DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
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WASHINGTON, DC 20314-1000

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MAY 2 6 2016

MEMORANDUM FOR RECORD

SUBJECT: Zoar Levee and Diversion Dam, Dam Safety Modification Report - Final USACE Response to Independent External Peer Review

1. Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resource Development Act (WRDA) of 2007, EC 1165-2-209 (superseded by EC 1165-2-214, 15 Dec 2012), and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).

2. The IEPR was conducted by Battelle Memorial Institute. The IEPR panel consisted of four panel members with technical expertise in the fields of geotechnical engineering, engineering geology, economics/planning, and cultural resources/National Environmental Policy Act impact assessment.

3. The final written agency responses to the IEPR are hereby certified. The enclosed document contains the final written responses of the Chief of Engineers to the issues raised and the recommendations contained in the IEPR report. The IEPR report and the USACE responses have been coordinated with the vertical team, endorsed by the Risk Management Center and approved by the Great Lakes and Ohio River Division, and will be posted on the Internet, as required in EC 1165-2-214.

4. If you have any questions on this matter, please contact me or have a member of your staff contact Ms. Yvonne Prettyman-Beck, Deputy Chief, Great Lakes and Ohio River Division Regional Integration Team, at 202-761-4670.

Encl

STEVEN L. STOCKTON, P.E.
Director of Civil Works

U.S. Army Corps of Engineers Response to
Independent External Peer Review of the
Zoar Levee and Diversion Dam
Dam Safety Modification Report
May 2016

Zoar Levee and Diversion Dam are located upstream of Dover Dam, in Tuscarawas County, Ohio on the Tuscarawas River. Dover Dam is a dry dam built on the Tuscarawas River. Zoar Levee and Diversion Dam is an appurtenant structure to Dover Dam and was built in the 1930s to keep Zoar Village from having to be acquired for flowage easement because of its historical significance.

The need for the Dam Safety Modification Study was identified following two successive storm events that occurred in January 2005 and March 2008 which loaded the exterior of Zoar Levee with water impounded on the Tuscarawas River by Dover Dam. Following the March 2008 event, Zoar Levee and Diversion Dam was classified as a Dam Safety Action Classification (DSAC) 1 project due to poor performance, and the Dam Safety Modification Report and Environmental Assessment (DSMR/EA) was initiated as a result of this designation.

Following a more thorough review of the project risks during the initial stages of the DSMR/EA, Zoar Levee and Diversion Dam was re-classified as a DSAC 3 project with the annual probability of a failure being above tolerable limits. When combined with the potential consequences of failure, especially to the historical value of Zoar Village, completion of the DSMR/EA was warranted to identify a plan to manage this risk.

The recommended plan in the DSMR/EA primarily consists of constructing an Internal Erosion Interception Trench (IEIT) and small weighted filter berm in the "Ball Field Reach" of the project. Also, as part of the plan, the ponding area for the pump station will be excavated and a reverse filter will be placed. The recommended plan, when implemented, will reduce the annual probability of failure to tolerable limits.

The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to always provide the most scientifically sound, sustainable water resource solutions for the nation. The USACE review processes are essential to ensuring project safety and quality of products USACE provides to the American people. The USACE conducted an Independent External Peer Review (IEPR) for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-214, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review (2004).*

Battelle Memorial Institute (Battelle), a non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to conduct the IEPR for the Zoar Levee DSMR/EA. Based on the technical content of the Zoar Levee review documents and the overall scope of the project,

Battelle identified four panel members, in the fields of geotechnical engineering, engineering geology, economics/planning, and cultural resources/National Environmental Policy Act (NEPA) impact assessment.

The Battelle IEPR panel reviewed the draft DSMR/EA, as well as supporting documentation. The final IEPR Battelle Report was issued on 23 March 2015. Overall, 15 comments were identified and documented by the IEPR Panel. Of these 15 comments, three were identified as having high significance, four had medium/high significance, five had medium significance, two had medium/low significance and one had low significance. The following discussions present the USACE Final Response to these 15 comments.

