

REVIEW PLAN

Zoar Levee and Diversion Dam
An Appurtenance to Dover Dam, Muskingum River Basin, Tuscarawas County,
Ohio
NDID: OH00003-ZL
P2: 399449

Dam Safety Modification Project
Decision Document

Huntington District

MSC Approval Date: 18 September 2014
Last Revision Date: 17 April 2012



**US Army Corps
of Engineers** ®

**REVIEW PLAN
For the
Decision Document
For the
Zoar Levee and Diversion Dam
Dam Safety Modification Project**

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the Zoar Levee and Diversion Dam, Dam Safety Modification Study (DSMS).

b. References.

- (1) Engineering Circular (EC) 1165-2-214, Civil Works Review, 15 Dec 12
- (2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 11
- (3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 06
- (4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 07
- (5) ER 1110-2-1156, Safety of Dams – Policy and Procedures
- (6) Zoar Levee and Diversion Dam Project Management Plan
- (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
- (10) Zoar Levee and Diversion Dam, Dam Safety Baseline Risk Assessment, October 2013

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).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

a. 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.

b. The RMO will coordinate with the Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise (MCX), located in Walla Walla District, to ensure the appropriate

expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3. STUDY INFORMATION

a. Decision Document. The decision document is a Dam Safety Modification Study (DSMS) concerning the Zoar Levee and Diversion Dam in Zoar, in Tuscarawas County, Ohio. The DSMS will address the inundation risks associated with the probability of failure from under seepage at Zoar Levee. These concerns contributed to the project's original classification by the U.S. Army Corps of Engineers (USACE) Screening for Portfolio Risk Assessment (SPRA) as a Dam Safety Action Class (DSAC) 2 – Urgent (unsafe or potentially unsafe) project. Due to poor project performance during the 2008 high water event the project was reclassified as a DSAC 1 (Urgent and Compelling) project. However, the Dam Safety Baseline Risk Assessment (BLRA) in October 2013, determined the risks associated with the project were not as severe as originally perceived and the project was reclassified as a DSAC 3 – Moderate Urgency of Action.

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). An Environmental Assessment (EA) is being prepared for the project, and a Finding of No Significant Impact (FONSI) is anticipated. 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 FY14. This analysis will be performed by Walla Walla District, who is the Cost Engineering Center of Expertise.

b. Project Description.

Zoar Levee and Diversion dam is an appurtenant structure to Dover Dam. Dover Dam, as well as the Zoar Levee and Diversion Dam, is located in Tuscarawas County, along the Tuscarawas River. The Zoar Levee was constructed in 1937. It is a rolled, earth filled embankment with an impervious core and crest length of 3,893 feet. The original height of the levee was El. 919, which corresponds to Dover Dam's spillway elevation with an additional 3 feet of freeboard. The level was raised by 9.5 feet in 1951, bringing the maximum height of the levee to 45 feet at El. 928.5.

Appurtenant works to the Levee include a gated concrete culvert, pump station and Zoar Diversion Dam (which was also constructed in 1937). The Diversion Dam was built to control interior drainage from Goose Run, which runs into the ponding area for the Zoar Levee Pump Station. The Diversion Dam is also a rolled earth filled embankment with an impervious core. It is approximately 500 feet long and 35 feet high. See Figure 1 below for project layout. For a more comprehensive history of the project, please see Attachment 5.

