REVIEW PLAN

ZOAR LEVEE & DIVERSION DAM

ZOAR VILLAGE, TUSCARAWAS COUNTY, OHIO

DAM SAFETY MODIFICATION STUDY

MSC Approval Date: *17 April 2012*
Last Revision Date: 17 April 2012

HUNTINGTON DISTRICT

US Army Corps
of Engineers ®

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1.0 PURPOSE AND REQUIREMENTS

1.1 Purpose

This Review Plan defines the scope and level of peer review for the Zoar Levee and Diversion Dam, Dam Safety Modification (DSM) Project.

1.2 References

(1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010
(2) EC 1105-2-412, Assuring Quality of Planning Models, 30 Dec 2009
(3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
(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 1110-2-1156, Safety of Dams – Policy and Procedures
(6) Zoar Levee and Diversion Dam Project Management Plan[1]
(7) Zoar Levee and Diversion Dam District Quality Control Plan
(8) Zoar Levee SPRA, 2005
(9) Dover Dam, Dam Safety Assurance Program, Final Evaluation Report and Environmental Impact Statement, June 2007

1.3 Requirements

This review plan was developed in accordance with EC 1165-2-209, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC 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 1165-2-209) and planning model certification/approval (per EC 1105-2-407).

2.0 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 RMC.

[1] Available upon request

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3.0 STUDY INFORMATION

3.1 Decision Document

The project is a DSM Study concerning the Zoar Levee and Diversion Dam in Zoar, in Tuscarawas County, Ohio. The decision document will address reliability issues related to the Zoar Levee and Diversion Dam. Action is needed because piping due to seepage through and under the levee and diversion dam, as well as malfunctioning outlet works at the diversion dam are negatively affecting the integrity of the project, increasing risks to the affected public. These concerns contributed to its original classification by the U.S. Army Corps of Engineers (USACE) Screening for Portfolio Risk Assessment (SPRA) as a Dam Safety Action Class (DSAC) II – Urgent (unsafe or potentially unsafe) project. Due to poor project performance during the 2008 high water event the project has since been reclassified as a DSAC I (Urgent and Compelling) project. Action is needed to minimize the potential for catastrophic failure of the project.

The decision document will present planning, engineering, and implementation details of the recommended plan to allow final design and construction to proceed subsequent to the approval of the plan by the USACE Dam Safety Officer (DSO) and Issuance of the Signed Record of Decision. An Environmental Impact Statement (EIS) will be prepared. This project will not require Congressional authorization. A Cost and Schedule Risk Analysis (CSRA) will be scheduled prior to the Agency Technical Review (ATR) in FY12. This analysis will be performed by Walla Walla District, who is the Cost Engineering Center of Expertise.

3.2 Study/Project Description

The Muskingum River basin is the site of Ohio's first multi-purpose water management and land conservation river basin project. The initial plan called for 14 flood control reservoirs. In 1933, the Public Works Administration (PWA) awarded a grant of $22,090,000 to the USACE to construct the proposed plan. Construction of the project began in 1935 and the completed system was turned over to the Muskingum Watershed Conservancy District (MWCD) in 1938. The Flood Control Act of 1939 returned the dams to the federal government and flood control operations back to USACE.

Zoar Levee & Diversion Dam is an appurtenant structure to Dover Dam (Figures 1 & 2) which is one of the 14 flood control reservoirs discussed above. Dover Dam is located in Tuscarawas County, along the Tuscarawas River approximately 3.5 miles north of the communities of Dover and New Philadelphia. The dam was constructed by USACE and completed in 1938. Dover Dam is a dry dam and as such does not hold a permanent pool. The federal government maintains a permanent flowage easement to elevation 916' above mean sea level (msl) upstream of the dam, which corresponds to the height of the spillway of the dam. A Dam Safety Assurance project is currently under construction at Dover Dam, which is classified as DSAC II project. Both Dover Dam and Zoar Levee & Diversion Dam are both administered by the Huntington District of USACE (CELRH).

The Zoar Levee was constructed in 1937 (Figures 1 & 2). The levee is a rolled earth filled embankment with an impervious core and a crest length of 3,893 feet. The levee's maximum height is 45 feet which includes the 9.5 feet added in 1951 to provide additional protection.). As such the original crest elevation of the Zoar levee was designed to correspond to the spillway elevation of Dover Dam of 916, with an additional 3 feet of freeboard for a resulting crest elevation of 919. In 1951, USACE made further investments in protecting the historic village of Zoar. These investments raised the levee elevation from El. 919 to El. 928.5.

Appurtenant works include a gated concrete culvert, pump station, and Zoar Diversion Dam (Figure 3). Zoar Diversion Dam was also constructed in 1937. It is located on Goose Run, approximately 1,000' upstream of Zoar Levee and was built to control interior drainage as a retention structure for runoff from the Goose Run watershed which flows into a ponding area for the Zoar Levee pump station. The rolled earth filled embankment with an impervious core is approximately 500 long and