1. **IEPR Comment – *High Significance:* Geologic uncertainty, which results in uncertainty in other aspects of the project, is not sufficiently estimated or characterized.**

This comment includes two recommendations for resolution; one recommendation was adopted and one was not adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 1) conducting additional geologic investigations during the pre-construction engineering and design (PED) stage along the IEIT alignment and in the ponding area, with particular attention to variations in grain size distributions, thickness and continuity of alluvium and fine sand layers, and ground water conditions. The recommendation was adopted. The USACE will perform investigations along the IEIT alignment and in the ponding area during the PED stage. The investigations in these highly variable in situ soils will help to determine the depth of the trench excavation and the decision to use one or multiple backfill materials throughout the trench. For the ponding area, during the PED stage, additional geotechnical investigations (shallow borings) will be performed. As these additional investigations were already planned and included in the cost estimate for the project, no change to the DSMR/EA is required.

USACE Response: Not Adopted

The IEPR panel recommended 2) characterizing geologic conditions, as stated under Recommendation 1 (above), encountered during IEIT excavation. Depending on the method of excavation utilized, limited opportunity may be afforded to characterize the geologic condition encountered during IEIT excavation. The USACE is confident that knowledge of geologic conditions obtained from the investigations in the PED stage will allow proper design and functionality of the IEIT. As noted in the DSMR/EA, there are three primary design criteria (non-erodibility, particle retention and stability) for the IEIT and information required to properly design this risk-reduction feature can be obtained from the planned geologic investigations during the PED stage. If site conditions are different from those assumed during PED, necessary actions will be taken during the

construction phase. In consideration of this recommendation, the DSMR/EA does not require revision and does not result in a change to the selected Risk Management Plan.

2. IEPR Comment – *High Significance:* The preferred alternative has little redundancy given the estimated risks and uncertainty.

This comment includes three recommendations for resolution; one recommendation was adopted and two were not adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 2) considering whether the weighted filter berm should be designed as a graded filter blanket or whether filter fabric may be used between in situ soils and the installed berm to provide additional redundancy and risk minimization from piping and boils. The USACE considered the recommendation and has determined that the weighted filter berm will be designed as a graded filter blanket. Therefore filter fabric is not necessary.

USACE Response: Not Adopted

The IEPR panel recommended 1) considering whether widening of the weighted filter berm, to be used in conjunction with IEIT, will provide additional redundancy and reduced risk; and 3) assessing whether relief wells, found in Action Alternatives 3A and 4A, would provide more redundancy. During formulation, a plan to widen the weighted filter berm was considered and evaluated as Alternative 10A. In addition, Alternatives 3A and 4A included the installation of relief wells as noted in the recommendation. These alternatives (3A, 4A, and 10A) were evaluated and found to provide additional redundancy and some risk reduction beyond the selected plan. However, because little risk reduction was required to meet the study objectives, all of these alternatives reduced risk sufficiently. Utilizing risk-informed decision-making, the additional cost of alternatives which provide increased redundancy and reduced risk were not justified. Therefore the selected plan within the DSMR/EA has been determined to be sufficient to meet project objectives.

3. IEPR Comment – *High Significance:* The effectiveness, completeness, and reliability of the IEIT concept for a dam or levee are untested.

This comment includes three recommendations for resolution; one recommendation was adopted and two were not adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 3) conducting additional subsurface investigations during the PED phase to better characterize geologic conditions along the length of IEIT excavation and at deeper levels of glacial outwash. The USACE will conduct additional subsurface investigations along the IEIT alignment during the PED phase to better characterize geologic conditions and provide the information required to complete detailed design.

USACE Response: Not Adopted

The IEPR panel recommended 1) considering whether IEIT technology risk can be adequately quantified as a risk reduction measure since it is an unproven and untested technology. The USACE notes that recent research in the United States and Netherlands supports the IEIT concept. As in any risk analysis, professional judgment was used to apply an understanding of the failure mode, key factors, uncertainties, and sensitivities to obtain a logically defendable estimate of the risk reduction for this measure. Little risk reduction was required to meet the study objectives, and with uncertainties accounted for, the selected alternative reduced risk sufficiently. Therefore, no revisions to the DSMR/EA are necessary. The IEPR panel also recommended 2) considering whether other action alternatives are more appropriate for risk reduction, such as extension of weighted filter blankets and use of relief wells, and would reduce risk to acceptable levels in a manner that is quantifiable. During formulation, a plan to widen the weighted filter berm was considered and evaluated as Alternative 10A. In addition, Alternatives 3A and 4A included the installation of relief wells as noted in the recommendation. These alternatives (3A, 4A, and 10A) were evaluated and found to provide additional redundancy and some risk reduction beyond the selected plan. However, because little risk reduction was required to meet the study objectives, all of these alternatives reduced risk sufficiently. Utilizing risk-informed decision-making, the additional cost of alternatives which provide increased redundancy and reduced risk were not justified. Therefore the selected plan within the DSMR/EA has been determined to be sufficient to meet project objectives.

