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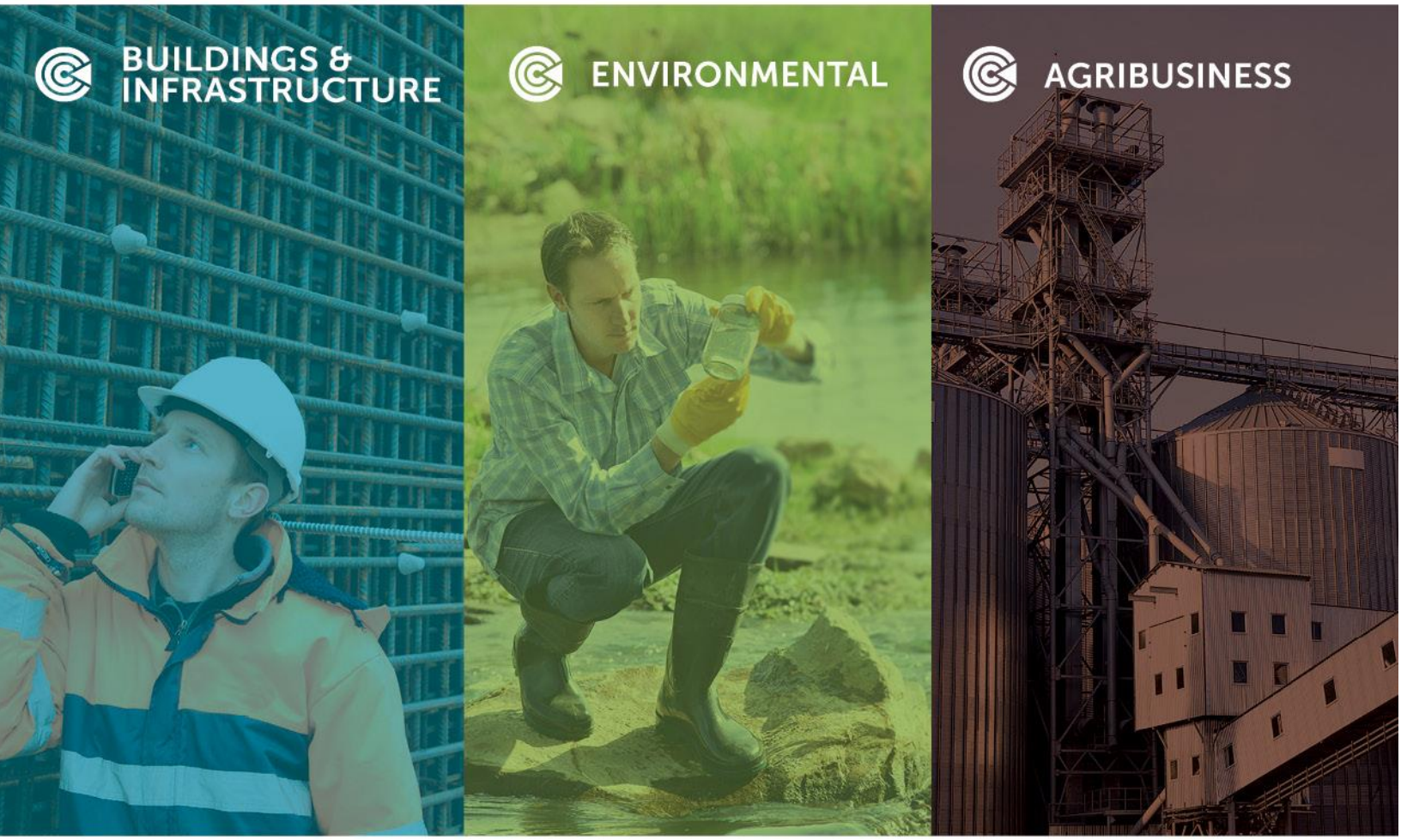


LAKE GERALDINE DAM
DAM SAFETY INSPECTION 2023 #4
IQALUIT, NUNAVUT

PRODUCED FOR: THE CITY OF IQALUIT
C/O COLLIERS PROJECT LEADERS

PRODUCED BY: CONCENTRIC ASSOCIATES INTERNATIONAL INCORPORATED

CONCENTRIC REFERENCE NUMBER: 21-9162

DATE: OCTOBER 4TH, 2023

TABLE OF CONTENTS

LIST OF APPENDICES

1. INTRODUCTION AND SCOPE OF WORK

This Dam Safety Inspection (DSI) of the Lake Geraldine Dam (LG Dam) has been prepared for the City of Iqaluit (City). As the owner and operator of the LG Dam, the City of Iqaluit is responsible for its safe management and operation. The intent of this DSI is to assist the City by identifying any visual changes in the condition of the LG Dam, identifying any new concerns, and making recommendations on maintenance, repairs, or further investigations.

