DLZ
ENGINEERS • ARCHITECTS • SCIENTISTS
PLANNERS • SURVEYORS

January 23, 2009

Lake Lemon Conservancy District
7599 North Tunnel Road
Unionville, Indiana 47468

Attn: Mr. Bob Madden
Manager

Re: 2008 Inspection Report
Lake Lemon Dam

Dear Mr. Madden:

Enclosed are four (4) copies of our 2008 inspection report for the subject dam. Based on our inspection, it appears the overall condition of the project hasn't changed significantly since the 2006 inspection, when the overall surficial condition of the project was determined to be satisfactory.

If we can be of further assistance or if you have any questions regarding the inspection report, please do not hesitate to call us.

Sincerely,

DLZ OHIO, INC.

Pete Nix awt for

Arthur (Pete) Nix, P.E.
Geotechnical Division Manager

Eric Tse, Ph.D., P.E.
Senior Geotechnical Engineer

APN/vlc
Enclosures

cc: John Langley, City of Bloomington Utilities – 1
DLZ Indiana – 1
File – 1

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Report for:

2008 Inspection Report
Lake Lemon Dam
Unionville, Indiana

Prepared for:

Lake Lemon Conservancy District
7599 North Tunnel Road
Unionville, Indiana 47468

DLZ Ohio, Inc.

6121 Huntley Road
Columbus, Ohio 43229-1003
Phone: (614) 888-0040
Fax: (614) 888-6415

DLZ Job No. 0863-0621.90

December, 2008

Prepared by:

DLZ

INSPECTION REPORT

LAKE LEMON DAM

Unionville, Indiana

Prepared by:

DLZ OHIO, INC.
6121 Huntley Rd
Columbus, Ohio 43229

December 2008

TABLE OF CONTENTS

APPENDICES

2008 INSPECTION REPORT
LAKE LEMON DAM
UNIONVILLE, INDIANA

INTRODUCTION

As requested by the Lake Lemon Conservancy District and the City of Bloomington Utilities, DLZ performed a field inspection of Lake Lemon Dam on October 7, 2008. Mr. Pete Nix, a geotechnical engineer with DLZ, completed the surficial inspection. During the surficial inspection, color photographs were taken of pertinent features of the dam. Representative photographs are included in this report in Appendix I.

A representative of Commercial Diving Services (CDS) inspected the interior of the outlet works, including the gate, the gatewell, and the outlet pipe. A copy of their inspection report is presented in Appendix II. The diver also repaired a minor defect in the outlet pipe that was observed during the 2006 inspection.

This report presents the observations and recommendations resulting from the 2008 inspection. As part of the inspection, IDNR's file on the project was reviewed as well as previous inspection reports. The completed IDNR Dam Inspection Report Form is presented in Appendix III.

PROJECT INFORMATION

General

It is believed that the dam was constructed in the early 1950's. For years the project was used for water supply to the City of Bloomington, but is now used for recreation. The drainage area is about 71 square miles and the pool area is approximately 1700 acres. The earth embankment is roughly 50 feet high with a crest length of approximately 660 feet. The crest width is about 13 feet, and the upstream and downstream slopes are about 1V:3.5H.

The outlet works consist of a reinforced concrete pipe near the left abutment. From its inlet to the gatewell, the pipe is 42 inches in diameter while the portion of the pipe between the gatewell and the stilling basin is 30 inches in diameter. Flow through the pipe is controlled by a gatewell, and the pipe discharges into a stilling basin.

The principal spillway is a 329-foot long, concrete ogee-type structure. The spillway is located in a valley northeast of the embankment.

We would also note that the project experienced a significant precipitation event in June 2008 when heavy rainfalls crossed south central Indiana. It is understood from the lake manager that the pool rose to within about 12 feet of the embankment crest. During this period the embankment and spillway were inspected daily and no distresses or seepage were noted.

Recent Maintenance Activities

In the 2006 Inspection Report, several recommendations were made for additional monitoring and maintenance. Many of these tasks were completed in 2007. A letter report to IDNR documenting the completion of those tasks is included in Appendix IV.

Security

Access to the embankment is along a private drive with a locked gate. The lake manager has access to this lock, as well as the City of Bloomington Utilities.

FIELD INSPECTION

Embankment

The inspection disclosed no serious problem areas in the physical condition of the embankment. The slopes were relatively uniform; no significant bulges or depressions were noted. Grass and vegetation on the embankment slopes and crest was low and had been mowed recently. It is understood from the lake manager that the embankment is mowed twice a year: once in the spring and once in the fall.

In the 2006 inspection, some small brush and trees were observed along the water's edge. However, this vegetation has since been removed. In addition, rutting on the crest from vehicular traffic was noted in the 2004 and 2006 inspections. These ruts were filled in 2007, but additional rutting occurred during the inspection of the dam that took place at the time of the large rainfall event in June 2008. These new ruts should be filled to enhance drainage of the crest.

