
REVIEW PLAN

**LOCKS AND DAMS 52 AND 53 REPLACEMENT PROJECT
OLMSTED DAM IN-THE-DRY STUDY**

LOUISVILLE DISTRICT



**US Army Corps
of Engineers®**

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1. PURPOSE

The purpose of the Olmsted Dam In-The Dry Study is to develop near feasibility level designs and associated cost estimates for in-the-dry (i.e. within cofferdams) construction of the dam that can be compared to the current in-the-wet construction methods. The on-going in-the-wet construction activity has completed a significant portion of the tainter gate section of the dam. Therefore, it is considered appropriate to focus this study on in-the-dry completion of the remaining portions of the dam which are the right boat abutment, navigable pass and left boat abutment. The fixed weir of the dam was placed under a previous contract.

2. STUDY SCOPE

To allow for comparison with in-the-wet methods, two cost estimates are required. One estimate will establish the costs for in-the-dry construction of the navigable pass and two boat abutments. The second estimate will calculate the overall cost for in-the-wet construction of the dam with the navigable pass and boat abutments deleted. The two estimates added together will represent the overall first cost of the in-the-dry alternative. The estimates will be completed in a format and presentation style similar to that of the Baseline Cost Estimate completed for the Olmsted L&D Post Authorization Change Request in October 2011. Completion of the cost estimates will require completion of an in-the-dry construction schedule.

Beyond the first costs of construction, the economics of the in-the-dry alternative will also be considered in the study. Net economic benefit for this alternative will be calculated in relation to a without-project alternative characterized by continued use of Locks and Dams 52 and 53 in a reactive maintenance fix-as-fails mode. Factors such as construction period length, online date, and delays during construction will be considered. The net economic benefit will be compared to that available for the in-the-wet alternative.

The design efforts will establish project features to be cost estimated, prove feasibility and create documentation of criteria, assumptions, analyses and drawing details. To maximize study efficiency, it is assumed that the current configuration of the dam will remain unchanged. The plan view shape, cross section and foundation support for the dam will be the same with no optimization undertaken on items such as piling. This is considered reasonable, given the relatively small size of the probable savings. The concrete shells of the in-the-wet method of

construction contain a large amount of steel reinforcement. The shells are not required for the in-the-dry method. Therefore, optimization of the reinforcing steel will be undertaken. Reference Appendix A for a listing of the design team.

3. PROJECT DESCRIPTION

The Olmsted Locks and Dam project provides for a navigation facility near Ohio River Mile 964.4 that would replace the existing Locks and Dams 52 and 53. The facility will consist of twin 110-foot by 1,200-foot locks adjacent to the Illinois bank, five tainter gates, a right boat abutment, a 1,400-foot navigable pass, a left boat abutment and a fixed weir extending into the Kentucky bank. During low flow conditions, an upper pool having an elevation of 300 feet (ORD) at the dam would extend upstream a distance of 47 miles to the Smithland Locks and Dam. Open river conditions will exist from the dam site downstream a distance of approximately 17 miles to the mouth of the Ohio River.

The study effort includes all planning and design necessary to develop details sufficient to estimate construction of the right boat abutment, navigable pass with wickets, and left boat abutment utilizing an in-the-dry approach. Under this approach, the boat abutments will be reinforced concrete structures founded on steel pipe piles. The navigable pass sill will be founded on pipe piles and will be mass concrete with structural reinforcement steel at the pile heads and the wicket anchorages. The cofferdams will consist of sand filled circular sheet pile cells.

4. LEVELS OF REVIEW

EC 1165-2-209, *Civil Works Review Policy*, dated 31 January 2010, outlines study review requirements including the three review approaches of DQC, ATR, and IEPR. Following is documentation of the risk-informed decisions on the applicability of each review approach. Note that this sub-feasibility level study will not make recommendations on the use of in-the-dry construction methods on the Olmsted Dam. It will only develop design concepts, determine technical viability, establish construction costs and assess economic net benefits for the in-the-dry alternative. Therefore, the study report is not considered a decision document or an implementation document.

(1) District Quality Control. DQC is the checking and review of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). It is managed in the District and may be conducted by in-house staff as long as reviewers are not doing the work involved in the study. Basic quality control tools include a Quality Management Plan (QMP) providing for seamless review, quality checks and reviews, supervisory reviews, Project Delivery Team (PDT) reviews, etc. For this Study, experienced senior level engineers, technicians and economists from LRL, LRP, LRH, SAS and NWW were assigned to carry out DQC checking and review of major draft and final products following review of those products by the PDT. The Major Subordinate Command

(MSC)/District are directly responsible for the QM and QC respectively, and to conduct and document this fundamental level of review. A Quality Control Plan (QCP) was included in the PMP for the subject study and addresses DQC by the MSC/District. DQC is not addressed further in this Review Plan.

