

DECISION DOCUMENT REVIEW PLAN

Soo Locks, Sault Ste. Marie, Michigan Major Rehabilitation Report

Detroit District
October 2015



MSC Approval Date: 23 Oct 2015

Last Revision Date: None



**US Army Corps
of Engineers** ®



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

CELRD-PD

OCT 23 2015

MEMORANDUM FOR Commander, US Army Corps of Engineers, Detroit District, ATTN: Steve Check, 477 Michigan Avenue, Detroit, MI 48226-2550

SUBJECT: Approval Memorandum for Soo Locks Major Rehabilitation Report Review Plan, Chippewa County, Michigan

1. References:

- a. Memorandum, CELRE-PL, subject same as above, 23 JUN 2015.
 - b. Memorandum, CELRH-PCXIN-RED (Risk Informed Economics Division), subject Review Plan (RP) for the Soo Locks, Sault Ste. Marie, Michigan, Major Rehabilitation Report (MRR), 23 SEP 2015.
 - c. Decision Document, Draft Review Plan, Soo Locks, Sault Ste. Marie, Michigan, Major Rehabilitation Report, October 2015.
 - d. Engineer Circular (EC) 1165-2-214, Civil Works Review, 15 DEC 2012.
2. The LRD staff has reviewed the RP for policy compliance and supports your findings. Additionally, the Planning Center of Expertise for Inland Navigation Risk-Informed Economics Division (PCXIN-RED) has also reviewed this RP for technical sufficiency and policy compliance and concurs with your findings and endorsed your recommendations.
3. I approve this RP for the Soo Locks Major Rehabilitation Report, Chippewa County, Michigan. Prior to posting, the names of all individuals identified in the RP should be removed.
4. POC for this action within LRD is Mr Phil Tilly, 513-684-3025, Philip.r.tilly@usace.army.mil.


RICHARD G. KAISER
Brigadier General, USA
Commanding



REPLY TO
ATTENTION OF

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

CELRH-PCXIN-RED

23 September 2015

MEMORANDUM FOR Commander, Detroit District

SUBJECT: Review Plan (RP) for the Soo Locks, Sault Ste. Marie, Michigan, Major Rehabilitation Report (MRR).

1. The Soo Locks Review Plan (RP) has been presented to the Planning Center of Expertise for Inland Navigation Risk-Informed Economics Division (PCXIN-RED) for its review and endorsement in accordance with EC1165-2-214 "Civil Works Review" dated 15 December 2012.
2. The Soo Locks MRR will result document the evaluation results of the present condition, present and future reliability, and consequences of unreliability of various key components of the Soo Locks. The MRR will address the maintenance issues faced in the Soo Locks complex that effect navigation and hydropower production.
3. PCXIN-RED staff has reviewed the plan for technical sufficiency and policy compliance. The cost of the project is expected to exceed the \$45 million threshold therefore, a Type I Independent External Peer Review will be conducted. However this decision may be revisited in light of the change in WRRDA 2014 and the increase in the threshold to \$200 million.
4. I concur with the findings of the PCXIN-RED technical staff and endorse the review plan for the Soo Locks MRR as presented to LRD and which was previously endorsed in May 2015. Following approval by the Great Lakes and Ohio River Division, the District is requested to post the RP to its web site and provide the link to the PCXIN-RED for their use. Prior to posting, the names of the individuals in the RP should be removed.
5. If you have any questions or need additional information, please contact Karen Miller at 304.399.5859.

A handwritten signature in black ink, appearing to read "Patrick Donovan", written over a horizontal line.

Patrick Donovan
Chief, PCXIN-RED

DECISION DOCUMENT REVIEW PLAN

**Soo Locks, Sault Ste. Marie, Michigan
Major Rehabilitation Report**

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DECISION DOCUMENT REVIEW PLAN

Soo Locks, Sault Ste. Marie, Michigan Major Rehabilitation Report

1. PURPOSE AND REQUIREMENTS

a. Purpose

This Review Plan defines the scope and level of peer review for the Soo Locks Major Rehabilitation Report (MRR). The Soo Locks are located on the St. Mary's River at Sault Ste. Marie, Michigan. This Review Plan applies to the MRR effort that will document the evaluation results of the present condition, present and future reliability, and consequences of unreliability of various key components of the Soo Locks. The MRR seeks to address the maintenance issues faced in the Soo Locks complex that effect navigation

b. References

- 1.) EC 1165-2-214, Civil Works Review, 15 Dec 2012
- 2.) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
- 3.) ER 1105-2-100, "Planning Guidance Notebook," April 2000
- 4.) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
- 5.) ER 200-2-2, "Procedures for Implementing NEPA", 4 Mar 88
- 6.) ER 1165-2-119, "Water Resources Policies and Authorities - Modifications to Completed Projects," 20 September 1982
- 7.) EP 1130-2-500, "Project Operations - Partners and Support (Work Management Guidance and Procedures)," 27 December 1996
- 8.) ER 1110-1-12, Quality Management, 30 Sep 2006
- 9.) Qualtrax #08504 LRD-QC/QA Procedures for Civil Works
- 10.) Draft Project Management Plan, Soo Locks, Replacement Lock, Sault Ste. Marie, Michigan, Major Rehabilitation Report, January 2015

c. Requirements

This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning model certification/approval (per EC 1105-2-412). This document outlines the peer review plan for the Soo Locks, Sault Ste. Marie, Michigan, Major Rehabilitation Report (MRR).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is the National Planning Center of Expertise for Inland Navigation and Risk Informed Economics Division (PCXIN-RED). Support will be needed by the Risk Management Center (RMC) for the Dam Safety portion of the project.

