



# > **Dam Safety Inspection Report Meadow Lake Dam (Dam ID No. 1686)**

October 2023  
ECT No. 230639

MEADOW LAKE FARM CIVIC ASSOCIATION  
Franklin, MI 48025

***ECT***

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## Dam Safety Inspection Report – Meadow Lake Dam

**Dam Identification Number:** 1686

**Dam Location:** Meadow Lake  
Bloomfield Township, Oakland County, Michigan  
Section 31, Township 2N, Range 10E

**Stream:** Franklin Branch of the Rouge River

**Owner/Operator:** Meadow Lake Farm Civic Association  
P.O. Box 103  
Franklin, Michigan 48025  
Contact: Laurie Ruben

**Hazard Potential Classification:** Low

**Inspected By:** Charles Humpriss, P.E.  
Environmental Consulting & Technology, Inc.  
2001 Commonwealth Blvd., Suite 300  
Ann Arbor, Michigan 48105  
(734) 769-3004

**Date of Inspection:** September 08, 2023

**Prepared By:** Charles Humphriss, P.E, CFM.  
State of Michigan Registration Number: 6201058033  
Expiration Date: April 7, 2024  
Environmental Consulting & Technology, Inc.  
2001 Commonwealth Blvd., Suite 300  
Ann Arbor, Michigan 48105  
(734) 769-3004

## 1.0 Introduction

On September 08, 2023, Environmental Consulting & Technology, Inc. (ECT) performed an inspection at the Meadow Lake Dam located at Meadow Lake in Bloomfield Township, Michigan. The purpose of the inspection was to observe the existing condition of this dam as required by Michigan's Dam Safety Law. This report is limited to a discussion of visual observations and review of any available reports, plans and data on the dam. This report should not be considered an in-depth engineering evaluation. Additional investigation, evaluation or study may be recommended based on the findings of this report.

In this report, all references to "right" and "left" are based on the observer standing on the dam and facing downstream. This may not correspond with the perspective of any figure, sketch, or photograph.

## 2.0 Conclusions and Recommendations

The Meadow Lake Dam is generally in good condition. There are a few items noted that require attention in the short term. There were no additional deficiencies observed during the inspection that would lead to failure of the dam. It is recommended that these be addressed as outlined in the recommendations below.

### 2.1 **Summary of Findings**

#### *Embankments*

- The downstream embankments are steep. They are generally vegetated with trees, shrubs, and grass and appear stable.
- The upstream embankment is bounded by a concrete wall that appears to be stable, with some spalling and minor cracking. Near the spillway on both sides, there is deterioration at the concrete wall with some exposed rebar. The ground surface upstream of the concrete wall is under water and was not observed at the time of inspection.

#### *Crest*

- At the time of the inspection, the crest of the dam appeared to be in good condition.
- Depressions of the ground surface were observed near the dam abutment walls, at the intersection with the upstream retaining wall, at both sides of the dam.

#### *Spillway*

- The spillway floor is concrete and appeared to be in good condition with some minor cracks and spalling.
- Riprap was observed downstream of the spillway, but appeared to be sparse and/or washed away. As a result, some undermining of the sill has occurred. A void was observed beneath the sill.
- The spillway capacity is not able to pass the 100-year flood, but the impoundment has enough capacity to store the 100-year flood volume and therefore the embankment will not be overtopped if a 100-year runoff event occurs.

- Just upstream of the spillway there is a wood dock section and other debris present.
- Voids with running water flowing through them were observed on the side of the apron.

#### *Abutments*

- Abutments appeared stable and in good condition with minor cracking and spalling.
- There are depressions on the outside of the abutments both on the left, and right sides.

## **2.2 Recommendations**

The following recommended actions should be completed within the time frames indicated:

#### *Immediately*

- Remove debris from spillway.

#### *Within 6 Months*

- Repair deteriorated corners of the embankment and spillway where rebar is currently exposed.
- Place grout underneath the undermined apron on the downstream side of the spillway. Place additional riprap downstream of the spillway sill.
- Remove trees and brush at dam and vegetate with grass. Use hardy, temporary stabilization such as erosion control blanket until vegetation becomes established.

#### *Within 1 Year*

- Develop an Operation and Maintenance (O&M) Manual or plan for the dam.

#### *Ongoing*

- Practice good maintenance procedures including mowing of embankments and weekly inspections.
- Fill void holes with soil or grout.
- Remove accumulated debris from spillway.
- Monitor for any erosion at the embankments. Stabilize as needed.
- Monitor for any additional deterioration, cracking, or spalling of concrete. Repair if deterioration continues.

- Monitor metal wall voids and erosion east of the left embankment wall. If erosion and failure continue, stabilization should be implemented.
- Inspect based on EGLE requirements.

