JOHNSON-FRENCH

DAM SAFETY INSPECTION REPORT

Margaret Creek Structure No. 5
File Number: 9220-002
Class III
Athens County, Alexander Township
Inspection Date: May 23, 2007

In accordance with Ohio Revised Code Section 1521.062, the owners of dams must monitor, maintain, and operate their dams safely. Negligence of owners in fulfilling these responsibilities can lead to the development of extremely hazardous conditions to downstream residents and properties. In the event of a dam failure, owners can be subject to liability claims.

The Chief of the Division of Water has the responsibility to ensure that human life, health, and property are protected from the failure of dams. Conducting periodic safety inspections and working with dam owners to maintain and improve the overall condition of Ohio dams are vital aspects of achieving this purpose.

Representatives of the Chief conducted this inspection to evaluate the condition of the dam and its appurtenances under authority of Ohio Revised Code Section 1521.062. In accordance with Ohio Administrative Code Rule 1501:21-21-03, the owners of dams must implement all remedial measures listed in the enclosed report.

Table of Contents

Required Remedial Measures

The requirements listed below are based on observations made during inspection, calculations performed, and requirements of the Ohio Administrative Code (OAC). A checklist noting all observations made during the inspection has been enclosed. References to right and left in this report are oriented as if you were standing on the dam crest and looking downstream.

Engineer Repairs and Investigations: The owner must retain the services of a professional engineer to address the following items. Plans, specifications, investigative reports, and other supporting documentation, as necessary, must be submitted to the Division of Water for review and approval prior to construction. A record of all repairs should be included in the operation, maintenance, and inspection manual.

No Engineer Repairs and Investigations items for this report.

Required Remedial Measures

Owner Repairs: The owner must address the following items. The owner may perform the work or hire a contractor. Repair activities should be documented in the operation, maintenance, and inspection manual.

☐ No owner repairs for this report.

☐ Trees and brush are not permitted on embankment surfaces or earthen spillways. Remove trees and brush from

☐ The embankment crest must have a uniform elevation. Repair the low area on/near…

Rodent burrows weaken dam embankments and must be repaired. Rodent activity must be controlled.
Repair the muskrat damage to the upstream slope.
☒ Fill the rodent burrows on (*entire embankment, crest, upstream slope, downstream slope*).

The embankment and spillways must be protected from erosion.
Replenish riprap (*along the shoreline, at the principal spillway outlet*).
Repair ruts and/or erosion gullies…
A healthy grass cover should be present on embankments and earthen spillways. Establish a grass cover on …

A satisfactory trashrack and/or antivortex plate must be present at the inlet of the principal spillway. (*Install/Repair*) the trashrack and/or antivortex plate.

Spillways must be able to flow at their full capacities.
☒ Remove debris from the inlet of principal spillway. Continue to remove beaver obstructions.
Remove trees/brush from the emergency spillway.

The lake drain must be operable and accessible. Routine maintenance of the lake drain should be performed annually and should include operation and lubrication of the valve/sluice gate in accordance with the manufacturer's specifications. Use caution if the operability is unknown. If the drain no longer functions contact the Division of Water to discuss repair or replacement.

Embankment drains and spillway drains must be periodically maintained to ease monitoring and functionality. Pipe outlets should be marked and cleared regularly to allow the owner to quickly identify changing seepage conditions in the dam. Perform routine maintenance on the

A spillway must convey flow without excessive leakage. Repair the (*cracks/joints/deterioration*) of the…

☒ The Emergency Action Plan (EAP) must be updated. Also, this dam must have an operation, maintenance, and inspection manual (OMI). Prepare and submit an OMI manual. In general, your current procedures and checklists are acceptable. Guidelines for the preparation of these documents are included with this report.

Flow through a deteriorated spillway subjects it to further deterioration and potentially failure. Repair…

☒ Mow the embankment and emergency spillway at least twice per year.