In previous inspections, an area of possible seepage was observed along the downstream toe, near the midpoint of the embankment. This area appears to be the location of the original stream channel. No discharge could be seen, but the old channel is wet with iron-stained, brackish water. This possible seepage was noted in the 2002, 2004, and 2006 inspections, also. This seepage area appears to be unchanged since the 2006 inspection. However, because of the high hazard associated with the project, it is recommended that this area be monitored visually on a monthly basis and following significant rainfall events. Any changes in the quantity or appearance of the seepage in this area should be brought to the attention of a dam engineer immediately.

It should also be noted that a poorly-drained area was observed immediately downstream of the right groin in previous inspections. Runoff from the embankment and right abutment tends to pond in this area. In past inspections, we had suggested that the owner consider regrading this area. It is understood that the owner did review this area in 2007, but it was dry and he didn't feel regrading was necessary at this time. We agree with this conclusion, but would recommend that the area be monitored after periods of heavy rain.

Outlet Works

Internal Inspection.
As part of the 2008 inspection, the downstream portion of the outlet works was dewatered and inspected. A diver from CDS Construction performed the inspection and videotaped the condition of the outlet pipe. We would note that CDS divers inspect and operate the Lake Lemon gate every two years and they are very familiar with the project. A copy of their inspection report of the outlet works is presented in Appendix III.

To facilitate the inspection of the downstream portion of the outlet pipe (gatewell to stilling basin), the gate was closed and the stilling basin pumped dry. Although some water remained in the pipe, it allowed the interior of the pipe to be visually inspected.

During the 2006 inspection of the downstream portion of the outlet pipe only one visible deficiency was noted. Approximately three feet downstream of the gate, filler had been lost from a small section of the pipe joint. During the 2008 inspection, the diver repaired the joint with hydraulic cement. The diver indicated the repair went well and no problems were reported. The diver also noted that the gate leaked slightly on the right side when in the closed condition.

The upstream portion of the outlet works (gatewell to pipe inlet) was also inspected but visibility was extremely poor and the condition of the pipe and joints were estimated by feel. No obvious distress was noted in the upstream portion of the outlet works during the inspection.

Finally, as part of the gatewell inspection, the gate stem was observed and all the frame bolts and adjusting bolts were checked for tightness. No distress was noted.

External Inspection.
The visible portions of the outlet works appeared in satisfactory condition. The structure was unchanged from previous inspections, although new vegetation has grown around the stilling basin. This vegetation should be removed to facilitate inspections of the structure.

In previous inspections, a large crack was observed in the left wall near the end of the stilling basin. This crack was about a ½ inch wide and extended from the top of the wall to the bottom. This crack appeared old and didn't appear to have changed recently. This crack appeared to be unchanged from the 2006 inspection.

Also, as mentioned above, the stilling basin was dewatered as part of the inspection. The portions of the stilling basin below water also appeared to be in satisfactory condition.

However, after the stilling basin dewatering was performed, an area of scour in the bottom of channel bottom was noted immediately downstream of the end of the stilling basin. This scoured area had been repaired in 2007. However, it's understood that this new scour occurred during winter drawdown last year, following the repair work. This area should be backfilled again with large riprap to prevent the scoured area from enlarging and undermining the stilling basin slab. The stilling basin design should be reviewed to determine the velocities at the end of the stilling basin so that the riprap can be properly sized for the anticipated velocities.

The gate was exercised as part of the inspection. The gate operated well and no problems were noted. We would recommend that the gate be exercised to its full limit at least once per year.

The banks of the outlet channel downstream of the stilling basin are showing signs of erosion and instability. This condition should be monitored. If debris in the channel affects the outflow, the debris should be removed.

Principal Spillway

The principal spillway was in acceptable condition. It does not appear to have changed significantly since the last inspection. There has been some displacement in the joints over the years (½ to ¾ inches) but the overall condition of the spillway appears to be acceptable.

The only minor concern we noted during the inspection of the principal spillway was the possible minor erosion immediately downstream of the ogee's end wall. If this condition worsens, the end slab could be endangered as the erosion progresses upstream beneath the slab. We recommend that this erosion condition be monitored, especially after significant spillway discharges. If the condition worsens, it is anticipated that properly-sized riprap could be placed immediately downstream of the end wall to armor this area.

CONCLUSIONS

Based on our observations, it appears that the project condition has not changed significantly since the 2006 inspection, where the overall surficial condition of the project was determined to be 'Satisfactory'.

RECOMMENDATIONS

1. Visually monitor the possible seepage condition at the toe of the embankment. Report any changes to a dam engineer immediately.

2. Fill new ruts in the crest to facilitate drainage.

3. Remove new vegetation from around the stilling basin.

4. Repair scoured area in the channel bottom immediately downstream of the stilling basin. It is anticipated that large riprap will be needed. The design velocities for the outflow will need to be evaluated to properly size the riprap.

5. Monitor the area downstream of the right abutment groin for standing water following high pool events.

6. Following high pool events, monitor the channel bottom immediately downstream of the ogee spillway's endsill for signs of additional erosion.

7. Inspect the interior of the outlet pipe again within six years. However, a more frequent inspection may be needed if conditions warrant.

8. Prepare an emergency action plan (EAP) for the project.

CLOSING REMARKS

We hope this information is helpful. If you have any questions, please do not hesitate to call.

Sincerely,

DLZ OHIO, INC.

