Indian Lake Dam Inspection Report

Dam Identification No.: 687
Hazard Potential: Low
Section 31; T.5N. – R.11E.
Addison Township, Oakland County, Michigan
Located on a tributary of West Branch of Stony Creek
Per Part 315, Act 451 of 1994

Prepared for:
Eric Goetz
Indian Lake Improvement Association
210 Indianside Rd.
Oakland, MI 48363
(248) 408-1320
Operator email: eric@tourconnection.com

Prepared By:

Spicer Group, Inc.
125 Helle Blvd #2
Dundee, Michigan 48131
(734) 823-3308

Inspected By:

Richard V. Graham III, P.E. # 62309

STATE OF MICHIGAN
RICHARD VADE GRAHAM, III
PROFESSIONAL ENGINEER
No. 6201062039
LICENSED PROFESSIONAL ENGINEER
12/23/22

Date of Inspection: December 16, 2022
Date of Final Report: December 23, 2022

Project No. 133689SG2022

TABLE OF CONTENTS

I. INTRODUCTION

The Indian Lake Dam was inspected pursuant to the requirements of Part 315, Dam Safety, Natural Resources and Environmental Protection Act, Act 451 of 1994. The Spicer Group conducted the 5-year inspection of the dam on December 16, 2022 as requested by the delegated authority of the dam, Indian Lake Improvement Association (ILIA). The scope of this inspection is to identify conditions that constitute an existing or potential hazard to the dam. The identification of potential hazards is limited to the field visual inspection, review of previous reports, review of previous plans, and general computations. The contents of this report are not to be treated as a detailed engineering evaluation.

This inspection report will serve as a supplement to previous inspections performed on the dam and document work being performed this year. Previous inspection reports, drawings, sketches, calculations, etc. will be referred to as part of this inspection report. A summary of the design, construction, maintenance, and subsequent inspections of the dam are outlined in the Project Information section of this report. All references regarding the orientation of the dam shall be made as viewed looking downstream. The terms satisfactory, fair, poor, and unsatisfactory will be used to describe the conditions of the dam. The following is a brief definition of each term.

SATISFACTORY

No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions (static, hydrologic, seismic) in accordance with the applicable regulatory criteria or tolerable risk guidelines.

FAIR

No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and /or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.

POOR

Dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. POOR may also be used when uncertainties exist as to

critical analysis parameters which identify a potential dam safety deficiency: further investigations and studies are necessary.

UNSATISFACTORY

Dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution. Reservoir restrictions may be necessary until problem resolution.

II. CONCLUSIONS AND RECOMMENDATIONS

A. Overall Condition

The visual inspection of the dam indicates the dam and its appurtenant structures are in satisfactory overall condition. However, there are deficiencies which should be monitored and/or corrected. The following list is a summary of the areas of concern that were observed during the visual inspection.

B. Observed Deficiencies/Prioritized Recommendations

Specific deficiencies and recommended corrective measures, listed in order of priority are as follows:

1. Erosion from surface runoff is evident on the downstream face of the dam near the west corner of the dam.

   Recommend: Install filter fabric and plain riprap in these areas to prevent further erosion from storm events.

2. Multiple cracks (mostly sealed), spalling, and patches in the concrete were observed.

   Recommend: Monitor cracks for increased separation, loss of material, or delamination of the patches. Fill cracks and repair concrete section loss as necessary.

3. The metal safety railings of the dam are corroding.

Recommend: Paint the metal safety railings and replace corroding sections with holes in them. Also, plan to either fully repair or replace all metal safety railings in the next 10 years if possible.

C. Further Detailed Studies and/or Investigations

At this time, we do not recommend any further investigation of the dam, outside of the visual inspection required every five (5) years by an engineer and periodic inspection by the Indian Lake Improvement Association.

D. Hazard Potential Classification

The hazard potential classification of the Indian Lake Dam is currently listed as a low hazard potential dam. Based on our inspection and the recent repairs, we do not recommend changing this classification.

The hazard potential classification is only an indication of the potential for loss of life and economic loss due to failure of the dam. The hazard potential is not an indication of the stability or integrity of the dam.

III. PROJECT INFORMATION

A. General Description of Dam

The Indian Lake Dam is in Section 31 of Addison Township, Oakland County, Michigan. The Indian Lake Dam is situated between northern and southern portions of Indian Lake. The impoundment is in the watershed for a tributary to the west branch of Stony Creek. The dam is a concrete buttress type dam consisting of an overflow spillway located between concrete bays and buttresses that extend east and west to the natural valley walls. There are six bays and a fixed concrete spillway. The crest of the dam is 150 feet in length. The Indian Lake Dam has a head of 16 feet and a spillway width of 20 feet. Downstream of the fixed crest spillway is an energy dissipating sill that extends the width of the

spillway. The dam crest consists predominately of a concrete pathway. The impoundment is about 58 acres and can store approximately 600 acre-ft of water under normal conditions and store a maximum of 900 acre-feet.

B. Purpose of Dam

The Indian Lake Dam was originally constructed for residential development and recreational purposes. Currently, the lake is well developed with lakeshore homes; Indian Lake is used for water recreation sports such as swimming, boating, fishing, and wildlife observation.

C. Available Design, Construction and Maintenance Information

At the time of the inspection all requested information regarding the dam was available. Spicer Group has a history with inspections and repairs for the dam. Repairs were completed in 2013 which were performed under Michigan Department of Environmental Quality (Now Department of Environment, Great Lakes, and Energy (EGLE)) Permit #13-63-0190-P. All information is in files with either Spicer Group and the ILIA. Information regarding design and construction should also be on file at the EGLE – Dam Safety Unit.