Owner Dam Safety Program: In accordance with Ohio Revised Code (ORC) Section 1521.062, the owner of a dam shall maintain a safe structure and appurtenances through inspection, maintenance, and operation. A dam, like any other part of the infrastructure, will change and deteriorate over time. Appurtenances such as gates and valves must be routinely exercised to ensure their operability. Inspection and monitoring of the dam identifies changing conditions and problems as they develop, and maintenance prevents minor problems from developing into major ones. Dams must have these procedures documented in an OMI.

Despite efforts to provide sufficient structural integrity and to perform inspection and maintenance, dams can develop problems that can lead to failure. Early detection and appropriate response are crucial for maintaining the safety of the dam and downstream people and property. The ORC requires the owner to fully and promptly notify the Division of Water of any condition which threatens the safety of the structure. A rapidly changing condition may be an indication of a potentially dangerous problem. The Dam Safety Engineering Program can be contacted at 614/265-6731 during business hours or at 614/799-9538 after business hours. Dams must have emergency preparedness procedures documented in an EAP.

The following references regarding dam safety and lake management are provided for your use and information:
(1) OMI and EAP guidelines
(2) Common Problems for Small Dams, including five fact sheets
(3) "Agencies Associated with Dams and Lakes"
(4) "Ohio Pond Management Handbook"

Val A. Zampedro 7/25/07

Val A. Zampedro, P.E. Date
Project Engineer
Dam Safety Engineering Program
Division of Water

Keith R. Banachowski July 25, 2007

Keith R. Banachowski, P.E. Date
Program Manager
On behalf of Deborah F. Hoffman, Chief
Division of Water

This inspection was performed pursuant to the authority granted to the Chief of the Division of Water in ORC Section 1521.062.

Photograph No. 1: The crest and downstream slope of the dam. Note the tall grass.

Photograph No. 2: The principal spillway riser.

Photograph No. 3: The principal spillway riser.

Photograph No. 4: The principal spillway riser. Note the indentation on the upstream slope of the dam.

Photograph No. 5: Looking toward the principal spillway outlet from the crest of the dam.

Photograph No. 6: The impact basin at the principal spillway outlet. Note the toe drain outlets.

Photograph No. 7: The left toe drain outlet.

Photograph No. 8: The emergency spillway channel looking downstream.

Photograph No. 9: The principal spillway channel looking downstream.

Dam Classification Checklist

Name of Dam:	Margaret Creek Structure No. 5			File Number:	9220-002
County:	Athens	Date:	May 23, 2007	Engineer:	VAZ

The classification of a dam is based on three factors: the dam's height, storage capacity, and potential downstream hazard. The height of the dam is the vertical distance from the crest to the downstream toe. The storage capacity is the volume of water that the dam can impound at the top of dam (crest) elevation. The downstream hazard consists of roads, buildings, homes, and other structures that would be damaged in the event of a dam failure. Potential for loss of life is also evaluated. Various dam failure scenarios must be considered, and they include failures when the dam is at normal pool level and failures during significant flood events. Each of the three factors is evaluated, and the final classification of the dam is based on the highest individual factor. Class I is the highest and Class IV is the lowest. The classification of a dam can change based on future development along the downstream channel.

This checklist is intended to establish or verify the appropriate classification in accordance with the Ohio Administrative Code – it does not necessarily show all potential hazards or the full extent of inundation. In addition, elevations and dimensions are estimated.