Pete Nix, P.E.
Geotechnical Division Manager

Eric Tse, Ph.D., P.E.
Senior Geotechnical Engineer

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APPENDIX I

Photographs

Embankment crest. View is towards right abutment.

Upstream embankment slope. View is towards right abutment.

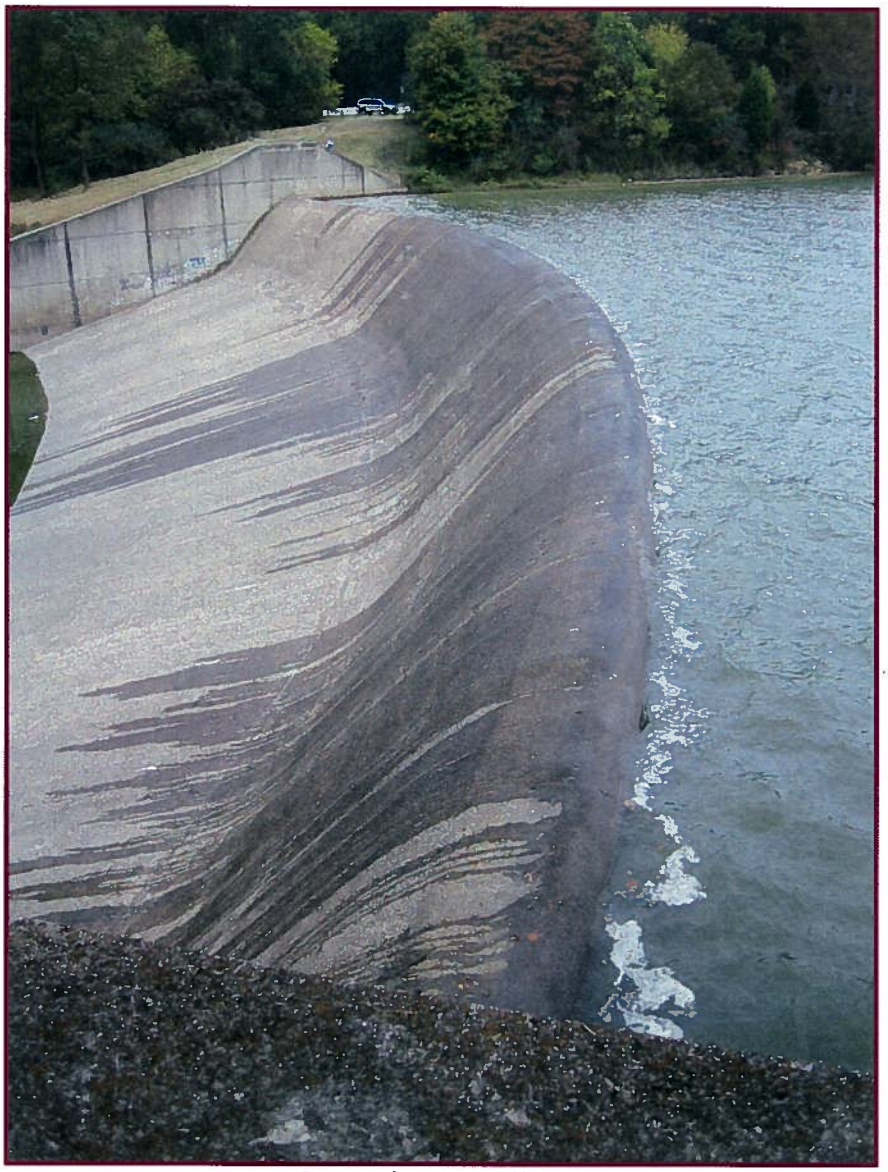
Downstream embankment slope. View is towards right abutment.

Gate structure.

Upstream embankment slope. View is towards left abutment.