The RMO will coordinate with the Cost Engineering and Agency Technical Review Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies. The RMO will also coordinate with the Corps of Engineers Institute for Water Research – Risk Management Center (CEIWR-RMC) to ensure that review teams with appropriate expertise are assembled.

3. STUDY INFORMATION

a. Decision Document.

The Soo Locks, Major Rehabilitation Study, Sault Ste. Marie, Michigan will develop and prepare a Major Rehabilitation Report to develop the engineering requirements, costs and associated consequences for rehabilitation of the Soo Locks to determine the economically efficient rehabilitation strategy. This document is being developed as a hybrid report that addresses Flood Risk Management (FRM), and Inland Navigation Design Center (INDC) issues. An issue paper (03 December 2014) was formally drafted to detail this hybrid report and presented to the Dam Safety Senior Oversight Group (DSOG). The Soo Locks, Major Rehabilitation Study will be subject to approval through Headquarters, United States Army Corps of Engineers (HQUSACE).

“Procedures for Implementing NEPA” (ER 200-2-2) will guide efforts in regards to National Environmental Policy Act (NEPA) compliance. It is anticipated that environmental compliance will be met through the use of a categorical exclusion. However, final actions will be assessed by the Detroit District’s Environmental Analysis Branch to ensure proper NEPA procedures are followed.

b. Project Description

The Soo Locks are situated on the St. Mary’s River at Sault Ste. Marie, Michigan. The locks have been in operation in this area since 1856. Both the United States and Canada have locks at this location in the St. Mary’s River (Figure 1a). The Canadian lock is a small lock suited for small recreation and passenger vessels. On the American side of the river, the U.S. Army Corps of Engineers operates and maintains two of its four parallel locks, the Poe Lock and the MacArthur Lock, in the St. Mary’s Falls Canal.

The United States' Soo Locks complex consists of two canals, four locks, and a hydropower plant. The North Canal contains the Davis and Sabin locks and the South Canal, the MacArthur and Poe locks (Figures 1a and 1b). The North Canal locks were built during World War I, the MacArthur Lock in 1943, and the Poe Lock in 1968. The Sabin lock is inoperable and was decommissioned in 2010 by constructing two cofferdams. The Sabin and Davis locks are within the footprint of a proposed new lock (authorized in WRDA 1986). However, the 2005 Limited Reevaluation Report (LRR) for a new lock resulted in a BCR less than 1 so the project did not proceed. All cargo vessels moving through the St. Mary's River transit either the Poe or the MacArthur lock.