HEIGHT CLASSIFICATION	***STORAGE CLASSIFICATION***	***EXEMPT~NON-REGULATED***
Dam Height = 29 feet	Stor. Capacity (top of dam)= 416.9 acre-feet	
_____ > 60' - Class I	_____ > 5000 acre-feet - Class I	_____ Height ≤ 6 feet
_____ > 40' - Class II	_____ > 500 acre-feet - Class II	_____ Storage ≤ 15 acre-feet
X > 25' - Class III	X > 50 acre-feet - Class III	_____ 6 ft. < Height < 10 ft. &
_____ ≤ 25' - Class IV	_____ ≤ 50 acre-feet - Class IV	Stor. ≤ 50 ac-ft

Height Class:	III		
Storage Class:	III		
Hazard Class (see next page):	III	**Estimated Population at Risk:**	(none 1-5 6-15 16+)
Final Class:	III		

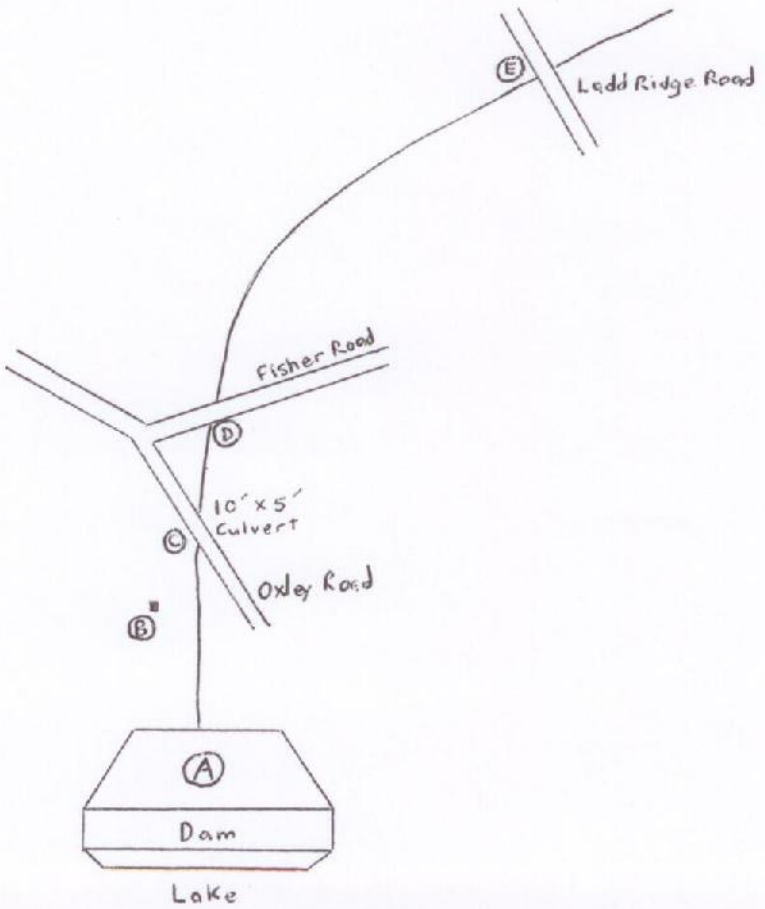
Class Changed (Yes, No)

Potential Downstream Hazard

I	II					III		IV	-	-			
Probable loss of human life	Loss of public water supply or wastewater treatment facility, release of health hazardous waste	Flooding of structure or high-value property	Damage to high-value or Class I, II, III dam or levee	Damage to major road (US or state route), disruption of only access to residential or critical facility area	Damage to railroad or public utility	Damage to rural building, not otherwise high-valued property, or Class IV dam or levee	Damage to local road (county and township)	Loss restricted mainly to the dam or agricultural /rural land	No hazard to structure noted	*No hazard assessment, further investigation needed*	Distance downstream of dam to affected structure (feet)	Vertical distance from streambed to base of affected structure (feet)	Horizontal distance from stream to affected structure (feet)
								A			–	–	–
									B		1300	20	100
							C				2000	6	–
							D				3000	6	–
							E				5300	6	–

This checklist is intended to establish or verify the appropriate classification in accordance with the OAC – it does not necessarily show all potential hazards or the full extent of inundation.