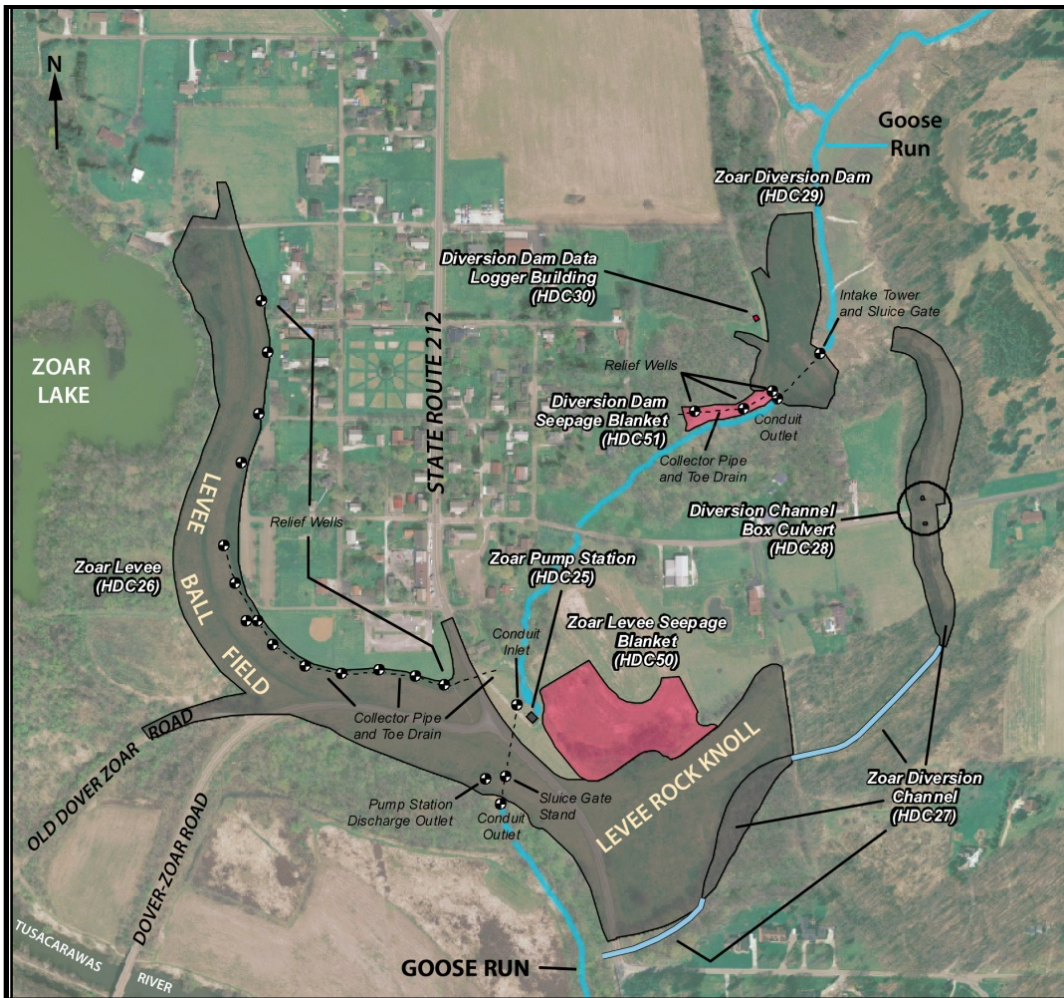


Figure 1. Zoar Levee & Diversion Dam showing appurtenant works and components

c. Study Description. To achieve the tolerable risk guidelines established in Chapter 5 of ER 1110-2-1156, under which this study is being conducted, the focus of the DSMS shall be on failure modes identified in the 2013 BLRA associated with underseepage through soil in the ball field area of Zoar Levee and underneath Route 212 into the ponding area.

These portions of Zoar Levee are founded on approximately 130 feet of highly pervious soils in contact with an intermittent confining layer. If the confining layer is heaved due to head pressure, the concern is that erodible sands in contact with a roof-holding material could lead to backward erosion and piping which may ultimately lead to a breach of the levee.

d. Factors Affecting the Scope and Level of Review. As previously discussed, Zoar Village is an important historical asset. Therefore, there is significant public controversy about how the Village may be affected by a DSM project. This controversy is the primary factor in the decision to undertake a Type I IEPR for the project.