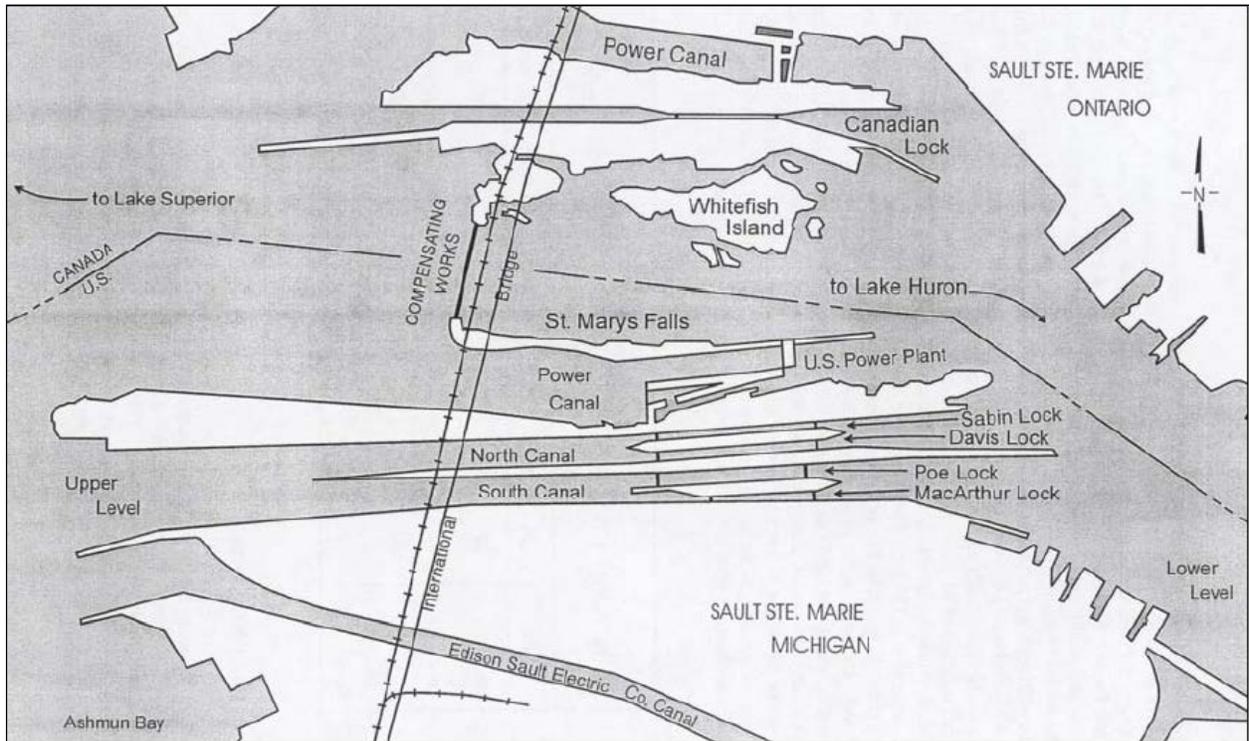


Figure 1a – St. Mary's River and the St. Mary's Falls Canal

The Poe Lock is the only lock capable of handling vessels with beams in excess of 76 feet. These vessels restricted to Poe lock account for nearly 70 percent of the potential carrying capacity of the Great Lakes fleet. Any service disruption at the Poe Lock would result in delays to these vessels, and depending on the length of time of the closure at the Poe, could cause serious problems for the industries and companies that rely on the Poe-restricted vessels for shipments of raw materials, particularly iron ore and coal.

The hydroelectric generating plant facilities at the Soo consist of two powerhouses (Figure 2) with a total installed capacity of 18.4 megawatts (MW), rated at a flow of 12,700 cfs. The Main Powerhouse located at the foot of the rapids has three generating units each of 4.8 MW capacity installed in 1951-52 and one generating unit of 2.0 MW capacity installed in 1954. Its adjoining features include the north and center dikes, which form the headrace, and the footbridge, which provides access to the powerhouse and carries power cables from the crib dam across the Unit 10 tailrace.

The Unit 10 powerhouse with a single unit of 2.0 MW capacity installed in 1932 is located at the head of the rapids. There is a dam to the north of the powerhouse that was formed when abandoned sluiceways were closed off by reinforced concrete bulkheads. To the south, gate bays, which are no longer in use, were filled with rock fill material to form the South Dam.

The Main Powerhouse and Unit No. 10 Powerhouse are operated by the U.S. Army Corps of Engineers, Detroit District. Immediate supervision of the facilities is the responsibility of the Area Engineer, Soo Area Office.

The power generated at the Government plants in excess of the Government's needs, is sold by contract to Cloverland Electric Cooperative.

The discharge of water through the plants is approximately 12,700 cubic feet per second (cfs). The average head at the plants is 20.2 feet. The facilities generate over 151 million kilowatt-hours of power each year.

The entire Soo complex has been designated a National Historic Landmark and is subject to Section 106 of the National Historic Preservation Act as amended.

The Major Rehabilitation Report seeks to address maintenance issues within the Soo Locks complex that affect navigation. There is no non-Federal sponsor for the rehabilitation of this federally owned facility. EP 1130-2-500, Chapter 3, Major Rehabilitation Program and Appendix B, Rehabilitation Evaluation Report provides guidelines for the study. As indicated in EP 1130-2-500, a major rehabilitation report must include engineering, environmental, and economic studies and requires plans and specifications subject to ER 1110-2-1200. Components recommended for maintenance were identified in the FY14 Soo Locks Assets Renewal Plan.



Figure 1b – St. Mary's River and the St. Mary's Falls Canal

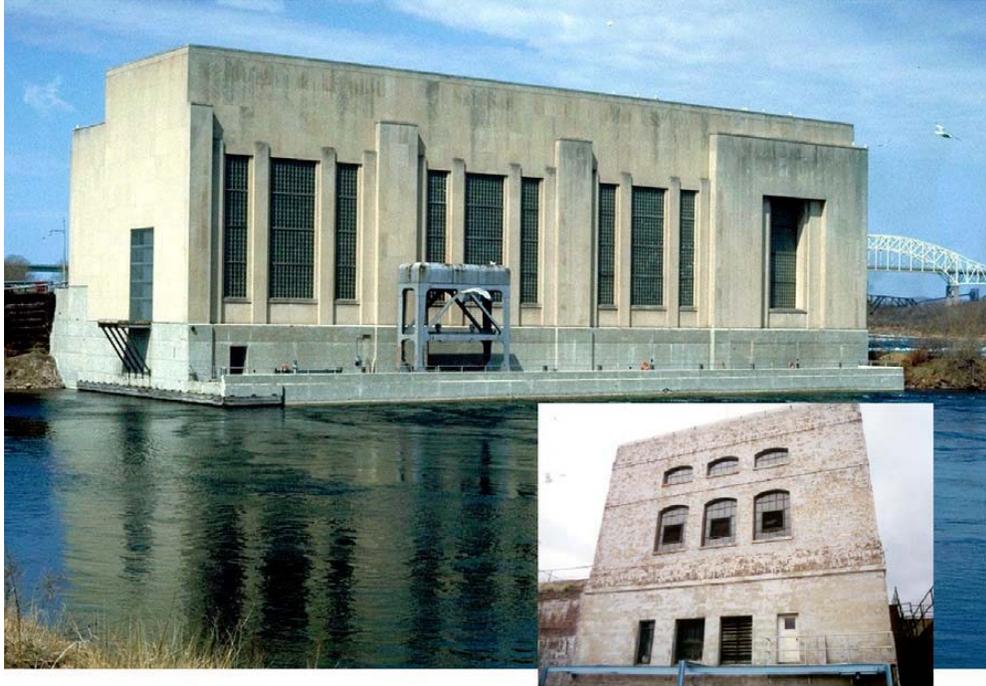


Figure 2 –The Main Power Plant and Unit 10 (inset)