4. **IEPR Comment – *Medium/High Significance:* A comprehensive risk assessment appears to have been conducted on the Zoar Village levee system, but the methods used to characterize the analysis have not been documented in a manner consistent with ER 1105-2-100, Appendix E.**

This comment includes five recommendations for resolution; one recommendation was adopted, two had already been addressed in the DSMR/EA, and two were not adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 1) explaining, if possible and in detail, how the comprehensive levee risk analysis meets or exceeds the requirements of ER 1105-2-100, Appendix E. The Planning Guidance Notebook, which is a guiding regulation for economic justification in reference Section E-19 states, "The level of effort expended on each step depends on the nature of the proposed improvement and on the sensitivity of the project formulation and justification to further refinement." The USACE is confident the economic risk estimation process conducted for Zoar Levee is appropriate considering the sensitivity of the project formulation to economic risks. The process is also in compliance with the procedures outlined in the ER 1110-2-1156 and is considered by the agency to be a reasonable level of technical investigation. The agency has determined the analysis meets or exceeds the requirements of ER 1105-2-100, Appendix E. The level of detail involved in the economic analysis was

commensurate with the role that the economics would play as a decision making factor. As the analysis conducted was determined to meet the requirements of the guidance, no change to the DSMR/EA is required.

The IEPR panel also recommended 4) estimating consequences of failure, even if those consequences are non-NED. The USACE considered consequences of failure and the DSMR/EA fully documents the consequences of failure, including those which cannot be counted in a traditional National Economic Development (NED) analysis. The non-NED qualitative documentation is summarized in Chapter 3 of the Main Report and detailed in Appendix D, Addendum 3.

USACE Response: Not Adopted

The IEPR panel recommended 2) delineating levee reaches or river stations using appropriate economic, geotechnical, and hydrologic/hydraulic criteria and 3) assigning probable non-failure and failure elevations to the levees for each location in a manner compliant with ER 1105-2-100, pp. 105-107. The USACE determined given the relatively small protected area associated with the levee, and the resulting lack of sensitivity in economic consequences related to levee breach location, hydrologic sub-reaches of the levee and river stations were not delineated to support economic analysis. As the study area was essentially a large "bowl", damages were not dependent upon where the potential breach occurred. Geotechnical analysis recognized and documented variability in subsurface conditions throughout the levee reach and the understanding of this reach-specific variability was utilized to guide plan formulation and is documented in the Baseline Risk Assessment.

The IEPR panel also recommended 5) providing a summary of the analyses conducted, as recommended in Recommendations 2-4 (above) in the Main Report and Economic, Geotechnical, and Hydraulic/Hydrologic Appendices. While the recommendations in 2-3 were not adopted, a summary of the economic analysis was included within the Main Report and associated appendices. This has been determined by the agency an appropriate level of analysis that meets or exceeds the requirements of ER 1105-2-100, Appendix E.

5. **IEPR Comment – *Medium/High Significance:* Potential pool storage elevations for Dover Dam related to climate change and recent dam modifications, which could impact impoundment and levee performance, are not fully described in the Draft DSMR/EA.**

This comment includes two recommendations for resolution; both recommendations were not adopted, as discussed below.

USACE Response: Not Adopted

The IEPR panel recommended 1) evaluating more fully the pool elevation that may occur from climate change, and evaluating the potential impacts flooding may have on piping or levee breach. The USACE determined additional studies were not warranted.

Relative to the uncertainties included in the hydrologic modeling for the Dover Dam impoundment, the effects due to climate change forecasts would be insignificant and would have no effect on decision-making. The IEPR panel also recommended 2) considering adding a narrative to the Draft DSMR/EA that more fully describes recent changes to Dover Dam and any risks associated with potential increased pool elevation, flooding risk in Zoar village, breach of Zoar levee, or impacts to pump inundation. Recent modifications to Dover Dam were assessed to have negligible effect on increasing pool elevations in the range that would affect Zoar Levee. Therefore adding additional narrative to the DSMR/EA was determined to be unnecessary.