Specifically, early concerns associated with inundation risk and the perception that USACE may choose to breach the levee instead of manage its risk through rehabilitative measures, led to a large expression

of societal concerns and public controversy. Since the inception of the DSMS, CELRH has engaged and been engaged by a large array of stakeholders, all of which have strong interest in or connections to Zoar Village. These stakeholders not only include local residents and governmental and elected officials, but also regional and national level stakeholders including the OHS, the Ohio Historic Preservation Office, Heritage Ohio, Ohio Archeological Council, the Ohio & Erie Canalway National Heritage Area, National Trust for Historic Preservation, the National Park Service, Federally recognized Tribal Nations, and the President's Advisory Council on Historic Preservation. For a more comprehensive discussion of the public controversy regarding the project, please see Attachment 5.

Otherwise, it is not anticipated the study will be particularly challenging in terms of development of risk management action alternatives. The number of remedial measures that are appropriate to the size and scale of the project are mainly limited to the installation of relief wells, collector systems, and various filters.

Due to the small number of structures being protected by the levee, it is possible that the project (whatever alternative is chosen) will not have positive net economic benefits. Ordinarily a DSM project can be justified by life safety issues; however the results of the 2013 BRLA, endorsed by CELRH Chief of Engineering and Construction, showed the annualized life loss potential is less than one. This is not unexpected, given the amount of warning time that would precede a catastrophic failure of the levee, robust evacuation plans in place and short distances to high ground.

To date, there has been no request by the Governor of Ohio for a peer review by independent experts.

The information in the decision document and subsequent project design is not likely to be based on novel methods, nor will it involve the use of innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, nor present conclusions likely to change prevailing practices. As previously stated, the number of remedial measures which are appropriate to the size and scale of the project are mainly limited to the installation of relief wells, collector systems, and various filters.

e. In-Kind Contributions. Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The potential non-Federal sponsor for this project is the MWCD. However, there are no in-kind products and or analyses to be provided by the non-Federal sponsor.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review 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 MSC.

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 which 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 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 and 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.

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

- Planning (including formulation, economics, NEPA, cultural resources, other social effects, environmental)
- Civil Design
- Engineering Geology
- Geotechnical Engineering
- H&H
- Electrical/Mechanical Engineering
- Cost Engineering
- Structural Engineering
- Real Estate
- HTRW
- Office of Counsel
- Operations

DrChecks review software will be used to document all DQC comments, responses and associated resolutions accomplished throughout the DQC review process. Documentation of significant DQC comments will be provided to the ATR team.

b. 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; and
- the integrated DSM Report and EA, technical appendices and supporting documentation and analyses.

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, and will be invited to participate (via phone or webinar) in PDT meetings.

a. Products to Undergo ATR. The ATR for the DSMS 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 aforementioned BLRA underwent ATR. The ATR of the BLRA was led and coordinated by the RMC. Documentation of this review is available upon request.

Additional products to undergo ATR include:

- All supporting data, including but not limited to technical analyses, engineering conclusions and environmental documentation; and
- the integrated DSM Report and EA, technical appendices and supporting documentation and analyses.

b. Required ATR Team Expertise. The following table summarizes the number of review panel members and expertise required for the required ATR. All ATR team members should be professionally registered, as required by their respective disciplines, in the area of expertise they are reviewing. The complete ATR roster is included in Attachment 1.

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 Effects	The Environmental Resources reviewer should have a strong background in inland riverine ecosystems (e.g. riparian, aquatic, 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.

ATR Team Members/Disciplines	Expertise Required
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.
Civil/Structural Engineer	Reviewer should be a senior level, professionally registered engineer with extensive experience with pump stations and dam safety projects.
Engineering Construction (Civil Engineer)	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.

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 been 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.

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

e. 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.

f. 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:

(1) Identify the document(s) reviewed and the purpose of the review;

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

(3) Include the charge to the reviewers;

(4) Describe the nature of their review and their findings and conclusions;

(5) Identify and summarize each unresolved issue (if any); and

(6) 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.

g. 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.

As previously stated, documentation of the ATR for the BLRA is available upon request.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

a. IEPR may be required for decision documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases which 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:

(1) 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.