1.1 Dam Safety Guidelines

The Dam Safety Guidelines (DSG), published by the Canadian Dam Association, were first released in 2007 and further revised in 2013. The DSG applies, in general, to those structures that are at least 2.5 meters in height, and which have at least 30,000 cubic meters of storage capacity. The LG Dam exceeds these minimum requirements and therefore requires annual DSI's. The DSI is considered to be an Engineering Inspection which is recommended by the DSG to be performed annually or semi-annually by a professional engineer. A Dam Safety Review (DSR) is required, at a minimum, every 5 years. The most recent DSR was performed in April 2022.

This DSI forms part of the dam's permanent record documentation along with other documentation that make up the historical record of the dam (and berms). Section 3.6 "Surveillance" of the DSG recommends more frequent visual inspections be performed. Routine inspections performed by City staff trained in dam surveillance are recommended on a weekly basis to identify any conditions that might indicate a change in the dam's performance.

1.2 Description of Structure

The LG Dam is comprised of a concrete section with an integral concrete spillway, and three earthen berms: the north, center, and south berms. See below for a reference site plan and Appendix A for site photographs.

The 15.3 m wide spillway has an upper elevation of 111.3 m (representing the current maximum operating level of the reservoir), while the concrete dam sections on either side of the spillway have an elevation of 112.3 m. At the maximum operating level of the reservoir, the concrete dam has approximately 1.0 m of freeboard.

The southern section of the concrete dam extends approximately 39.1 m to the south rock abutment. The northern section of the concrete dam extends 13.3 m to the north of the spillway section, where it joins the south end of the center earthen berm.

The center earthen berm extends north approximately 75 m where it meets the access ramp and north access road. The north earth berm is located to the north of the access road ramp and extends approximately 60m to the north rock abutment.

The south earthen berm is a separate structure that is located in a valley to the south of the main concrete dam. The south berm is approximately 68.5 m long. The north, center and southern berms incorporate a concrete cutoff wall which is reportedly founded in rock at the base of the berms.