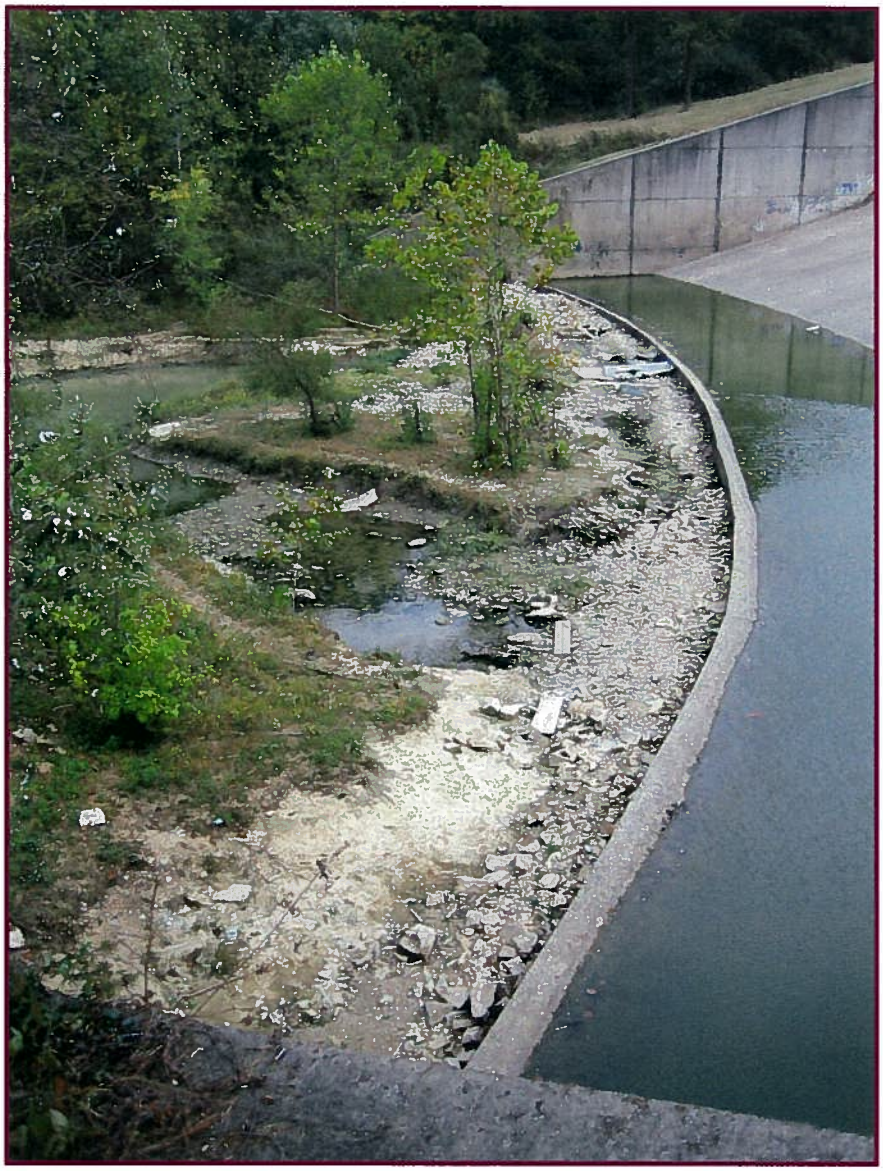
Embankment crest. View is towards left abutment.

Downstream embankment slope. View is towards left abutment.



Crest of ogee spillway.

Stilling basin at toe of ogee spillway.



Minor erosion along end wall.

Possible seepage area near location of original stream channel.

Scour area immediately downstream of stilling basin.

Outlet channel. View is upstream.

Outlet channel. View is downstream.

Downstream end of dewatered stilling basin.

Diver preparing to enter outlet pipe for inspection and to perform minor joint repairs as recommended in 2006 inspection.

APPENDIX II

Outlet Works Inspection Report

C.D.S. Construction Co., Inc.

A Division of ADS & Associates

- MARINE CONTRACTING
- CONSULTING ENGINEERS
- FIBER OPTIC INSTALLATION
- DESIGN & FABRICATION

Keith Elkins, President / CEO
(502) 937-8061 Office
(502) 937-3970
(502) 937-3971 Fax

October 9, 2008

Lake Lemon Conservancy District
ATTN: Bob Madden
Office: (812)334-0233

Work Performed: October 9, 2008

The gate valve was greased and verified in the closed position. Diver entered the gate well and inspected the valve stem guides until he arrived at the sluice gate. The gate frame bolts were all checked for tightness. After gate inspection the diver proceeded into the conduit that goes under the lake to the intake structure (approximately 200 ft.). Diver cleaned logs off the intake grate from inside. Diver returned to the gate well and climbed approximately 50 ft. out of well.

Below the dam, most of the water is pumped out of the discharge conduit. Diver enters the conduit wearing surface supply air, radio communications, grout and tools. Diver proceeds upstream approximately 220 ft. until he reaches the downstream side of the sluice gate. The diver cleaned the pipe joint that needs repair. Diver installed grout in the voids in the pipe joint (approximately 3" x 4" void maximum). Diver exited the discharge conduit.

If any questions or if further information is needed, you may contact our office at (502)937-8061.

Respectfully,

Dave Colston/DS

Dave Colston
Diving Supervisor

Riverport Industrial Complex
7400 Distribution Drive • Louisville, Kentucky 40258

APPENDIX III

Completed IDNR Dam Inspection Form

IDNR DAM INSPECTION REPORT FORM (Refer to pages 5 and 6 for instructions.)

Name of Professional Conducting Inspection	Professional License No. (Indiana)
Pete Nix	
Business Address	**Phone: (day)** 614 - 848 - 4141
6121 Huntley Rd., Columbus, OH 43219	(evening) 614 - 329 - 3150

Company Name: DLZ Ohio, Inc.

INSPECTION PREPARATION: Reviewed all pertinent technical documentation related to this dam and site in the State's and the Owner's files: Yes ☒ No ☐ Comment: Last inspection report was reviewed prior to inspection. IDNR's file on the project was also reviewed, including the original construction documents.