(2) 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. The Type II IEPR panels are made up of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of expertise suitable for the review being conducted. This will be done using the National Academy of Science policy which sets the standard for “independence” in the review process. 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.

b. Decision on IEPR. As previously stated, despite the elimination of non-structural measures such as levee removal from the final array of alternatives, enough controversy still exists to warrant an IEPR. Therefore, Type I and Type II IEPR, will be conducted for the Zoar Levee and Diversion Dam DSMS. The decision document will undergo a Type I IEPR, with SAR incorporated into the Type I IEPR process, while the products produced during the DDR, P&S and Construction phases will undergo Type II IEPR¹. It is not anticipated that the public will be asked to nominate potential reviewers.

c. Type I IEPR (and SAR)

(1) Products to Undergo Type I IEPR. The DSMS, environmental assessment and supporting documentation will undergo a Type I IEPR with an incorporated SAR.

¹ This review plan only documents the reviews required during the feasibility, or decision document, phase of the project. Once the decision document has been approved, a review plan will be developed for the Implementation phase of the project.

(2) 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 which should be represented on the review panel. Only those disciplines which 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 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

IEPR Panel Members/Disciplines	Expertise Required
	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.

(3) 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:

- (a) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- (b) Include the charge to the reviewers;
- (c) Describe the nature of their review and their findings and conclusions; and
- (d) 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.

d. Type II IEPR

Type II IEPR takes place during the Implementation phase, it will be fully documented in the Review Plan prepared for PED and construction following the approval of the Decision Document.

(1) 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.

(2) 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.
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.

IEPR Panel Members/Disciplines	Expertise Required
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.

(3) Documentation of Type II IEPR SAR

The IEPR will be managed by AE firm which meets the criteria set forth in EC 1165-2-214. 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. 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 AND ATR MANDATORY CENTER OF EXPERTISE (MCX) REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering and ATR 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 certification. The RMO is responsible for coordination with the Cost Engineering MCX.

9. MODEL CERTIFICATION AND APPROVAL

a. 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 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).

b. 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).

(1) Planning Models. The following planning models are anticipated to be used in the development of the decision document: 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

(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 2 nd 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
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. REVIEW SCHEDULES AND COSTS

a. DCQ/ATR Schedule and Cost.

Task	Proposed Dates
On-site Kick-off Meeting	May 2012
Alternative Scoping Meeting	21-June to 22 August 2012
Tentatively Selected Plan Meeting	11 April 2014
Draft Report Complete	1 Aug 2014
DQC/ATR of Draft Report	1 August 2014
ATR Certification of Final Report	26 Sept 2014

The costs for the DQC and ATR respectively are \$60,000 and \$80,000.

b. Type I IEPR Schedule and Cost. N/A

Task	Proposed Dates
Award of IEPR Contract	1 Oct
IEPR Review of Draft DSMS/EA	17 November 2014
Resolve IEPR Comments	30 January

The estimated cost for the Type I IEPR is approximately \$175,000.

c. Type II IEPR Schedule and Cost

Task	Proposed Dates
Design Documentation Report (DDR)	TBD
Plans and Specifications (P&S)	TBD
Construction	TBD

A scope of work and cost estimate has not been developed for the review.

c. Model Certification/Approval Schedule and Cost. N/A

11. PUBLIC PARTICIPATION

Opportunities for public comment have been and will continue to be provided throughout the development of the decision document. As the decision document is an integrated DSM Report and EA, a 30-day public comment period is required by NEPA. Significant comments received as part of this review will be forwarded on to DQC, ATR and IEPR panel members as part of their review.