Site Plan

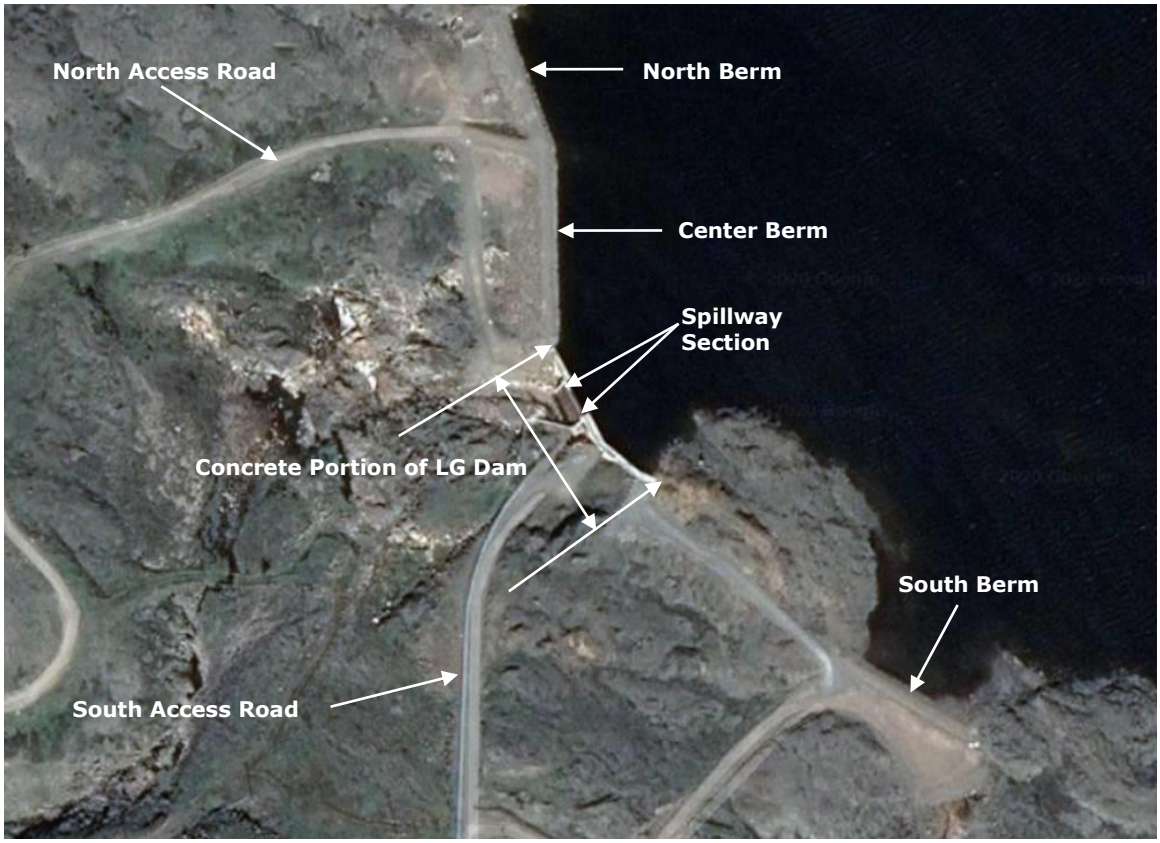


Table 1.1: Lake Geraldine Dam Summary*

Dam/Berm Segment	Length (m)	Crest Elevation	Base Elevation	Bedrock Elevation	Height of Dam/Berm (m)
North Berm	55.5	112.5	108.3	105.0	4.3
Center Berm	78.0	112.5	108.3	97.5	4.5
North Dam	13.3	112.3	102.6	97.5	11.0
Spillway	15.3	111.3	101.6	96	10.0
South Dam	39.1	112.3	102.6	97.5	11.0
South Berm	68.5	112.5	111.5	110.0	1.0

*Tabular data based upon Meco "Dam Safety Management Plan", July 2020

1.3 Scope of Work

As per the requirements of the Dam Safety Guide, the primary task of this DSI is to help identify any significant visual changes in the condition of the concrete dam and earthen berms based on a comparison with the previous inspections and reviews. A visual inspection can identify issues related to dam safety and provides the City of Iqaluit with the opportunity to mitigate any observed concerns or issues. This DSI report is the

primary deliverable and has been prepared in accordance with the Dam Safety Guide document.

The following is a summary of the scope of work for this assignment:

- Conduct a visual on-site assessment of the dam and berms above the water line;
- Prepare a photographic record documenting general and representative conditions;
- Identify, characterize, and risk-assess any significant visual changes in condition;
- Prepare a written report summarizing our observations, items of concern, and recommendations;
- Indicate any recommended repairs and outstanding recommendations from previous inspections and reviews;
- Develop a prioritized list of recommended repairs, upgrades, and improvements with Class D cost estimates;
- Submit final documents in electronic format.

2. HISTORY & BACKGROUND

2.1 Reservoir

The City of Iqaluit derives its water supply from Lake Geraldine, which is retained by a structure consisting of a cast in place concrete section incorporating an integral spillway, and three earthen berms. All concrete structures are reported to be founded on bedrock and engage the rock abutment at the south end of the concrete structure.

Lake Geraldine is a natural body of water in an irregularly shaped basin. It is fed by rainfall and snow/ice melt from a watershed with an area of approximately 385 hectares.

2.2 History

In the late 1950's, the demand for a reliable year-round source of water resulted in the construction of a cast in place concrete gravity dam and a section of earth berm with a central cast in place concrete cut off wall. The project was designed and built by the Department of National Defense. According to the documentation available, the original construction took place circa 1958.

Since that time, as the City has grown and water demands have risen, the dam has been raised four times to increase the storage capacity. In recent years, the City of Iqaluit has been pumping additional water into the reservoir in the summer and fall of the year from a river and or lake located east of the reservoir.

The first height increase (0.3m) of the concrete dam and berms reportedly took place in 1979. This involved a concrete extension, which was dowelled into the existing structure.