Sketch of Developments Downstream of Dam



Flood Routing Summary

A dam must be able to safely pass severe flood events. A dam uses a combination of spillway discharge capacity and reservoir storage capacity, known as discharge/storage capacity, to prevent floodwater from overtopping the embankment crest and destabilizing the dam. When a dam has inadequate discharge/storage capacity, floodwater will overtop and erode the embankment. This can cause severe damage and dam failure.

Dam embankment prior to severe flood.

Erosion caused by floodwater overtopping the dam – a result of inadequate discharge/storage capacity.

Erosion caused by floodwater overtopping the dam – a result of inadequate discharge/storage capacity and debris obstructing the 5-foot-diameter spillway pipe.

As part of this inspection, the Division of Water did not thoroughly investigate this dam's discharge/storage capacity or its ability to safely pass the required design flood. In 1990 the Division of Water performed hydrologic and hydraulic calculations to estimate the size of the design flood and the discharge/storage capacity of the dam. These calculations were used in the flood routings to determine the maximum water surface elevation in the reservoir for various flood events.

Margaret Creek Structure No. 5 is a Class III dam; therefore, in accordance with OAC Rule 1501:21-13-02, the required design flood is 25% of the Probable Maximum Flood (PMF) or the critical flood. This dam and its spillway system must safely pass the design flood without overtopping the embankment crest and destabilizing the dam. Flood routing calculations indicate that the dam can pass approximately 80% of the PMF; Margaret Creek Structure No. 5 appears to be able to safely pass the design flood.

LOCATION MAP

MARGARET CREEK STRUCTURE NO. 5 - 9220-002

Mar 02, 2007

Dam Inventory Sheet

Name: MARGARET CREEK STRUCTURE NO. 5
File No: 9220-002
National #: OH00085
Reservoir: JOHNSON/FRENCH LAKE
Permit No.: EXEMPT
Class: III

Owner Information

Owner: Hocking Conservancy District
Owner Type: Public, C.d.
Address: 560 West Union Street
Parcel No.:

City: Athens **State:** OH **Zip:** 45701-2331
Contact: Terry Courtney, Exec. Sec-Treas **Phone No.:** 740/592-1792

Location Information

County: Athens **Latitude Deg.:** 39 **Min.:** 15 **Sec.:** 40
Township: Alexander **Longitude Deg.:** 82 **Min.:** 7 **Sec.:** 0
Stream Biddle Creek
Nearest Affected Community: Athens
Community's Distance from Dam (miles): 3.4
USGS Quad.: Athens **USGS Basin No.:** 05030204

Design/Construction Information

Designed By: Usda, Scs
Constructed By:
Completed: 1970 **Plan Available:** YES **At:** USDA, SCS
Failure/Incident/Breach:

Structure Information

Purpose: Flood Control, C.d.
Type of Impound.: Dam And Spillway
Type of Structure: Earthfill
Drainage Area (sq. miles): 1.68 **or (acres):** 1078

Embankment Data

Length (ft): 600 **Upstream Slope:** 3H:1V
Height (ft): 29 **Downstream Slope:** 2.5H:1V
Top Width (ft): 14 **Volume of Fill (cub. yds.):** 46600

Spillway Outlet Works Data

Lake Drain: 12-IN PIPE CAST IRON
Principal: 30-IN REINFORCED CONCRETE PIPE W/30-IN X 90-IN CONCRETE RISER
Emergency: 120-FT WIDE OPEN CHANNEL W/3H:1V SIDE SLOPES
Maximum Spillway Discharge (cfs) 9573 **Design Flood:** 0.25 **Flood Capacity** 0.80

Dam Reservoir Data	Elevation (ft-MSL)*	Area (acres)	Storage (acre-feet)
Top of Dam:	734	37.3	416.9
Emergency Spillway:	728.5	31.2	228.7
Principal Spillway:	716.7	8.3	29.1
Streambed:	705		
Foundation:	699		