The District has, and plans to continue involving the public via meetings, workshops, and frequent informational sessions. Public involvement will also include a public meeting on the Draft Report. The final decision document 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. 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 is 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. 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 – [REDACTED]
Great Lakes and Ohio River Division – [REDACTED]
Risk Management Center – [REDACTED]

ATTACHMENT 1: TEAM ROSTERS

DSMMCX / DSPC & LRH PDT		
Team Member	Expertise	Email
[REDACTED]	Project Manager	[REDACTED]
[REDACTED]	Lead Planner	[REDACTED]
[REDACTED]	Economics	[REDACTED]
[REDACTED]	Plan Formulation/Other Social Effects	[REDACTED]
[REDACTED]	Environmental	[REDACTED]
[REDACTED]	Lead Engineer	[REDACTED]
[REDACTED]	Civil Design	[REDACTED]
[REDACTED]	Engineering Geology	[REDACTED]
[REDACTED]	Geotechnical Engineer	[REDACTED]
[REDACTED]	Electrical/Mechanical	[REDACTED]
[REDACTED]	Cost Engineering	[REDACTED]
[REDACTED]	Structural Engineer	[REDACTED]
[REDACTED]	Dam Safety	[REDACTED]
[REDACTED]	Engineering Construction	[REDACTED]
[REDACTED]	Operations Manager MUR	[REDACTED]
[REDACTED]	Real Estate	[REDACTED]
[REDACTED]	HTRW	[REDACTED]
[REDACTED]	Office of Counsel	[REDACTED]
[REDACTED]	Public Affairs	[REDACTED]

NAE & RMC Cadre		
[REDACTED]	Cadre Lead	[REDACTED]
[REDACTED]	Geotechnical Engineer (RISK OPERATOR)	[REDACTED]
[REDACTED]	Geologist	[REDACTED]
[REDACTED]	Civil Engineer	[REDACTED]
[REDACTED]	Geologist	[REDACTED]
[REDACTED]	Hydraulics and Hydrology	[REDACTED]
[REDACTED]	Structural Engineer	[REDACTED]
[REDACTED]	Senior Advisor/Civil Engineer	[REDACTED]
[REDACTED]	Consequences	[REDACTED]
[REDACTED]	Civil Engineer	[REDACTED]

District Quality Control Team		
Team Member	Expertise	Email
[REDACTED]	Planning (all aspects)	[REDACTED]
[REDACTED]	Civil Design	[REDACTED]
[REDACTED]	Engineering Geologist	[REDACTED]
[REDACTED]	Engineering Geologist	[REDACTED]
[REDACTED]	Geotechnical Engineer	[REDACTED]
[REDACTED]	Geotechnical Engineer	[REDACTED]
[REDACTED]	Hydraulics and Hydrology	[REDACTED]
[REDACTED]	Electrical/Mechanical	[REDACTED]
[REDACTED]	Cost Engineering	[REDACTED]
[REDACTED]	Structural Engineer	[REDACTED]
[REDACTED]	Real Estate	[REDACTED]
[REDACTED]	HTRW	[REDACTED]
[REDACTED]	Civil Design	[REDACTED]
[REDACTED]	Office of Counsel	[REDACTED]
[REDACTED]	Office of Counsel	[REDACTED]
[REDACTED]	Operations	[REDACTED]

Agency Technical Review Team		
Team Member	Expertise	Email
[REDACTED]	ATR Lead	[REDACTED]
[REDACTED]	Civil Engineer	[REDACTED]
[REDACTED]	Electrical Engineer	[REDACTED]
[REDACTED]	Civil Engineer	[REDACTED]
[REDACTED]	Real Estate	[REDACTED]
[REDACTED]	Cultural Resources	[REDACTED]
[REDACTED]	Environmental	[REDACTED]
[REDACTED]	Civil Design	[REDACTED]
[REDACTED]	Geologist	[REDACTED]
[REDACTED]	Plan Formulation/Economist	[REDACTED]
[REDACTED]	Geotechnical Engineer	[REDACTED]
[REDACTED]	Hydraulics and Hydrology	[REDACTED]
[REDACTED]	Cost Engineering	[REDACTED]