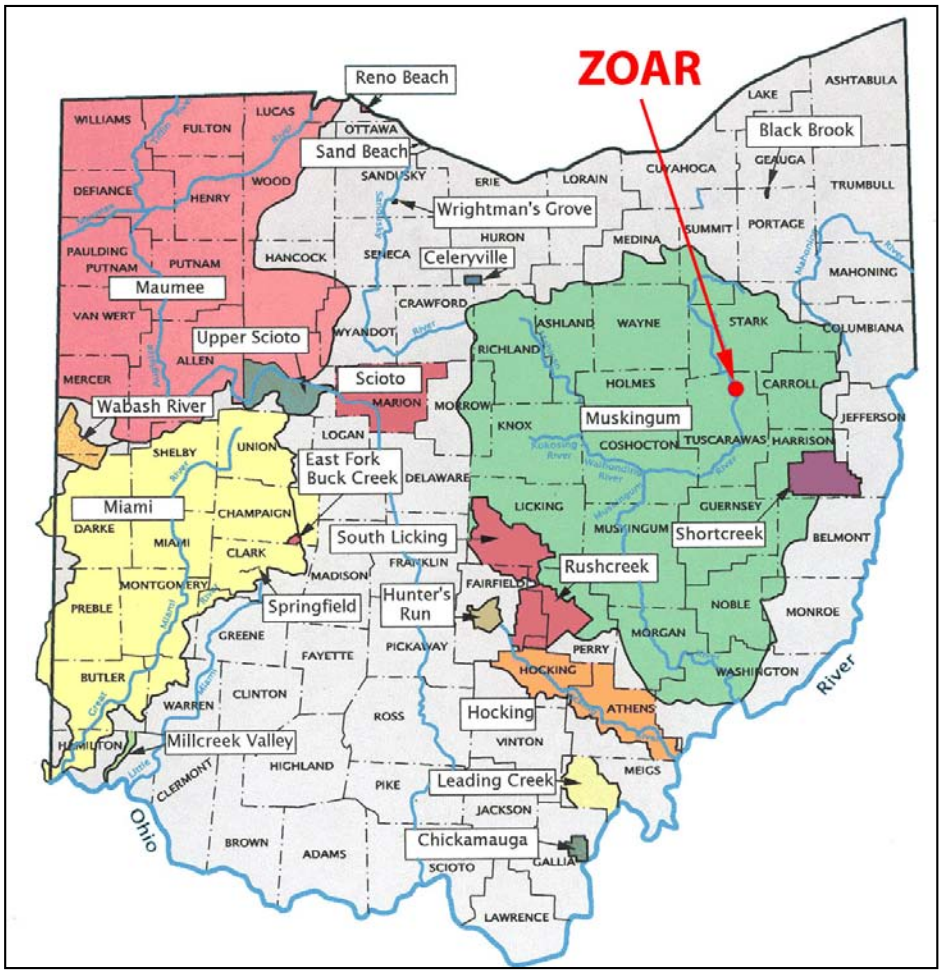

Figure 1. Location of Zoar Levee & Diversion Dam in Muskingum River Basin (in green) in Ohio.

Figure 2. Location of Zoar Levee & Diversion Dam upstream of Dover Dam on the Tuscarawas River.

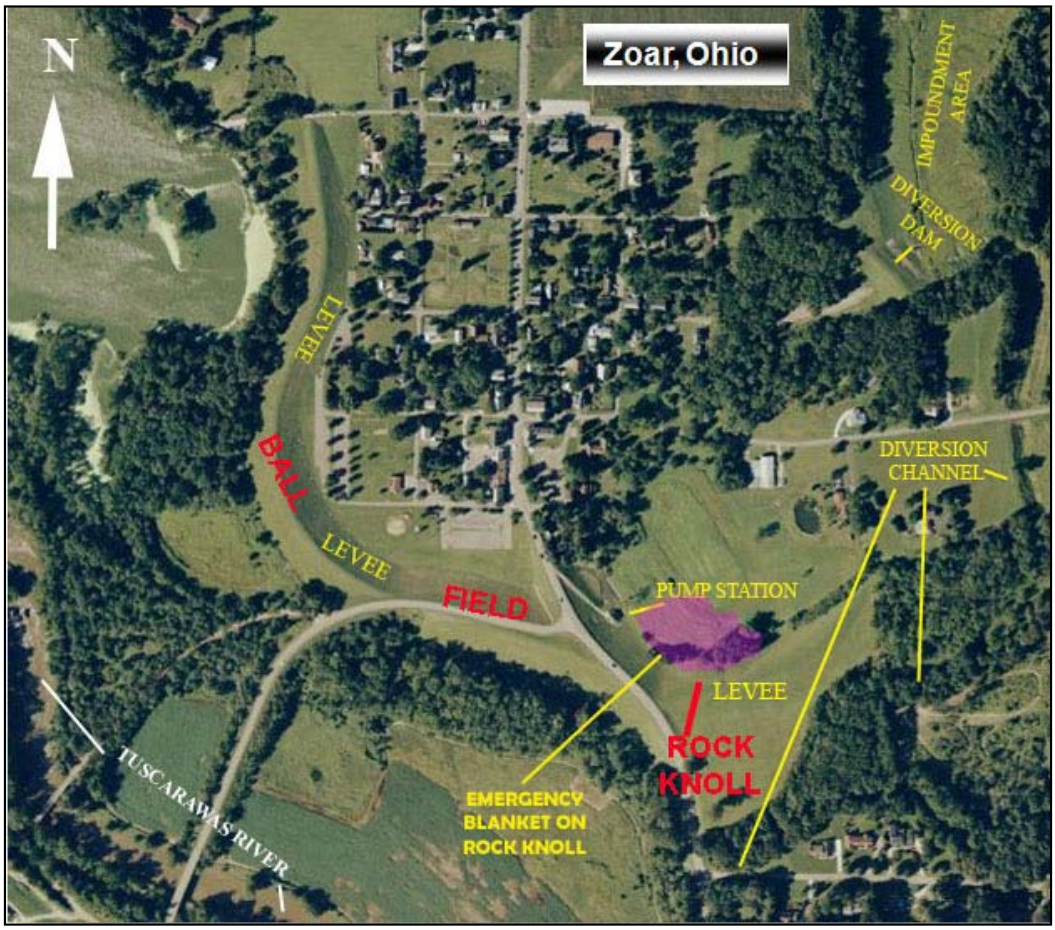

Figure 3. Zoar Levee & Diversion Dam showing appurtenant works and components.

35 feet high. This small dam permanently impounded Goose Run Lake until 1992, when it was drained for repairs and never refilled, as it was determined that the Diversion Dam was never authorized to retain a permanent reservoir. A pump station was constructed in 1950 to help pump flows from the Diversion Dam outside of the Levee. A gated concrete culvert through Zoar Levee provides an exit for normal flow from Goose Run

Together, these project features reduce flooding to the Village of Zoar; (1) when Dover Dam is retaining a pool, and: (2) from interior runoff from Goose Run. Zoar Levee begins to provide flood damage reduction benefits to the Village of Zoar when Dover Dam is retaining a pool above El. 890 (a 3-year event. There are approximately 54 properties (approximately 98 buildings including dependencies) located inside the levee within the Village of Zoar, at or below the elevation 916' above msl, or the spillway crest of Dover Dam. Figure 4 below approximates which structures would be within the flowage easement behind Dover Dam, if it was not for Zoar Levee.

Figure 4. Portion of Zoar Village (shaded in blue) that would be in Dover Dam's flowage easement of elevation 916' if it were not for Zoar Levee.

The Zoar Levee & Diversion Dam is classified as a DSAC I project. There are three separable components (Figure 3) that need to be addressed under the resulting DSM Study: (1) the ball field side of the levee; (2) the rock knoll side of the level, and; (3) the diversion dam (Figure 3). As currently understood, each of these components will require separate consideration to achieve the tolerable risk guidelines established in Chapter 5 of ER 1110-2-1156, under which this study is being conducted. That is to say, while fixing one of these single components might reduce the risk associated with that component it may not reduce the risk or increase the reliability of the project as a whole. Therefore, structural measures are being developed for each component that would address the risk associated with that specific piece of the project. Specifically, the following problems will be addressed.