## 3.0 Project Information

### 3.1 Description of the Dam

The Meadow Lake Dam is located on the Franklin Branch of the Rouge River in Bloomfield Township, Oakland County, Michigan. The dam forms an impoundment lake (Meadow Lake) which extends to the north of the dam, impounding approximately 18 acres at normal flow. A location map is included in Appendix A of this report. The dam has a drainage area of approximately 205 acres. A drainage area map is also included in Appendix A of this report.

The dam consists of a 12-foot wide concrete overflow spillway with earth embankments which extend to the west (right) and east (left). The spillway is approximately 25 feet long, with an 8-foot long concrete apron. Some stone was observed downstream of the apron but appears to have been washed out and re-located. At the time of inspection, there was less than one-inch depth of flow over the spillway. The embankment's top width is approximately 20 feet. A concrete wall is located along the upstream side of both embankments. The total height of the dam is approximately 9 feet from the downstream toe to the dam crest. A plan view and sections that were provided in previous dam safety reports by Collins Engineers have been included in Appendix B.

### 3.2 Purpose of the Dam

The original purpose and age of the dam are unknown. The dam currently impounds 18 acres at normal flow. The impoundment (Meadow Lake) serves a recreational purpose for the adjacent property owners.

### 3.3 Available Information

No design drawings or geotechnical data were available for this dam at the time of our site visit.

### 3.4 Past Inspection Reports

The following is a list of the known previous inspections of this dam:



Date

September 6, 2000

April 6, 2007

June 27, 2012

May 16, 2017

Preparer

Collins Engineers, Inc.

Collins Engineers, Inc.

Environmental Consulting & Technology, Inc.

Environmental Consulting & Technology, Inc.

None of these reports will be included with this document.

## 4.0 Field Inspection Information

The following discussion of the physical condition of the dam is based on the visual observations and photographs obtained on the inspection date. Photographs taken at the time of the inspection are included in Appendix C of this report.

### **Upstream Embankments**

Both the left and right upstream dam embankments are bounded by a concrete wall. Photos of the concrete walls are shown in photographs 1 through 7. The concrete wall appears to be generally stable and in fair condition with some cracking, spalling, and deterioration (Photos 4, 5, 6, and 7). At either corner of the embankment walls, there are depressions, possibly due to some erosion or some soil loss. The top of the concrete walls appear to have some spalling (Photo 5) and on the right side, there is a crack that extends down in the side of the wall (Photos 6 and 7). The portion of the wall under water and the lake bottom/ground surface in front of the wall was not visible during the time of inspection and was not observed. East of the left embankment concrete wall, there is a section of bank that was reinforced with riprap since the last inspection. (Photo 11). During the 2017 inspection, a steel sheet pile seawall in poor condition was observed, which has since been replaced with riprap.

### **Crest**

The crest is shown in photographs 8 through 13. It has mowed lawn on both sides of the dam, with dense trees and shrubs on the right side near the spillway and mulch with lilac shrubs on the left side near the spillway.

### **Abutments**

The left and right abutments are shown in photographs 14 through 19. They appear to be in stable condition but are deteriorating. Spalling, exposed rebar (photos 14 and 15), and some cracking was observed.

### **Spillway**

The spillway is shown in photographs 18 through 26. It is approximately 12 feet wide and approximately 25 feet long. Minor spalling and cracking was observed at the concrete wall and the spillway on both sides (Photos 16 and 17). Immediately downstream of the spillway is a concrete apron that is approximately 3 feet below the spillway and 8 feet long. Some riprap was observed downstream of the apron but it is sparse and appears as though some has been displaced. It also appears that the apron is sloping downwards towards the discharge channel. Some erosion was observed just downstream of the apron, as well as void spaces with running water flowing through the voids (Photos 24, 25, and 26).

### **Downstream Embankments**

The downstream embankments are shown in photographs 27 and 28. They are steep and vegetated with trees and shrubs. Both sides of the downstream embankments near the corner of the spillway have depressions (Photo 26). The right downstream embankment is vegetated with dense trees and shrubs (Photo 28).

## 5.0 Structural Stability

Based on the visual observations made during the field inspection, the dam appears to be stable. Repairs, monitoring, and routine operation and maintenance, however, should continue to be conducted as indicated in the recommendations.

## 6.0 Hydrologic/Hydraulics

Because the Meadow Lake Dam is classified as a low hazard potential classification by the Michigan Department of Environment, Great Lakes, & Energy (EGLE), it is required that the dam pass a minimum of the 100-year design flood. In their November 29, 2023 email, the EGLE estimated the 100 year flood to be 170 cubic feet per second (cfs) with a total runoff volume generated from the 100-year event to be 35 acre-feet. This email is included with this report in Appendix D.