The major rehabilitation report compares the base condition against various maintenance scenarios. The base condition assumes that the existing O&M practices continue with emergency repairs of failed components as they occur. The rehabilitation alternatives may include:

1. **Advanced maintenance** which would include scheduling the repair or replacement of components to avoid emergency repair.
2. **Planned repair** which includes creating a stockpile of replacement parts and developing emergency repair procedures to reduce service disruptions.
3. **Scheduled rehabilitation.** Develop a schedule based on the determined “optimum” timing for rehabilitation given the reliability, service degradation, and economic costs.
4. **Immediate rehabilitation.** Immediately start with major rehabilitation.
5. **Rehabilitation with efficiency improvements.** Based on the completion of the components listed in the FY14 Asset Management Plan, the estimated cost for a complete rehabilitation is approximately \$100,000,000. A complete rehabilitation of the Soo Locks facility would likely increase the reliability of the transportation system and power production facility.

Authorization - This study is being conducted under the maintenance authorities for the various features of the St. Mary’s River Project which includes navigation, flood control and hydropower facilities. The Michigan Legislature, by an act approved March 3, 1881, transferred the St. Mary's Ship Canal with all its property to the United States. Under this act, the actual transfer took place June 9, 1881. Subsequent to that transfer the Rivers and Harbors Act of 1882 authorized the Secretary of War to accept the remaining tolls collected by the State of Michigan to continue improvements deemed necessary by the Secretary of War to improve the infrastructure at the site. The Rivers and Harbors Act of 1886 saw the first appropriation by

Congress post turnover to improve infrastructure at the Soo. The Soo Locks MRR will follow guidance provided by ER 110-2-1200 “Guidance for Major Rehabilitation Evaluation Reports”.

c. Factors Affecting the Scope and Level of Review.

Major rehabilitation of the Soo Locks complex requires an assessment of the reliability of specific components of the locks and the associated costs of repairs. In addition to the reliability effort, the economic impact of lock closure, from planned repair closures through catastrophic failure, will be evaluated to determine the consequences of various repair schedules and aid in the determination of the most efficient plan.

The development of the MRR involves a large team of experts, among which are the Detroit District (LRE), the Risk Management Center, the Inland Navigation Design Center MCX, and the Planning Center of Expertise for Inland Navigation (PCXIN). The potential economic impacts of Soo Locks failure events would be felt across the entire Great Lakes watershed, and would impact the U.S. economy since over 50 million tons of iron ore per year are shipped through the Soo Locks. The next largest commodities are stone (used in the steel industry, for roads, and in other industrial applications) and coal (used in providing energy throughout the Midwest), both of which are critical to the regional economy with farther reaching impacts.

The project risks primarily involve the reliability and economic modeling of the structure components and the potential economic consequences. One of the four economic models is not certified and will need to go through the USACE model approval process for single project use. The project acts as a single point of failure where the closure of the locks would result in significant undeliverable tonnage. The associated tonnage would impact industries across the U.S. The economic evaluation seeks to quantify the impacts of the resulting idle capital. This type of evaluation involves the use of innovative modeling techniques and presents unique challenges and risks. Other risks include the nature of the teams’ dispersion, requiring continuous communication.

In summary, the primary challenges of the MRR are:

- Coordination of a diverse team of experts.
- Coordination of the FRM and INDC business line managers (BLMs) to ensure that the hybrid report adequately addresses each BLMs concerns and to ensure the report is of sufficient quality for a decision level document.
- Identification of the appropriate components for evaluation.
- Model development and associated approval(s).
- Component selection.
- Selection and development of evaluation methodology for the single point of failure and unmet tonnage that would result from a lock closure involving novel modeling techniques and/or evaluation tools.
- Due to the single point of failure at the locks, the project may require redundancy, potentially unique construction sequencing, and/or a reduced or overlapping design/construction schedule.

Other factors that have been considered which could impact the scope and level of review include:

- **Life Safety** – The MRR will not be justified by life safety and is not likely to involve significant threat to human life/safety assurance. The main purpose of this MRR is for inland navigation. Some inundation could occur on the downstream side of the hydropower plant; however, this would not result in a significant loss of property or life. The LRE Dam Safety Officer believes that life and safety concerns are minimal at the Soo Locks Complex. Downstream inundation is possible with a dam breach, but unlikely to cause a significant threat to life and safety. Supporting documentation for the MRR will include the RMC’s assessment of the risk.
- **Governor Request for Peer Review:** To date, no request by a Governor of an affected state for a peer review by independent experts has been received. There is little to no potential for the project to involve significant public dispute as to the effects of the project, since the project is aimed at maintaining the existing shipping and power structures of federally owned facilities.
- **Public Dispute:** The project/study is not anticipated to be controversial or result in significant public dispute as to the size, nature, or effects of the project. Previous studies on the site have received critical scrutiny from lock users on the economic evaluations arguing that the assumption of alternative transportation of the commodities was unreasonable. A partial benefits analysis reviewing the viability of alternative modes of transportation and their associated costs has been completed and will be used toward the economic analysis.
- **Type I IEPR** – A Type I IEPR for the Soo Locks Complex MRR is required since the cost of the project is greater than forty-five million dollars.
- **Cost-Share Partner** – A cost sharing partner is not required for the study portion of the MRR as all rehabilitation being considered is directed towards restoring the reliability of the original project features. Potential cost sharing of design and construction activities will be addressed in the feasibility report.

d. In-Kind Contributions. The locks are federally owned, operated and maintained, thus, there will be no in-kind contribution.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home Major Subordinate Command MSC. The U.S. Army Corps of Engineers, Detroit District has adopted the Great Lakes and Rivers Division LRD quality control process.

a. Documentation of DQC.