The ball field area of Zoar Levee has 130 feet deep foundation soils consisting of mostly of highly pervious glacial outwash. This is an area of significant under seepage (Figure 5). The rock knoll area, where an emergency gravel blanket was placed in 2008, is founded on sandstone, limestone, with interbedded shale. The rock is fractured with open bedding planes and joints and has also lead to significant under seepage (Figure 5). A typical cross section of the Levee is provided below as Figure 6. The Zoar Diversion Dam sits on the same fractured bedrock as the Rock Knoll that has in the past been caused significant abutment/under seepage. Piping along outlet conduits through the levee and diversion dam is also considered a potential significant failure mode.

Per Section 2033 of the Water Resources Development Act (WRDA) of 2007, and guidance provided in ER 1110-2-1156 and ER 1105-2-100, non-structural measures are also being developed for the project. Some non-structural measures could include breaching the levee and/or diversion dam, effectively placing the structures protected by the project back into the aforementioned Dover 916' flowage easement. There are a variety of ways this can be accomplished.

Figure 5. 2008 Aerial Photograph showing performance issues at Zoar Levee.

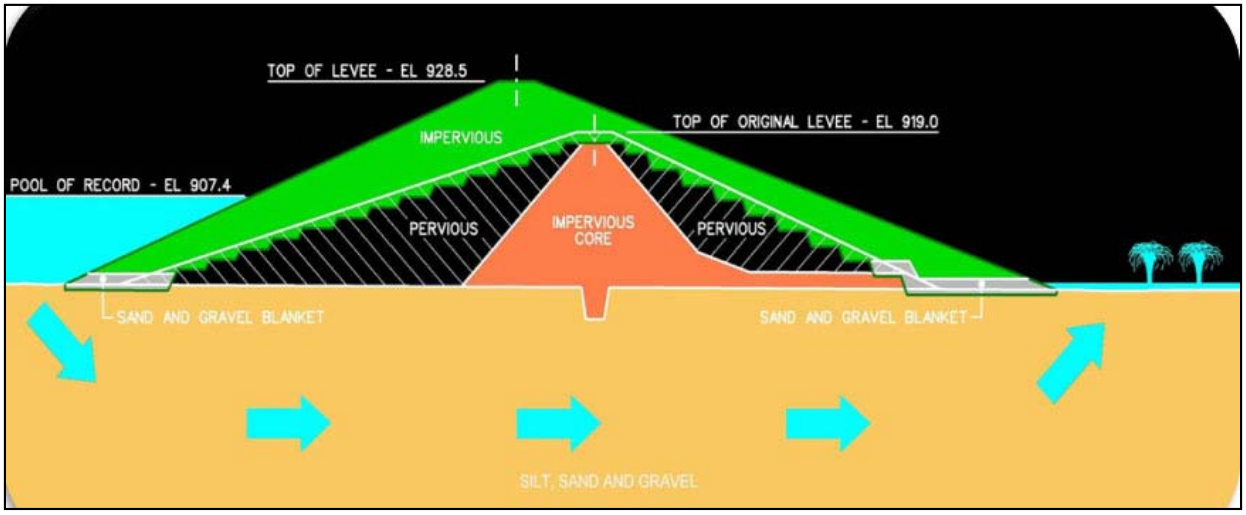

Figure 6. Typical cross-section of Zoar Levee demonstrating under seepage.

The PDT has not yet begun to formulate risk reduction measures. Below are some measures that *may* be considered:

- Structural measures
  - Full depth cut off wall
  - Partial depth cut off wall; new relief wells
  - New relief wells
  - Landward filter berm

- Non-structural measures
  - Flood Warning Early Evacuation Plan (FWEEP)
  - Controlled backfill to maintain structural stability of levee and dam
  - Alter Dover Dam's operation
  - Breach and Acquisition
  - Breach and Flood-proofing

- Alternatives required by guidance
  - Meet risk reduction objectives for the DSAC class of the dam
  - Achieving only tolerable risk limit for life safety
  - Permanently adopt Interim Risk Reduction Plan (IRRMP)
  - Removal of project
  - Replacement of all project structures
  - No Action (required by NEPA and 1110-2-1165)

The potential non-Federal sponsor for this project is the Muskingum Watershed Conservancy District (MWCD).

3.3 Factors Affecting the Scope and Level of Review

There are several aspects of the study that make it particularly challenging.

Given there are three separate components of the project and the number of measures identified for each component, along with the projects proximity to Dover Dam, there are many alternatives to evaluate. The team will be challenged to find the most effective combination of measures to form the recommended alternative. Given the interconnectedness of the project components, a change to one component affects the performance of the others. This makes it difficult to evaluate the project as a whole.

As discussed above in Section 3.b and required by ER 1110-2-1156, non-structural measures are being given equal consideration as structural measures in this study. Many DSM Studies are considering projects with large downstream areas with high economic benefits. In these instances, many non-structural measures that meet the study and federal objectives are economically infeasible. However, the Zoar DSM has a relatively small affected area with comparatively low economic benefits. Therefore, intuitively, a non-structural alternative could be implemented at a lower cost than many of the potential structural measures considered to date, while still satisfying the federal and study objectives. Both structural and non-structural alternatives are feasible from a constructability standpoint. However, many non-structural alternatives would have more negative impacts on the cultural and historical quality of the Village of Zoar, significantly impact a community, and potentially incur other social effects which would require mitigation.

Original documentation concerning the decision to construct the levee verses remove the Village from Dover Dam's flowage easement indicates that the USACE considered the historical significance of the community when it originally constructed the levee. A 1949 design memorandum concerning the capacity of the Zoar pump station states that "…*protection of the village instead of evacuation was adopted because of its historical significance*…"

Further, a 2001 article from the National Park Service's magazine entitled CRM stated:

> "…*in 1929, under pressure from the U.S. Army Corps of Engineers to move the town to higher ground to accommodate a nearby flood-control dam, the villagers began to recognize their heritage and restored the central garden and opened a museum. A levee was built instead*." (Fernandez 2001).

The cultural and historical significance of the Village of Zoar is well documented. The Village of Zoar is unique in the State of Ohio, being the only physically remaining intact utopian community and a significant collection of early nineteenth century German folk architecture. Much of Zoar was documented in 1936 by the Historic American Building Survey (HABS). This study concluded that Zoar was "the most successful communist experiment ever conducted in the United States" (HABS 1936). In the 1960s, the Ohio General Assembly appropriated $300,000 for the Ohio Historical Society (OHS) to purchase significant buildings in Zoar to preserve, restore and interpret them. The OHS now owns and operates ten buildings in the Village of Zoar.