MULTIDISCIPINARY: I am experienced in the technical disciplines or I am working with other professionals experienced in the technical disciplines to properly inspect this dam and appurtenant works. Technical disciplines, in additional to the general civil engineering, may include geotechnical, geological, hydrologic, structural, and mechanical. Yes ☒ No ☐ Comment:

Dam Name	Quad.	Date of Inspection
Lake Lemon Dam	Hindustan	10/07/2008

State Dam ID	Permit (if unaproved see pg. 6)	County	Sec. T. R.	Last Inspection
58-1	State Approved on Construction Completed in 1952	Monroe	28, 10 N, 1 E	09/25/2006

Owners Name	Owner's Phone
City of Bloomington Utilities	(812) 349-3655

Address/Zip Code: P.O. Box 1216, Bloomington, IN 47401

Contact's Name	Contact's Phone	Spillway Width	Ft. FBD.
Lake Lemon Conservancy District Bob Madden, Manager	(day) 812 - 334 - 0233 (evening) - -	Top Bot. ~330	~16

Hazard	Drainage Area	Surface Area	Height	Crest Length	Crest Width	Inlet Below Crest	Slope
High	~71 MI²	~1700 AC	~50 FT	~660 FT	~13 FT	~16 FT	Up 3 1/2: 1 Down 3 1/2: 1

FIELD CONDITIONS OBSERVED

Water Level - Below Dam Crest ~17 Ft.

Ground Moisture Condition: Dry ____ Wet X Snowcover ____ Other ____

DRAWDOWN STRUCTURE

☒ Yes ☐ None

Comment: A 42-in. diameter R.C. pipe with a gatewell and stilling basin.

MONITORING ☐ Yes ☒ None [☐ Gage Rod ☐ Piezometers ☐ Seepage Weirs ☐ Survey Monuments ☐ Other]

Comments: ____

A UPSTREAM SLOPE

GOOD	X
ACCEPTABLE	
DEFICIENT	
POOR	

PROBLEMS NOTED: ☒ (A-1) None ☐ (A-2) Riprap - Missing, Sparse, Displaced, Weathered ☐ (A-3) Wave Erosion-with Scarps ☐ (A-4) Cracks-with Displacement ☐ (A-5) Sinkhole ☐ (A-6) Appears Too Steep ☐ (A-7) Depressions or Bulges ☐ (A-8) Slides ☐ (A-9) Animal Burrows ☐ (A-10) Trees, Brush, Briars ☐ (A-11) Other ____

Comments: Some brush / weeds observed at the waterline. Grass and vegetation cover is high. Project reportedly is mowed twice annually and has yet to be mowed for second time.

Brush and weeds along waterline in 2006 have been removed. Slope had been recently mowed and looked in very good condition.

B CREST

GOOD	
ACCEPTABLE	X
DEFICIENT	
POOR	

PROBLEMS NOTED: ☐ (B-1) None ☒ (B-2) Ruts or Puddles ☐ (B-3) Erosion ☐ (B-4) Cracks with Displacement ☐ (B-5) Sinkholes ☐ (B-6) Not Wide Enough ☐ (B-7) Low Area ☐ (B-8) Misalignment ☒ (B-9) Inadequate Surface Drainage ☐ (B-10) Trees, Brush, Briars ☐ (B-11) Other ____

Comments: Ruts from vehicular traffic were visible. These ruts look essentially the same as they were in the 2006 inspection. Crest had been recently mowed.

Spillway Width refers to the open channel (typically the emergency or auxiliary spillway) at the control section.
Ft. FBD. refers to the vertical distance from the emergency (auxiliary) spillway control section to the lowest point of the crest of the dam.
Inlet Below Crest refers to the vertical distance from the inlet of the principal spillway to the crest of the dam.

C DOWNSTREAM SLOPE	
GOOD	
ACCEPTABLE	X
DEFICIENT	
POOR	

PROBLEMS NOTED: ☐ (C-1) None ☐ (C-2) Livestock Damage ☒ (C-3) Erosion or Gullies ☐ (C-4) Cracks with Displacement ☐ (C-5) Sinkholes ☐ (C-6) Appears too Steep ☐ (C-7) Depression or Bulges ☐ (C-8) Slide ☐ (C-9) Soft Areas ☐ (C-10) Trees, Brush, Briars ☐ (C-11) Animal Burrows ☐ (C-12)Other_____

Comments: A few isolated erosion areas were noted.

D SEEPAGE	
GOOD (NONE)	
ACCEPTABLE	X
DEFICIENT	
POOR	

PROBLEMS NOTED: ☐ (D-1) None ☐ (D-2) Saturated Embankment Area ☐ (D-3) Seepage Exits on Embankment ☐ (D-4) Seepage Exits at Point Source ☐ (D-5) Seepage Area at Toe ☐ (D-6) Flow Adjacent to Outlet ☐ (D-7) Seepage Clear/Muddy

[**DRAIN OUTFALLS SEEN** X No ___ Yes ☐ (D-8) Flow Clear/Muddy ☐ (D-9) Dry/Obstructed]

☐ (D-10) Other_____Describe location of drains and indicate amount and quality of discharge.

Comments: Possible seep observed at toe about mid-length of the embankment. Appears to be in the original stream channel. Does not appear to have changed since the 2006 inspection. The poor draining area noted at downstream end of right groin in 2006 appears unchanged.