Documentation of DQC will follow the procedures as outlined in Qualtrax document #08504 LRD-QC/QA Procedures for Civil Works. It is the responsibility of each product development team member, their supervisors, and the project manager to ensure that every product receives an internal quality control review. It is the responsibility of the supervisor or section chief for each team member to ensure that a qualified DQC reviewer that has not been involved with the preparation of the technical product under review is selected and conducts a review of their product prior to delivery to the project manager, or prior to completion. In accordance with District QMP procedures, the management of the review process will be coordinated by a designated Quality Control Review Leader (QCRL). The QCRL will compile all technical, grammatical, and editorial comments and will ensure DQC standards are met prior to submission of the MRR and associated appendices to the Vertical Team. Dr. Checks will be used to document all DQC comments, responses, and associated resolution accomplished throughout the review process. Once the DQC process is complete a Certificate of Quality Control Review and the DrChecks comments will be provided to the ATR team lead.

b. Products to Undergo DQC may include:

- (1) Engineering (surveys; climatology report; hydrologic records report; HEC-RAS model input and output for base conditions, future without and alternative plans; input to HEC-FDA model; alternative plans; drainage capacity of existing lock; design stages and design differential heads; WQ report and 404(b)(1) report input; H&H input to the draft and final MRR; quantity take-off for channels; preliminary geotech design; soil foundation analysis; geology section; boring and testing results; general mechanical and electrical designs of alternative plans; general mechanical and electric designs of the tentatively selected plan; mechanical and electrical input to the draft and final MRR; structures design of alternative plans; structures design of tentatively selected plan; construction cost estimates of the alternative plans, tentatively selected plan, and recommended plan; risk analysis of the tentatively selected plan and the recommended plan; and value engineering study).
- (2) Economics (documentation identifying a baseline condition; regional impact assessment (RIA), a RIA model, event tree analysis, alternative analysis, simulation modeling, project benefits determination and evaluation, NED determination, transportation rate savings study, traffic forecasts, elasticity of demand calculations and related modeling, analysis of response to closures, draft economic appendix, and final economic appendix).
- (3) Environmental (preliminary draft National Environmental Policy Act documentation; preliminary draft MRR; public review transmittal letters; initial cultural resources evaluations; cultural resources scope of work; cultural resources input to the MRR; final NEPA documentation and decision document; and final MRR document).

Where practicable, the technical products that support subsequent analyses should be reviewed prior to being used in the study. Additionally, the PDT will be responsible for a complete reading of the report to assure the overall integrity of the report, technical appendices and the recommendations before the approval by the District Commander. Each draft report submittal for LRD/MSC review will be subjected to the DQC process and will include a DQC certification.

c. Required DQC Expertise.

DQC checks will be performed by qualified staff within each discipline to include engineering, construction, operations, risk and reliability, environmental, economics, plan formulation, cost engineering, and legal. Supervisors within each area of responsibility will assign appropriate qualified staff to perform QC on their respective products. Personnel performing QC shall have the necessary expertise to address compliance with published Corps policy. No real estate requirements are associated with this project, therefore no real estate PDT or review team members will be needed.

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all decision documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC. The PCXIN will coordinate the ATR with the INDC-MCX as necessary for technical advice and oversight. The ATR Team Leader has been selected from outside the Great Lakes and Ohio River Division. All ATR reviewers for an engineering discipline will be CERCAP certified. If the INDC representative has an engineering background, this team member will also be CERCAP certified.

a. Products to Undergo ATR.

ATR will be performed for the following standard products:

- Draft MRR Report
- Final MRR Report

In addition to the above, early ATR will be required for the economic modeling effort. This ATR will be part of the model review and approval process. Further, in progress documentation will be prepared as practicable and necessary for review of process and outcomes as determined by the PCXIN.

b. Required ATR Team Expertise.

The names, organizations, and contact information of ATR team members are included in Attachment 1.

ATR Team Members/Disciplines	Expertise Required
ATR Lead/Plan formulation	The ATR Lead/Planning reviewer should have 10 – 15 years experience as a plan formulator who has worked with project teams to identify and evaluate navigation (lock replacement) 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 – 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. Experience certifying economic models preferred.
Geotechnical Engineering	The Geotechnical Engineering reviewer should have a PE and at least 10 years geotechnical engineering experience and graduate study in engineering or a related field. Should have several years of direct geotechnical experience on design or construction teams that worked on navigation (lock replacement) projects in a coastal inland waterway system.
Civil Engineering	The Civil Engineering reviewer should have a PE and at least 10 years civil engineering experience or equivalent education. Should have extensive civil engineering experience on design or construction teams related to navigation (lock replacement) projects.
Structural Engineering	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 (lock replacement) projects elements such as lock gates and gate bays, lock chambers, lock guide walls, and levees. Should have design experience evaluating reinforced concrete structures and steel gates.