D. Previous Inspection Reports

2003 Dam Inspection Report – Hanson Engineering
2008 Dam Inspection Report – Spicer Group
2013 Dam Inspection Report – Spicer Group
2018 Dam Inspection Report – Spicer Group

Copies of these dam inspection reports and relevant information are on file with the ILIA, and the EGLE – Dam Safety Unit.

IV. FIELD INSPECTION

Spicer Group performed a visual inspection of the dam on December 16, 2022. Photographs were taken, and a field inspection checklist was completed in the field and

in the office summarizing the inspection. The checklist and photographs are included in the appendices of this report. The following is a summary of the visual observations made during the inspection:

A. The structure has had repairs completed to the bays. Overall the structure appears to be in fair condition.

B. The approach channel is open and free of debris.

C. The spillway appears to be functioning well and no issues are observed

D. The safety railings are experiencing corrosion and need to be painted, repaired, and monitored annually.

E. Site security is satisfactory, as the structure is surrounded by private homes and is easily monitored by property owners. There are fenced gates at each end of the structure to limit access.

F. There is minor erosion on the west side of the downstream slope which appears to be caused by runoff from the access road.

G. Vegetation on the downstream slopes is well established except where the runoff mentioned above is accessing the site.

H. The repairs to the concrete bays appears to be functioning as expected and there are no issues observed.

I. Animal burrows were observed in fill placed inside of the spillway bays. However, the animal burrows do not pose a threat to the dam as there are concrete walls and footings below the fill.

V. STRUCTURAL STABILITY

The overall structural stability of the dam is satisfactory, based on visual inspection. The dam's concrete structures and embankments show no signs of potential failure. The outlet structures appear to be in fair condition.

VI. HYDROLOGY AND HYDRAULICS

A. Available Design Data, Hydrologic Design Data

Hydrologic Design Data and information has been obtained from EGLE. Hydrologic information provided by EGLE has been obtained and is included in the appendix of this report. The design discharge for this dam is the 1% chance peak inflow into Indian Lake and calculated by EGLE to be 65 cfs. Low hazard dams are required to convey the 100yr (1% chance discharge flood) storm or the flood of record, whichever is greater.

B. Contributing Drainage Area

EGLE estimates the contributing drainage area to be 1.75 square miles or 1,120 acres. EGLE estimates the surface area of Indian Lake at normal flow to be 58 acres. This provides a ratio of 19.3 to 1 of contributing watershed drainage area to impoundment area in acres. The impoundment is about 58 acres and can store approximately 600 acre-ft of water under normal conditions and store a maximum of 900 acre-ft.

C. Design Flood Determination

The design flood is determined by the EGLE classification of the dam. Low hazard dams are required to convey the 100-year event or maximum observed event, whichever is greater. EGLE determined the 100-year peak flow into Indian Lake Dam to be 65 cfs.

D. Existing Spillway Capacity

As reported by JCK & Associates, on October 24th, 1994, the dam discharged 200 cfs. The 200 cfs exceeds the flow on the discharge request. Based on this documented evidence the dam has the capacity to pass the flood of record. Therefore, no further evaluations are necessary.

E. Routing of Spillway Design Flood

Due to the fact that the dam can convey the required storm event, routing of the inflow hydrographs is not necessary.

F. Flood of Record

The largest flood of record is October 24th, 1994, with a discharge rate of 200 cfs. An engineering report by JCK & Associates from 1994 confirms the spillway can pass this flow.

VII. OPERATION AND MAINTENANCE

A. Assessment of Operating Equipment and Procedures

The dam has a fixed crest spillway with no adjustment and no operating equipment. There are no stop logs or other flow control structures present.

B. Evaluation of Current Maintenance Plan

A maintenance log is maintained by the association members and includes records back to 2013.

In addition to the items outlined in the operation and maintenance plan, all metal surfaces should be inspected on a regular basis. Sandblasting, cleaning, and painting should be performed as necessary. The cracks and spalling in the concrete structure should be inspected each year for displacement or widening and repaired as necessary.

APPENDIX A

2022 EGLE FLOW RATES

2022 DAM INSPECTION CHECKLIST

Malburg, Andra L.

From: Bowser, Joseph C.
Sent: Tuesday, January 10, 2023 6:12 PM
To: Malburg, Andra L.
Subject: FW: Flood or Low Flow Discharge Request

Follow Up Flag: Follow up
Flag Status: Flagged

-----Original Message-----
From: EGLE-wrd-qreq <EGLE-wrd-qreq@michigan.gov>
Sent: Tuesday, January 10, 2023 12:01 PM
To: Bowser, Joseph C. <joseph.bowser@spicergroup.com>
Subject: RE: Flood or Low Flow Discharge Request

We have processed the discharge request submitted by email on December 12, 2022 (Process No. 20220735), as follows:

Tributary to West Branch Stony Creek at Indian Lake Dam, Dam ID 687, Section 31, T5N, R11E, Addison Township, Oakland County, has a total drainage area of 10.3 square miles and a contributing drainage area of 1.75 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 outflows are estimated to be 10 cubic feet per second (cfs), 15 cfs, 25 cfs, 40 cfs, 50 cfs, 65 cfs, 80 cfs, and 110 cfs, respectively. (Watershed Basin No. 12 Clinton).

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.

Low flows are provided in a separate email.

