

	<u>Scheduled</u>	<u>Actual</u>	<u>Complete</u>
<b><u>Alternatives Milestone:</u></b>	13 Apr 2020		No
<b><u>Tentatively Selected Plan:</u></b>	4 Jan 2021		No
<b><u>Release Draft Report to Public:</u></b>	24 Mar 2021		No
<b><u>Agency Decision Milestone:</u></b>	7 Jul 2021		No
<b><u>Final Report Transmittal:</u></b>	11 Aug 2022		No
<b><u>Senior Leaders Briefing:</u></b>	TBD		No
<b><u>Director's Report:</u></b>	13 Sep to 13 Oct 2022		No

## Project Fact Sheet

March 2020

**Project Name:** Winfield Locks and Dam Major Rehabilitation Evaluation Report

**Location:** Red House, Kanawha County, West Virginia

**Authority:** River and Harbor Acts of 1930 (P.L. 71-520) and 1935 (P.L. 74-409) and Water Resources Development Act of 1986 (P.L. 99-662)

**Sponsor:** N/A, Federally constructed owned and operated.

**Type of Study:** Major Rehabilitation Evaluation Report

- **RP References:**

- Engineer Circular (EC) 1165-2-217, Review Policy for Civil Works (CW), 20 February 2018
- EC 1105-2-412, Assuring Quality of Planning Models, 31 March 2011
- Engineer Regulation (ER) 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 November 2007
- Director's Policy Memorandum (DPM) CW Programs 2018-05, Improving Efficiency and Effectiveness in USACE CW Project Delivery (Planning Phase and Planning Activities), 3 May 2018
- Director of Civil Works (DCW) Memorandum, Revised Delegation of Authority in Section 2034(a)(5)(A) of the Water Resources Development Act of 2007 (WRDA 2007), as amended (33 U.S.C. 2343), 7 June 2018
- Planning Bulletin (PB) 2018-01, Feasibility Study Guidelines, 26 September 2018
- DPM 2019-01, Policy and Legal Compliance Review, 9 January 2019
- Winfield Locks and Dam Major Rehabilitation Evaluation Report, Project Management Plan, Pending Approval
- District Quality Management Plan is contained within the Project Management Plan, Pending Approval

**SMART Planning Status:** This study is compliant with SMART Planning Process (3x3x3)

**Review Management Organization:** The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for the peer review effort described in this Review Plan is the PCX for Inland Navigation (PCXIN). The RMO will coordinate with the Civil Works Cost Engineering Mandatory Center of Expertise (MCX) as needed to ensure the appropriate level of review is conducted for the subject study. The RMO will also coordinate with the Inland Navigation Design Center (INDC) for the appropriate engineer review.

**Project Area:** Winfield Locks & Dam is navigation project located at river mile 31.1 on the Kanawha River at Winfield, WV. This is one of three similar navigation structures constructed on

the Kanawha River to maintain a navigable depth of nine feet. The Kanawha River is navigable for about 91 miles. The Kanawha River is a major tributary of the Ohio River. Figure 1 provides a vicinity map of the Ohio and Kanawha Rivers navigation structures. Winfield's navigation pool extends approximately 36.6 miles upstream to Marmet Locks and Dam and includes the industrial and chemical plant production areas around Charleston, West Virginia, the state's capitol. The project facilities are located on 37 acres.

The project was constructed and the original lock chambers were placed into operation in September 1935. The remaining project features were completed in August 1937. The construction of an additional lock (main lock) and fish and wildlife mitigation began in 1990 and was completed in 1997 when it was placed into operation. Overall, the project facilities from the right descending bank and continuing to the left, consists of the main 110 ft wide x 800 ft long high-lift lock; a Tainter gate bay which was constructed to improve navigation conditions for downward bound tows approaching the main lock during high water; the original twin 56 ft wide x 360 ft long lock chambers now serving as auxiliary locks; a non-navigable gated dam and service bridge; and a three-unit hydropower facility operated by American Electric Power (AEP). Figure 2 provides an aerial view of the project with major feature labels.