*Elevations are not necessarily related to a USGS benchmar

Inspection Information

Inspection History: 05/23/2007 VAZ
03/28/2000 VAZ
09/12/1990

Phase I:
Other Visits: 11/13/84 INV

Operation Information/Remarks

PL-566 PROJECT

Emergency Action Plan: Yes **Format:** ICODS **OMI:** No
Annual Fee: $146.00 **Last Entry:** 07/20/2007

Dam Safety Inspection Checklist

Name of Dam: Margaret Creek Structure No. 5 — Athens County
Date of Inspection: May 23, 2007 — Required Action
File Number: 9220-002 — None Mon. Maint. Eng.
Class: III Design Flood: 0.25 Flood Capacity: 0.80 — [X] [ ] [ ] [ ]
Haz.: III, Height: III, Volume: III

Interview with Owner (at the site):
Owner/Representative present: (Yes) No) Name(s): Mark Holdcroft
Owner's Name(s): Hocking Conservancy District
Address: 560 West Union Street, ,
City: Athens State: OH Zip (+4): 45701-2331
Contact Person: Terry Courtney, Exec. Sec-Treas Telephone: 740/592-1792
Email Address:
Purpose of dam: Flood Control, C.d.

Owner Dam Safety Program
Emergency Action Plan Yes ICODS — None Mon. Maint. Eng.
EAP (document): Up-to-date? (yes, no) — [X] [ ] [ ] [ ]
Downstream development: No recent changes.

Operation, Maintenance, and Inspection No — None Mon. Maint. Eng.
OMI (document): Up-to-date? (yes, no) — [ ] [ ] [X] [ ]
All drains operable? (yes) no)

Normal rate of drawdown: 4 to 5 inches overnight Accessibility for operation: From shore.

Maintenance
Frequency of mowing: Twice per year.
Other maintenance: Woody plants cut annually, rodent burrows filled as needed, toe drains monitored.

Inspection
Frequency and thoroughness of day-to-day & routine inspections: Monthly walk through.

Problems found during inspections: None.

Field Information
Pool Elevation (during inspection): Slightly below normal. Time: 1:30 (a.m.) p.m.)
Site Conditions (temp., weather, ground moisture): 85°, sunny, dry
Inspection Party: Val Zampedro, Keith Banachowski

Confirm the Following: [X] Dam Height (ft): 29 [X] NP Area (ac): 8.3

Reference Information

Riser has a 1-ft x 1.9 ft low-flow inlet at 716.7, and two 7.5-ft-long weirs at 725.2; Lake drain is cast iron and discharges into riser, control from top of riser, upstream side; Toe drains (6-inch CMP) discharge into each side of impact basin.

PI-566 Project

	Elev.	Area (ac)	Stor. (ac-ft)	(in.)
TOD:	734	37.3	416.9	4.3
Em. S/w:	728.5	31.2	228.7	2.1
Prin. S/w:	716.7	8.3	29.1	
Strmbd:	705			
Basin (ac):	1078			

Impound. Type: Dam And Spillway
Structure Type: Earthfill
Township: Alexander
Stream: Biddle Creek
Designed By: Usda, Scs
Constr. By:
Year Compl.: 1970 Plans Avail.? Yes At: Usda, Scs
Fail./Incid.:

Required Action

Upstream Slope

☒ Gradient: 3H:1V

Typical Problems: shoreline erosion, trees & brush, surface erosion, ruts, rodent burrows, earth slides, cracks

A few rodent burrows.
Tall grass on entire slope
Indentation 50 ft. long, 1 ft. into embankment, 6 inches high, near principal spillway riser.

None	Monitor	Repair	Engineer
		X	
		X	
	X		

Crest

☒ Width (ft): 14 ☒ Length (ft): 600 ☒ Total Freeboard (ft): 17.30

Typical Problems: low areas, trees & brush, surface erosion, ruts, cracks

No problems noted.

None	Mon.	Rep.	Eng.
X			

Downstream Slope

☒ Gradient: 2.5H:1V

Typical Problems: trees & brush, surface erosion, ruts, rodent burrows, earth slides, cracks, seepage

Tall grass on entire slope.