-----Original Message-----
From: EGLE-Automated <EGLE-Automated@michigan.gov>
Sent: Monday, December 12, 2022 12:24 PM
To: EGLE-wrd-qreq <EGLE-wrd-qreq@michigan.gov>
Subject: Flood or Low Flow Discharge Request

Requestor: Joseph Bowser
Company: Spicer Group
Address: 125 Helle Blvd Suite #2
City/State: Dundee
ZIP Code: 48131

Phone: 7342657552
Date: 12/12/2022
50 percent
20 percent
10 percent
4 percent
2 percent
1 percent
0.5 percent
0.2 percent
Monthly 95 percent exceedance
Monthly 50 percent exceedance
Monthly Mean
90 Day, 10 year (90Q10)
Lowest monthly 95 percent exceedance
Lowest monthly 50 percent exceedance
Harmonic Mean
Flow Exceedance Curve
Contact Agency:
Contact Person:
Watercourse: Indian Lake
Local Name:
County: Oakland
City/Township: Addison Township
Section: 31
Town: 05N
Range: 11E
Location: Indian Lake Dam ID# 687 Coordinates: 42.799180, -83.200300
FFR1: Dam
Email: joseph.bowser@spicergroup.com

GENERAL INFORMATION / DESCRIPTION	
Name of Dam:	Indian Lake Dam
Dam Identification Number	ID #687
Project Number:	133689SG2022
County:	Oakland
Township	Addison Twp. / Oakland Twp
Town - Range:	T5N – R11E
Quarter Section of Section:	SE ¼ of Section 31
Impounded Lake, Stream, or River:	Indian Lake
Height of Dam:	20-ft
Length:	150-ft
Outlet Pipe(s) Size:	N/A
Normal Head on Dam:	16-ft
Impoundment Size:	58 acres
Maximum Storage Capacity:	900 ac-ft
Normal Storage:	600 ac-ft
Purpose of Dam:	Recreation
Owner:	Indian Lake Improvement Association
Contact Name:	Eric Goetz
Owner Address:	210 Indianside Rd.
	Oakland, MI 48363
Owner Phone Number:	248-408-1320
Email Address for report cover	eric@tourconnection.com
Operator:	As above
Contact Name:	
Operator Address:	
Email Address	
Operator Phone Number:	
Hazard Potential Classification: (Circle 1)	High – 3 yr Significant – 4 yr Low – 5 yr
Emergency Action Plan (EAP) Required?	No – low hazard rating
Is there an existing EAP?	Not Required
Name of the Emergency Coordinator:	
Emergency Coordinator Address:	
Emergency Coordinator Phone Number:	

Date of Inspection:	12/16/2022 2:00 p.m.
Photographs:	Yes
Tie down stationing along top of dam:	
	U/S = Upstream D/S = Downstream **N/A = Not Applicable**
FIELD INSPECTION	
EARTH EMBANKMENT	
A.) Settlement	
1.) depressions	None observed
2.) sinkholes	None observed
3.) ruts and paths	None observed
B.) Slope Stability (upstream/ downstream slopes)	
1.) Irregularity in alignment	None observed
2.) Movement	
a.) sloughing	None observed
b.) cracks	None observed
c.) slides	None observed
d.) slumps	None observed
e.) beaching	None observed
C.) Slope and Crown Protection	
1.) Vegetative Cover	Yes, U/S & D/S slopes
2.) Trees and brush	Minor
3.) Erosion from Surface Runoff	Yes on upstream slope west side
4.) Wave protection	Vegetation
D.) Seepage, Boils, Piping	
1.) At contact points with all concrete structures	None observed
2.) Along downstream slopes	None observed
3.) Along downstream toe	None observed
4.) Potential seepage areas	
a.) trees	None present in critical areas
b.) animal burrows	Yes, inside fill placed on bays. Not a safety concern.
5.) Drainage Systems	
a.) toe drains	None observed
b.) filters	None observed
c.) ditches	None observed

SPILLWAY AND OUTLET WORKS	
A.) Hydraulic Capacity	
1.) Principal Spillway	20-ft wide concrete spillway
2.) Auxiliary Spillway	None observed
3.) Powerhouses	N/A
4.) Other diversions or outlets, withdrawals	N/A
B.) Control Gates & Operating Mechanisms	N/A
1.) Structural Members	N/A
2.) Connections	N/A
3.) Hoists	N/A
4.) Cables	N/A
5.) Power Supply	N/A
6.) Gate Seals	N/A
C.) Stop Logs and Stop Log Channels	Not Applicable
1.) Leakage	
2.) Deterioration	
3.) Corrosion	
D.) Obstruction to Flow	
1.) Approach Channel	None observed
2.) Trash Racks	None observed
3.) Outlet Channel	None observed
4.) Sedimentation	minor
E.) Drawdown Facilities	
1.) Operation	None needed
F.) Energy Dissipation	
1.) Stilling Basins	None
2.) Plunge Pools	None
3.) Baffles	None
4.) Sills & Spillway Aprons	Present
5.) Erosion Protection	Riprap

