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August 28, 2006

0.1.8.4.CN0522005

Ms. Kathy Dorman-Wade
City of Mason
Engineering, Building and Planning Department
6000 Mason-Montgomery Road
Mason, Ohio 45040

Re: **Revised** Proposal for Emergency Action Plan (EAP)
Pine Hill Lake Dam
City of Mason, Warren County, Ohio

Dear Ms. Dorman-Wade:

Fuller, Mossbarger, Scott and May Engineers, Inc. (FMSM) is pleased to present this proposal to prepare the Emergency Action Plan (EAP) for Pine Hill Lake Dam. This proposal was written in response to a letter sent by Richard Bartz of the Ohio Department of Natural Resources, Division of Water to the City of Mason approving the repairs to the dam completed in June 2004. In this letter, Mr. Bartz cites Ohio Administrative Code (OAC) Rule 1501:21-15-06 and 1501:21-15-07 requiring that an EAP be developed and submitted to the Division of Water.

FMSM has extensive familiarity with Pine Hill Lake Dam because of our participation in the design of the recent dam and spillway improvements and a flood study of Pine Run upstream and downstream of the lake. As part of this previous work, FMSM has already developed some of the data required in the EAP. The attached scope of work summarizes the work necessary for the completion of the EAP based on the guidelines supplied to us by ODNR. A lump sum cost derivation has also been included.

We appreciate this opportunity to assist you on this project and look forward to working with you. Please call us at your convenience with any questions or comments.

Respectfully submitted,

FULLER, MOSSBARGER, SCOTT AND MAY
ENGINEERS, INC.

Stan A. Harris, P.E.
Associate

SEP - 5

Attachment

Technical Scope of Services

Fuller, Mossbarger, Scott and May Engineers, Inc. (FMSM) will prepared an Emergency Action Plan (EAP) for Pine Hill Lake Dam in accordance with Ohio Administrative Code (OAC) Rules 1501:21-15-06 and 1501:21-15-07. The purpose of the EAP is reduce the potential for loss of life and property damage along Pine Run and Muddy Creek in the event of the failure of Pine Hill Lake Dam.

1.0. Work Elements

The following paragraphs outline the specific work tasks to be performed as part of this Scope of Services.

1.1. Task 1 – Data Collection and Work Meetings with the City of Mason. FMSM will coordinate work meetings with City personnel to verify project tasks and goals, collect all necessary data, and to collectively establish protocols for emergency response, maintenance and operation of Pine Hill Dam. Prior to the scheduled meetings, FMSM will supply the City with an agenda so that appropriate participants can be contacted and planning decisions can be made in advance. It is anticipated that two (2) meetings will be required.

1.2. Task 2 - Development of EAP Report Content. ODNR has provided the *ICODS EAP Guidelines for Dam Owners* as guidance for the format of the EAP. Specific requirements for the content of the EAP are also outlined in this document. Task 2 of this Scope of Services includes Sections 1 through 6 of the EAP. These sections include:

Section:

1. Notification Flowchart – Consists of a diagram illustrating the hierarchy for contacting first responders in the event of an emergency.
2. Statement of Purpose – States the purpose and scope of the EAP.
3. Project Description – Includes a description of all retention structures, a vicinity map, and a listing of downstream structures potentially affected by a dam failure or lake drawdown.
4. Emergency Detection, Evaluation, and Classification – Documents the procedures for detection of emergency conditions, how these emergency conditions will be evaluated, and finally the protocols for the level or classification of the emergency.
5. General Responsibilities – Documents the responsibility of the City for a variety of tasks. These tasks include emergency notification, evacuation, follow up, and for evaluating compliance with EAP procedures.
6. Preparedness – Describes the preplanned measures for responding to an emergency. Areas of preparedness include monitoring, response during periods of darkness, access to site, response during weekends and holidays, operations during power failures, procedures for notifying officials, and impact of expected response times.