In 1967, the Zoar Community Association was founded to ensure the preservation of the Village of Zoar and the surrounding areas and to assist in the maintenance of the economic vitality of the Zoar area. The community association hosts several festivals and events each year, and the village is a

regional asset associated with tourism. For more information concerning the community, please visit http://www.zca.org/home.html or http://ohsweb.ohiohistory.org/places/ne10/index.shtml.

The Zoar State Memorial Historic District was placed on the NRHP in 1969 (Pratt 1969) and its boundary was increased in 1975 (Darbee and Pratt 1975). The NRHP boundary is shown below in Figure 4. The community was listed under Criterion A for its association with the 19th century German separatist movement and under Criterion C for its outstanding examples of nineteenth century architecture. As currently listed, its period of significance extends from 1817 to 1899.

The USACE Technical Center of Expertise for Preservation of Historic Buildings & Structures in the Seattle District (CENWS) has stated that the Village of Zoar's similarity to other utopian communities, high level of historic integrity, and unique place in history indicates it may meet criteria for listing as a National Historic Landmark (McCroskey Personal Communication 2009).

Due to the small number of structures being protected by the levee, it is unlikely that the project (whatever alternative is chosen) will have positive net benefits. Ordinarily a DSM project can be justified by life safety issues; however preliminary loss of life numbers for Zoar Levee show a loss of life for a catastrophic failure event at less than one. This is expected, given the amount of warning time that would precede a catastrophic failure of the levee. As previously stated, water does not load on the levee until Dover Dam is holding a pool. However, in the event of a failure, even if there were no loss of life, the loss of the structures themselves would be a significant impact given their historical significance.

It is not anticipated that the Governor of the State of Ohio will request a peer review by independent experts, however, that possibility cannot be ruled out at this point in the study. In any event, given the measures associated with non-structural alternatives there is the possibility that the study will invoke significant public controversy as to the effects of the project.

The decision document will be formulated using standard USACE guidance applicable to the subject project. However, given the nature of the study, there is the possibility that the decision document and subsequent project design may involve the use of innovative materials and techniques, contain precedent-setting methods, and present conclusions that are likely to challenge prevailing practices. Due to the broad range of potential measure the District cannot yet say if the project design might require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reducing or overlapping design construction. The PDT will involve the review and vertical teams on such aspects of the project as the study moves forward.

3.4 In-Kind Contributions

Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. There are no in-kind products anticipated as part of this project.

4.0 DISTRICT QUALITY CONTROL (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.

DSM Report / Feasibility Phase: A DSM Report is listed as a planning document and is therefore subject to ISO Document 3500 LRH – Planning Document Quality Control to District Quality Control (DQC) requirements for EC 1105-2-410.

In accordance with local ISO procedure (Document ID: 4282) to assess the risk associated with a planning product, the project was rated using a risk assessment worksheet, in which it scored a 76.5, signifying the study has levels of risk that require a Level 2 District Quality Control Plan (QCP). Concern is high for factors distributed within three major assessment groups: POLICY, TECHNICAL AND PROJECT. Within the major POLICY headings, there is a high degree of concern for Regulation, Social/Environmental, Project Funding, and Risk Aversion. Within the major heading of TECHNICAL, factors rated high are Project Size, Project Complexity, Project Uniqueness, and Inherent Uncertainty. Factors rated high with the major heading of PROJECT are Project Costs, Project Schedule, Political Sensitivity, Goal Certainty, and Review Schedule.

Therefore, in conformance with ISO Document 3500, a Senior Journeyman Level Planner, in concurrence with the Chief of Planning, has developed a DQC plan for the DSM report, which relies on the Chief of Planning to review an assign quality control reviews to all aspects of the planning study to Senior Journeyman Level Planners concerning planning aspects of the study.

This DQC plan relies on DQC procedures for certifying quality on all engineering studies and data provided to the PDT for input into the DSM report per procedures set forth in ISO documents 08504 and 08825.

This DQC plan relies on DQC procedures for certifying quality on all Real Estate planning studies and data provided to the PDT for input into the DSM report per procedures set forth in ISO document LRD 15530.

PED Phase: Until an alternative is selected it is not possible to assign specific DQC procedures for DDR and Plans & Specifications.

In general, engineering products prepared for the DDR and Plan & Specifications shall be certified for quality according to the appropriate/relevant procedures laid out in ISO Documents set forth in ISO documents 08504 and 08825.

Real Estate products prepared for the DDR and Plans & Specification shall be certified for quality according to the appropriate/relevant procedures laid out is ISO documents LRD 15000.

This section will be updated appropriately following the completion of the report.

4.1 Documentation of DQC

Persons outside of the project delivery team shall be assigned DQC responsibilities for certifying quality on products developed the following disciplines:

- Planning (including formulation, economics, NEPA, cultural resources, other social effects, environmental)
- Civil Design
- Engineering Geologist
- Geotechnical Engineer
- Hydraulics and Hydrology
- Electrical/Mechanical
- Cost Engineering
- Structural Engineering
- Engineering Construction
- Real Estate
- HTWR

4.2 Products to Undergo DQC

Specific products to undergo DQC include:

- All supporting data, including but not limited to technical analyses, engineering conclusions and environmental documentation.
- the integrated DSM Report and EIS, technical appendices and supporting documentation and analyses
- the Design Documentation Report (DDR)
- the Plans and Specifications (P&S)

5.0 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.

5.1 Products to Undergo ATR

The ATR for the Dam Safety Modification Report (DSMR) will conduct three in-progress reviews: (1) attending a site visit to become familiar with the project; (2) reviewing the without or total baseline condition; and (3) reviewing the final array of with project alternatives. The Baseline Risk Assessment will also receive an ATR. The Baseline Risk Assessment is a key component of the Baseline Condition

to be developed and documented in the DSMR. The ATR of the Baseline Risk Assessment will be led and coordinated by the RMC. After the Baseline Risk Assessment is complete, including the ATR, resolution of ATR comments and approval by the Quality Control and Consistency (QCC) Panel, the Project Delivery Team (PDT) will develop the Baseline Condition for the project.
Specific products to undergo ATR include:

- the integrated DSM Report and EIS, technical appendices and supporting documentation and analyses
- the Design Documentation Report (DDR)
- the Plans and Specifications (P&S)