G.) Pipes	Not Applicable – no pipes
1.) Joint Separation	
2.) Leakage	
3.) Protective Coatings	
4.) Settlement	
5.) Displacement	
H.) Sketch of Outlet Works	
CONCRETE & MASONRY STRUCTURES	
A.) Surface Conditions	
1.) Spalling	Spalling present on crown deck
2.) Cavitation	None observed
3.) Cracks	Present
a.) Displacement and Separation	Minor
b.) Seepage	None observed
4.) Efflorescence	Minor
B.) Joints (Monolith)	
1.) Sealant or Fillers	Yes, on the majority
2.) Movement	None observed
3.) Seepage	None observed
OPERATION AND MAINTENANCE	
A.) Operation	
1.) Seasonal or Fluctuating Pond Levels	
2.) Operation Records	With owner
3.) Periodic Drawdowns	None
4.) Instrumentation	None
B.) Maintenance	
1.) Repairs	
2.) Periodic Maintenance	
a.) Wood	N/A
b.) Metal	Safety railings corroded, needs replacement and painting
c.) Concrete	None
d.) Soils	None
e.) Electrical	N/A
f.) Mechanical	N/A

3.) Operation and Maintenance Plan	With owners
4.) Site Security	On private property with gates
C.) Emergency Action Plan	None
1.) Warning systems	
2.) Notification Networks	
GENERAL AREAS	
A.) Reservoir	
1.) Unique Features	None observed
2.) Dead trees, debris in reservoir	None observed
B.) Shoreline	
1.) Erosion	None observed
2.) Vegetation	Present
3.) Wave Protection	Vegetation
C.) Upstream Watershed	
1.) Historic Development	Residential / recreational
2.) Present Development	Residential / recreational
3.) Proposed Development	Residential / recreational
D.) Downstream Floodplain	
1.) Flood Protection	Floodplain present
2.) Historic, present, proposed development	Residential / recreational
3.) Channel restrictions	None observed
E.) Structural Stability	
1.) Embankment	Satisfactory
2.) Weir structure	N/A
3.) Outlet structure / pipe(s)	Fair
4.) Overall	Satisfactory
Further Detailed Studies?	No
If yes, explain	
GENERAL COMMENTS/OVERALL CONDITIONS	Satisfactory
Recommend Changing Hazard Classification?	YES NO

DAM INSPECTION PREPARATION CHECKLIST	
Requested / Received information from MDEQ?	Yes
Construction Plans, specifications,	No
Operations and Maintenance records,	No
Design Calculations, Any Information	No
Requested/ Received from OWNER?	Yes
Construction Plans, specifications,	
Operations & Maintenance records,	Yes
Design Calculations, Any Information	
Set Date of Inspection with owner?	Yes 12/16/2022 at 2:00 p.m.
Weather, Owner Availability?	20° Overcast
Operation of Gates/ Outlet Works?	N/A
What special instrumentation will be necessary?	No
Piezometers, Alignment Markers	
Benchmarks, Established Elevations	
Equipment:	
Survey (level or hand level, tripod, level rod):	X
Measuring equip. (tapes, rules, sounding lines):	X
Marking Paint/ Keel	X
Paper/ Pencil	X
Calculator	X
Scale	X
Map	X
Measuring Wheel	X
Seepage (bucket and timer)	
Camera/ Film	X
Binoculars	
Probe (undercutting) / Level Rod	X
Rubber Boots, Waders	X
Survey Field Book	X
File Folder	X
Boat	
Shovel	X
Hammer	X
Crack measuring device	X
Specialized Equipment (piezometers, etc.)	
Safety Equipment:	
Life Jacket	
Hard hats	X
Steel toed shoes	X
Lights	

Interview with Owner	Yes
Comments, Date	
Inspection Checklist/ Forms	X
POST INSPECTION CHECKLIST	
Interview with Owner/ Operator	Yes
Insure everything on inspection checklist is answered	Yes
Call Emergency Coordinator	N/A
What is needed in EAP for the County?	
Schedule a meeting with Owner and coordinator	
Prepare preliminary EAP (see EAP form)	
Inundation map	
List of possible flooded facilities, structures, etc.	
Time frame of flood wave	
Meeting with Emergency Coordinator and owner	N/A
Final EAP	N/A
Make revisions per results of meeting	
Preliminary Dam Inspection Report	Completed December 16, 2022
Submit preliminary dam inspection report to owner	
Final Dam Inspection Report	
Make revisions per owner's request, if any	