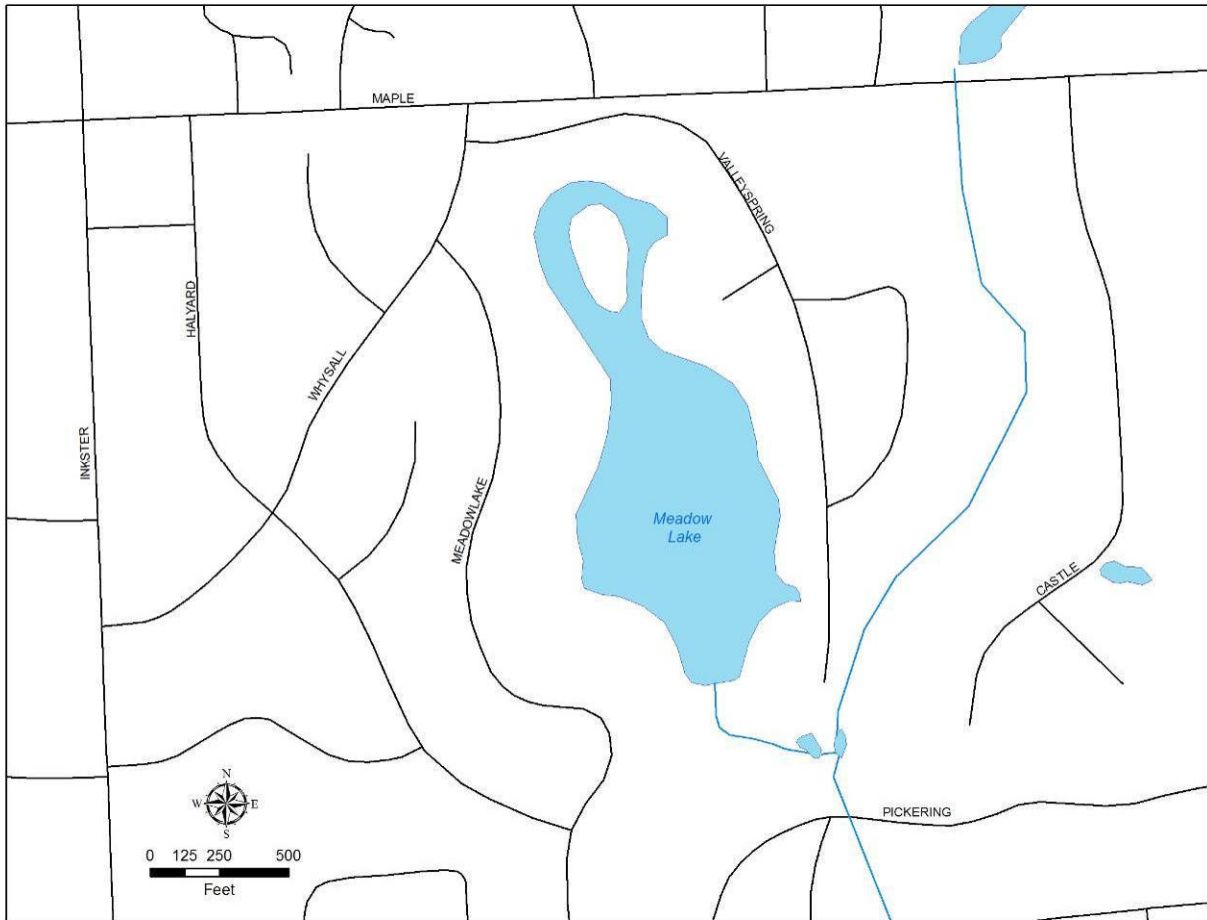
As presented in the 2007 Collins Engineers, Inc. dam safety report, the capacity of the spillway is 110 cfs. Based on the information included in the 2007 report, the lake provides 42 acre-feet of storage, exceeding the required 35 acre-feet, 100-year flood volume.

Based on this information, the spillway capacity is not able to pass the 100-year design flood, but the impoundment should have enough capacity to store the 100-year flood volume without overtopping the embankment of the dam.

## 7.0 Operation and Maintenance

Operation of the dam is the responsibility of the owner, Meadow Lake Farm Civic Association. It is understood that an association representative makes routine visits to the dam. An Operation and Maintenance (O&M) Manual or plan does not exist for this dam. It appears that the only maintenance conducted on the dam since the last inspection was reinforcement of the bank to the east of the left embankment (steel sheet pile seawall in poor condition replaced with riprap) and rodent hole repairs. It is recommended that an O&M Manual or plan be developed for the dam.