5.2 Required ATR Team Expertise

The following table summarizes the number of review panel members and expertise required for the required ATR. Once the ATR panel has been established, their names, organizations, contact information, credentials and years experiences will be attached to this Review Plan as Attachment 1. All ATR team members should be professionally registered, as by required by their respective disciplines, in the area of expertise they are reviewing.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, cultural resources, etc).
Plan Formulation / Cultural Resources	The Cultural Resources reviewer will play a particularly significant role on the ATR team and should meet Professional Qualification Standards set forth in the Secretary of the Interior's Standards and Guidelines for Archeology and Historical Preservation (48 FR 44716) in history, architectural history, archeology and/or in historic architectural and have a strong background in formulating and implementing complex USACE civil works projects that have significantly impacted cultural resources and historic properties in compliance with all relevant and applicable cultural resource laws, regulations and policies
Plan Formulation/Economics	The Planning/Economics reviewer should be a senior water resources planner with experience in current Administration Policy, Executive Orders and guidance related to planning studies, and alternative optimization. The reviewer should have a strong understanding of economic models or studies relative to flood risk management, including simulation of engineering reliability data and the development of life-cycle costs.
Environmental Resources/NEPA/Other Social	The Environmental Resources reviewer should have a strong background in inland riverine ecosystems (e.g. riparian, aquatic,

ATR Team Members/Disciplines	Expertise Required
Effects	wetland), NEPA and other State and Federal environmental laws and regulations. The panel member should also have experience and background in evaluating community impacts and Other Social Effects.
Civil Design	Reviewer should be a senior level, professionally registered civil engineer with extensive experience with civil site layout and dam safety projects.
Engineering Geologist	The reviewer should be a senior-level engineering geologist with extensive experience in the dam safety analysis and karstic geology and be proficient in assessing seepage through sedimentary rock. The reviewer should be experienced in the design of seepage barriers or cutoff walls, and should have knowledge of spillway erodibility in sedimentary rock. The reviewer should have seepage, piping and seismic experience and a working knowledge of all applicable Corps of Engineers design criteria.
Geotechnical Engineer	The reviewer should be a professionally registered engineer with experience in embankment dam design and evaluation, as well as experience in seepage and piping and seepage failure mode analysis, and risk analysis of embankment dams, and familiarity with USACE dam safety guidance. Specific experience with seepage barriers or cutoff walls, relief wells, seepage filters & drainage elements is required.
Hydrology and Hydraulics Engineering	The H&H reviewer should be a professionally registered engineer with experience with engineering analysis related to flood risk management and dam safety projects. He or she should be familiar with standard Corps hydrologic and hydraulic computer models (HEC-RAS, HEC-HMS, & HEC-ResSim), and have experience with unsteady flow dam failure analysis modeling.
Electrical/Mechanical Engineering	The reviewer should either be a professionally registered engineer with extensive knowledge of electrical works, gates and operating equipment on flood risk management dams.
Cost Engineering	The reviewer for cost estimating shall be a registered or certified cost engineer with a BS degree or higher in engineering or construction management, and should have 5-10 years experience estimating complex, phased multi-year civil works construction projects and hydraulic retention structures. The reviewer shall have extensive knowledge of MII software and the Total Project Cost Summary (TPCS) as required during ATR. A certification from the Cost Directorate of Expertise (Dx) in Walla Walla District will be required.
Structural Engineer	Reviewer should be a senior level, professionally registered engineer with extensive experience with pump stations and dam

ATR Team Members/Disciplines	Expertise Required
	safety projects.
Engineering Construction	Reviewer should be a senior level, professionally registered engineer with extensive experience in the engineering construction field with particular emphasis on dam safety projects.
Real Estate	The reviewer should have experience in real estate issues related to flowage easements associated with existing Corps projects, as well as a working knowledge of USACE real estate policy and regulation.
Hazardous, Toxic and Radioactive Waste (HTRW)	The reviewer should have experience in dealing with HTRW issues in relation to USACE projects, as well as a working knowledge of USACE HTRW policy and regulation.

5.3 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:

- The review concern – identify the product's information deficiency or incorrect application of policy, guidance, or procedures;
- The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;
- 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
- 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 AFB, draft report, and final report. A sample Statement of Technical Review is included in Attachment 2.

6.0 INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

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 1165-2-209, 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 1165-2-209.

- 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.

6.1 Decision on IEPR

IEPR, Types I and II, will be conducted for the Zoar Levee and Diversion Dam DSM Project. The decision document will undergo a Type I IEPR, with SAR incorporated into the Type I IEPR process[2], while the products produced during the DDR, P&S and Construction phases will undergo Type II IEPR.

The decision document will meet the following mandatory triggers for Type I IEPR outlined in EC 1165-2-209:

- there are life safety concerns associated with the project;
- total project costs associated with the project are almost certain to be greater than $45M;
- there is a possibility the Governor of the State of Ohio, or the head of an affected state agency, may request a Type I IEPR;
- there exists the possibility for significant public dispute as to the effects of the project;
- there exists the possibility for significant public dispute as to the environmental cost and benefit of the project; and
- due to project complexity, information developed in support of the project could possibly be based on novel methods, present complex challenges for interpretation, contain precedent-setting methods and models, and could likely present conclusions that might affect prevailing Corps practices.

The decision document will meet the following mandatory triggers for Type II IEPR outlined in EC 1165-2-209:

- there exists potential hazards posing a threat to human life associated with the project;
- the Federal action will be justified by life safety;
- the project is likely to involve the use of innovative materials and techniques, the engineering may be based on novel methods, present complex challenges for interpretation, contain precedent setting methods and models and present conclusions that are likely to change prevailing practices;
- the project may require unique construction sequencing and/or an overlapping design construction schedule.

Additionally, since design initiates in the decision document phase, SAR will be incorporated into the Type I IEPR.

6.2 Products to Undergo Type I IEPR

[2] EC 1165-2-209 states "…when life safety issues exist, a Type I IEPR that includes a Safety Assurance Review (SAR) is required.) As there is life safety concerns at Zoar Levee a SAR will be incorporated into the Type I IEPR.

The specific products that will undergo Type I IEPR include the integrated Zoar Levee and Diversion Dam DSM Report and EIS, as well as technical appendices, and supporting documentation. The IEPR panel will conduct three in-progress reviews: (1) attend a site visit to become familiar with the project; (2) review the without or total baseline condition; and (3) review the final array of with project alternatives. As the RMC and PCXs will be heavily involved in project formulation, the District will ensure that representatives from the RMC and appropriate PCXs are engaged throughout the Type I IEPR process and invited to all panel meetings and site visits.