The second height increase of the concrete dam and berms took place in 1985 and increased the height of the spillway structure by approximately 1.15m. The berm portion was widened and heightened as well to accommodate the increased storage capacity of the reservoir. The extension of the concrete dam was constructed with concrete and steel

reinforcement, dowelled into the existing structure and incorporated a steel formwork frame over the spillway section.

The third extension was undertaken in 1995 and increased the height of the concrete structures by a further 1.5m, with a corresponding increase in berm geometry. Based on analysis done prior to the extension, it was determined that the concrete structures would not have an adequate factor of safety against overturning if the extension was simply "dowelled-in" as before. The 1995 alteration therefore included an extensive rock-anchoring program for the concrete portions to provide the required stability to the structure.

The latest extension was completed in two phases over 2005/06. Additional rock anchors were installed thought the concrete structures in 2005 in preparation for a further height extension of 2 m in 2006. The existing berms were enlarged and the existing cut-of-walls within the north and center berms were extended in height. A new berm (south berm) and cut off wall were installed to the south of the main dam structure. A subsequent technical analysis of the dam and earth berms completed in 2020 indicated that the spillway structure is marginally compliant for stability when relying on rock anchors to resist overturning. CDA guidelines indicate that it is not recommended that passive rock anchors are relied on for stability. The geotechnical investigation completed in 2019 concluded that the bedrock below the concrete dam appeared to be fractured and that the loading capacity of the rock bolts (installed in 2006) would not meet the design expectations. Additional information on this investigation is available within the report produced by Meco and titled, "Technical Analysis & Risk Assessment, Lake Geraldine DSMP", dated 16 July 2020.

In August 2019 various repairs were undertaken to repair the upstream face (below the water line) of the dam. These repairs included:

- Repair of the expansion joint.
- Polyurethane crack injection.
- Localized concrete repairs.

The last major repair program undertaken was completed in the summer of 2021, various repairs were undertaken to maintain the concrete structures, berms, and access roads. These repairs included:

- Placement of additional aggregate material and regrading of the north and south access roads.
- Installation of additional rip-rap/armor stone on the upstream face of the center and north berms.
- Installation of additional aggregate and regrading of the top of the center and north berms.
- Crack repair and sealing on the downstream face of the concrete structures.
- Concrete repair on the downstream face of the dam.

Replacement of the expansion joint sealant material on the downstream face of the concrete structures was started in 2021 however, the work could not be completed due to local weather and site conditions. This work was completed in July 2022.

Additional improvements were undertaken in the summer of 2022. These repairs included:

- Re-establishment of aggregate stock piles on site.
- Installation of eight survey monuments (incomplete at this time).
- Survey of the survey monuments (incomplete at this time).
- Installation of water pressure (piezometer) and temperature data monitoring stations (incomplete at this time).

Installation of the additional aggregate material is complete however; installation of the sensor instrumentation and survey monuments was incomplete at the time this report was prepared.

3. DAM SAFETY INSPECTION

3.1 Site Inspections and Staff Interviews

A visual site inspection of the LG Dam was performed on October 4, 2023 by W.R. Scott, of Concentric. The inspection was non-invasive in nature and did not include an underwater survey or assessment. For a general overview, see the photograph in Appendix A.

A summary of observed conditions is as follows:

- Ice and deep snow were not present on or around the dam.
- The water level within the reservoir was overflowing the spillway, the water level reported by Natural Resources Canada on October 4, 2022 was 111.3m.
- No significant changes were noted in the general condition of the visible portions of the concrete structures. Seepage at the horizontal cold joint was active at the time of our review, repair of this joint is currently scheduled for summer 2024. See Photograph 1.
- The north access road has several areas where the sand and gravel roadbed has been eroded away. See Photographs 4 & 5
- The power pole that had previously supplied power to the temporary water treatment facility at the south berm has been removed. However, the VOC contaminated soil at the base of the pole has not been removed from site. See Photograph 6.
- A depression is present within the crest of the rip rap at the south end, of the south berm (in line with the previously installed mobile water treatment plant). It appears that the rip rap material was displaced to accommodate intake hoses. This rip-rap material should be re-instated. See Photograph 7.
- Several locations across the center and north berm have been contaminated with VOC / oil from the pile installation in the fall of 2021. The Contractor has removed some of this material; however, not all the contaminated material has been taken away. See Photograph 8.
- One small sink hole was noted within the south access road to the south berm. Further investigation is recommended; this work should include excavation of the affected area, visual inspection, and re-instatement of the granular material with

compacting of fill material should be done in 12" lifts. We recommend that Concentric be present to oversee this work and provide technical direction should it be necessary. See Photograph 9.