## Appendix A Maps



*Meadow Lake Dam Location Map*

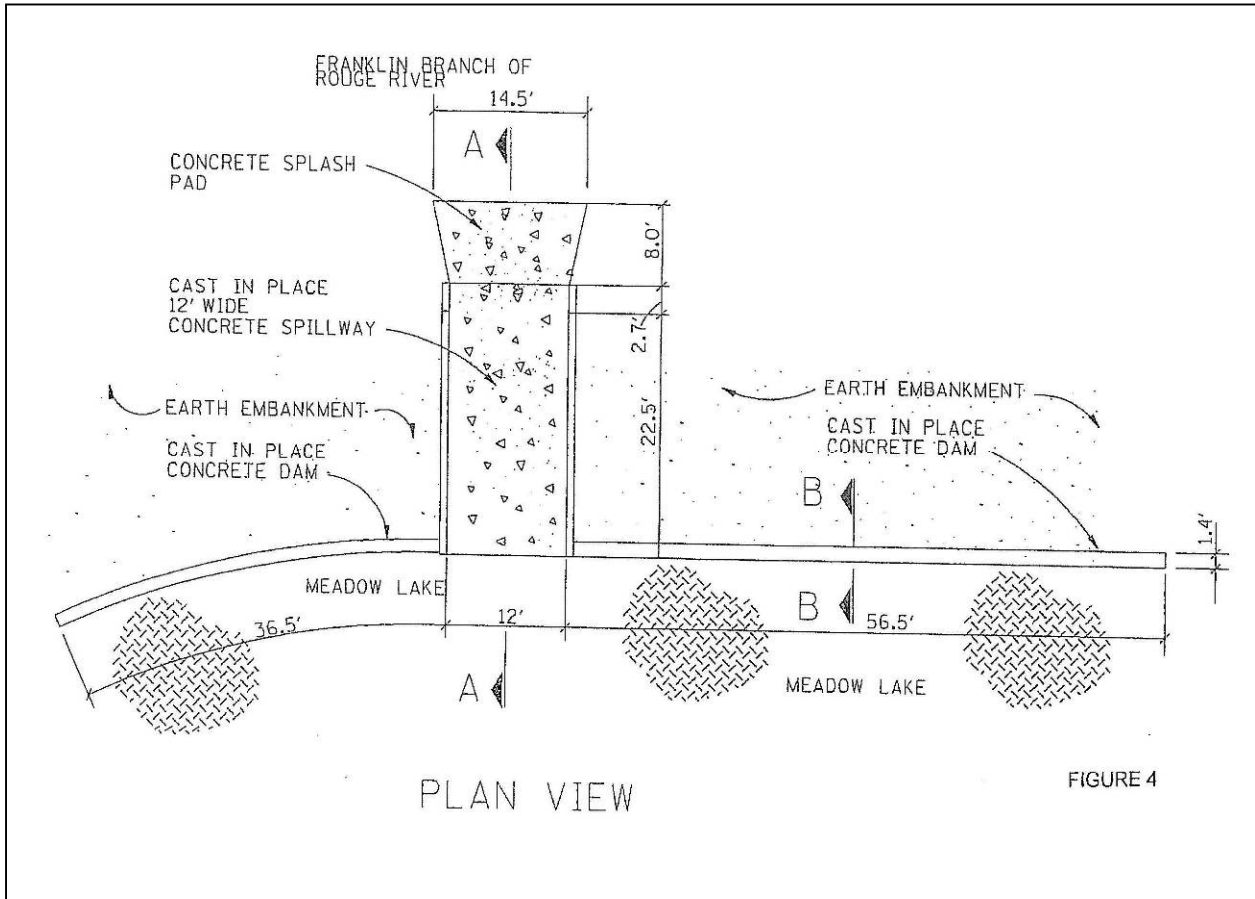