6. **IEPR Comment – *Medium/High Significance:* The proposed filter design for the Ponding Area does not appear to adequately protect against piping, considering the lack of geologic information in this area.**

This comment includes three recommendations for resolution, all of which were adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 1) clarifying whether a filter fabric will be needed, as indicated in drawing CG303, or if filter fabric use is no longer appropriate, based on information provided during the site visit. The USACE adopted the recommendation by revising drawing CG303 to indicate the potential need for geogrid for stability, rather than filter fabric. No other revisions to the DSMR/EA are necessary for clarification. The IEPR panel also recommended 2) conducting additional subsurface investigations of the Ponding Area during the design phase to gain a better understanding of the geologic conditions, especially the horizontal and vertical variability of grain size distributions and the hydrologic conditions anticipated during construction. The USACE will perform additional subsurface investigations at the ponding area during the design phase to gain a better understanding of variations in grain size distribution of sand and gravel deposits and to ensure an appropriate filter gradation. In addition, these investigations will inform the agency of the hydrologic conditions anticipated during construction. As these investigations were already planned, no additional revision to the DSMR/EA was necessary. The IEPR panel also recommended 3) assessing if the proposed 4-foot thick filter will be adequate to counter the anticipated uplift pressures associated with large storm events, including the PMF. During the design phase an analysis will be performed to assess the ability of the proposed filter to withstand uplift pressures expected at extreme events. As part of the design of the selected plan, the layer of soil that would allow pressures to develop will be removed. Therefore, no stability issues are anticipated.

7. **IEPR Comment – *Medium/High Significance:* The limited width of the weighted filter berm in the Ball Field Reach, to be used in conjunction with the IEIT, does not provide resiliency and redundancy to assist in controlling migration of fines from piping.**

This comment includes three recommendations for resolution; two recommendations were adopted and one was not adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 2) using either a graded weighted filter berm or a filter fabric between the weighted filter berm and the confining layer to prevent fine sand migration during flood storage events that may lead to significant seeps, boils, and piping. The weighted filter berm will be designed as a graded filter berm to prevent migration of fine sands. Therefore filter fabric will not be utilized. No revision to the DSMR/EA was necessary for clarification. The IEPR panel also recommended 3) clearly identifying in the DSMR/EA that a small weighted filter berm is included in Action Alternative 6A, since most of the Draft DSMR/EA documentation only indicates an IEIT for PFM 1A-4, Action Alternative 6A for the Ball Field Reach, in tables, figures, and narrative throughout the report. The USACE adopted this recommendation by revising the description of the selected alternative (Action Alternative 6A) in tables, figures, and narrative throughout the report to clarify that this alternative includes a weighted filter berm of limited width between the toe of the levee and the IEIT.

USACE Response: Not Adopted

The IEPR panel recommended 1) modifying the weighted filter berm limits to provide more resiliency and redundancy within areas where it could be expanded to mitigate risk of piping along the full length of the IEIT. A plan to widen the weighted filter berm was evaluated as Alternative 10A. This alternative was found to provide additional redundancy and some risk reduction beyond the selected plan. However, because little risk reduction was required to meet the study objectives, all of these alternatives reduced risk sufficiently. Utilizing risk-informed decision-making, the additional cost of alternatives which provided increased redundancy and reduced risk was not justified. Therefore the DSMR/EA has not been revised.

8. **IEPR Comment – *Medium Significance:* Piezometer data are inconsistent and incomplete, and many piezometers are often inaccessible or nonfunctional during large-flood events, creating data gaps.**

This comment includes three recommendations for resolution, all of which were adopted as discussed below.

USACE Response: Adopted

The IEPR panel recommended 1) streamlining the monitoring procedure for piezometer data collection so that data are collected regularly and frequently, leaving no data gaps; 2) replacing nonfunctional piezometers with new piezometers; and 3) automating piezometers as part of the selected RMP/PAA so that accessibility is not a problem and comprehensive data collection is possible under all loading and weather conditions. The USACE adopted this recommendation by revising the selected plan, or RMP/PAA, in the DSMR/EA to include costs for additional piezometers and automation of the instruments. This will ensure the monitoring process is streamlined and data is

regularly, frequently, and consistently obtained. In addition, nonfunctional instrumentation will be repaired/replaced as necessary as part of ongoing operation and maintenance of the levee.