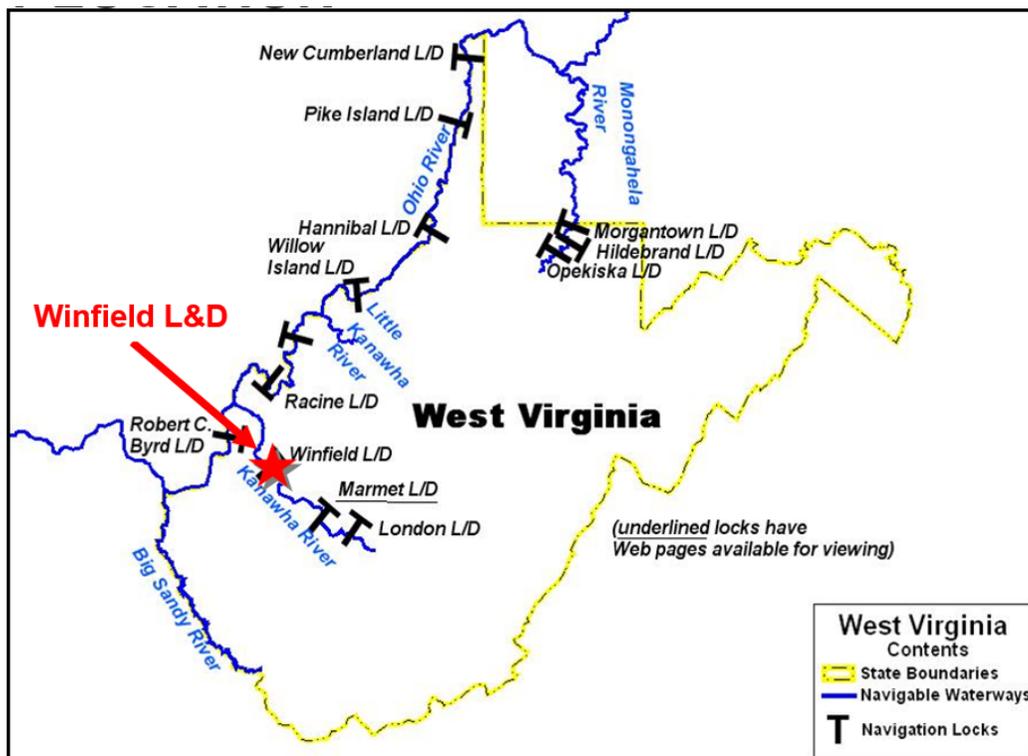


FIGURE 1: VICINITY MAP



**FIGURE 2: WINFIELD LOCKS AND DAM PROJECT OVERVIEW AND PROJECT FEATURES**

**Problem Statement:** The major systems and components of Winfield Locks and Dam have exceeded their design life, exhibited poor performance or are showing signs of unreliability. Numerous problems have been documented with the aging structural, mechanical, and electrical components. Failures of components or systems could have the potential to result in prolonged lock closures and loss of pool. The primary consequence is disruption to commercial navigation resulting in increased transportation costs. The possible loss of pool could also result in secondary impacts to municipal water supply for 200,000 customers; 19 industrial water intakes including one for AEP's Amos Power Plant and other industrial and chemical facilities; recreation; and hydropower generation.

A Major Rehabilitation Evaluation Study was initiated primarily due to operational and structural concerns of the roller gates and numerous documented issues with other components of the locks and dam. First, funding was provided for an out of cycle Periodic Assessment (PA) initiated in FY17. During the PA, multiple failure modes were identified with high probability of failures. Subsequently, funding was provided to initiate this study. The Major Rehabilitation Evaluation Report (MRER) will establish the engineering condition of the structure and determine the need for reliability or efficiency improvements. An integrated Environmental Assessment will provide the appropriate considerations of alternatives in compliance with the National Environmental Policy Act (NEPA).

The MRER will identify the strategy which is most economically efficient in addressing the structural, electrical and mechanical deficiencies and improving reliability of the existing project. The methodology of the evaluation conforms to ER 1130-2-500, supplemented by EP 1130-2-500,

dated 27 December 1996, including incorporating risk and uncertainty and applying probabilistic analyses of reliabilities of major project components. The engineering reliability and risk for the MRER will be conducted in accordance with EC 1110-2-6062 dated, 1 February 2011. The MRER presents the results of the evaluation of the present and future reliability, and consequences of unreliability of key components of Winfield Locks and Dam.