(2) Agency Technical Review (ATR). The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The ATR is an in-depth review, managed within USACE, and conducted by a qualified team outside of the home district that is not involved in the day-to-day production of a project/product. The ATR team reviews the various work products and assures that all the parts fit together in a coherent whole. ATR teams will be comprised of senior USACE personnel (Regional Technical Specialists (RTS), etc.) and may be supplemented by outside experts as appropriate. To assure independence, the leader of the ATR team shall be from outside the home MSC. EC 1105-2-408 first established the requirement that DrChecks be used to document all ATR comments, responses, and associated resolutions accomplished. Given the size and complexity of this project, an ATR of the study is considered necessary. Reference paragraph 5 below for further discussion on the ATR process and the makeup of the ATR team.

(3) Independent External Peer Review. EC 1165-2-209 delineates the definition of IEPR, into Types I and II, the latter of which being synonymous with Safety Assurance Review. 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. Type I IEPR is managed by an outside eligible organization (OEO) that is described in the Internal Review Code Section 501(c)(3), is exempted from Federal tax under Section 501(a), of the Internal Revenue Code of 1986; is independent; is free from conflicts of interest; does not carry out or advocate for or against Federal water resources projects; and has experience in establishing and administering IEPR panels. The scope of an IEPR review will address all the underlying planning, engineering, including safety assurance, economics, and environmental analyses performed, not just one aspect of the project. Given this work product is not a decision document, a Type I IEPR by a group from outside USACE is not considered appropriate or necessary.

(4) Safety Assurance Review / Type II IEPR. In accordance with Section 2035 of WRDA 2007 and EC 1165-2-209, all projects addressing flooding or storm damage reduction are required to undergo a safety assurance review during design and construction. Per EC 1165-2-209, "A Type II IEPR (SAR) shall be conducted on design and construction activities for hurricane and storm risk management and flood risk management projects, as well as other projects where existing and potential hazards pose a significant threat to human life." Safety assurance factors must be considered in all reviews for those projects. Given this work product is not associated with such a project nor is an implementation document, a Type II IEPR / SAR is not considered necessary.

(5) Review Plan Approval and Posting. In order to ensure the Review Plan is in compliance with the principles of EC 1165-2-209 and the MSC's QMP, the Review Plan must be endorsed and approved by the applicable MSC, in this case the Commander, Great Lakes and Ohio River Division (LRD). Once the Review Plan is approved, the District will post it to its district public website and notify LRD.

5. AGENCY TECHNICAL REVIEW (ATR)

Given the size and complexity of this project, an ATR of the study is considered necessary. Individuals from the disciplines of construction, scheduling and cost estimating, as well as the engineering disciplines of structural, geotechnical, hydraulics, mechanical and electrical should be involved. Expertise in the area of navigation design and costing is required. For the geotechnical and structural disciplines, expertise in the design and construction of circular sheet pile cell cofferdams is required. Reference Appendix B for a listing of the proposed ATR team. Note that a cost estimator from the Cost Engineering Directory of Expertise (DX) located in the Walla Walla District will be part of the ATR team and that the DX will certify the cost estimate. Following the guidance of EC 1165-2-209 and considering the fact the study report is not a decision document, Dam Safety modification report or Levee Safety modification report, the MSC will serve as the Review Management Organization.

The ATR team will conduct Concurrent Reviews and Milestone Progress Reviews. The Concurrent Review process is conducted seamlessly in accordance with the QC plan. Concurrent QC involves the review of sub-products and products as they are prepared. The Quality Control is performed in a proactive manner by the ATR team interacting throughout the entire planning and design process to take advantage of their collective experience. This review is in the form of formal and informal meetings, telephone conversations, and other forms of informal communication that may involve one or more review team members. The Milestone Progress Review (MPR) process is conducted in the traditional approach using complete milestone deliverables. It occurs during a specified period after design progress has reached a target milestone. Deliverables are reviewed, and written comments, prepared by reviewers, are provided. Design progress ceases during the review period. The comments and responses associated with all formal reviews will be managed and documented within DrChecks. Reference Appendix C for the proposed review schedule.

6. MODEL CERTIFICATION

For the purposes of this paragraph, planning models 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. It includes all models used for planning, regardless of their scope or source, as specified in the following sub-paragraphs.