Due to the complexity of the project, the Type I IEPR will be initiated early in the study process to reduce the impacts resulting from potential, significant changes to the decision document occurring at the end of the study due to IEPR panel findings and recommendations.

6.3 Required Type I IEPR Panel Expertise

The following table provides an estimate of the number of Type I IEPR panel members and the types of expertise that should be represented on the review panel. Only those disciplines that have the potential to have significant and/or controversial impacts associated with the project have been selected for the Type I IEPR Panel. All IEPR panel members shall be Level 3 reviewers with a minimum of 20 years of specialized experience and are considered to be a recognized expert in their field.

IEPR Panel Members/Disciplines	Expertise Required
Cultural Resources / NEPA	The Panel Member should meet Professional Qualification Standards set forth in the Secretary of the Interior's Standards and Guidelines for Archeology and Historical Preservation (48 FR 44716) in archeology, history, architectural history, and/or in historic architectural and have a strong background in implementing or helping to implement USACE civil works projects that have significantly impacted cultural resources and historic properties in compliance with all relevant and applicable cultural resource laws, regulations and policies. The Panelist should also have particular knowledge National Environmental Policy Act (NEPA) process and requirements, and other pertinent environmental statutes and policies. At least 5 years experience of directly for or with the USACE is highly recommended.
Plan Formulator / Economist	The Panel Member should have a degree in planning or a related field and should have extensive experience in the plan formulation process, particularly with the Corps 6 step planning process. Panelist should be familiar with evaluation of alternative plans for flood risk management. The Panel Member should have a degree in economics or a related field and should be able to evaluate the appropriateness cost/benefit analysis used. Experience dealing directly with HEC-FDA is encouraged. The Panel Member should also be familiar with risk and uncertainty analysis (i.e. Monte Carlo type simulation). Panel Member should

IEPR Panel Members/Disciplines	Expertise Required
	also have experience with National Economic Development analysis procedures, particularly as they relate to flood risk management projects. At least 5 years experience directly working for or with USACE is highly recommended.
Engineering Geologist	The Engineering Geologist panel member should be a senior-level geologist familiar with identification of geological hazards, exploration techniques, field and laboratory testing, and instrumentation. The Panel Member should be proficient in assessing seepage and piping through and beneath dams constructed on fractured and faulted rock, karstic rock, or within various geologic environments, including but not limited to alluvial (including open-work gravels) and colluvial (including boulders and cobbles) materials. The Panel Member should be experienced in the design and construction of seepage barriers or cutoff walls. The Panel Member should have a working knowledge of all applicable USACE design criteria and shall be a licensed Professional.
Geotechnical Engineer	The Geotechnical Engineering panel member should be a senior-level geotechnical engineer with experience in the field of geotechnical engineering, analysis, design, and construction of embankment dams and levees. The Panel Member should have knowledge and experience in the forensic investigation and evaluation of seepage and piping, settlement, slope stability, and deformations problems associated with embankments constructed on weathered and jointed rock and alluvial soils. The Panel Member should have experience in the design and construction of seepage barriers or cutoff walls. The Panel Member should have experience in failure mode analysis, risk assessment of embankment dams, evaluating risk reduction measures for dam safety assurance projects, and familiarity with the USACE dam safety guidance. The Panel Member should have a working knowledge of all applicable USACE design criteria, and shall be a licensed Professional Engineer.

6.4 Documentation of Type I IEPR

The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-209, 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.

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.

6.5 Products to Undergo Type II IEPR SAR

The Type II IEPR SAR team shall perform reviews (and a site visit, as necessary) at the completion of the plans and specifications, at the midpoint of construction, and other important milestones as determined by the RMO and LRD. Representatives from the RMC will be invited to these site visits, as well as all other panel meetings.

6.6 Required Type II IEPR SAR Panel Expertise

The following table provides an estimate of the number of Type II IEPR SAR panel members and the types of expertise that should be represented on the review panel.

IEPR Panel Members/Disciplines	Expertise Required
Geotechnical Engineer	The Geotechnical Engineering panel member should be a senior-level geotechnical engineer with experience in the field of geotechnical engineering, analysis, design, and construction of embankment dams and levees. The Panel Member should have knowledge and experience in the forensic investigation and evaluation of seepage and piping, settlement, slope stability, and deformations problems associated with embankments constructed on weathered and jointed rock and alluvial soils. The Panel Member should have experience in the design and construction of seepage barriers or cutoff walls. The Panel Member should have experience in failure mode analysis, risk assessment of embankment dams, evaluating risk reduction measures for dam safety assurance projects, and familiarity with the USACE dam safety guidance. The Panel Member should have a working knowledge of all applicable USACE design criteria, and shall be a licensed Professional Engineer.

IEPR Panel Members/Disciplines	Expertise Required
Engineering Geologist	The Engineering Geologist panel member should be a senior-level geologist familiar with identification of geological hazards, exploration techniques, field and laboratory testing, and instrumentation. The Panel Member should be proficient in assessing seepage and piping through and beneath dams constructed on fractured and faulted rock, karstic rock, or within various geologic environments, including but not limited to alluvial (including open-work gravels) and colluvial (including boulders and cobbles) materials. The Panel Member should be experienced in the design and construction of seepage barriers or cutoff walls. The Panel Member should have a working knowledge of all applicable USACE design criteria and shall be a licensed Professional Geologist.
TBD	Other Type II IEPR SAR reviewers will be added once the recommended alternative has been identified and the integrated Dam Safety Modification and Environmental Impact Statement Record of Decision (ROD) have been approved.

6.7 Documentation of Type II IEPR SAR

The IEPR will be managed by AE firm which meets the criteria set forth in EC 1165-2-209. The review team will prepare a review report that 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.
- 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.

This review report, including reviewer comments and a recommendation letter will be provided to the RMC as soon as they become available.

Written responses to the IEPR Review Report will be prepared to explain the agreement or disagreement with the views expressed in the report, the actions undertaken or to be undertaken in response to the report, and the reasons those actions are believed to satisfy the key concerns stated in the report (if applicable). These comment responses will be provided to the RMC for concurrence. The revised submittal will be provided to the RMO with the USACE response and all other materials related to the review.

The Huntington District's responses shall be submitted to the LRD MSC for final MSC Commander Approval. After the MSC Commander's approval, the District will make the report and responses available to the public on the District's website.

7.0 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.

8.0 COST ENGINEERING DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION

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

9.0 MODEL CERTIFICATION AND APPROVAL

EC 1105-2-407 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 a certified/approved planning model 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 1105-2-407 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).