**Federal Interest:** Winfield Locks and Dam was authorized for construction by the River and Harbors Acts of 1930 (P.L. 71-520) and 1935 (P.L. 74-409) and Water Resources Development Act (WRDA) of 1986 (P.L. 99-662), Section 301b. The project purpose and Federal interest of the Winfield Locks and Dam is to provide continued, efficient operation as a component of the Kanawha River navigation system to maintain a nine feet channel depth. The primary commodities moved through the locks are coal and aggregates. Winfield Locks and Dam provides direct benefits to public, commercial, industrial users and indirect benefits to consumers. From 2009 to 2018, approximately 134 million tons of commodities have moved through the locks yielding an average annual transportation cost savings of \$257 million over that time period. Winfield Locks and Dam is used for purposes other than navigation, including recreational boating, fishing access, recreation areas, hydropower generation, a consistent pool elevation allowing for public water supply, electric generation cooling water, other industrial uses, and environmental quality and consistency.

**Risk Identification:**

**General:** Since Winfield Locks and Dam is a navigation dam with the purpose of maintaining a consistent pool elevation for commercial navigation, failure of the damming surface does not pose life safety risks. A loss of pool could have secondary effects that indirectly impact public health and safety through loss of municipal water supply. Additionally, a rapid pool loss could have negative environmental impacts to aquatic species and stream bank stability.

**Study Risk:** Study risks primarily involve uncertainty around key points of the analysis, such as economic modeling, assessment of economic costs and benefits, and engineering reliability assessments of component performance. Overall risk is low to medium, as these risks are standard for an analysis of this type and the PDT will take steps necessary to reduce risk where prudent and feasible.

**Project Complexity:** Medium Complexity.

**Project Delivery Team:** Throughout the study, review, and comment resolution process, the PDT is delegated the ultimate responsibility for the production of a quality product. The key PDT members are listed in Attachment 1.

## **FACTORS AFFECTING THE LEVELS OF REVIEW**

### **Scope of Review.**

- Will the study likely be challenging?  
Primary challenges of the MRER include coordination among a diverse PDT with heavy workload; meeting the SMART Planning 3x3x3 timeline given an engineering centric study with complex engineering and economic models; and quantifying other consequences

associated with industrial and municipal water intakes, the American Electric Power's John E. Amos Plant and environmental impacts resulting from loss of pool.

- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks.

- Completing the study in sufficient time to take action in advance of increasing component failures and major maintenance needs that could cause impacts to commercial navigation and additional impacts to include municipal and industrial water supply.
- The standard benefit categories of transportation cost savings may not fully represent all the beneficiaries of the pool. Other benefits include municipal and industrial water supply, coal power generation dependent on cooling water, and stable stream banks in relationship to public infrastructure.
- Challenges with estimating the condition and remaining life of components in order to calculate accurate hazard rates for the engineering reliability analysis. This could affect the feasibility of alternatives either negatively or positively.

- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues?

The Huntington District Chief of Engineering's assessment of Winfield Locks & Dam has determined, if the project was to experience a failure, it does not pose a direct significant threat to human life as the project is for the purposes of navigation. In addition, the MRER and potential construction of the report's recommendation does not present a significant threat to human life as the methods for construction are standard for rehabilitation of navigation structures and will adhere to required safety protocols. Recommendations of the MRER are likely to be scheduled and therefore minimize impacts to navigation.

- Has the Governor of an affected state requested a peer review by independent experts?

To date, no request by the governor of the affected state has been made and is not anticipated at this time.

- Will it likely involve significant public dispute as to the project's size, nature, or effects?

The project is not likely to involve significant public dispute as to its size, nature, or effects. The improvements being considered are not expected to have a significant negative affect to the environment and would only be implemented if economically justified, environmentally acceptable, and technically feasible.

- Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project?

No, public dispute is not anticipated with respect to project costs and benefits. While there is some potential for scrutiny/dispute from waterway users who argue the benefits are underestimated or assumptions used to quantify benefits may not be realistic, the Corps follows current guidance, policy and procedures for benefit and cost estimation.

- Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges

for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices?

No.

- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule?

No, there are none anticipated at this time.

- Is the estimated total cost of the project greater than \$200 million?

No, the screening level cost estimates are in the range of \$75-95 million, LERRDS will be minimal as work is anticipated to only require the existing Federally owned land at the project.

- Will an Environmental Impact Statement be prepared as part of the study?

No, an Environmental Assessment is the expected level of NEPA compliance.

- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources?