E PRINCIPAL SPILLWAY	
GOOD	
ACCEPTABLE	X
DEFICIENT	
POOR	

DESCRIPTION: A 329-foot long concrete ogee-type (curved crest) structure located in a topographic saddle northeast of the dam.

PROBLEMS NOTED: ☐ (E-1) None ☒ (E-2) Deterioration ☐ (E-3) Separation ☒ (E-4) Cracking ☐ (E-5) Inlet, Outlet Deficiency ☐ (E-6) Stilling Basin Inadequacies ☐ (E-7) Trash Rack ☐ (E-8) Other_____

Comments: The concrete ogee section and training walls appear unchanged since the 2006 inspection. Minor erosion has occurred immediately downstream of the endwall. Some joints offset 1/2" to 1" and joint filler being squeezed out. These conditions are old and the spillway appears to be in satisfactory condition.

F AUXILIARY SPILLWAY	
GOOD	
ACCEPTABLE	
DEFICIENT	
POOR	

DESCRIPTION:_____

PROBLEMS NOTED: ☐ (F-1) None ☒ (F-2) No Auxiliary Spillway Found ☐ (F-3) Erosion-with Backcutting ☐ (F-4) Crack with Displacement ☐ (F-5) Appears to be Structurally Inadequate ☐ (F-6) Appears too Small ☐ (F-7) Inadequate Freeboard ☐ (F-8) Flow Obstructed ☐ (F-9) Concrete Deteriorated/Undermined ☐ (F-10) Other _____

Comments:_____

G MAINTENANCE AND REPAIRS	
GOOD	
ACCEPTABLE	
DEFICIENT	
POOR	

PROBLEMS NOTED: ☐ (G-1) None ☐ (G-2) Access Road Needs Maintenance ☐ (G-3) Cattle Damage ☐ (G-4) Spillway Obstruction ☐ (G-5) Brush, Weeds, Tall Grass, on Upstream Slope, Crest, Downstream Slope, Toe ☐ (G-6) Trees on Upstream Slope, Crest, Downstream Slope ☐ (G-7) Rodent Activity on Upstream Slope, Crest, Downstream Slope, Toe ☐ (G-8) Deteriorated Concrete-Facing, Outlet, Spillway ☐ (G-9) Gate and/or Drawdown Need Repair ☐ (G-10) Other _____

Comments: Refer to page 3 of 6.

H OVERALL CONDITIONS

Based on this inspection and recent file review, the overall surficial condition is determined to be: ☒ (H-1) Satisfactory ☐ (H-2) fair ☐ (H-3) Conditionally Poor ☐ (H-4) Poor ☐ (H-5) Unsatisfactory

IMPORTANT: IF THIS RATING IS DIFFERENT THAN PREVIOUS IDNR RATING, PLEASE ATTACH EXPLANATION AND REASONS FOR CHANGE ON PAGE 4.

DAM NAME Lake Lemon Dam STATE DAM I.D. 53-1 DATE 12 / 03 / 08

RECOMMENDATIONS AND ITEMS REQUIRING ACTION BY OWNER TO IMPROVE THE SAFETY OF THE DAM

MAINTENANCE-MINOR REPAIR-MONITORING

☐ (1) Provide Additional Erosion Protection: _____

☐ (2) Mow: _____

☒ (3) Clear Trees and/or Brush From: around stilling basin. This is new growth since 2007.

☐ (4) Initiate Rodent Control Program and Properly Backfill Existing Holes: _____

☒ (5) Repair: the new ruts on the crest.

☐ (6) Provide Surface Drainage For: _____

☒ (7) Monitor: possible seep in original streambed; contact a qualified engineering firm if any changes are seen.

☒ (8) Other: repair scoured area in channel immediately downstream of stilling basin.

☒ (9) Other: Following high pools, monitor area downstream of right groin and channel erosion downstream of ogee endsill.

ENGINEERING-EMPLOY AN ENGINEER EXPERIENCED IN DESIGN AND CONSTRUCTION OF DAMS TO:

(Plans & Specifications must be approved by State prior to construction.)

☐ (10) Prepare Plans and Specifications for the Rehabilitation of the Dam: _____

☐ (11) Prepare As-Built Drawings of: _____

☐ (12) Perform a Geotechnical Investigation to Evaluate the Stability of the Dam: _____

☐ (13) Perform a Hydrologic Study to Determine Required Spillway Size: _____

☐ (14) Prepare Plans and Specifications for an Adequate Spillway: _____

☐ (15) Set up a Monitoring Program: _____

☐ (16) Refer to Unapproved Status of Dam: _____

☒ (17) Develop an Emergency Action Plan: for this high-hazard project.

☐ (18) Other: _____

☐ (19) Other: _____

Recommended schedule for upgrades/comments (Please prioritize and note importance of each item.) _____

Photographs ☐ Attachments ☐

ENGINEER'S INSTRUCTION Instructed owner on the safety concerns with the structure and how to monitor and inspect the dam and appurtenant works in the interim period between the regulatory two-year inspections. Yes ☒ No ☐

Comment Recommended that lake manager continue to visually monitor possible seep on a regular basis and after significant rainfall events. Contact a qualified engineering firm if any changes are noted.