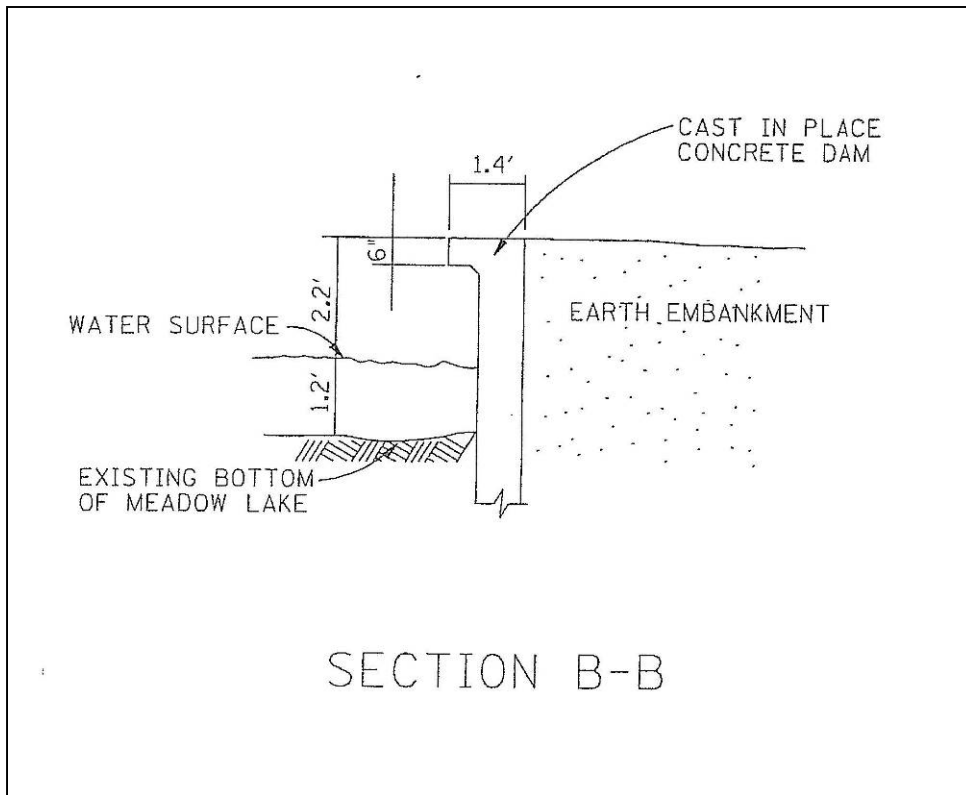
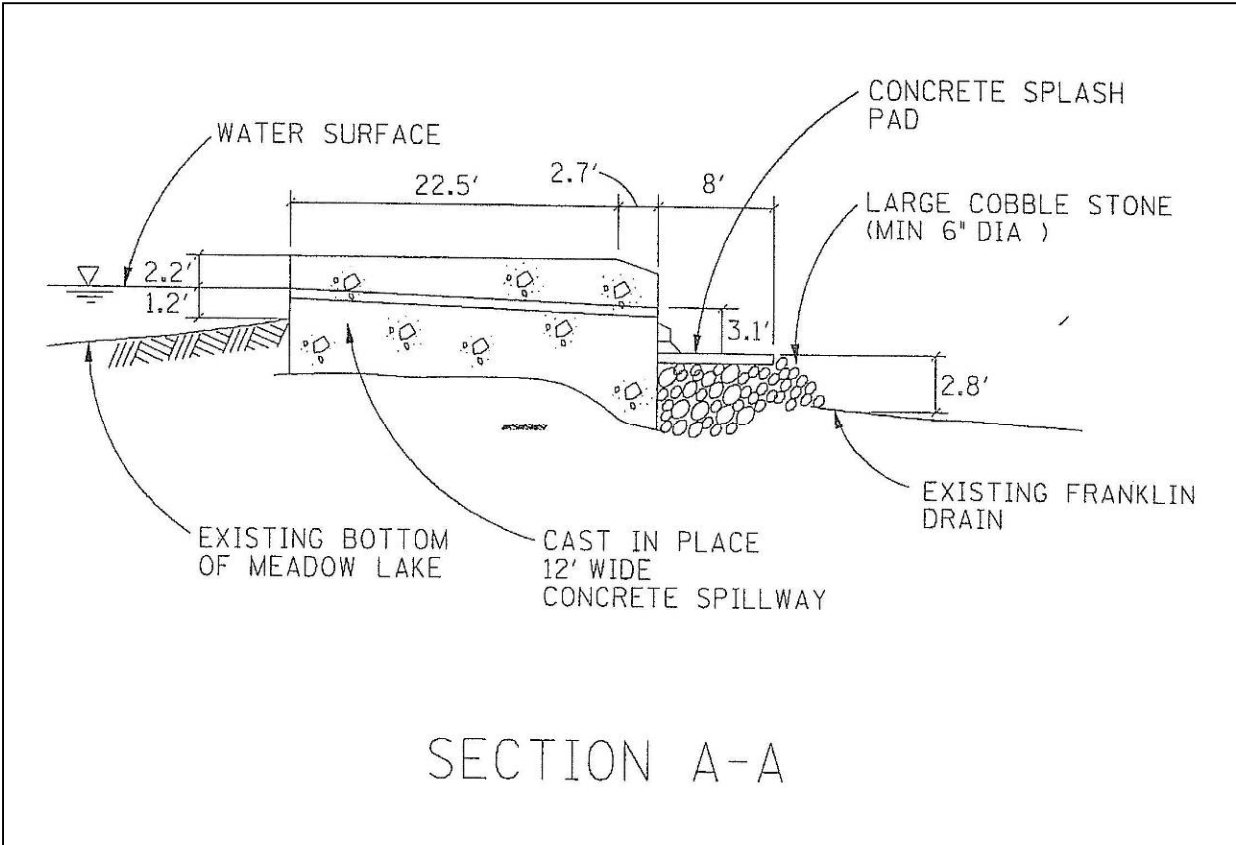