9. IEPR Comment – *Medium Significance:* Pump station performance during low-frequency floods, including PMF, has not been fully characterized.

This comment includes five recommendations for resolution, all of which were adopted as discussed below.

USACE Response: Adopted

The IEPR panel recommended 1) describing how previous pump station performance events were evaluated. The recommendation was adopted by adding additional information to Appendix N of the DSMR/EA to describe the pump performance in the August 2014 Event and subsequent analysis and remediation actions taken. Previous issues with pump station performance include lack of automatic startup and inadequate power supply. These issues were investigated and addressed. The IEPR panel also recommended 2) discussing the proximate cause of pump station performance issues. The recommendation was adopted by adding additional information to Appendix N of the DSMR/EA to describe the proximate cause of the pump station issues and how this was determined. The proximate cause of the overheating issue was the small confined area and lack of ventilation, the size and efficiency of the motors, and the ambient air temperature. The IEPR panel also recommended 3) describing the types of pump systems employed on the Zoar Levee and Diversion Dam flood risk management system. The recommendation was adopted by adding the following information to the background section of the DSMR/EA: the three pumps are motor driven, mixed flow, with 15,000 gallons per minute capacity each; total pump station capacity is 45,000 gallons per minute; two of the motors are 125 horsepower and one is 150 horsepower. The IEPR panel also recommended 4) describing how the performance issues will be addressed during PED. The recommendation was adopted by noting that the pump performance issue has already been addressed. An exhaust fan and intake louvers have been installed in the pump station. The IEPR panel also recommended 5) describing and comparing the heat generation versus cooling procedures used. The recommendation was adopted by adding information to Appendix N of the DSMR/EA. The pump motors generate heat, which can be exacerbated by high outside ambient temperatures. Recent remedial measures involved addition of a fan and intake louvers, designed to remove the heat generated.

10. IEPR Comment – *Medium Significance:* Considering the extensive seepage and piping observed in the Rock Knoll area during the flood events of 2005 and 2008, the emergency seepage blanket may not be adequate to minimize future piping problems.

This comment includes two recommendations for resolution; one recommendation was adopted and one was not adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 2) monitoring the drainage ditch around the blanket and the associated weir after all flood events for presence of sediment. The recommendation was adopted by updating the instrumentation observation schedule to include observations of the drainage ditch and associated weir to monitor flow and sediment accumulation.

USACE Response: Not Adopted

The IEPR panel recommended 1) modifying the seepage blanket to serve as a filter blanket as part of the selected RMP/PAA rather than a long-term recommendation. In consideration of the recommendation, the limitations of the seepage blanket were clearly recognized at the Rock Knoll and the agency has determined that the risks associated with the seepage blanket were well understood and appropriately reflected in the risk estimate. Due to the low estimated risk at the Rock Knoll, the objectives of the Dam Safety Modification Study did not include addressing this area. Although modifying the seepage blanket to better filter the foundation soils is a reasonable long-term recommendation to consider, utilizing risk-informed decision- making, this action was not justified.

11. IEPR Comment – *Medium Significance:* The possible migration of sand and silt size particles from the glacial outwash that comprises the levee foundation, which could result in foundation adjustment and detrimental settlement of the levee, has not been evaluated.

This comment includes two recommendations for resolution; one recommendation was adopted and one was not adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 2) monitoring future large-size seeps for the presence of sediment. The recommendation was adopted by noting that in future flood events, all areas of seepage and boils will be monitored for sediment transport.

USACE Response: Not Adopted

The IEPR panel recommended 1) evaluating the potential for migration of fines from the Zoar Levee foundation, in addition to piping, during future infrequent storm events. In analyzing the baseline condition risks, the migration of fines from mechanisms other than piping were thoroughly considered. The failure mode of piping, or Backwards Erosion Piping, which would include consideration of the potential for migration of fines, was identified as the highest risk-driving failure mode. All alternative risk management plans were developed to address this failure mode.

12. IEPR Comment – *Medium Significance:* Pipes or channels beneath the levee may lead to unknown risk of a levee collapse and breach.