- Two small sink holes that were noted (center berm) in our previous DSI #3 have been excavated and repaired. The sink hole extended approximately 30" below grade.
- Minor seepage at the horizontal cold joint in the downstream face of the dam on the south side of the concrete dam was noted during our review. Leakage at this location is typically noted when the water levels in the reservoir are near capacity. See Photograph 10.
- Leakage was observed at the base of the interface between the bedrock and the concrete dam. Minor leakage at the base of the concrete dam at the interface with the bedrock has been consistent over the last 10+ years. We did not observe any changes or displacement of the bedrock at the base of the dam. As such, we do not believe that the underlying bedrock has changed or been disturbed. See Photograph 11.
- Sealant within the expansion joints require replacement, this damage appears to be the result of ravens that have picked away at the joint material. See Photograph 12.
- The metal corner post (used to indicate the edge of the road) knocked over by vehicle traffic on the south access road has not been repaired. See Photograph 13.
- The blizzard markers installed along the north side of the south access road previously identified in our DSI reports have not been repaired. See Photograph 14.
- Portions of the galvanized metal enclosure that covers the pipe that supplies water from the dam to the water treatment plant have not been re-instated. See Photograph 15.
- The rip rap at the base of the concrete dam, within the spillway, needs to be adjusted. The rip-rap has been displaced and is no longer providing full coverage at the base of the spillway.
- With the exception of the above noted, no significant changes, such as sloughing, slides, bulging or displacement, were noted in the earthen berms. No active seepage/leakage was observed within the visible portions of the berms; however, based upon our previous inspections and experience, minor water leakage/seepage is typically present within the valley downstream of the center berm.
- The aggregate stockpiles located on the downstream side of the north berm are intact.
- Members of the public continue to access the Dam structures and Lake Geraldine.
- Several depressions within the upstream face of the dam were noted when the water level was low in June 2022, these depressions should be corrected in the spring – summer of 2024 when the water level is low in the dam.

3.2 Dam Safety Analysis

A dam safety analysis was not completed as part of this inspection; however, there were no obvious indicators that the concrete structures have had significant changes since the last DSI.

3.3 Operation, Maintenance, and Surveillance

This DSI falls under the requirements of a visual inspection by an engineer as stated in Section 3.6 "Surveillance" of the Dam Safety Guide. The lack of a centralized repository of operational and maintenance records has been an ongoing issue. This, along with other issues regarding the operation and maintenance of the dam and reservoir, is noted within both the "Dam Safety Management Plan" dated July 16, 2020 prepared by MECO and the 2021 Dam Safety Review dated May 31, 2022 prepared by Concentric.

3.4 Recommendations and Required Action

Based on our inspection and review, we recommend the following:

1. Items deemed to be of an urgent need include:
    a. The contaminated soil around the base of the hydro pole adjacent to the south berm should be removed.
    b. Outstanding deficiencies remaining to be corrected by Nunavut Excavation should be completed no later than the 2nd week of October 2023.
    c. The depressions at the base of the upstream face of the center and north berms should be repaired in the spring of 2024 when the water level is low.
    d. Exercising and testing of the valves within the valve chamber is required as part of preventative measures. The condition of the valves within the valve chamber at the base of the dam was previously identified as being in an advanced state of corrosion. To our knowledge no maintenance or testing has been completed on the controls valve in the last 5+ years. There is a significant potential for the valves to fail and not operate correctly when needed in an emergency. A study to address this issue has been submitted to the City of Iqaluit.
2. Damaged and deteriorated sealant material should be replaced in 2024. It may be necessary to install a (removable) sheet metal panel over the horizontal expansion joint to protect it against damage from ravens.
3. One sink hole was observed within the south access road that leads to the southern berm. The sink hole should be excavated area should be refilled and compacted in 12" lifts. We also recommend the Concentric be present to identify the possible cause and record the depth, size, and potential impact on the berm.
4. Undertake an underwater survey of the concrete dam and spillway in 2024.
5. The protective galvanized metal enclosure installed over the pipeline from the dam to the water treatment plant should be re-instated.
6. The metal posts / markers that were installed along the north side of the south access road should be re-instated.