Vertical Team Roster			
Team Member	Expertise	Organization	Email
[REDACTED]	Dam Safety	Headquarters	[REDACTED]
[REDACTED]	Dam Safety	Headquarters	[REDACTED]
[REDACTED]	Planning and Policy	DSM-MCX	[REDACTED]
[REDACTED]	Dam Safety	RMC	[REDACTED]
[REDACTED]	Planning and Programs	Headquarters	[REDACTED]
[REDACTED]	Dam Safety	DSM-MCX	[REDACTED]
[REDACTED]	Planning	Headquarters	[REDACTED]
[REDACTED]	Operations	Lakes and Rivers Division	[REDACTED]
[REDACTED]	Dam Safety	Lakes and Rivers Division	[REDACTED]
[REDACTED]	Dam Safety	Huntington	[REDACTED]
[REDACTED]	Dam Safety	Risk Management Center	[REDACTED]
[REDACTED]	Dam Safety	Risk Management Center	[REDACTED]
[REDACTED]	Dam Safety	Risk Management Center	[REDACTED]
[REDACTED]	Planning and Policy	Lakes and Rivers Division	[REDACTED]
[REDACTED]	Planning and Policy, Environmental	Lakes and Rivers Division	[REDACTED]
[REDACTED]	Planning and Policy	Headquarters	[REDACTED]
[REDACTED]	Planning and Policy	Headquarters	[REDACTED]
[REDACTED]	Cultural Resources	Headquarters	[REDACTED]
[REDACTED]	FRM Business Line Manager	Lakes and Rivers Division	[REDACTED]

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 <type of product> for <project name and location>. 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 DrCheckssm.

SIGNATURE

Name
ATR Team Leader
Office Symbol/Company

Date

SIGNATURE

Name
Project Manager (home district)
Office Symbol

Date

SIGNATURE

Name
Architect Engineer Project Manager¹
Company, location

Date

SIGNATURE

Nathan Snorteland
Director, RMC

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 (home district)
Office Symbol

Date

SIGNATURE

Name
Dam Safety Officer² (home district)
Office Symbol

Date

¹ Only needed if some portion of the ATR was contracted
² Only needed if different from the Chief, Engineering Division.

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number
March 2014	Reflects the change in DSAC rating and reformatting to the new Review Plan template	throughout

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

Term	Definition	Term	Definition
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
EA	Environmental Assessment	OEO	Outside Eligible Organization
EC	Engineer Circular	OSE	Other Social Effects
EIS	Environmental Impact Statement	PCX	Planning Center of Expertise
EO	Executive Order	PDT	Project Delivery Team
ER	Ecosystem Restoration	PAC	Post Authorization Change
FDR	Flood Damage Reduction	PMP	Project Management Plan
FEMA	Federal Emergency Management Agency	PL	Public Law
FRM	Flood Risk Management	QMP	Quality Management Plan
FSM	Feasibility Scoping Meeting	QA	Quality Assurance
GRR	General Reevaluation Report	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
MCX	Mandatory Center of Expertise	USACE	U.S. Army Corps of Engineers
MSC	Major Subordinate Command	WRDA	Water Resources Development Act

Attachment 5: Additional Information

History and Description of Zoar Levee and Diversion Dam

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 below) 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 2 project. Both Dover Dam and Zoar Levee & Diversion Dam are administered by the Huntington District of USACE (CELRH).

The Zoar Levee was constructed in 1937 (Figures 1 & 2 below). 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 below). 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 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 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.