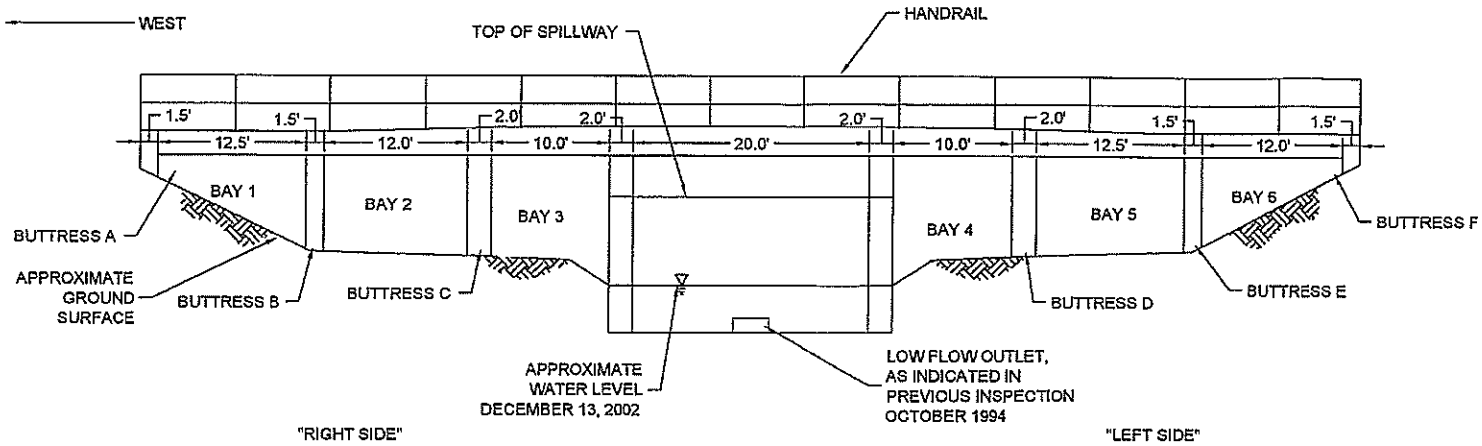
APPENDIX B

SITE LOCATION MAP

SCHEMATIC OF INLET/OUTLET

2013 REPAIR DETAIL


Indian Lake Dam
Dam Location
Google Earth
1 mi
N



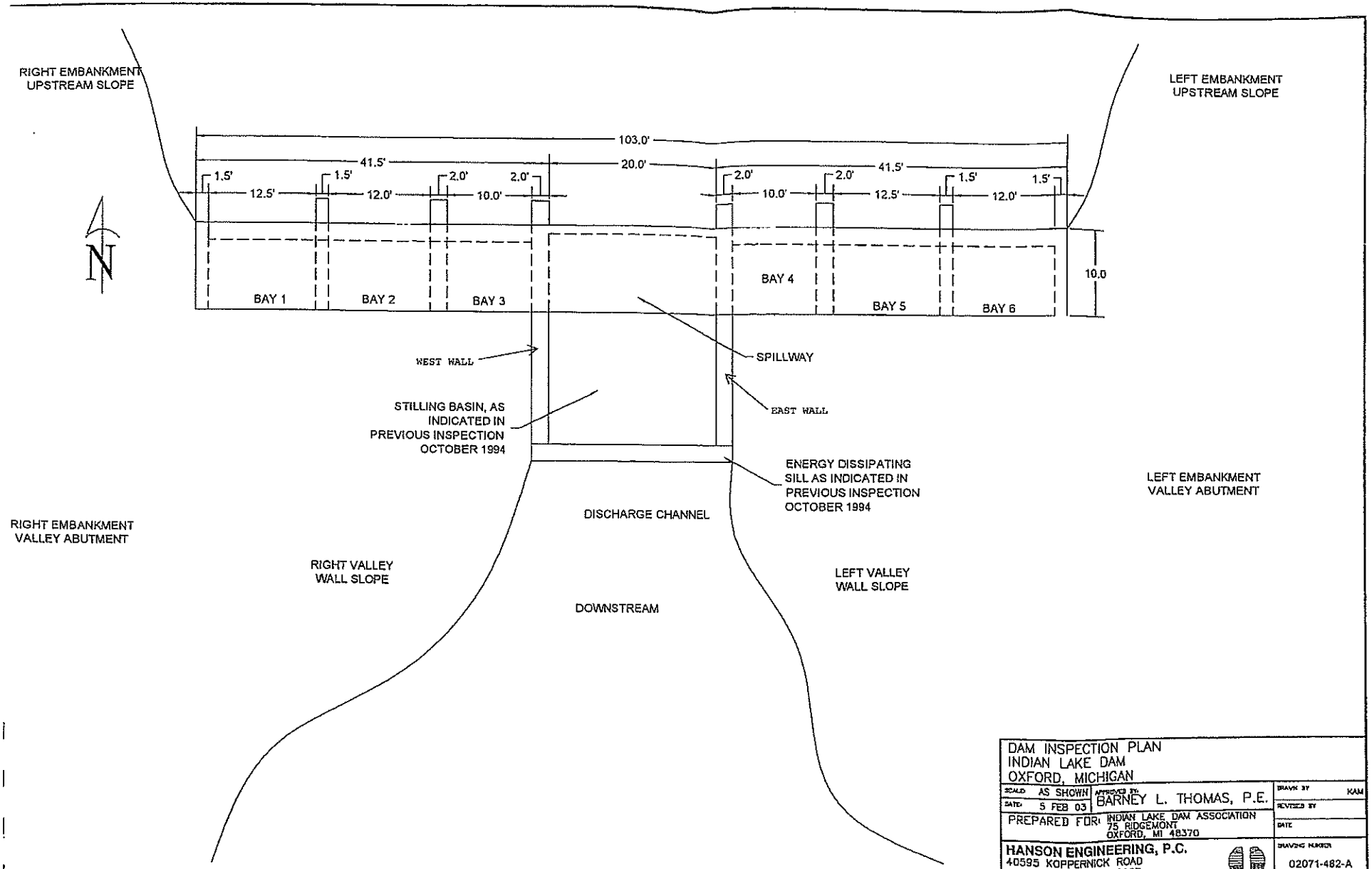
ELEVATION VIEW
SCALE: NONE

DAM INSPECTION ELEVATION VIEW
INDIAN LAKE DAM
OXFORD, MICHIGAN

SCALE: AS SHOWN	APPROVED BY: BARNEY L. THOMAS, P.E.	DRAWN BY	KAM
DATE: 5 FEB 03		REVISED BY	
PREPARED FOR: INDIAN LAKE DAM ASSOCIATION 75 RIDGEMONT OXFORD, MI 48370		DATE	