This comment includes two recommendations for resolution; one recommendation was adopted and one was not adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 1) considering whether additional trenching inspection, boreholes, or geophysical techniques may be used to identify pipes or channels. The USACE will consider the geophysical techniques during the PED phase, in conjunction with archeological investigations, in an attempt to locate any large voids in the landward levee toe area.

USACE Response: Not Adopted

The IEPR panel recommended 2) considering whether suitable techniques may be employed to retard or minimize flow paths if pre-existing channels or pipe paths can be identified. If channels can be identified, determine how this might impact the alternatives analysis presented in the Draft DSMR/EA. The USACE has determined it is very unlikely that existing pipes or channels could be identified. However, if small pre-existing channels or pipe paths do exist beneath the levee, the IEIT and Ponding Area filter would be expected to filter and arrest their continuation without additional measures.

13. IEPR Comment – *Medium/Low Significance:* Potential recreation benefits have not been estimated in sufficient detail to reinforce its importance to the area.

This comment includes two recommendations for resolution; one recommendation was adopted and one was not adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 2) investigating whether CVM/CVS or TCM studies have been performed and determining whether they could be applicable to this study. During the Community Impacts Analysis, extensive research into the recreation and tourism benefits of Zoar Village was undertaken to support the appendix. The results of that research are included and available in Appendix D, Addendum 3, "Community Impacts," specifically in Sections 3.5 and 3.6 "Economic Vitality: Zoar Village's Tourism & Community Vision" and "Leisure & Recreation: Zoar Village's Garden Traditions and Outdoors." A recent internet search resulted in no Contingent Value Method (CVM)/CVS or Travel Cost Methodology (TCM) studies completed to date.

USACE Response: Not Adopted

The IEPR panel recommended 1) performing a UDV recreation benefit analysis. While the recreational opportunities provided by and enhanced by the Village is of significant value and notable, additional quantitative calculations regarding these values would not benefit the decision-making process. Therefore, generating a quantitative Unit Day Value (UDV) analysis in an effort to perform a recreation benefit analysis for Zoar Levee

is not necessary. Monetary benefits associated with attendance at festivals and tourism are captured under the Other Social Effects section of the document. This discussion is available in Appendix D, Addendum 3, "Community Impacts," specifically in Sections 3.5 and 3.6 "Economic Vitality: Zoar Village's Tourism & Community Vision" and "Leisure & Recreation: Zoar Village's Garden Traditions and Outdoors."

14. IEPR Comment – *Medium/Low Significance:* Regional Economic Development outputs have not been analyzed, and could convey the message that all effects on regional employment and income in Zoar Village have been considered.

This comment includes two recommendations for resolution; one recommendation was adopted and one was not adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 2) determining if others outside USACE have studied the regional economic effects of protecting Zoar Village and describing how these external studies are appropriate for inclusion and discussion. An internet search was conducted for external studies; however, no outside studies on the regional economic effects of protecting Zoar Village were found for inclusion or discussion within the DSMR/EA.

USACE Response: Not Adopted

The IEPR panel recommended 1) performing an RED analysis of the selected RMP/PAA. Regional outputs were qualitatively described in Appendix D, Addendum 3. As a Regional Economic Development (RED) analysis would have no effect on the formulation of the project additional effort to conduct detailed analysis was determined unnecessary.

15. IEPR Comment – *Low Significance:* The Draft DSMR/EA defines the Programmatic Agreement as a document that will account for all impacts on all social, economic, and recreational resources, but this exceeds the scope and intent of the agreement as established in 36 CFR 800.14 and ER 1105-2-100.

This comment includes one recommendation for resolution, which was adopted, as discussed below.

USACE Response: Adopted

The IEPR panel recommended 1) rewording text in the Draft DSMR/EA that discusses social, economic, and recreational resources in tandem with cultural resources to note that the relationship is symbiotic only for those social, economic, and recreational resources that support or are linked with the town's heritage tourism industry, which relies on preserved integrity of its historic properties/district (see Draft DSMR/EA, p. 3-

31, 2nd paragraph for an example). The text in Section 5.3.1.3 page 5-21 has been revised as follows: "With the advent of this Programmatic Agreement, any additional social, economic, recreational, and cultural/historical impacts or adverse effects related to the historical integrity and significant character defining features of Zoar Village that are identified from any of the action alternative risk management plans shall be managed to avoid, minimize or mitigate those impacts and/or effects appropriately."