*Meadow Lake Dam Drainage Area Map*

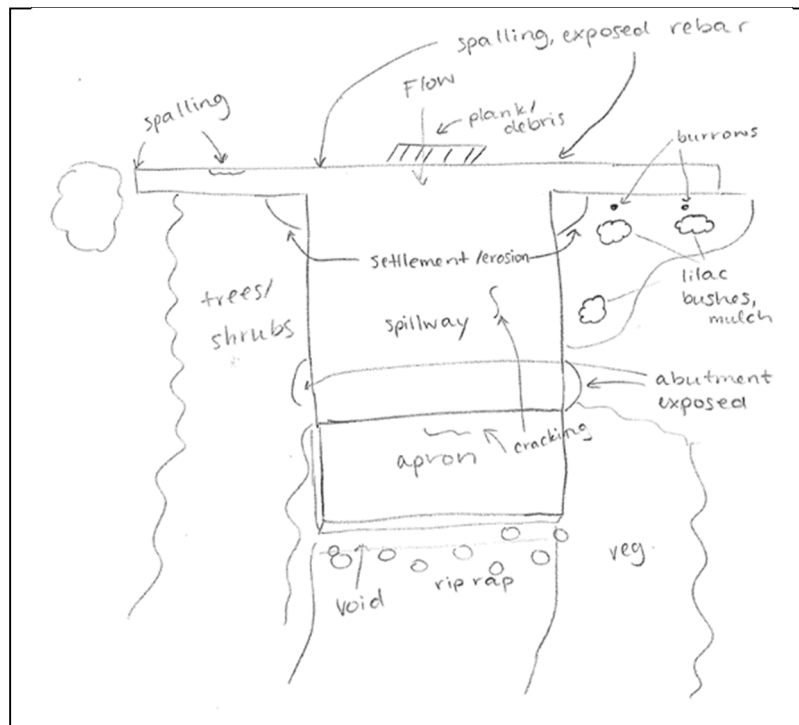
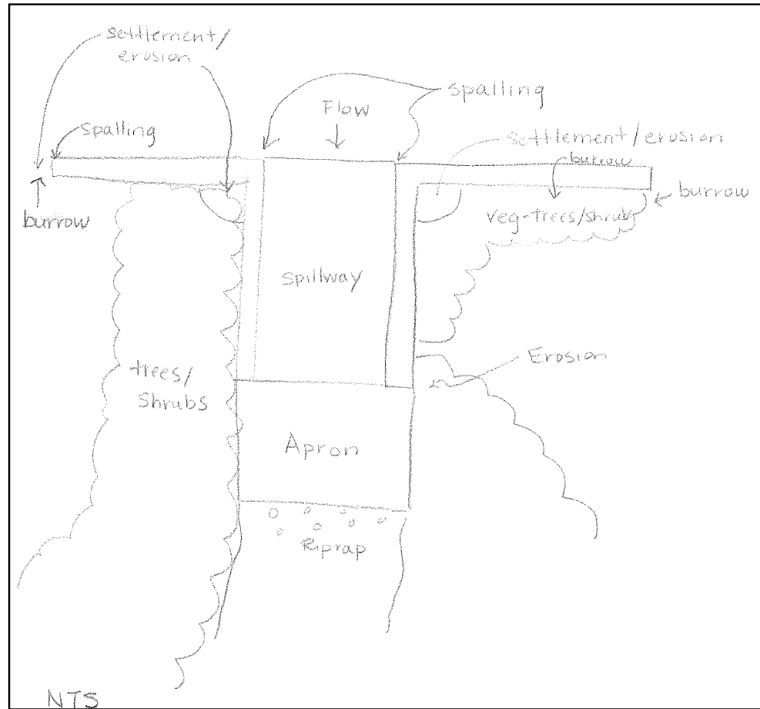
## Appendix B Figures and Sketches

The following figures and sketches were included in both the 2000 and 2007 Collins Engineers, Inc. Dam Safety Inspection Report.





The following sketches were included in the 2012 and 2017 ECT Dam Safety Inspection Reports. No other figures and/or sketches are known to be available. An updated sketch based on the 2023 inspection is included in the Appendix.



## Appendix C Photographs

Photo

Description



Photo 1:

Upstream side of dam. View looking southwest.



Photo 2:

Upstream concrete wall. View looking west.



Photo 3:

Upstream concrete wall. View looking east.