Mechanical Engineering	Mechanical Engineer with 5-10 years of experience in Lock and Dam construction and rehabilitation, maintenance, refurbishing and risk assessment of mechanical systems including during construction.
Electrical Engineering	Electrical Engineer with 5-10 years of experience in Lock and Dam construction and rehabilitation, maintenance, refurbishing and risk assessment of mechanical systems including during construction.
Cost Engineering	The Cost Engineering reviewer should have 5-10 years 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.
Environmental	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/NHPA	The cultural resources review should have 10+ years of extensive National Historic Preservation Act experience.

c. Documentation of ATR.

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

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

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

The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the District, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in

accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

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

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed, based on work reviewed to date, for the draft report and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW

IEPR may be required for decision documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- **Type I IEPR.** Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214

- Type II IEPR. Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.
- a. **Decision on IEPR.** In accordance with EC 1165-2-214, Paragraph 11, a Type I IEPR will be mandatory for the Soo Locks MRR as the cost of the project will exceed the \$45 million threshold. Additionally, the project involves the use of innovative modeling techniques in the economic evaluation and involves the development and approval of a onetime use economic model.
- b. **Products to Undergo Type I IEPR.** Products to undergo the Type I IEPR include:
- (1) Draft MRR with supporting documentation.
- c. **Required Type I IEPR Panel Expertise.** Anticipated panel review disciplines listed below however it is noted that the Planning and Econ review disciplines could be combined with an Economics reviewer as the primary expertise required. Once the TSP has been determined, it is possible that one of the engineering disciplines could be eliminated. The goal would be to have the appropriate disciplines covered where independent external review would have the most value added.

IEPR Panel Members/Disciplines	Expertise Required
Planning (combine with Economics)	The Planning panel member should be from academia, a public agency, a non-governmental entity, or an Architect-Engineer or Consulting Firm with at least a Bachelors degree and have 15 years demonstrated experience as a senior water resources planner who has worked with project teams to identify and evaluate measures and alternatives using appropriate planning methodologies to address navigation (lock replacement) projects in a coastal inland waterway system. Must have extensive 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. Five years experience directly dealing with USACE planning process as outlined in ER 1105-2-100, Planning Guidance Notebook, is highly recommended.

Economics	<p>The Economics panel member should 15 years demonstrated experience or combined equivalent of education and experience. Should have MS degree or higher in economics and be a recognized expert in applied economics related to transportation economics including experience with financing transportation infrastructure and national and international logistics and transportation requirements. Should have experience working with risk informed approaches to decision making, risk models and disaster scenarios with regard to economic impact.</p>
Geotechnical Engineer	<p>The Geotechnical Engineering panel member should have a PE with a minimum 20 years demonstrated experience and graduate study in soils engineering or related field. Member should be a Registered Professional Engineer from academia, a public agency, or an Architect-Engineer or Consulting Firm with at least a MS degree. Must have lock and dam design and construction experience. Should have several years of direct experience with regard to locks and dams as either a designer or construction project engineer. Must be skillful with the USACE risk informed approach to navigation transportation and flood risk reduction projects. Active participation in related professional societies is encouraged.</p>
Civil/Structural Engineering	<p>The Civil and Structural Engineering panel members should have a PE with a minimum 15 years demonstrated civil engineering experience or combined equivalent of education and experience assessing navigation (lock replacement) projects. Member should be a Registered Professional Engineer from academia, a public agency, or an Architect-Engineer or Consulting Firm with at least a Bachelors degree. Should have direct civil engineering design or construction management experience with regard to lock gates and gate bays, lock chambers, lock guidewalls, levees, reinforced concrete structures, and steel gates. Active participation in related professional societies is encouraged.</p>
Mechanical Engineering	<p>The Mechanical Engineering panel member should have a PE with 15 years demonstrated experience or combined equivalent of education and experience assessing navigation (lock replacement) projects in an inland waterway system. Member should be a Registered Professional Engineer from academia, a public agency, or an Architect-Engineer or Consulting Firm with at least a Bachelors degree. Should have direct mechanical engineering design or construction management experience centered around lock and dam design and construction along the coastal inland waterway system. . Should be familiar with USACE applications of risk and uncertainty analysis in navigation transportation projects. Active participation in related professional societies is encouraged.</p>

Electrical Engineering	The Electrical Engineering panel member should have a PE with 15 years demonstrated experience or combined equivalent of education and experience assessing navigation (lock replacement) projects in an inland waterway system. Member should be a Registered Professional Engineer from academia, a public agency, or an Architect-Engineer or Consulting Firm with at least a Bachelors degree. Should have direct mechanical engineering design or construction management experience centered around lock and dam design and construction along the coastal inland waterway system. Should be familiar with USACE applications of risk and uncertainty analysis in navigation transportation projects. Active participation in related professional societies is encouraged.
Cost Engineer	The Cost Engineering panel member should have a PE with 15 years demonstrated experience or combined equivalent of education and experience assessing navigation (lock replacement) projects in an inland waterway system. Member should be a Registered Professional Engineer from academia, a public agency, or an Architect-Engineer or Consulting Firm with at least a Bachelors degree. Should have direct cost engineering design or construction management experience centered around lock and dam design and construction along the coastal inland waterway system. Should be familiar with USACE applications of risk and uncertainty analysis in navigation transportation projects. Active participation in related professional societies is encouraged.
Environmental/ Cultural Resources	The Environmental and Cultural Resources panel members should be a scientist from academia, a public agency, a non-government entity, or an Architect-Engineer or Consulting Firm with a minimum 15 demonstrated experience working with the NEPA impact assessment of public works projects. The panel member should have a minimum MS degree or higher in an appropriate field of study. Experience should encompass determining the scope and appropriate methodologies for environmental impact analyses for projects and programs with high public and interagency interests. Should have detailed knowledge of the National Environmental Protection Act and National Historic Preservation Action.

d. Documentation of Type I IEPR.