1.3. Task 3 – Report Appendices and Engineering Analyses. FMSM will perform engineering analyses to investigate the flooding associated with an uncontrolled dam breach. During the design of the recent improvements of Pine Hill Lake Dam, FMSM performed dam breach analyses as part of a critical flood analysis and will utilize the hydrologic and hydraulic models in the development of *Appendix A: Investigation and Analyses of Dam Break Floods* of the EAP. In an email dated May 13, 2005, Matt Rapasky of ODNR, Dam Safety Engineering Program suggested some revisions to the critical flood modeling so that they are

consistent with EAP dam break modeling. Mr. Rapasky requested results for the 100-Year, 25% PMF and full PMF with a dam breach time of 60 minutes. In addition, some modification to the combining of flood hydrographs of Pine Run and Muddy Creek will be performed. It is anticipated that these analyses will be performed using the HEC-HMS and HEC-RAS computer programs developed by the U.S. Army Corps of Engineers.

Appendices B through D will be prepared in accordance with the *ICODS EAP Guidelines for Dam Owners*. These appendices include: *Appendix B: Plans for Training, Exercising, Updating, and Posting the EAP*, *Appendix C: Site Specific Concerns*, and *Appendix D: Approval of the EAP*.

1.4. Task 4 – Inundation Mapping

Section 7 of the EAP as specified in the *ICODS EAP Guidelines for Dam Owners* requires inundation maps be developed for various flooding / dam breach scenarios. As stated in Section 1.3 of this Scope of Services, FMSM will prepare flood inundation mapping for dam breaches occurring during the 100-Year, 25% PMF, and 100% PMF events as requested by Mr. Rapasky with ONDR. Inundation maps will be created using GIS data provided by the City of Mason and data derived from the engineering analyses. Peak discharges, maximum flood elevations, and travel times will be labeled on the map along with emergency coordination information. Maps will also be supplemented with a narrative of those areas inundated by the dam breach as required.

1.5. Task 5 – Final Report

Upon completion of Tasks 1 through 4, FMSM will prepare a draft EAP for submittal to ODNR for review. FMSM will revise the report, as appropriate, based on ODNR's review comments. For the purposes of this scope of services it is assumed that review comments will be minor. After review comments have been addressed, FMSM will submit the finalized EAP to the City and ODNR. FMSM will also submit a CD containing the hydrologic and hydraulic models and GIS shapefiles used in the engineering analyses and inundation mapping.

2.0. **Deliverables**

The following deliverables will be prepared under this scope of services.

- Final Emergency Action Plan in accordance with OAC Rules.
- Hydrologic and Hydraulic Models. Hydrologic and hydraulic modeling created for dam breach analyses will be provided to the city on a CD.
- GIS Shapefiles. GIS shapefiles used in the preparation of the inundation mapping and illustrating the results of the hydrologic and hydraulic analyses will be provided to the city on a CD.

3.0. **City Responsibilities**

- Provide GIS data necessary for engineering analyses and inundation maps. It is assumed GIS data will be provided in standard ESRI shapefile and database formats.
- FMSM will need to meet with City staff and personnel in preparing various sections of the EAP. Many of these sections will require the City to establish protocols for

emergency response, maintenance and operation of the lake. Participation and coordination with key personnel by the City will be imperative to the overall completion of the EAP. It is assumed that two (2) meetings will be required. Meetings are assumed to be held at the City's offices.

4.0. Schedule

Milestone Activity	Duration
Submit draft EAP to ODNR	60 days
ODNR review of draft EAP	30 days
Address ODNR comments and submit final EAP	30 days
Total =	120 days

5.0. Fee Estimate

Fees for providing the services described above are as follows:

Task 1 – Data Collection / Working Meetings w/ City	\$ 3,050.00
Task 2 – Development of EAP Content	\$ 6,355.00
Task 3 – Report Appendices (Engineering Analyses)	\$ 6,770.00
Task 4 – Inundation Mapping	\$ 5,960.00
Task 5 – Final Report / Securing ODNR Approval	\$ <u>2,820.00</u>
Total	\$24,955.00



August 28, 2006

0.1.8.4.CN0722006

Ms. Kathy Dorman-Wade
City of Mason
Engineering, Building and Planning Department
6000 Mason-Montgomery Road
Mason, OH 45040