9.1 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
HEC-FDA 1.2.4	The Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA) program provides the capability for integrated hydrologic engineering and economic analysis for formulating and evaluating flood risk management plans using risk-based analysis methods. The program will be used to evaluate and compare the future without- and with-project conditions to aid in the selection of a recommended.	Certified
LRP Risk and Uncertainty Model	The model will be use to incorporate risk and uncertainty into the economic analysis, and is being developed by Pittsburg District for use as part of this study.	pending

9.2 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
MCACES 2nd Generation (MII) Version 3.01	Developed by Project Time and Cost, Inc. (PT&C), MII is a detailed cost estimating application used by the USACE and its A-E contractors for military, civil works and hazardous, toxic and radioactive waste (HTRW) projects. MII was first released in June 2003 and replaced the MCACES and MCACES for Windows programs.	Approved
Crystal Ball Fusion Edition, Release 11.1.3.00 (Build 11.1.1077.0 on 7/23/2009)	Developed by Oracle, this Excel add-in is used to perform a risk analysis based on the Monte-Carlo principles. It involves selecting a distribution type for an identified risk, determining the input parameters to fit the selected distribution, completing the correlation matrix, running the simulation, allocating the risk dollars back to the appropriate line items, and running final reports on the analysis. The forecasts that result from these simulations help quantify areas of risk so decision-makers can have as much information as possible to support wise decisions.	Approved

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
Primavera Project Management (P5) Release 5.0 SP1 (Build #: 10000002)	Developed by Primavera Systems, Inc., P5 is a comprehensive planning application built on Oracle and Microsoft SQL Server relational databases. P5 was used to develop a detailed, resource-loaded construction schedule from the MII estimate as a basis construction duration and fully-funding.	Approved
HEC-RAS Version 4.0 and the BETA VERSION 4.0	The function of this model is to complete one-dimensional hydraulic calculations for a full network of natural and manmade channels. HEC-RAS major capabilities are the user interface, hydraulic analysis, data storage and management, and graphics and reporting	Approved
HEC-HMS, Version 3.2	By applying this model the PDT is able to define the watersheds' physical features, describe the metrological conditions, estimate parameters, analyze simulations and obtain GIS connectivity.	Approved
SEEP/W and SLOPE/W – GeoStudio 2007 (Version 7.13, Build 4419)	Seepage analysis – Finite Element Software Slope stability analysis – capable of probabilistic analyses	Approved

10.0 REVIEW SCHEDULES AND COSTS

10.1 ATR Schedule and Cost

Task	Proposed Dates
On-site Kick-off Meeting	May 2012
Alternative Scoping Meeting	21-June to 22 August 2012
Risk Management Plan Formulation Briefing	8 April to 7 June 2013
Draft Report Complete	4 December 2013
ATR of Draft Report	9-20 December 2013
ATR Certification of Final Report	7 January 2014

The estimated cost for the ATR is $270,000.

10.2 Type I IEPR Schedule and Cost

Task	Proposed Dates
On-site Kick-off Meeting	May 2012
Review of W/O Project	July to August 2012
Review of Final Array of Alternatives	April to June 2013

Task	Proposed Dates
IEPR Review of Draft DSMR/EIS	30 Sept to 3 December 2014
Resolve IEPR Comments	4-24 December 2014

The estimated cost for the Type I IEPR, based on previous projects, is $350,000.

10.3 Type II IEPR Schedule and Cost

Task	Proposed Dates
Design Documentation Report (DDR)	March to April 2016
Plans and Specifications (P&S)	January to February 2017
Construction	Throughout Construction, to begin March 2018

10.4 Model Certification/Approval Schedule and Cost

The only one model currently being considered for use in this study that is not certified is the LRP Risk and Uncertainty model. This model was originally developed for use on the Bolivar Dam Major Rehabilitation Project, and is merely being adapted for use on the Zoar project. As stated, certification in pending. No further funding is needed.

11.0 PUBLIC PARTICIPATION

Opportunities for public comment will be provided throughout the development of the decision document. As the decision document is an integrated DSM Report and EIS, formal public scoping, as well as a 45-day public comment period are required by NEPA. Public scoping started in early 2011.

A public scoping meeting a notice was posted in the Federal Register advising the public that the Huntington District intends to prepare an EIS for the project. The District also intends to involve the public via meetings, workshops, and frequent informational sessions. Public involvement will also include a public hearing on the Draft Report, as required. Significant and relevant public comments will be provided to the IEPR panel along with the other materials to be reviewed. It is not anticipated that the public, including scientific or professional societies, will be asked to nominate potential peer reviewers.

The final decision document, along with the final Type I IEPR report and agency responses will be made available to the public through the district website.

This Review Plan will be reviewed by the PDT and approved by the Great Lakes and Ohio River Division Major Subordinate Command. After approval, this Review Plan will be posted on the Huntington District website at: http://www.lrh.usace.army.mil/approved_review_plans_rps/.

12.0 REVIEW PLAN APPROVAL AND UPDATES

The Great Lakes and Ohio River 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 home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13.0 REVIEW PLAN POINTS OF CONTACT

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

- Huntington District – Aaron Smith, 304.399.5720
- Great Lakes and Ohio River Division – Rob Taylor, 513.684.3804
- Risk Management Center – Colin Krumdieck, 720.215.5545

ATTACHMENT 1: TEAM ROSTERS

Product Delivery Team Roster		
Team Member	**Expertise**	**Email**
Rodney Cremeans	Project Manager	Rodney.G.Cremeans@usace.army.mil
Aaron Smith (Lead Planner)	Project Formulation / Cultural Resources	Aaron.Smith@usace.army.mil
Jami Buchanan	Project Formulation/Economics	Jami.L.Buchanan@usace.army.mil
Gus Drum	Project Formulation/Other Social Effects	Richard.G.Drum@usace.army.mil
Andy Johnson	Environmental/NEPA	Andrew.N.Johnson@usace.army.mil
Lauren McCroskey	Historic Buildings (Technical Expert)	Lauren.L.McCroskey@usace.army.mil
Terry Shilley (Lead Engineer)	Civil Design	Terry.D.Shilley@usace.army.mil
Mike Nield	Engineering Geology	Michael.C.Nield@usace.army.mil
Adam Kays	Geotechnical Engineer	Adam.W.Kays@usace.army.mil
Matt Gibson	Hydraulics and Hydrology	Matthew.R.Gibson@usace.army.mil
Andy Cremeans	Electrical/Mechanical	Anthony.I.Cremeans@usace.army.mil
Dustin Sawyers	Cost Engineering	Dustin.L.Sawyers@usace.army.mil
Pedro Luciano	Structural Engineer	Pedro.J.Luciano@usace.army.mil
Raynell Napier	Dam Safety	Raynell.Napier@usace.army.mil
Matt Folk	Engineering Construction	Matthew.W.Folk@usace.army.mil
Nick Krupa	Operations Manager MUR	Nicholas.E.Krupa@usace.army.mil
Gary Walker	Real Estate	Gary.M.Walker@usace.army.mil
Dan Stark	HTRW	Daniel.F.Stark@usace.army.mil
Brad Stark	Office of Counsel	Bradley.J.Stark@usace.army.mil
Dianne Hall	Contracting	Dianne.W.Hall@usace.army.mil
Brian Maka	Public Affairs	Brian.Maka@usace.army.mil