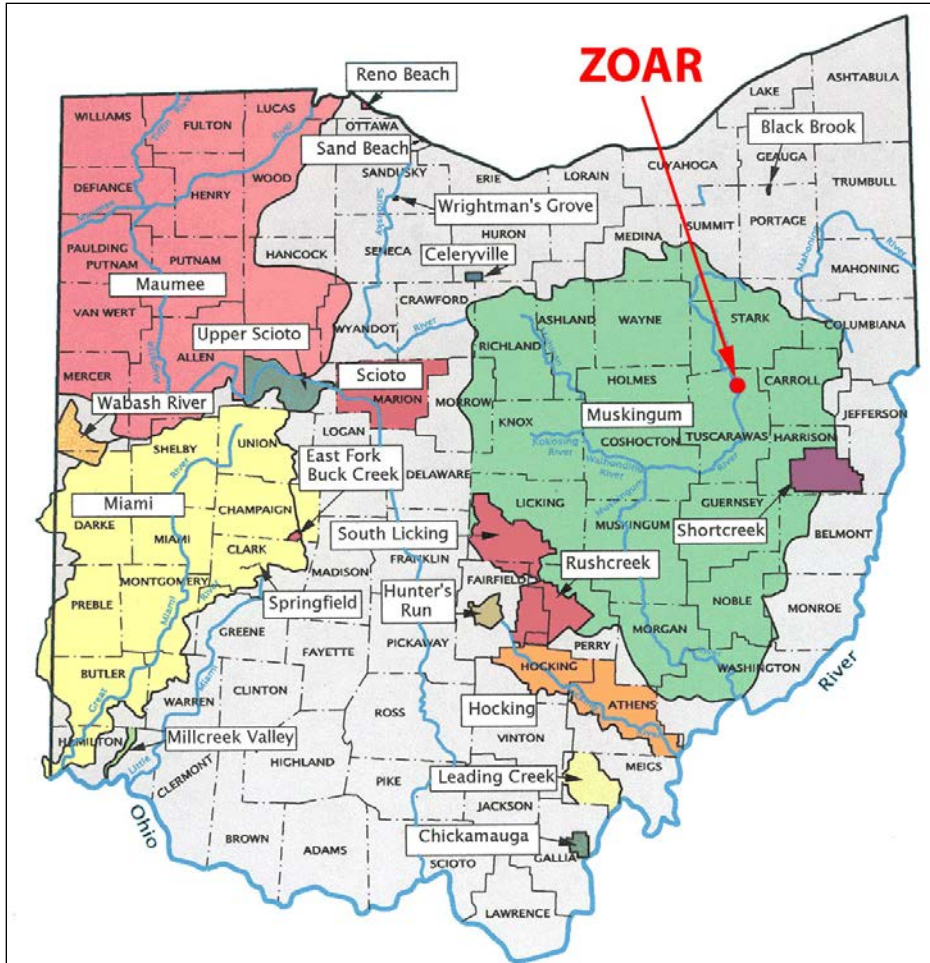


Figure 1. Location of Zoar Levee & Diversion Dam in Muskingum River Basin (in green) in Ohio

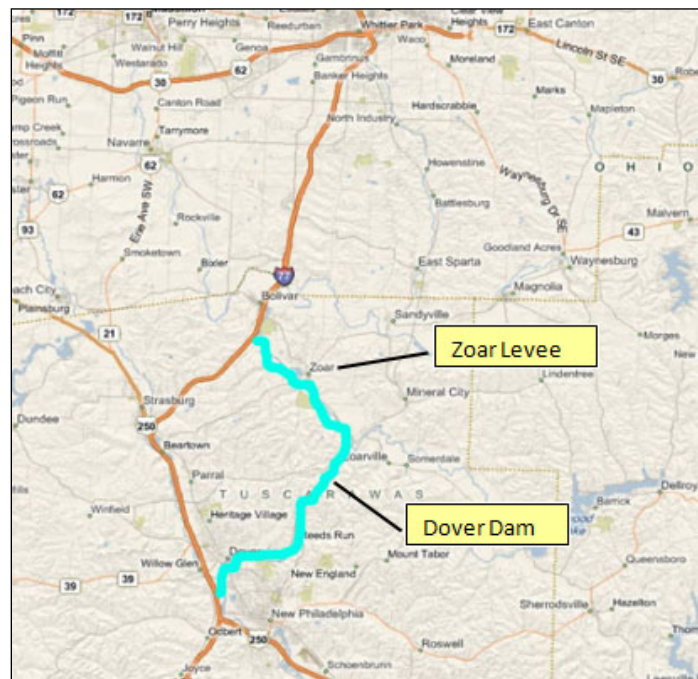


Figure 2. Location of Zoar Levee & Diversion Dam upstream of Dover Dam on the Tuscarawas River