Professional Engineer's Signature _____ PE10606244 Date 12 / 31 / 08

Reviewed By _____ Date ___ / ___ / ___

Owner/Owner's Representative

EXPLANATION FOR CHANGE IN RATINGS (Describe all repairs, upgrades or improvements made if dam conditions and rating have improved since the last inspection. Describe deteriorating conditions if ratings have worsened.)

REASONS FOR RATING CHANGE:

PREVIOUS RECOMMENDATIONS FOR MAINTENANCE, REPAIRS, AND UPGRADES:

HAVE THEY BEEN PERFORMED ☒ YES ☐ NO (If no, please explain:)

* Ruts on crest were filled in 2007, but new ruts created during June 2008 strom event. These new ruts need to be filled in.
* Area downstream of right groin was monitored throughout 2007 and it remained dry. No regrading believed necessary in this area at this time.
* Vegetation removed from around stilling basin but new growth has emerged.
* An emergency action plan still needs to be prepared.

Supporting Documentation

Photographs ☐ Attachments ☐ Calculations ☐ Drawings ☐ Other ☐

Comments:

INSTRUCTIONS FOR COMPLETING DAM VISUAL INSPECTION REPORT

1. Complete all items that are applicable; if not applicable, write in "N/A". For concrete dams, complete all applicable items and use "comments" section to cover items not included in the check boxes. Also indicate that the dam is concrete in the comments section.

2. Use page 6 to determine ratings of each dam component (items A through G) and for Overall Conditions (Item H).

3. Please write legibly and concisely.

4. Inspector must be knowledgeable with the type of dam, materials, and components being inspected. If not, qualified assistance shall be engaged.

5. The inspector shall review the dam owner's and IDNR project files prior to the inspection. Previous inspection reports shall be closely reviewed for previous problems and deficiencies.

6. If the ratings of the components (items A through G) or the Overall Conditions (item H) of the dam have changed since the last inspection, please complete page 4. If a rating has improved, dam repairs, improvements, analyses, or maintenance must have been performed and documented on page 4.

7. For a dam to have a satisfactory "Overall Conditions" rating, it must have no existing or potential dam safety deficiencies recognized. Safe performance is expected under all anticipated loading conditions, including infrequent hydrologic events (PMP for high hazard dams) and seismic events. The dam owner's project files must contain hydrologic and hydraulic analyses of the dam and its spillways to verify performance. The files must also contain slope stability analyses to verify embankment stability under full reservoir conditions and rapid-draw down conditions. The dam and all of its components must meet current IDNR and design standards. "Normal" deficiencies such as minor erosion, minor seepage, or normal concrete aging may not make a dam unsatisfactory or unacceptable. For a satisfactory "Overall Conditions" rating to be assigned, items A through G generally should all have a "good" rating; however, in some cases an "acceptable" rating may be satisfactory if the "Problems Noted" are minor, or "normal" conditions, such as minor erosion rills, small puddles on crest, or if grass needs mowed, but is in good condition.

8. This inspection report form must be submitted to IDNR along with a formal technical inspection report as described in Chapter 4.0 of Part 3 of the Indiana Dam Safety Inspection Manual.

9. Please sign and date this page in the space below to verify that you have read and understand these instructions.

Inspector's Signature: _____ Date: 10/08/08

GUIDELINES FOR DETERMINING CONDITIONS

CONDITIONS OBSERVED - APPLIES TO UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, PRINCIPAL SPILLWAY, AUXILIARY SPILLWAY

GOOD	ACCEPTABLE	DEFICIENT	POOR
In general, this part of the structure has a good appearance, and conditions observed in this area do not appear to threaten the safety of the dam.	Although general cross-section is maintained, surfaces may be irregular, eroded, rutted, spalled, or otherwise not in new condition. Conditions in this area do not currently appear to threaten the safety of the dam.	Continued deterioration and/or unusual loading may threaten the safety of the dam.	Conditions observed in this area appear to threaten the safety of the dam. Conditions observed in this area are unacceptable.

CONDITIONS OBSERVED - APPLIES TO SEEPAGE

GOOD (NONE)	ACCEPTABLE	DEFICIENT	POOR
No evidence of uncontrolled seepage. No unexplained increase in flows from designed drains. All seepage is clear. Seepage conditions do not appear to threaten the safety of the dam.	Some seepage exists at areas other than the drain outfalls, or other designed drains. No unexplained increase in flows from designed drains. All seepage is clear. Seepage conditions observed do not currently appear to threaten the safety of the dam.	Excessive seepage exists at areas other than drain outfalls and other designed drains. Seepage needs to be evaluated. Increased flow and/or continued deterioration in seepage conditions may threaten the safety of the dam.	Excessive seepage conditions observed appear to threaten the safety of the dam and is unacceptable. Examples: 1) Designed drain or seepage flows have increased without increase in reservoir level. 2) Drain or seepage flows contain sediment. i.e., muddy water or particles in jar samples. 3) Widespread seepage, concentrated seepage or ponding appears to threaten the safety of the dam.