HANSON ENGINEERING, P.C.
40595 KOPPERNICK ROAD
CANTON, MICHIGAN 48187
Phone: (734) 454-6560 Fax: (734) 454-7423

DRAWING NUMBER: 02071-482-B

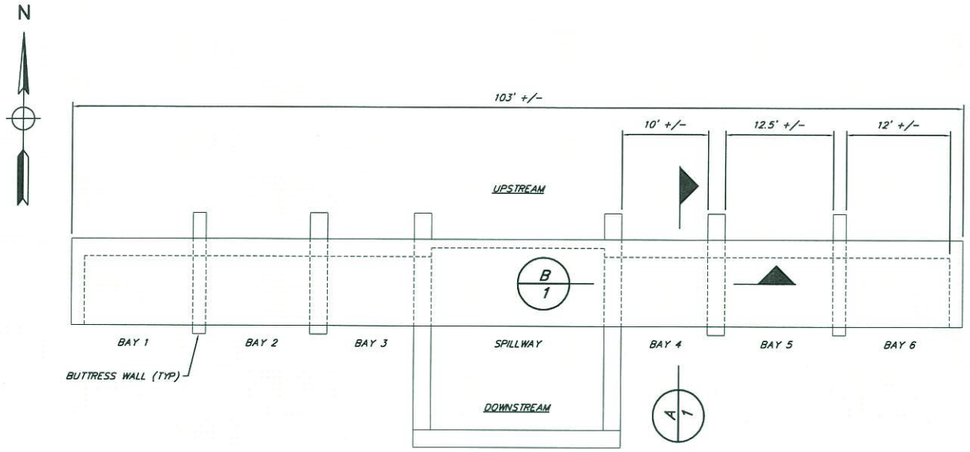


DAM INSPECTION PLAN
INDIAN LAKE DAM
OXFORD, MICHIGAN

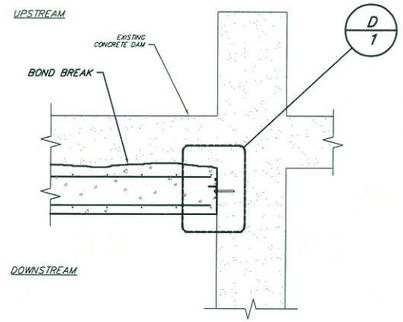
SCALE: AS SHOWN	APPROVED BY: BARNEY L. THOMAS, P.E.	DRAWN BY: KAM
DATE: 5 FEB 03		REVISED BY:
PREPARED FOR: INDIAN LAKE DAM ASSOCIATION 75 RIDGEMONT OXFORD, MI 48370		DATE:

HANSON ENGINEERING, P.C.
40595 KOPPERNICK ROAD
CANTON, MICHIGAN 48187
Phone: (734) 454-6560 Fax: (734) 454-7423

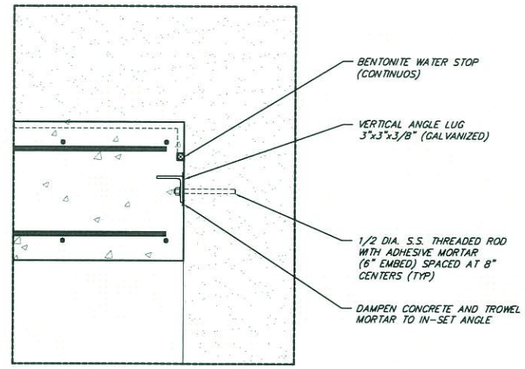
DRAWING NUMBER: 02071-482-A



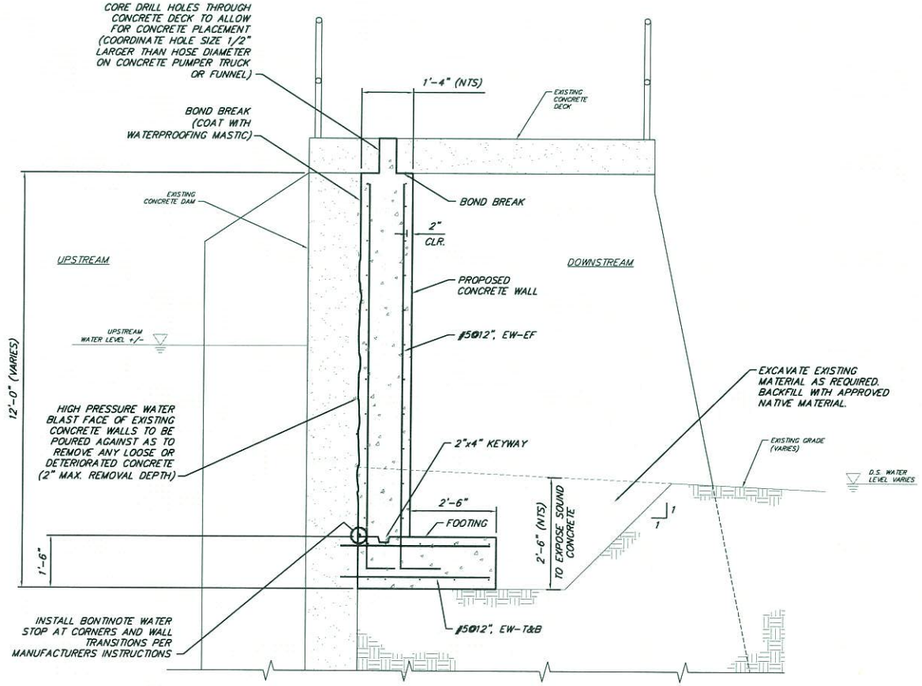
PLAN VIEW OF DAM
SCALE: 1/8"=1'-0"