The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-214, Appendix D. Panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. IEPR comments should generally include the same four key parts as described for ATR comments in Section 4.d above. The OEO will prepare a final Review Report that will accompany the publication of the final decision document and shall:

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;

- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions; and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

Interim Review Reports, completed based on interim reviews of the reliability and economic modeling efforts, will be incorporated into the final Review Report. The official USACE response to the IEPR panel recommendations will be provided in the final Review Report only. Initial responses to IEPR panel recommendations will be developed and documented by the PDT and provided to the vertical team for consideration in developing the official USACE response.

The final Review Report will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. COST ENGINEERING AGENCY TECHNICAL REVIEW AND MANDATORY CENTER OF EXPERTISE (MCX) REVIEW AND CERTIFICATION

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

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, for the purposes of the EC, are defined as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to

address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of certified/approved planning models does not constitute technical review of the planning product. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

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

a. Planning Models.

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

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
Economic Impact Model	REMI PI+ will be utilized to assist in the evaluation of the impacts of lock closures	Approved for use. Standard economic modeling software.
Soo Locks Reliability Economic Model (SOREM)	SOREM is a spreadsheet model developed through LRE utilizing @Risk with inputs from Engineering Reliability modeling and those developed through the Rockwell Automation Arena Simulation model. This model will be utilized to combine the probability of failure of Soo Locks components with the corresponding economic impact of that failure.	Approval needed. Model development and approval for project use is concurrent during project evaluation
Great Lakes System Analysis of Navigation Depths (GL-SAND) model	Model to calculate transportation cost savings for different dredging depths.	Certified
HEC-FDA 1.2.5	A Hydrologic Engineering Center model provides the capability to integrate hydrologic engineering and economic analysis in the formulation and evaluation of flood risk management initiatives. This model will be utilized in the evaluation of potential flood control issues associated with the Soo Complex.	Certified

b. Engineering Models.

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

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
TRACES MII 4.1 (Tri-Service Automated Cost Engineering Systems)	TRACES is an integrated suite of cost engineering tools designed to support the cost engineers throughout the USACE, Air Force, and Navy. MCACES (Micro-Computer Aided Cost Estimating System) MII is a second generation module of TRACES used by the USACE for the preparation of detailed construction cost estimates.	Approved
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.	Approved
@RISK Version 6.1.2	@RISK performs risk analysis using Monte Carlo simulation to show you many possible outcomes in your spreadsheet model	Approved
HEC-RAS 4.1	HEC-RAS is a one-dimensional hydraulic modeling software used to calculate water surface profiles for steady gradually varied flow. The original Consequence Assessment Report for the Soo was based on an HEC-RAS analysis that included an overestimation of breach and resulted in a subsequent inundation that could not occur. HEC-RAS will be used to remodel a more realistic scenario and achieve a better estimation of inundation and consequences. Different breach scenarios will also be analyzed to determine the possible impacts on hydropower and navigation.	Approved
HEC-GeoRAS 10.2	HEC-GeoRAS is used to compute inundation mapping using the outputs supplied by the HEC-RAS results. New inundation maps will be produced based on the remodeled results.	Approved

ADH	ADH (ADaptive Hydraulics Modeling) is a multi-dimensional hydraulic modeling system. It will be used to refine the HEC-RAS hydraulic modeling results around the more complex project features given more complicated breach scenarios.	Approved
SMS	SMS (Surface Water Modeling System) is a comprehensive graphical environment for one-, two-, and three-dimensional hydrodynamic modeling. It will be used to visualize and evaluate the ADH modeling results. The analysis will support the impacts on hydropower and navigation.	Approved

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost.

The following ATR schedule and cost table corresponds to the products that are listed in Section 5a that will undergo the ATR process.

Description	Scheduled Date	Cost
ATR of Draft MRR	2016 – 4Q	50,000
ATR of Final MRR	2017	50,000

b. Type I IEPR Schedule and Cost.

The estimated cost for the IEPR is \$500,000. Funding requirements may result in delays between initial notification and availability of funds.

Description	Scheduled Date
Draft MRR	2017
Independent External Peer Review	2017

c. Model Certification/Approval Schedule and Cost.

The model certification team will apply the principles of EC 1105-2-412 during the certification process to ensure the model is theoretically and computationally sound, consistent with USACE policies, and adequately documented. The model certification team will apply the principles of EC 1105-2-412 during the certification process to ensure the model is theoretically and computationally sound, consistent with USACE policies, and adequately documented. A draft economic model with supporting documentation was completed at the end of 2014. The draft economic model is currently under review with the PCXIN. A full model review is scheduled for completion by February 2016. Model development and review are actively coordinated through LRD and the PCXIN.