No, none are anticipated. Compliance with the NHPA will be completed during the study and impacts to tribal, cultural or historic properties, if any, will be taken into account. Due to age of the project, the structure is eligible for listing on the National Register of Historic Places, however is only anticipated to require appropriate coordination. Conceptual alternatives are all expected to be within the existing Federally owned footprint that has previously been disturbed.

- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures?

No adverse impacts are anticipated, but will be fully evaluated throughout the study as part of the NEPA compliance.

- Is the project expected to have, before mitigation measures, more than a negligible adverse impact on an endangered or threatened species or their designated critical habitat?

No adverse impacts are anticipated, but will be fully evaluated throughout the study as part of the NEPA compliance.

## 1. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

**District Quality Control.** All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and engineering work products. It fulfills the project quality requirements of the Project Management Plan. The DQC will be provided to the ATR team prior to the start of their review.

**Agency Technical Review.** ATR is performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams will be

comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC. Significant life safety issues are not involved in a study or project so a safety assurance review will not be necessary.

**Independent External Peer Review.** Type I IEPR may be required for decision documents under certain circumstances. This is the most independent level of review, and is applied in cases that meet criteria where the risk and magnitude of the project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision is made as to whether Type I IEPR is appropriate.

**Cost Engineering Review.** All decision documents shall be coordinated with the Cost Engineering Mandatory of Expertise (MCX). The MCX will assist in determining the expertise needed on the ATR and IEPR teams. The MCX will provide the Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews. These reviews typically occur as part of ATR.

**Model Review and Approval/Certification.** EC 1105-2-412 mandates the use of certified or approved models for all planning work to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions.

**Policy and Legal Review.** All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H provides guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. These reviews are not further detailed in this section of the Review Plan.

Table 1 provides the schedules and costs for reviews. The specific expertise required for the teams are identified in later subsections covering each review. These subsections also identify requirements, special reporting provisions, and sources of more information.

**Table 1: Levels of Review**

<b>Product(s) to undergo Review</b>	<b>Review Level</b>	<b>Start Date</b>	<b>End Date</b>	<b>Cost</b>	<b>Complete</b>
Waterway Analysis Model (WAM)	PCXIN - one time approval	01/11/21	03/15/21	\$5K	No
Draft Major Rehabilitation Evaluation Report and EA	District Quality Control	02/08/21	03/17/21	\$30K	No
Draft Major Rehabilitation Evaluation Report and EA	Agency Technical Review	03/18/21	05/06/21	\$53K	No
Draft Major Rehabilitation Evaluation Report and EA	Policy and Legal Review	03/18/21	06/14/21	n/a	No
Final Major Rehabilitation Evaluation Report and EA	District Quality Control	11/30/21	12/27/21	\$30	No
Final Major Rehabilitation Evaluation Report and EA	Agency Technical Review	12/28/21	02/17/22	\$53	No
Final Major Rehabilitation Evaluation Report and EA	Policy and Legal Review	02/18/22	05/17/22	n/a	No

**a. DISTRICT QUALITY CONTROL**

The home district shall manage DQC and will appoint a DQC Lead to manage the local review (see EC 1165-2-217, section 8.a.1). DQC will include quality control and quality assurance procedures required by ER 1110-1-12, Quality Management and in accordance with LRH – Design Quality Control (08504.02). The DQC Lead should prepare a DQC Plan and provide it to the RMO and MSC prior to starting DQC reviews. Table 2 identifies the required expertise for the DQC team.