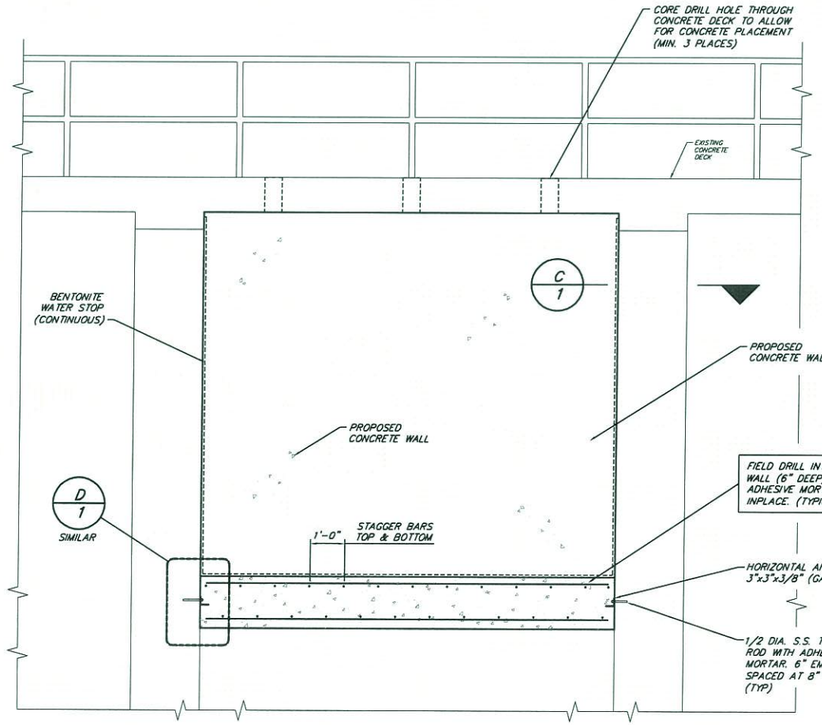
C 1 SECTION
SCALE: 1/2"=1'-0"



D 1 DETAIL
SCALE: 1 1/2"=1'-0"



A 1 SECTION
SCALE: 1/2"=1'-0"



B 1 SECTION (LOOKING UPSTREAM)
SCALE: 1/2"=1'-0"

CONCRETE AND ACCESSORIES

- ALL CONCRETE WORK SHALL BE PERFORMED IN ACCORDANCE WITH ACI 301 AND ACI 350.
- CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 3500 PSI AT 28 DAYS
- CONCRETE SHALL HAVE A SLUMP RANGE OF 2"-4".
- CONCRETE SHALL HAVE A AIR CONTENT OF 5%-7% BY VOLUME.
- CONTRACTOR SHALL SUBMIT CONCRETE MIX DESIGN TO OWNER FOR REVIEW AND APPROVAL.
- WATERSTOP SHALL BE CONTINUOUS 1" x 3/4" STRIPS CONTAINING 75% BENTONITE (WATERSTOP-RX-101 BY "CETCO" OR APPROVED EQUAL). INSTALL PER MANUFACTURERS INSTRUCTIONS.
- CONCRETE REINFORCING STEEL SHALL CONFORM TO ASTM A615 AND HAVE A YIELD STRENGTH OF 60 ksi.
- ADHESIVE MORTAR SHALL BE THE 2 COMPONENT SYSTEM HIT-HY-150 AS MANUFACTURED BY HILTI (OR APPROVED EQUAL). INSTALL PER MANUFACTURERS INSTRUCTIONS.
- ANCHOR RODS SHALL BE HAS-150 THREADED RODS AS MANUFACTURED BY HILTI (OR APPROVED EQUAL).
- INSTALL VERTICAL ANGLE LUGS 6" FROM TOP OF FOOTING TO 6" FROM BOTTOM OF EXISTING CONCRETE DECK. INSTALL HORIZONTAL ANGLE LUGS 6" FROM BACK FACE OF EXISTING CONCRETE DAM WALL TO 6" FROM BACK SIDE OF PROPOSED CONCRETE FOOTING.
- PLYWOOD FORM WORK SHALL BE CONSTRUCTED OF 5-PLY DOUGLAS FIR, SOUND SHEETS WITH CLEAN, TRUE EDGES. STEEL FORMS SHALL BE SMOOTH, TRUE AND UNDAMAGED. ALL FORM WORK SHALL BE STIFFENED OR BRACED TO SUPPORT THE WEIGHT OF THE CONCRETE WITH MINIMUM DEFLECTION. DO NOT REMOVE FORMS OR BRACING UNTIL CONCRETE HAS GAINED SUFFICIENT STRENGTH TO CARRY ITS OWN WEIGHT AND IMPOSED LOADS.
- LIMIT LOADING ON EXISTING CONCRETE DECK TO 4 TONS.

BY	MARK	REVISIONS	DATE

THE WORK REPRESENTED BY THIS DRAWING WAS DESIGNED BY THE ENGINEER FOR THIS SPECIFIC APPLICATION AND SPECIFIC LOCATION DESCRIBED HEREON IN ACCORDANCE WITH THE CONDITIONS PREVALENT AT THE TIME THE DESIGN WAS DONE. THE ENGINEER DOES NOT GUARANTEE AND WILL NOT BE LIABLE FOR ANY OTHER LOCATION, CONDITION, DESIGN OR PURPOSE.