The computational models employed in this study have either been developed by or for the USACE. Model certification and approval for all identified planning models will be coordinated through the Planning Center of Expertise for Inland Navigation (PCXIN) as needed. Project schedules and resources will be adjusted to address this process for certification and PCXIN coordination. Models to be used are:

(1) Ohio River Navigation Investment Model (ORNIM) – Developed by the Center for Transportation Analysis (CTA) in cooperation with the Great Lakes and Ohio River Division of the Corps of Engineers (LRD), ORNIM is a three component model; the Waterway Supply and Demand Module (WSDM), the Lock Risk Module (LRM), and the Optimization Module. The three components of the ORNIM model determine shipper equilibrium, use a Monte Carlo simulation to determine closure probabilities, and optimize investments, respectively. *Certification of ORNIM is currently in progress.*

(2) Waterways Analysis Model (WAM) – The Waterways Analysis Model is used to estimate traffic/delay relationships, lock capacities, and simulating closure impacts on traffic. The WAM was certified on 15 August 2011.

(3) Barge Costing Model – The Barge Costing Model, which contains three modules; one-way general towing service, roundtrip general towing service, and a roundtrip dedicated towing service module, is used for rate estimation. *Certification of the Barge Costing Model is in Progress.*

7. PUBLIC REVIEW

The Private individuals, elected officials, agencies, and all levels of government have been publically involved in the development of the Olmsted project. The primary vehicle for public involvement has been the process of complying with the National Environmental Policy Act and its provisions for public involvement. The 1985 and 1993 Environmental Impact Statements each had a 45-day comment period for the draft documents followed by a 30-day comment period for the final documents. The 2002 Environmental Assessment had a 30-day comment period.

Public involvement is also part of the permitting process whether for Section 401 water quality certification under the Clean Water Act or for some other law or regulation. For example, changes involving Historic/Cultural Mitigation issues resulted from coordination with consulting parties undertaken in accordance with the National Historic Preservation Act (NHPA). Changes involving cultural resources/archaeology sites resulted from coordination with the Illinois and Kentucky State Historic Preservation Officer and Native American tribes in accordance with NHPA and the Native American Graves Protection and Repatriation Act.

Public involvement and coordination was maintained with residents of local communities such as Paducah, KY and Olmsted, IL on Project features such as the disposition of L&D 52 and 53, construction of a new boat ramp at Olmsted, construction and operation of a contractor facility in Paducah, and purchase of mitigation lands in Ballard County, Kentucky.

In addition, this Review Plan will be posted to a public website for review and comment.

8. POINTS OF CONTACT

The Points of Contact for questions and comments on this Review Plan are as follows:

- (1) District Point of Contact: 502-315-6279
- (2) MSC Point of Contact: 513-684-3071
- (3) PCXIN Point of Contact: 304-399-6938

APPENDIX A

**Olmsted Dam In-The-Dry Study
Design Team**

<u>DISCIPLINE</u>	<u>NAME</u>	<u>OFFICE SYMBOL</u>
Project Manager		CELRL-PM-C
Team Leader		CELRL-ED-DN
Structural Checker		CELRL-ED-DN CELRP-EC-NS
Civil Checker		CELRL-ED-TC CELRL-ED-TG
Geotechnical Checker		CELRL-ED-TG CELRL-ED-TG
Hydraulics Checker		CELRL-ED-TH CELRL-ED-TH
Mechanical Checker		CELRL-ED-DN CELRL-ED-DM
Electrical Checker		CELRL-ED-DM CELRL-ED-D
CADD Support Checker		CELRL-ED-DN CELRL-ED-DN
Cost Checker Checker		CELRH-EC-TC CELRL-ED-MC CELRH-EC-TC CELRL-ED-MC
Construction Checker		CELRL-CD-O CELRL-CD-O

Scheduling
Checker

Mgmt Solutions
CESAS

Environmental

CELRL-PM-P

Economics
Checker

CELRL-PM-P
CELRH-NC

APPENDIX B

Olmsted Dam In-The-Dry Study Agency Technical Review Team

<u>DISCIPLINE</u>	<u>NAME</u>	<u>OFFICE SYMBOL</u>
Team Lead		CEMVS-EC-DA
Structural		CELRH-EC-DS
Geotechnical		CELRC-TS-DG
Hydraulics		CELRP-EC-DH
Mechanical		CELRH-EC-DE
Electrical		CELRP-EC-NT
Cost		CENWW-EC-X CELRH-EC-TC
Construction		CELRP-EC-CM

APPENDIX C

Olmsted Dam In-The-Dry Study Review Milestones

<u>MILESTONES</u>	<u>COMPLETION DATE</u>	<u>REVIEW METHOD</u>
Final Calc's and Drawings	17 April 2012	MPR
Final Compiled Report	11 May 2012	MPR
Cost Estimate	23 May 2012	MPR