**Table 2: Required DQC Expertise**

<b>DQC Team Disciplines</b>	<b>Expertise Required</b>
DQC Lead	A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.).
Planning	A senior water resources planner with experience in plan formulation experience in major rehabilitation evaluation studies and formulation experience in screening, evaluation, comparison and alternative selection in accordance with ER 1105-2-100, the Planning Guidance Notebook.
Navigation Economics	A senior economist with experience analyzing, developing, and evaluating economic benefits for large-scale inland navigation projects, specifically with lock and dam systems. Should have extensive experience in analyzing navigation projects in accordance with ER 1105-2-100.
Environmental Resources	A senior environmental professional with experience in the National Environmental Policy Act and all applicable laws and Executive Orders.
Hydrology and Hydraulic Engineering	This reviewer should be a hydraulic engineer with at least 5 to 10 years demonstrated experience in the field of hydrology, hydraulics and H&H modeling, including a general knowledge of West Virginia/Ohio hydrology and water management. The reviewer(s) should have a thorough understanding of water storage and conveyance and sediment control and be knowledgeable of associated hydrologic and hydraulic model applications.
Structural Engineer	A senior structural engineer experienced with design and analysis of hydraulic structures, concrete structures, structural stability and post-tensioned anchor components on locks and dams. Experience must include the design of new structural features as well as the inspection and design of the rehabilitation of existing structural features.
Electrical Engineer	A senior electrical engineer experienced with electrical components on locks and dams. The engineer must have a good understanding of electrical system reliability, electrical design and analysis, and experience with electrical equipment testing methods.
Mechanical Engineer	A senior mechanical engineer experienced with mechanical systems on locks and dams. Experience must include the design of new

DQC Team Disciplines	Expertise Required
	equipment and systems as well as the inspection and design of the rehabilitation of existing machinery. Experience must also include the risk assessment of mechanical systems on navigation projects.
Cost Engineering	The Cost Engineering reviewer should have 5 to 10 years' experience working with estimating complex and phased costing of multi-year civil construction projects.
Construction/Operations	A senior reviewer with extensive experience with the project history as well as large construction techniques utilized in marine construction activities. This may lead to multiple reviewers with different disciplines (mechanical, electrical, civil). Reviewer should also have extensive experience with large construction contract acquisition techniques and shall have Facilities Engineer certification level II.

**Field Investigations.** The PDT will conduct a thorough examination of the project site and the collected data documenting the existing conditions (including structures and other features, topographic surveys, geotechnical data, utility information, and environmental conditions) to accurately develop the products.

**Coordination.** The PDT will conduct periodic coordination meetings to review status, product development matters, upcoming reviews, and conformity with quality objectives. PDT members will communicate regularly to coordinate interfaces among the design disciplines and product components. The goal is to avoid design and construction coordination issues. PDT members will continuously share information relating to their progress and matters which affect product development.

**PDT Reviews.** All PDT members will be knowledgeable about the critical project elements of all their PDT counterparts and will understand how their assigned project elements and work relate and affect those requirements. PDT members will also be knowledgeable of the customer objectives and will understand how their work relates to and affects them. The PDT will review products to insure consistency and effective coordination across disciplines and verify the correct application of methods, validity of assumptions, adequacy of data, correctness of calculations, completeness of documentation, and compliance with guidance, standards and customer objectives.

**Place-in-hand Review.** At the end of product development, the PDT will conduct a final plan-in-hand review to verify all quality and customer objectives have been met. This review will be done to verify the correct application of methods, validity of assumptions, completeness of documentation, and compliance with guidance, standards, and customer objectives.

**Quality Control (QC) Reviews.** Informal technical checks and reviews will be performed during product development. These reviews will include checking basic assumptions and calculations. DQC reviews will be performed by qualified personnel from each technical discipline involved with the work. 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. All design computations will be checked in accordance with LRH - Design Quality Control (08504.02).

**Biddability, Constructability, Operability, Environmental, & Sustainability Review (BCOES).** Since the study is not a construction product, a BCOES is not required.

**Documentation of DQC.** A specific certification of DQC completion is required at the draft and final report stages. Documentation of DQC should follow the District Quality Manual and the MSC Quality Management Plan. An example DQC Certification statement is provided in EC 1165-2-217, on page 19 (see Figure F).

Documentation of completed DQC should be provided to the MSC, RMO and ATR Team leader prior to initiating an ATR. The ATR team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort. Missing or inadequate DQC documentation can result in delays to the start of other reviews (see EC 1165-2-217, section 9).

**b. AGENCY TECHNICAL REVIEW**

The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents explain the analyses and results in a clear manner. An RMO manages ATR. The review is conducted by an ATR Team whose members are certified to perform reviews. Lists of certified reviewers are maintained by the various technical Communities of Practice (see EC 1165-2-217, section 9(h)(1)). Table 3 identifies the disciplines and required expertise for this ATR Team.