Photo	Description
 A close-up photograph of a concrete wall at the top of a dam. The water level is just above the wall. There is significant spalling and crumbling of the concrete at the top edge, with some green vegetation growing in the gaps.	<p>Photo 4: Upstream right concrete wall. Spalling on top of wall.</p>
 A photograph showing a concrete wall on the left side of a dam. The wall is heavily damaged, with large sections of concrete missing and exposed aggregate. The water is visible to the right of the wall.	<p>Photo 5: Upstream right concrete wall. Spalling on top of wall.</p>
 A close-up photograph of a concrete wall showing a prominent vertical crack that runs along the length of the wall. The crack is deep and appears to be a structural failure. There is some discoloration and staining around the crack.	<p>Photo 6: Upstream right concrete wall. Crack, extending alongside of wall.</p>



Photo

Description



Photo 7:  
Upstream right concrete wall. View of face of wall. Crack extending alongside of wall.



Photo 8:  
Right crest. View looking northwest.

Photo

Description



Photo 9:

Right crest with vegetation. View looking east.



Photo 10:

Right crest and top of right embankment concrete wall.

Photo

Description



Photo 11:  
Left crest and left embankment concrete wall.  
View looking east.



Photo 12:  
Left crest and embankment.

Photo

Description



Photo 13:  
Left abutment spalling, cracking, and exposed rebar. Spalling and cracking of concrete at crest.



Photo 14:  
Left abutment spalling, rebar exposed.



Photo 15:  
Right abutment at crest spalling, rebar exposed. Cracks in vertical concrete walls and horizontal concrete spillway. The crack visible near the upstream edge of the horizontal spillway inlet apron extends across the entire apron.

Photo

Description



Photo 16:  
Right abutment, concrete wall spalling and cracking.



Photo 17:  
Left side of spillway concrete wall spalling and cracking. View looking east.



Photo 18:  
Left side of spillway. View looking southeast.

Photo

Description



Photo 19:

Right side of spillway. View looking southwest.



Photo 20:

Top of spillway and downstream embankments. View looking south.



Photo 21:

Spillway, apron and downstream of dam. View looking northwest.

Photo

Description



Photo 22:  
View of apron looking north.

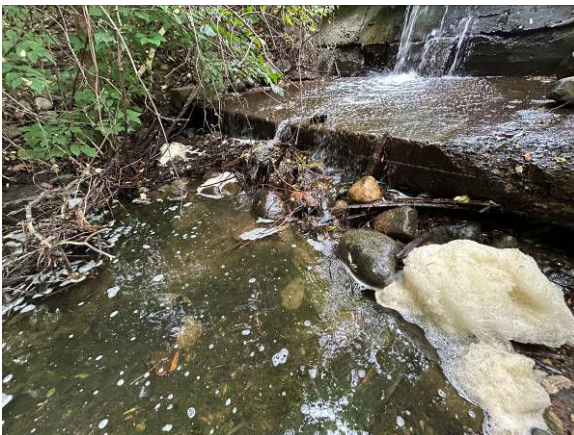


Photo 23:  
Apron of dam. Debris piled up along apron and void present.



Photo 24:  
Right side of apron showing sparse rip rap, voids with seepage, and woody debris.

Photo

Description



Photo 25:  
Seepage observed flowing from void space beneath outlet apron. Sparse riprap downstream of apron.



Photo 26:  
Left downstream embankment with good vegetation.



Photo 27:  
Void space to the east of left concrete wall corner at downstream embankment. Top view.



Photo



Description

Photo 28:

Right downstream embankment.

## Appendix D Hydrological and Hydraulic Data

**From:** EGLE-wrd-qreq <EGLE-wrd-qreq@michigan.gov>  
**Sent:** Wednesday, November 29, 2023 3:44 PM  
**To:** Maria Kuenzer  
**Subject:** RE: Flood or Low Flow Discharge Request

We have processed the discharge request submitted by email on October 31, 2023 (Process No. 20230576), as follows:

Tributary to Franklin Branch River Rouge at Meadow Lake Dam, Dam ID 1686, Section 31, T2N, R10E, Bloomfield Township, Oakland County, has a drainage area of 0.32 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The 50%, 20%, 10%, 4%, 2%, 1%, 0.5%, and 0.2% chance peak flows are estimated to be 50 cubic feet per second (cfs), 80 cfs, 100 cfs, 120 cfs, 150 cfs, 170 cfs, 190 cfs, and 230 cfs, respectively. The 1% chance flood volume is estimated to be 35 acre-feet. (Watershed Basin No. 31 Rouge).

Please include a copy of this letter with your inspection report or any subsequent application for permit. These estimates should be confirmed by our office if an application is not submitted within one year. If you have any questions concerning the discharge estimates, please contact Ms. Susan Greiner, Hydrologic Studies and Floodplain Management Unit, at 517-927-3838, or by email at: GreinerS@michigan.gov. If you have any questions concerning the hydraulics or the requirements for the dam safety inspection report, please contact Mr. Mitchel Thelen of our Dam Safety Unit at 517-230-5866, or by email at: ThelenM21@michigan.gov.