Description	Scheduled Date	Cost
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Model and Documentation Development	Completed	
Model Beta Tested and Documentation Review	February 2016	\$50,000
Model Approval	March 2016	

11. PUBLIC PARTICIPATION

A Major Rehabilitation Report does not require extensive public participation since it involves the rehabilitation of an existing facility. Therefore, it is likely that NEPA documentation will be met through the use of a categorical exclusion for operations and maintenance activities. However, any agencies with regulatory review responsibilities will be contacted for coordination as required by applicable laws and procedures. The ATR team will be provided copies of any public and agency comments.

12. REVIEW PLAN APPROVAL AND UPDATES

The Great Lakes and Ohio Rivers 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 for the decision document. Like the PMP, the Review Plan is a living document and may change as the study progresses. The Detroit District is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval will be documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) will 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 Detroit District's webpage. The latest Review Plan will also be provided to the RMO and home MSC.

13. REVIEW PLAN POINT OF CONTACT

Public questions and/or comments on this review plan can be directed to the following point of contact:

Title	Name	Office Phone Number
Project Manager		

ATTACHMENT 1: TEAM ROSTERS

PROJECT DELIVERY TEAM (PDT) MEMBERS

Discipline	Office Symbol	Name	Telephone Number
Project Manager	LRE-PL-P		
Plan Formulator	LRE-PL-P		
Economist	LRE-PL-P		
Geotechnical Engineer	LRH-DSPC-GS		
Civil Engineer	MVS-EC-DA		
Structural Engineer	LRL-ED-E		
Mechanical Engineer	MVP-EC		
Electrical Engineer	MVP-EC-D		
Cost Engineer	LRE-EC-C		
Environmental Reviewer	LRE-PL-E		
Cultural Resources/NHPA reviewer	LRE-PL-E		

DISTRICT QUALITY CONTROL (DQC) MEMBERS

Discipline	Office Symbol	Name	Telephone Number
Plan Formulation	LRE-PL-P		
Economics	PCXIN-RED		
Geotechnical Engineering	LRE-EC-G		
Civil Design/Structural Engineering	LRE-EC-G		
Mechanical Engineering	LRE-EC-G		
Electrical Engineering	LRE-EC-G		
Cost Engineering	LRE-EC-C		
Environmental/NHPA	LRE-PL-E		

AGENCY TECHNICAL REVIEW (ATR) MEMBERS

Discipline	Office Symbol	Name	Telephone Number
ATR Lead	CEMVP		
Plan Formulator	PCXIN		
Economist	PCXIN-RED		
Geotechnical Engineer	CESWT-DS		
Civil Engineer	MVS-EC		
Structural Engineer	CEMVS-EC		
Mechanical Engineer	CEMVP-EC		
Electrical Engineer	MVR-EC		
Cost Engineer	CENWW		
Environmental Reviewer	CELRH		
Cultural Resources/NHPA reviewer	CEMVS		

INDEPENDENT EXTERNAL PEER REVIEW (IEPR) MEMBERS

Discipline	Office Symbol	Name	Telephone Number
Plan Formulator	TBD		TBD
Economist	TBD		TBD
Geotechnical Engineer	TBD		TBD
Civil Engineer	TBD		TBD
Structural Engineer	TBD		TBD
Mechanical Engineer	TBD		TBD
Electrical Engineer	TBD		TBD
Cost Engineer	TBD		TBD
Environmental Reviewer	TBD		TBD
Cultural Resources/NHPA reviewer	TBD		TBD

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Major Rehabilitation Report for Soo Locks, Sault Ste. Marie, Michigan. The ATR was conducted as defined in the project’s Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer’s needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrCheckssm.

SIGNATURE

Name
ATR Team Leader
Office Symbol/Company

Date

SIGNATURE

Name
Project Manager
Office Symbol

Date

SIGNATURE

Name
Architect Engineer Project Manager¹
Company, location

Date

SIGNATURE

Name
Review Management Office Representative
Office Symbol

Date

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: Describe the major technical concerns and their resolution.

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

SIGNATURE

Name
Chief, Engineering Division
Office Symbol

Date

SIGNATURE

Name
Chief, Planning Division
Office Symbol

Date

¹ Only needed if some portion of the ATR was contracted

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
AFB	Alternative Formulation Briefing	NED	National Economic Development
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CSDR	Coastal Storm Damage Reduction	O&M	Operation and maintenance
DPR	Detailed Project Report	OMB	Office and Management and Budget
DQC	District Quality Control/Quality Assurance	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DX	Directory of Expertise	OEO	Outside Eligible Organization
EA	Environmental Assessment	OSE	Other Social Effects
EC	Engineer Circular	PCX	Planning Center of Expertise
EIS	Environmental Impact Statement	PDT	Project Delivery Team
EO	Executive Order	PAC	Post Authorization Change
ER	Ecosystem Restoration	PMP	Project Management Plan
FDR	Flood Damage Reduction	PL	Public Law
FEMA	Federal Emergency Management Agency	QMP	Quality Management Plan
FRM	Flood Risk Management	QA	Quality Assurance
FSM	Feasibility Scoping Meeting	QC	Quality Control
Home District/MSD	The District or MSD responsible for the preparation of the decision document	RED	Regional Economic Development
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMC	Risk Management Center
IEPR	Independent External Peer Review	RMO	Review Management Organization
ITR	Independent Technical Review	RTS	Regional Technical Specialist
LRR	Limited Reevaluation Report	SAR	Safety Assurance Review
MRR	Major Reevaluation Report	USACE	U.S. Army Corps of Engineers
MSC	Major Subordinate Command	WRDA	Water Resources Development Act