7. The north and south access roads should be regraded and eroded material replaced in the spring of 2024.
8. Undertake a test opening on the downstream side of the concrete dam and center berm in late January – early February 2024 to ascertain the source of the water that forms large ice sheets within the valley in the winter months.
9. The rip-rap material in the spillway should be re-distributed to provide cover at the base of the spillway.
10. The displaced rip-rap material at the south end of the south berm should be re-instated.
11. Repair of cracks within the concrete dam, this work is tentatively scheduled for summer 2024.
12. Repair of spalled concrete within the concrete dam, this work is tentatively scheduled for summer 2024.
13. The installation of video surveillance should be considered with a scheduled implementation in the next 5 years.
14. Updating of the permanent record file and its storage in a central location with an index that documents the date and contents of all records. The permanent record file needs to include:
    a) As-built drawings and specification for work undertaken at the dam.
    b) Weekly/monthly inspections completed by City staff.
    c) Dam Safety Inspections and Dam Safety Reviews generated by third parties on behalf of the City of Iqaluit.
    d) All maintenance records.
    e) Correspondence with regulatory agencies.
    f) Dam operation, maintenance, and surveillance documents.
    g) Reports and documentation generated by third parties on behalf of the City of Iqaluit.
15. Implement a public awareness program to educate and inform the public that:
    a) The dam and earthen berms are a *no trespass* area.
    b) Dog walkers should not allow their pets to travel atop and across the earthen berms due to the risk of (dog) fecal matter contamination of the potable water supply.
    c) ATV and skidoos should not be traveling atop the berms and across Lake Geraldine.

4. LIMITATIONS

This report was prepared for the sole use of the City of Iqaluit.

This report was prepared exclusively for the purposed project and site locations outlined in this report. The report is based on information provided to, or obtained by Concentric

as indicated in the report, and applies solely to site conditions existing at the time of the site investigations.

The conditions of the site may change over time or may have already changed due to natural forces or human intervention, and Concentric takes no responsibility for the impact that such changes may have on the accuracy or validity of the observations, conclusions and recommendations set out in this report.

The report does not extend to any latent defect or other deficiency which could not have been reasonably discoverable or discovered within the scope of the report. Information supplied by the City of Iqaluit or third parties for use in this report has not been verified by Concentric unless stated otherwise.

Concentric's report represents a review of available information with an established work scope, schedule, and budget. The material in the report reflects Concentric's judgement in light of the information available to it at the time of preparation. Any uses that a third party makes of this report, or any reliance on decisions made based on it, are the responsibilities of such third parties.

Concentric accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made based on this report.

Should there be any questions, please contact the undersigned.

Yours sincerely,

CONCENTRIC

Randy Scott
Project Manager

Steve Parker, P.Eng.
Lead Project Manager

APPENDIX A
Site Photographs

Photograph 1 – Overview of concrete dam and spillway.

Photograph 2 – Typical south berm condition at the time of our review.

Photograph 3 – Typical north and center berm condition at the time of our review. Note the soil contamination in the foreground atop the berm.

Photograph 4 – Erosion of the north access road at the intersection with Takuminaqtuq Avenue.

Photograph 5 – Erosion within the north access road.

Photograph 6 – Oil residue on the ground from the hydro pole, that had been 6reviously installed and removed.

Photograph 7 – Section of the south berm where the rip-rap material on the upstream face of the dam has been displaced.

Photograph 8 – VOC contamination atop the center berm. The contractor responsible has been directed to remove and replace the contaminated material.

Photograph 9 – Small sink hole found within the south access road to the south berm.

Photograph 10 – Seepage through the concrete dam.

Photograph 11 – Seepage at the base of the concrete dam, note the water flow through the drainage tube.

Photograph 12 – Deteriorated sealant material at the expansion joint.

Photograph 13 – Corner marker at the junction of the south access road and the road to the south berm has been knocked over.

Photograph 14 – Blizzard markers knocked over and or missing along the south access road.

Photograph 15 – Section of the supply pipe from the dam with the corrugates metal enclosure removed.

Photograph 16 – Warning signage installed in the wrong location at the South end of the South Berm.