INDIAN LAKE DAM
OAKLAND COUNTY, MICHIGAN

INDIAN LAKE DAM STRUCTURAL REPAIR DETAILS

Spicer group ©2011
SAGINAW OFFICE
230 S. Washington Ave.
Saginaw, MI 48607
Tel. 989-754-4717
Fax. 989-754-4440
www.SpicerGroup.com

DE. BY: MAL	CH. BY: MAL	PROJECT NO.	
DR. BY: KMT	APP. BY: MAL	117401.2011	
STDS.		SHEET 1 OF 1	
DATE JUNE, 2012		FILE NO.	
SCALE AS SHOWN		DF-1070-01	

PLOTTING SCALE: RET F.B. PG. ACAD FILE:

APPENDIX C

PHOTOGRAPHS

NAME: Richard V. Graham
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CLIENT: Indian Lake Improvement Association
STRUCTURE: Indian Lake Dam
INSPECTION DATE: December 16, 2022
PROJECT NUMBER: 133689SG2022

DESCRIPTION: Cracks filled on left main spillway abutment

SEVERITY: Low

DESCRIPTION: First bay from left, minor cracking

SEVERITY: Low

DESCRIPTION: Animal burrow in second bay from left on downstream side of structure

SEVERITY: Low

DESCRIPTION: Right bank upstream of structure

SEVERITY: Low

DESCRIPTION: Delamination on top of walkway noted especially toward the ends of the structure. Photo looking toward left bank

SEVERITY: Low

DESCRIPTION: Looking toward left bank on upstream side of structure

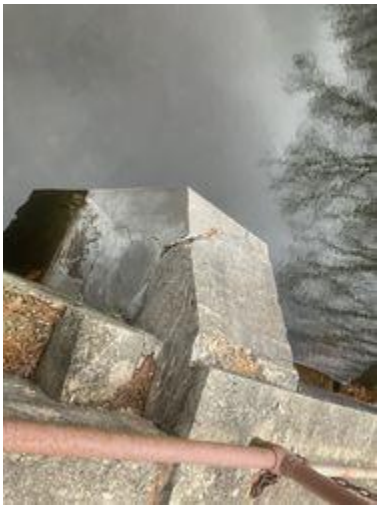
SEVERITY: Low

DESCRIPTION: Second abutment from right showing signs of delamination and cracking on upstream end, photo looking east

SEVERITY: Low

DESCRIPTION: Second abutment from right bank showing signs of delamination and cracking on upstream side of dam, photo looking west

SEVERITY: Low

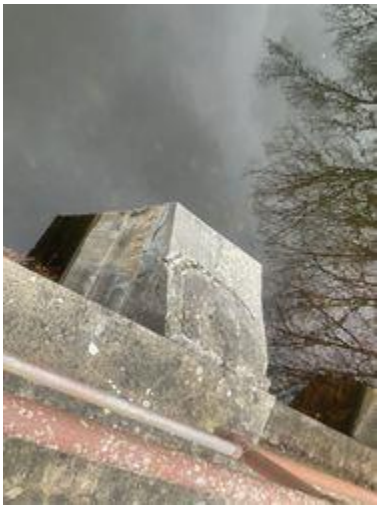


DESCRIPTION: Third abutment from right showing signs of delamination and cracking on upstream side, photo looking east

SEVERITY: Low

DESCRIPTION: Third abutment from right bank showing signs of delamination and cracking, photo looking west

SEVERITY: Low



DESCRIPTION: Third abutment from left showing signs of delamination and cracking, photo looking east

SEVERITY: Low

DESCRIPTION: Third abutment from left showing signs of delamination and cracking, photo looking west

SEVERITY: Low

DESCRIPTION: Concrete separated between pours on upstream end of structure

SEVERITY: Low

DESCRIPTION: Rusted rail post. third post from left on upstream side

SEVERITY: Low

DESCRIPTION: Looking toward right bank on upstream side of dam

SEVERITY: Low

DESCRIPTION: Spalling and cracking noted on main deck of spillway on downstream side of dam

SEVERITY: Medium

DESCRIPTION: Cracking and delamination on right abutment of main spillway

SEVERITY: Medium

DESCRIPTION: Spalling at left downstream end of structure

SEVERITY: Low

DESCRIPTION: Second bay from right end of structure

SEVERITY: Low

DESCRIPTION: Animal burrow noted in second bay from right end of structure

SEVERITY: Low

DESCRIPTION: Second abutment from left on upstream end of structure showing signs of delamination and cracking

SEVERITY: Low

DESCRIPTION: First bay from right end of structure, minor efflorescence

SEVERITY: Low

DESCRIPTION: Delamination on top of walkway noted especially toward the ends of the structure. Photo looking west.

SEVERITY: Low

DESCRIPTION: Main spillway, note possible wearing at top center of spillway

SEVERITY: Low

DESCRIPTION: Animal burrows noted in second bay from right end of structure

SEVERITY: Low

DESCRIPTION: Animal burrows noted in third bay from right end of structure

SEVERITY: Low

DESCRIPTION: Delamination noted on right abutment of main spillway on downstream side of dam

SEVERITY: Low

DESCRIPTION: Left abutment on downstream end of spillway. Minor cracking toward bottom of abutment wall

SEVERITY: Low

DESCRIPTION: Erosion at downstream of right abutment wall

SEVERITY: Low

DESCRIPTION: Minor erosion on right bank downstream of the structure

SEVERITY: Low

DESCRIPTION: Right side of downstream dam face

SEVERITY: Low

DESCRIPTION: Crack and spalling on right downstream side of structure

SEVERITY: Low

DESCRIPTION: Hole in fourth rail post from right on downstream side of structure

SEVERITY: Low

DESCRIPTION: Spalling and delamination on right main spillway abutment on the downstream side of the structure

SEVERITY: Medium