District Quality Control		
Team Member	**Expertise**	**Email**
Amy Frantz	Planning (all aspects)	Amy.K.Frantz@usace.army.mil
David Conley	Civil Design	David.L.Conley@usace.army.mil
Mike McCray	Engineering Geologist	Michael.S.McCray@usace.army.mil
Mike Robinette	Geotechnical Engineer	Michael.D.Robinette@usace.army.mil
Tom Macfarland	Hydraulics and Hydrology	Thomas.G.Macfarland@usace.army.mil
Brenden McKinley	Electrical/Mechanical	Brenden.F.McKinley@usace.army.mil
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John Clarkson	Structural Engineer	John.D.Clarkson@usace.army.mil
Shane Hall	Engineering Construction	Shane.D.Hall@usace.army.mil
Steve Schielder	Real Estate (all aspects)	Elizabeth.Cooper@usace.army.mill
Wyatt Kmen	HTRW	Wyatt.H.Kmen@usace.army.mil

ATR Team Roster			
Team Member	**Expertise**	**District**	**Email**
Scott Shewbridge	ATR Lead	RMC	Scott.E.Shewbridge@usace.army.mil
Valerie McCormack	Plan Formulation / Cultural Resources	Nashville	Valerie.J.McCormack@usace.army.mil
Joe DeLucia	Project Formulation/Economics	Pittsburg	Joseph.M.Delucia@usace.army.mil
Kim Franklin	Environmental Resources / NEPA / Other Social Effects		Kimberly.S.Franklin@usace.army.mil
TBD	Civil Design	TBD	TBD
TBD	Engineering Geologist	TBD	TBD
TBD	Geotechnical Engineer	TBD	TBD
TBD	Hydrology and Hydraulics Engineering	TBD	TBD
TBD	Electrical/Mechanical Engineering	TBD	TBD
TBD	Cost Engineering	TBD	TBD
TBD	Structural Engineer	TBD	TBD
TBD	Engineering Construction	TBD	TBD
TBD	Real Estate	TBD	TBD
TBD	Hazardous, Toxic and Radioactive Waste (HTRW)	TBD	TBD

Vertical Team Roster			
Team Member	**Expertise**	**Organization**	**Email**
Eric Halpin	Dam Safety	Headquarters	Eric.C.Halpin@usace.army.mil
Travis Tutka	Dam Safety	Headquarters	Travis.C.Tutka@usace.army.mil
Charles Pearre	Dam Safety	Headquarters	Charles.M.Pearre@usace.army.mil
Jay Warren	Planning and Programs	Headquarters	Jay.E.Warren@usace.army.mil
Robert Iseli	Operations	Lakes and Rivers Division	Robert.W.Iseli@usace.army.mil
Rob Taylor	Dam Safety	Lakes and Rivers Division	Robert.E.Taylor@usace.army.mil
Richard Hancock	SES	Lakes and Rivers Division	Richard.A.Hancock@usace.army.mil
John Jaeger	Dam Safety	Huntington	John.J.Jaeger@usace.army.mil
Karl Dise	Dam Safety	Risk Management Center	Karl.M.Dise@usace.army.mil
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Nathan Snorteland	Dam Safety	Risk Management Center	Nathan.Snorteland@usace.army.mil

Vertical Team Roster			
Team Member	**Expertise**	**Organization**	**Email**
John Zimmerman	Planning and Policy	Lakes and Rivers Division	John.C.Zimmerman@usace.army.mil
Hank Jarboe	Planning and Policy, Environmental	Lakes and Rivers Division	Hank.Jarboe@usace.army.mil
TBD	Planning and Policy, Economist	Lakes and Rivers Division	TBD
Jeremy LaDart	Planning and Policy	Headquarters	Jeremy.LeDart@usace.army.mil
Mark Matusiak	Planning and Policy	Headquarters	Mark.Matusiak@usace.army.mil
Paul Rubenstein	Cultural Resources	Headquarters	Paul.D.Rubenstein@usace.army.mil

As seen in the tables above the ATR Team have not yet been fully developed. The Review Plan will be revised once this information is available.

The IEPR process for this project has not yet been initiated. The Review Plan will be updated once an OEO point of contact has been established.

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECSION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Zoar Levee and Diversion Dam DSM Report for Zoar, Ohio. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-209. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks[sm].

SIGNATURE _____ Date _____
TBD
ATR Team Leader

SIGNATURE _____ Date _____
Rodney Cremeans
Project Manager
CELRH-PM-PP-P

SIGNATURE _____ Date _____
Nate Snorteland
Director, Risk Management Center

CERTIFICATION OF AGENCY TECHNICAL REVIEW

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

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

SIGNATURE _____ Date _____
John Jaeger
Chief, Engineering Division
CELRH-EC

SIGNATURE _____ Date _____
Amy K. Frantz
Chief, Planning Division
CELRH-PM-PD

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

Term	Definition	Term	Definition
ASA(CW)	Assistant Secretary of the Army for Civil Works	OEO	Outside Eligible Organization
ATR	Agency Technical Review	PCX	Planning Center of Expertise
DPR	Detailed Project Report	PDT	Project Delivery Team
DQC	District Quality Control/Quality Assurance	PMP	Project Management Plan
DX	Directory of Expertise	QMP	Quality Management Plan
EA	Environmental Assessment	QA	Quality Assurance
EC	Engineer Circular	QC	Quality Control
EIS	Environmental Impact Statement	RMC	Risk Management Center
FRM	Flood Risk Management	RMO	Review Management Organization
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RTS	Regional Technical Specialist
IEPR	Independent External Peer Review	SAR	Safety Assurance Review
MSC	Major Subordinate Command	USACE	U.S. Army Corps of Engineers
NED	National Economic Development	WRDA	Water Resources Development Act
NEPA	National Environmental Policy Act		