None	Mon.	Rep.	Eng.
		X	

Principal Spillway

☒ 30-in Reinforced Concrete Pipe W/30-in X 90-in Concrete Riser

Typical Problems: Inlet obstructed, unsatisfactory trashrack/anti-vortex plate, material deterioration, misalignment, open joints, outlet erosion, outlet overgrown, undermining

Sediment & debris around low-flow inlet - appears to be beaver activity.
Concrete in good condition.
Trashrack in good condition.

None	Mon.	Rep.	Eng.
		X	
X			
X			

☒ Sufficient measurements to perform hydraulics (dimensions, riser depth, outlet elevation)

Required Action

	None	Monitor	Repair	Engineer
120-ft Wide Open Channel W/3h:1v Side Slopes	X			
Freeboard (to normal pool, feet) 11.80				

Emergency Spillway

Typical Problems: Flowpath obstructed, material deterioration, erosion, misalignment, overgrown, undermining

No problems noted.

☒ Sufficient measurements to perform hydraulics (dimensions, breadth, side slopes)

Lake Drain

☒ 12-in Pipe Cast Iron

Typical Problems: Poor operating access, inoperable, deteriorated/missing components, outlet erosion

	None	Mon.	Rep.	Eng.
No problems noted.	X			

Other

	None	Mon.	Rep.	Eng.
No flow in toe drain outlets.		X		
A small amount of rust colored deposits at outlet area.		X		

☒ All Field Data Gathered (inspector's inititals): VAZ

Site Sketch

☐ Investigate Downstream Hazard

Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

Deborah F. Hoffman • Chief

Division of Water

July 23, 2007

Hocking Conservancy District
Terry Courtney, Executive Secretary-Treasurer
560 West Union Street
Athens, OH 45701-2331

RE: Margaret Creek Structures No. 1, No. 4, No. 5, and No. 6
File Numbers: 9121-008, 9220-003, 9220-002, and 9221-001
Athens County

Dear Mr. Courtney:

Thank you for allowing Val Zampedro and me to conduct safety inspections of Margaret Creek Structures No. 1, No. 4, No. 5, and No. 6 on May 23, 2007. These inspections were conducted by representatives of the Chief of the Division of Water under the provisions of Ohio Revised Code Section (ORC) 1521.062 to evaluate the conditions of the dams and their appurtenances. The Chief has the responsibility to ensure that human life, health, and property are protected from dam failures. Conducting periodic safety inspections and working with dam owners to maintain and improve the overall condition of Ohio dams are vital aspects of achieving this purpose. A copy of the laws and administrative rules for dam safety is available on the division's web site or by request. I have enclosed guidelines for preparing an operation, maintenance, and inspection manual and guidelines for preparing an emergency action plan.

The enclosed inspection reports were generated based on available information and are hereby provided for your use and study. Listed in the reports are several repair, maintenance, and monitoring items that as a dam owner you are required by law to perform. Completion of these required items will improve the safety and overall conditions of the dams. The Chief must approve any plans for modifications or repairs to these dams. Following approval of the engineered plans, all necessary repairs must be implemented by the owner under the supervision of a registered professional engineer.

Please be advised that you may qualify for a loan to make required repairs from the Ohio Dam Safety Loan Program administered by the Ohio Water Development Authority (OWDA). To find out more about the program, please contact OWDA's Loan Officer at 614/466-5822.

To gain information that will help improve the inspection program, a short survey has been developed and is enclosed. Please complete the survey and return it in the self-addressed envelope provided. Your feedback is important.

Your cooperation in improving the overall conditions of these dams is appreciated and you are commended on the maintenance performed thus far. Please contact Val Zampedro at 614/265-6760 if you have any questions.

Sincerely,

Keith R. Banachowski, P.E.
Program Manager
Dam Safety Engineering Program
Division of Water

KRB:vaz

Enclosures