Re: Proposal for Operation, Maintenance and Inspection Manual (OMI)
Pine Hill Lake Dam
City of Mason, Warren County, Ohio

Dear Ms. Dorman-Wade,

Fuller, Mossbarger, Scott and May Engineers, Inc. (FMSM) is pleased to present this proposal to prepare the Operation, Maintenance and Inspection Manual (OMI) for Pine Hill Lake Dam. This proposal was written in response to a letter sent by Richard Bartz of the Ohio Department of Natural Resources, Division of Water to the City of Mason approving the repairs to the dam completed in June 2004. In this letter, Mr. Bartz cites Ohio Administrative Code (OAC) Rule 1501:21-15-06 and 1501:21-15-07 requiring that an OMI be developed and submitted to the Division of Water.

FMSM has extensive familiarity with Pine Hill Lake Dam because of our participation in the design of the recent dam and spillway improvements and a flood study of Pine Run upstream and downstream of the lake. As part of this previous work, FMSM has already developed some of the data required in the OMI. The attached scope of work summarizes the work necessary for the completion of the OMI based on the guidelines supplied to us by ODNR. A lump sum cost derivation has also been included.

We appreciate this opportunity to assist you on this project and look forward to working with you. Please call us at your convenience with any questions or comments.

Respectfully submitted,

FULLER, MOSSBARGER, SCOTT AND MAY
ENGINEERS, INC.

Stan A. Harris, P.E.
Associate

Attachment

1.0. Technical Scope of Services

Fuller, Mossbarger, Scott and May Engineers, Inc. (FMSM) will prepare an Operation, Maintenance, and Inspection Manual (OMI) for Pine Hill Lake Dam in accordance with Ohio Administrative Code (OAC) Rules 1501:21-15-06 and 1501:21-15-07. The purpose of the OMI is to document protocols established by the City of Mason in the operation, maintenance and operation of the dam.

An OMI for Pine Hill Lake Dam is required by ODNR. The OMI is a summary of the dam including size and purpose of dam, inspection reports or monitoring plans, maintenance schedules, operation procedures, and the Emergency Action Plan (EAP). Many of the requirements listed for the OMI are duplicated within the EAP. Like the EAP, specific formats and content are specified in the *Guidelines for an Operation, Maintenance and Inspection Manual*. The following sections will be prepared as part of this task.

1. Introduction – Listing of pertinent facts about the dam including: dam and reservoir height, freeboard lake area, drainage area, elevations, spillway sizes, etc. In addition, stage-storage-discharge rating curves will be provided.
2. Inspection – Documents who performs, how frequent, and what is involved with dam inspection. Pertinent inspections are listed in *the Guidelines for an Operation, Maintenance and Inspection Manual*.
3. Maintenance – Includes procedures for periodic maintenance and frequency.
4. Operation –Documents general operation procedures. Emergency operations are included in the EAP.
5. Safe Rate Drawdown Plan – Includes the method to be used for drawing down the lake under emergency conditions at rates that would not contribute to flooding. In addition, non-emergency protocols for drawdown are identified.
6. Appendix – *The Guidelines for and Operation, Maintenance and Inspection Manual* lists several possible items that could be included. FMSM will compile those applicable items that are currently available and attach them to the appendix.

2.0. Deliverables

The following deliverable will be prepared under this scope of services.

- Final Operation, Maintenance, and Inspection Manual in accordance with OAC Rules.

3.0. City Responsibilities

- Provide GIS data necessary for engineering analyses and inundation maps. It is assumed GIS data will be provided in standard ESRI shapefile and database formats.

4.0. Schedule

Milestone Activity	Duration
Submit draft OMI to ODNR	60 days
ODNR review of draft OMI	30 days
Address ODNR comments and submit final OMI	30 days
Total =	120 days

5.0. Fee Estimate

Fees for providing the services described above are as follows:

Task 1 – Operation, Maintenance, and Inspection Manual (OMI)	\$ 5,910.00
Miscellaneous Expenses (mileage, duplication, etc.)	\$ <u>518.00</u>
Total	\$ 6,428.00