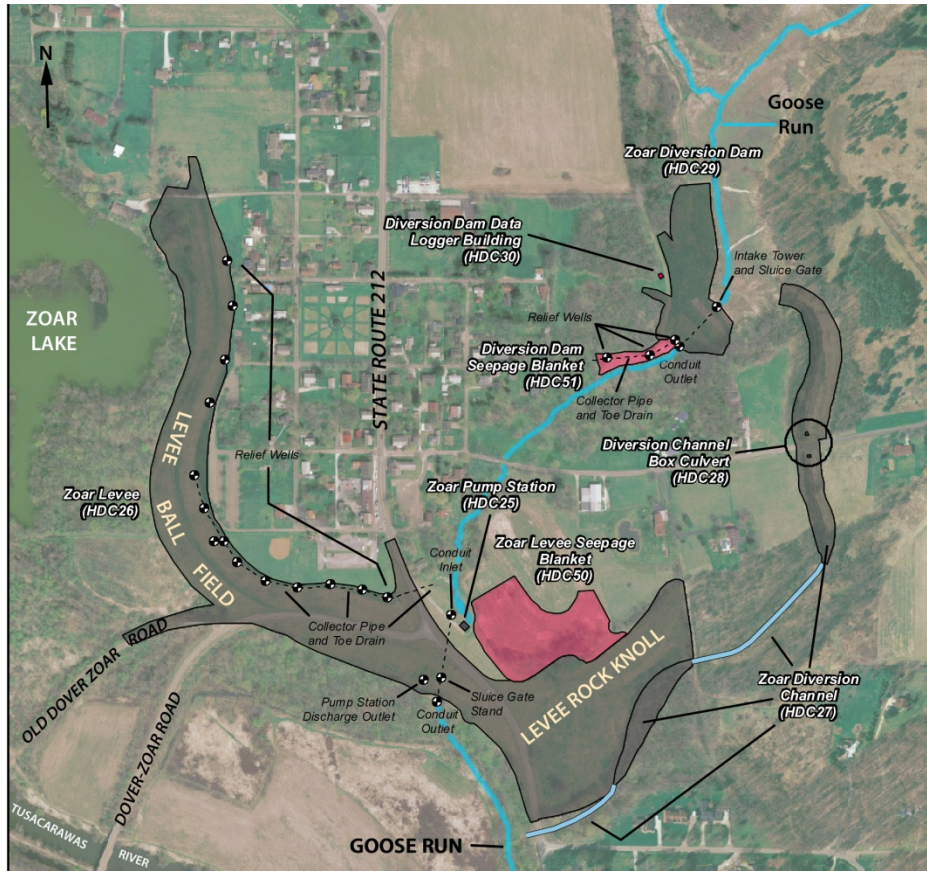


Figure 3. Zoar Levee & Diversion Dam showing appurtenant works and components

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 elevation 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

Additional Information on Public Controversy and Societal Concerns about the Project

To date, Huntington District has received well in excess of 3000 comments via email, letter, and a post-card writing campaign urging USACE to “Save Zoar, including repairing the Zoar levee and diversion dam.” Societal concerns have also been expressed by designations. In 2012, Zoar Village was listed as one of the “11 Most Endangered Historic Places” in America due to levee performance. This annual list spotlights important examples of the nation’s heritage that are at risk. In addition to the *11 Most* designation, the National Trust of Historic Places named Zoar Village a National Treasure, one of only 33 such sites across the United States. National Treasures are defined as irreplaceable, critically threatened places across the country where the National Trust is making a deep organizational investment.

In selecting Zoar Village for the list, the President of the National Trust for Historic Preservation, Stephanie Meeks, stated that “The Village of Zoar is one of those very few places in the country that transports visitors back in time, giving people an authentic glimpse of what life was like for previous generations. Working closely with the USACE, we believe a solution can be found that spares this one-of-a-kind Village from catastrophic flooding or demolition.” While societal concerns have been significantly reduced by the screening of alternatives such as levee removal, enough controversy still exists to warrant a Type I IEPR for the decision document, as described in subsequent sections.

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. Indeed, the most significant consequence of poor or non-performance is the loss of a highly valued recreational and heritage tourist asset and nationally significant historical property.