**Table 3: Required ATR Team Expertise**

ATR Team Disciplines	Expertise Required
ATR Lead	A senior professional from outside the MSC, with extensive experience preparing Civil Works decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR. The lead may serve as a reviewer for a specific discipline (such as planning).
Planning	The planning reviewer should have 10 to 15 years as a plan formulator who has worked with project teams to identify and evaluate navigation measures and alternatives using appropriate planning methodologies to address navigation studies in accordance with ER 1105-2-100, the Planning Guidance Notebook. Must have extensive plan formulation experience reviewing the analysis with which the measures and alternatives were evaluated and determining that they are sufficiently comprehensive and complete to result in approval of a recommended alternative. Review the documentation of the selection of a recommended plan and ensure the team used an approved plan selection methodology.
Economics	The economics reviewer should have 10 to 20 years USACE economics experience or equivalent education. The Economics reviewer should have a background in developing economic simulation models and analysis for large, complex regional investigations, involving non-traditional project benefit determination. Should have extensive experience in analyzing navigation projects in accordance with ER 1105-2-100, the Planning Guidance Notebook.
Environmental Resources	The environmental reviewer should have experience in reviewing environmental compliance documents for large, complex regional investigations, involving traditional project impacts. The reviewer should be thoroughly versed in national environmental statutes and guidelines, especially in regards to the National Environmental Policy Act.
Cultural Resources	The cultural resources review should have 10+ years of National Historic Preservation Act experience.
Structural Engineer	The Structural Engineering reviewer should have at least 10 years structural engineering experience or equivalent education. Should have extensive structural engineering experience on design or construction teams that worked on navigation projects elements

ATR Team Disciplines	Expertise Required
	such as lock gates and dam gates, lock chambers, lock guide walls, and levees. Should have design experience evaluating reinforced concrete structures and steel gates.
Hydraulic Engineering	This reviewer should be a senior hydraulic engineer with a minimum of 10 years demonstrated experience in the field of hydrology, hydraulics and H&H modeling, including a general knowledge of West Virginia/Ohio hydrology and water management. The reviewer(s) should have a thorough understanding of water storage and conveyance and sediment control and be knowledgeable of associated hydrologic and hydraulic model applications.
Electrical Engineer	The electrical engineer should have at least 10 years experience with electrical components on locks and dams. The engineer must have extensive understanding of electrical system reliability, electrical design and analysis, and experience with electrical equipment testing methods.
Mechanical Engineer	A senior mechanical engineer should have at least 10 years experience with mechanical systems on locks and dams. Experience must include the design of new equipment and systems as well as the inspection and design of the rehabilitation of existing machinery. Experience must also include the risk assessment of mechanical systems on navigation projects.
Cost Engineering	The Cost Engineering reviewer from the Cost Engineering Center of Expertise (MCX), at the Walla Walla District with experience working with estimating complex and phased costing of multi-year civil construction projects. Should have direct cost engineering experience working with navigation (lock replacement) projects in a design phase or construction management capacity.
Construction/Operations	The engineer should have at least 5 years experience of navigation experience that involves lock and dam construction and rehabilitation, maintenance, refurbishing and risk assessment of multiple systems related to lock and dam infrastructure. Should have experience as Project Engineer of major maintenance activities on Lock and dam components. Should be familiar with USACE applications of risk and uncertainty analysis in navigation transportation projects.
Climate Preparedness and Resilience CoP Reviewer	The climate reviewer shall be a member of the Climate Preparedness and Resiliency Community of Practice (CoP) and have experience with inland navigation projects.

**Documentation of ATR.** DrChecks will be used to document all ATR comments, responses and resolutions. Comments should be limited to those needed to ensure product adequacy. If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team for resolution using the EC 1165-2-217 issue resolution process. Concerns can be closed in DrChecks by noting the concern has been elevated for resolution. The ATR Lead will prepare a Statement of Technical Review (see EC 1165-2-217, Section 9), for the draft and final reports, certifying that review issues have been

resolved or elevated. ATR may be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

**c. INDEPENDENT EXTERNAL PEER REVIEW**

**(i) Type I IEPR.**

**Decision on Type I IEPR.** Per EC 1165-2-217, dated 20 February 2018, Review Policy for Civil Works and the Director for Civil Works Memorandum dated 5 April 2019, Interim Guidance on Streamlining Independent External Peer Review for Improved Civil Works Product Delivery, the Winfield Locks and Dam MRER does not meet the three mandatory conditions requiring IEPR to be undertaken.