CONDITIONS OBSERVED - APPLIES TO MAINTENANCE AND REPAIR

GOOD	ACCEPTABLE	DEFICIENT	POOR
Dam appears to receive effective on-going maintenance and repair, and only a few minor items may need to be addressed.	Dam appears to receive maintenance, but some maintenance items need to be addressed. No major repairs are required.	Level of maintenance of the dam needs significant improvement. Major repairs may be required. Continued neglect of maintenance may threaten the safety of the dam.	Dam does not receive adequate maintenance. One or more items needing maintenance or repair has begun to threaten the safety of the dam. Level of maintenance is unacceptable.

OVERALL CONDITIONS

SATISFACTORY - No existing or potential dam safety deficiencies recognized. Safe performance is expected under all anticipated loading conditions, including such events as infrequent hydrologic and/or seismic events. Project Files contain necessary hydrologic, and other engineering calculations to verify dam safety and performance.

FAIR - No existing dam safety deficiencies are recognized for normal loading conditions. Infrequent hydrologic and/or seismic events would probably result in a dam safety deficiency.

CONDITIONALLY POOR - A potential safety deficiency is recognized for unusual loading conditions which may realistically occur during the expected life of the structure. CONDITIONALLY 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.

POOR - A potential dam safety deficiency is clearly recognized for normal loading conditions. Immediate actions to resolve the deficiency are recommended; reservoir restrictions may be necessary until problem resolution.

UNSATISFACTORY - A dam safety deficiency exists for normal conditions. Immediate remedial action is required for problem resolution.

HAZARD CLASSIFICATIONS OF DAMS (STRUCTURE)

LOW HAZARD- A structure the failure of which may damage farm buildings, agricultural land, or local roads

SIGNIFICANT HAZARD- A structure the failure of which may damage isolated homes and highways, or cause the temporary interruption of public utility services.

HIGH HAZARD-A structure the failure of which may cause the loss of life and serious damage to homes, industrial and commercial buildings, public utilities, major highways, or railroads.

UNAPPROVED STATUS OF DAM

A dam that has been given an unapproved status (see entry for permit) means that plans, construction specifications, hydraulic analyses, and/or a geotechnical investigation on your dam, proving the safety of the structure, have not been received and approved by the Indiana Department of Natural Resources (IDNR). IDNR records indicate that no progress has been made to secure this approval. The fact that the dam is inspected under the Regulation of Dams Act (IC 14-27-7.5) in no way alters the illegal status of the structures.

If your dam is indicated to be unapproved, it is requested that your engineer contact the Indiana Department of Natural Resources,

APPENDIX IV

Maintenance Since 2006 Inspection

DLZ
ENGINEERS • ARCHITECTS • SCIENTISTS
PLANNERS • SURVEYORS

November 26, 2007

Mr. Ronald M. Carter, P.E.
Hydraulic Engineer
Indiana Department of Natural Resources
Division of Water
402 W. Washington Street, Room W264
Indianapolis, IN 46204-2641

Re: Lake Lemon Dam: Maintenance Improvements

Dear Mr. Carter:

On behalf of the Lake Lemon Conservancy District (LLCD), I am writing to inform you that recommended dam maintenance improvements have been completed by the LLCD. Pursuant to your letter dated March 28, 2007, and consistent with the October 2006 Lake Lemon Dam Inspection Report "Engineer's Recommendations", LLCD has completed the following tasks in October 2007.

1. Visually monitor the possible seepage condition at the toe of the embankment. Report any changes to a dam engineer immediately.

On September 21, 2007, LLCD and DLZ Indiana, LLC inspected this area along the toe of the embankment. It was noted that there was no standing or visible surface water at the site, which was traversable by foot with little or no indentation.

2. Remove the small brush and trees in the embankment along the water's edge.

Small brush and trees have been removed from embankment at water's edge as illustrated by attached photo 1.

3. Fill ruts in crest to facilitate drainage.

Ruts have been filled and seeded as illustrated by attached photo 2.

4. Remove vegetation from left wall of stilling basin.

Vegetation has been removed from perimeter of stilling basin as illustrated by attached photo 3.

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5. Repair scour area in the channel bottom downstream of stilling basin.

Scour area has been repaired by placement of riprap as illustrated by attached photos 4 & 5.

6. Regrade or ditch area downstream of the right groin to facilitate surface drainage.

On September 21, 2007, LLCD and DLZ Indiana, LLC, inspected the area along the right groin of the embankment. It was noted that the area was dry with no evidence of standing water. The LLCD will continue to monitor this area but has determined that no additional action will be taken at this time.

If you have questions regarding this matter please do not hesitate to contact me at (317) 445-1130.

Respectfully,

DLZ INDIANA, LLC

Michael E. Massonne
Project Manager

Attachment: Photo Record of Completed Tasks

Cc: Bob Madden, LLCD
John Langley, CBU
Jon LaTurner, P.E., DLZ
Pete Nix, P.E., DLZ
File

Photo Record of Completed Tasks
Lake Lemon Dam Maintenance Improvements
November 26, 2007

Photo 1

Small brush and trees removed from embankment at water's edge

Photo 2

Ruts along crest filled and seeded

Photo 3

Vegetation removed from perimeter of still basin

Photos 4 & 5

Areas of scour repaired by placement of riprap *(after above/before below)*