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**From:** EGLE-Automated <EGLE-Automated@michigan.gov>  
**Sent:** Tuesday, October 31, 2023 11:14 AM  
**To:** EGLE-wrd-qreq <EGLE-wrd-qreq@michigan.gov>  
**Subject:** Flood or Low Flow Discharge Request

Requestor: Maria Kuenzer  
Company: Environmental Consulting & Technology, Inc.  
Address: 2100 Commonwealth Blvd. Ste. 300  
City/State: Ann Arbor/Michigan  
ZIP Code: 48105  
Phone: 5176058818  
Date: 10/31/2023  
50 percent  
20 percent  
10 percent  
4 percent  
2 percent  
1 percent  
0.5 percent  
0.2 percent  
Contact Agency:  
Contact Person:  
Watercourse: Meadow Lake  
Local Name:  
County: Oakland

City/Township: Bloomfield Township

Section: 31

Town: 02N

Range: 10E

Location: Dam Name: Meadow Lake Dam, ID Number: 1686

FFR1: Dam

Email: [mkuenzer@ectinc.com](mailto:mkuenzer@ectinc.com)

## Appendix E Dam Inspection Checklist

### DAM INSPECTION CHECKLIST

**NAME OF DAM** Meadow Lake Dam      **SECTION** 31      **T** 2N      **R** 10E  
**OWNER** Meadow Lake Association      **COUNTY** Oakland  
**ADDRESS** P.O. Box 103, Franklin, MI 48025      **LOCATION** Bloomfield Twp., Michigan  
**PHONE** \_\_\_\_\_      **INVENTORY NO.** 1686  
**INSPECTED BY** Charles Humphriss      **HAZARD CATEGORY** Low  
**DATE** September 08, 2023      **WEATHER** Sunny, 80°  
**PERSONS PRESENT AT INSPECTION** Charles Humphriss, Maria Kuenzer

**EMBANKMENT CREST ELEV.** Unknown/ Not surveyed      **TALLWATER ELEV.** Unknown/ Not surveyed  
**IMPOUNDMENT ELEV.** Unknown/ Not surveyed  
**RIVER NAME** Franklin Branch of the Rouge River

**Y=YES N=NO P=PHOTO**

ITEM	Y	N	P	REMARKS/LOCATION
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**I. EMBANKMENT**

**A. UPSTREAM SLOPE** – no upstream slope, upstream embankment bounded by concrete wall in stable conditions, some cracks and spalls.

1. Grass Cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N/A
2. Trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lilac bushes (left side, near wall), vegetation-shrubs and a few trees (right side)
3. Riprap	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5. Cracks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7. Animal burrows	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8. Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
9. Voids	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

**B. CREST**

1. Grass Cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lilac bushes on the left, some lawn on both sides.
2. Trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lilac trees on the left, shrubs with a few trees on right.
3. Gravel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

5. Cracks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Photo 15
6. Settlement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low grade near corners of spillway on both sides
7. Rutting	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

**C. DOWNSTREAM SLOPE**

1. Grass Cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Trees	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Cracks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5. Animal Burrows	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7. Seeps/boils	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8. Toe Drain	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

**D. VALLEY ABUTMENTS**

1. Seepage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

**II. PRINCIPAL SPILLWAY**

**A. LEFT ABUTMENT**

1. Concrete Cracks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Displacement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Spalling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Exposed rebar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Earth erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Seepage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Photo 25
7. Rip-Rap	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

**B. RIGHT ABUTMENT**

1. Concrete Cracks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Displacement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Spalling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Exposed rebar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Earth erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Seepage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Photo 24
7. Rip-Rap	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

**C. DISCHARGE CHANNEL**

1. Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cracks on the spillway and apron. Void underneath apron.
2. Bank Sloughing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Riprap	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Missing riprap downstream of apron, and present riprap is sparse.
4. Debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**IV. OTHER**

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### V. SUMMARY/COMMENTS/RECOMMENDATIONS

Generally, stable and in fair condition.

- Spalling and exposed rebar along concrete wall at spillway on each side should be repaired.
- Voids beneath outlet apron should be filled in to minimize seepage flows and settlement of apron
- Riprap should be placed to restore the outlet apron to the as-built condition depicted in Appendix B, Section A-A, which will help prevent further undermining and settling of the concrete apron slab and help stabilize the stream bed downstream of the apron.
- Trees and large shrubs, including ornamental lilacs and invasive honeysuckle and buckthorn, should be removed from dam crest because roots provide pathways for seepage/erosion beneath the dam. Large roots also have the potential to damage concrete. Dense vegetation also makes it difficult to observe the condition of the dam during routine inspections.
- Minor cracking and spalling should be monitored.

### VI. SKETCHES