1. The current cost if all components identified at the screening level were recommended for immediate rehabilitation ranges between \$75 and \$95 million and therefore does not reach the \$200 million trigger.
2. The governor of the affected state has not requested a peer review and is not expected to request one.
3. The Winfield Locks and Dam MRR study is not expected to yield controversy due to public dispute over size, nature, or effects of the project or the economic or environmental costs or benefits.

If any of these conditions were to change the PDT would take the appropriate steps to incorporate IEPR into the review plan.

**d. MODEL CERTIFICATION OR APPROVAL**

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models are any models and analytical tools used to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and the input and output data is the responsibility of the users and is subject to DQC, ATR, and IEPR.

**Table 5: Planning Models.** The following models may be used to develop the decision document:

<b>Model Name and Version</b>	<b>Brief Model Description and How It Will Be Used in the Study</b>	<b>Certification / Approval</b>
Navigation Investment Model (NIM)	NIM is a partial equilibrium transportation cost model focused on the inland navigation system and, in particular, the effect of lock reliability and size on waterway transportation costs and the determination of equilibrium traffic levels. The conceptual basis of the model is basically	February 2012 (Recertification underway)

	<p>the same as that of earlier models used by the Planning Center of Expertise of Inland Navigation over the past three decades; i.e. the model calculates lockage times, including delays, to compute trip travel times. NIM differs from previous models in that it simulates lock reliability, shipper response to unscheduled service disruption, and optimizes the timing of component replacements. The calculations performed by NIM produce the estimated transportation costs of the existing and proposed alternative systems, which can then be used to estimate, and optimize, the benefits of the recommended with-project plan.</p>	
Waterway Analysis Model (WAM)	<p>The WAM is a simulation model developed to analyze the relationship between vessel transits and lock performance in order to produce an expected value curve representing estimated lock transit times at varying tonnage levels during full operation and for potential closure events.</p>	<p>One time approval Pending</p>

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in studies. These models should be used when appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR.

**Table 6: Engineering Models.** These models may be used to develop the decision document:

<b>Model Name and Version</b>	<b>Brief Model Description and How It Will Be Used in the Study</b>	<b>Approval Status</b>
STAAD.Pro V8i (SELECTseries 2)	STAAD is a structural engineering software product for model generation, analysis and multi-material design. Miter gate anchorage will use STAAD for finite element analysis.	CoP Preferred Model
Reliability Workbench Version 14	Reliability Workbench is a software program used to construct and analyze fault trees which represent the logical relationship between sub-system and component failures and how they combine to cause system failures.	CoP Preferred Model
Decision Tools Suite 7.5.1	A set of software programs that includes @Risk which performs risk analysis using Monte Carlo simulation to show you many possible outcomes in your spreadsheet model and PrecisionTree which is used in event tree analysis.	CoP Preferred Model
HEC-RAS 5.0.7 (River Analysis System)	The software performs 1-D steady and unsteady flow river hydraulics calculations and has capability for 2-D (and combined 1-D/2-D) unsteady flow calculations. It will be used for steady flow analysis to evaluate the future without-project and future with-project conditions.	HH&C CoP Preferred Model

## **e. POLICY AND LEGAL REVIEW**

Policy and legal compliance reviews for draft and final planning decision documents are delegated to the MSC (see Director's Policy Memorandum 2018-05, paragraph 9).

### **(i) Policy Review.**

The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team will be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as SMART Planning Milestone meetings. These engagements may include In-Progress Reviews, Issue Resolution Conferences or other vertical team meetings plus the milestone events.
- The input from the Policy Review team should be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR should be distributed to all meeting participants.
- In addition, teams may choose to capture some of the policy review input in a risk register if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations should be documented in an MFR.

### **(ii) Legal Review.**

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District, MSC and HQUSACE. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

- In some cases legal review input may be captured in the MFR for the particular meeting or milestone. In other cases, a separate legal memorandum may be used to document the input from the Office of Counsel.
- Each participating Office of Counsel will determine how to document legal review input.

**ATTACHMENT 1: TEAM ROSTERS**

PROJECT DELIVERY TEAM			
Name	Office	Technical Discipline	Phone Number
[REDACTED]	[REDACTED]	Project Manager	[REDACTED]
[REDACTED]	[REDACTED]	Lead Planner	[REDACTED]
[REDACTED]	[REDACTED]	Engineering Manager/Electrical Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Lead Engineer/Mechanical Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Structural Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Structural Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Cost Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Geotechnical Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Hydraulics Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Economist	[REDACTED]
[REDACTED]	[REDACTED]	Economist	[REDACTED]
[REDACTED]	[REDACTED]	Economist	[REDACTED]
[REDACTED]	[REDACTED]	Economist	[REDACTED]
[REDACTED]	[REDACTED]	Environmental/NEPA	[REDACTED]
[REDACTED]	[REDACTED]	Cultural Resources	[REDACTED]
[REDACTED]	[REDACTED]	Assistant Operations Manager	[REDACTED]
[REDACTED]	[REDACTED]	Technical Manager	[REDACTED]

DISTRICT QUALITY CONTROL TEAM			
Name	Office	Technical Discipline	Phone Number
[REDACTED]	[REDACTED]	Planner	[REDACTED]
[REDACTED]	[REDACTED]	Economist	[REDACTED]
[REDACTED]	[REDACTED]	Environmental	[REDACTED]
[REDACTED]	[REDACTED]	Electrical Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Structural Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Mechanical Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Cost Engineer	[REDACTED]
[REDACTED]	[REDACTED]	Operations	[REDACTED]
[REDACTED]	[REDACTED]	Hydraulic Engineer	[REDACTED]

AGENCY TECHNICAL REVIEW TEAM			
Name	Office	Position	Phone Number
[REDACTED]	[REDACTED]	Lead/Plan Formulation	[REDACTED]
[REDACTED]	[REDACTED]	Environmental and Cultural Resources	[REDACTED]
[REDACTED]	[REDACTED]	Economics	[REDACTED]
[REDACTED]	[REDACTED]	Structural Engineering	[REDACTED]
[REDACTED]	[REDACTED]	Hydraulic Engineering	[REDACTED]
[REDACTED]	[REDACTED]	Electrical Engineering	[REDACTED]
[REDACTED]	[REDACTED]	Mechanical Engineering	[REDACTED]
[REDACTED]	[REDACTED]	Cost Engineering	[REDACTED]
[REDACTED]	[REDACTED]	Construction/Operations	[REDACTED]
[REDACTED]	[REDACTED]	Climate Preparedness and Resiliency	[REDACTED]

VERTICAL TEAM			
Name	Office	Position	Phone Number
[REDACTED]	[REDACTED]	HQ Planner	[REDACTED]
[REDACTED]	[REDACTED]	LRD Regional Programs Director	[REDACTED]
[REDACTED]	[REDACTED]	LRH District Commander	[REDACTED]
[REDACTED]	[REDACTED]	LRH Deputy District Engineer	[REDACTED]
[REDACTED]	[REDACTED]	LRH Chief of Planning	[REDACTED]
[REDACTED]	[REDACTED]	LRH Chief of Engineering	[REDACTED]
[REDACTED]	[REDACTED]	LRH Chief of Operations	[REDACTED]
[REDACTED]	[REDACTED]	Project Manager	[REDACTED]
[REDACTED]	[REDACTED]	Lead Engineer	[REDACTED]

POLICY AND LEGAL COMPLIANCE REVIEW TEAM			
Name	Office	Position	Phone Number
[REDACTED]	[REDACTED]	Review Manager/Plan Formulation	[REDACTED]
[REDACTED]	[REDACTED]	MSC Review Lead	[REDACTED]
[REDACTED]	[REDACTED]	Economics	[REDACTED]
[REDACTED]	[REDACTED]	Environmental	[REDACTED]
[REDACTED]	[REDACTED]	Risk Analysis Coordinator	[REDACTED]
[REDACTED]	[REDACTED]	Real Estate	[REDACTED]
[REDACTED]	[REDACTED]	Operations	[REDACTED]
[REDACTED]	[REDACTED]	Engineering	[REDACTED]

POLICY AND LEGAL COMPLIANCE REVIEW TEAM

POLICY AND LEGAL COMPLIANCE REVIEW TEAM			
[REDACTED]	[REDACTED]	Climate Preparedness and Resiliency	[REDACTED]
[REDACTED]	[REDACTED]	Hydraulics	[REDACTED]
[REDACTED]	[REDACTED]	Cost Engineering	[REDACTED]
[REDACTED]	[REDACTED]	Office of Counsel	[REDACTED]
[REDACTED]	[REDACTED]	Dam Safety Program Manager	[REDACTED]