APPENDIX B

Lake Geraldine Dam Inspection Checklist

Lake Geraldine Dam
Inspection Check List

Inspector Name:	W.R. Scott	Reviewer:	
Inspection Date:	October 4, 2023	Review Date:	
Weather:	Overcast & Rain	Action Required:	

Sketch the deficiency, and note its important characteristics.
Measure the deficiency.
Photograph the deficiency or describe its characteristics in writing.
Locate the deficiency relative to a recognizable reference point.
https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=10UH013

General Observations

Description	Yes	No	Observations	Action Required
Snow and ice present on dam & berms		X		
Snow and ice present on the lake		X		
North access road, gate secured (Any visible damage)	X		- Erosion noted at several locations within the north access road, road should be repaired and re-graded in 2023	yes
South access road, gate secured (Any visible damage)	X		- The side of road markers on the north side of the road are missing and or damaged and a corner post has been knocked down. - Small sink hole noted is road to south berm, site plan for location.	yes
Gates on the concrete dam locked (north and south ends on top of dam)	X			
Gates and fencing on top of dam intact or damaged	X			

Lake Geraldine Dam
Inspection Check List

Description	Yes	No	Observations	Action Required
Vandalism		X		
Debris on site or in the lake		X		
Dam signage intact or damaged	X		Contractor (Nunavut Excavation) needs to repair installation of the signage	
Valve chamber condition and damage (Indicate if there is any cracking, displacement, physical damage, cover is in place, etc)		X	No visible damage	
Uncontrolled breach in the concrete dam or earthen berms (embankments)		X		
Animal Activity:		X		

Additional Comments, Sketches or Observations

1. Reservoir at capacity

Concrete Dam and Spillway				
Description	Yes	No	Observations	Action Required
Water level relative to sill of spillway (measure from top of the concrete dam) Is there flow over the spillway	X		Reservoir at capacity with active discharge over the spillway	
Cracking / spalling present on top (surface) of the concrete dam (Indicate if new, existing, expanded, length, width, depth)		X	Existing cracking only, no additional cracking observed	
Cracking / spalling present on upstream face (surface) of the concrete dam (Indicate if new, existing, expanded, length, width, depth)		X	Existing cracking only, no additional cracking observed	
Cracking / Spalling present on Downstream face (surface) of the concrete dam (Indicate if new, existing, expanded, length, width, depth)	X		No change in spalled areas, scheduled to be repaired in 2024 No additional cracking observed	
Active seepage / leakage through dam Is there silt / sand within the leaking water (Indicate location and rate of leakage in liters per minute)	X		Minor (normal) seepage a cold joint in dam and in cracks, scheduled to be repaired in 2024	
Sealant Condition – Top of Dam			In poor condition, ravens have picked out a large amount of material from the joints	X
Sealant Condition – Up stream face of Dam			No change	
Sealant Condition – Downstream face of Dam			Minor (typical) leakage at base of dam	
Active seepage / leakage at: - Interface between concrete and ground (bedrock) - Sealant joints	X		Minor (typical) seepage at interface between the concrete dam and the bed rock.	

Description	Yes	No	Observations	Action Required
Displacement, settlement or misalignment of sections of the dam		X		
Debris / blockage within the spillway and or drainage channel at base of dam		X		
Erosion at the base of the spillway		X	Existing rip-rap material should be re-distributed	
Monitoring stations (condition, damage, other)			Fill material required at base of monitoring stations, contractor deficiency (Nunavut Excavation)	X

Additional Comments, Sketches or Observations

North Berm				
Description	Yes	No	Observations	Action Required
Sloughing, slides, bulging, collapse or displacement within the earthen berm – Top of Berm		X		
Sloughing, slides, bulging, collapse or displacement within the earthen berm - Upstream Face		X		
Sloughing, slides, bulging, collapse or displacement within the earthen berm - Downstream Face		X		
Depressions or sink holes within the top (crest) of the berm		X		X
Depressions or sink holes within the upstream face of the berm		X		
Depressions or sink holes within the downstream face of the berm		X		
Rock, gravel or aggregate displacement or washout (erosion) with the top of the berm	X		- Minor erosion at top of berm, - Contractor to fill voids at base of monitoring stations	X
Rock, gravel or aggregate displacement or washout (erosion) within the upstream face of berm		X		
Rock, gravel or aggregate displacement or washout (erosion) within the downstream face of berm		X		

Description	Yes	No	Observations	Action Required
Displaced rip-rap /armor stone on the upstream face of berm	X		Rip-Rap erosion below the water line, repairs recommended in 2024	X
Displaced rip-rap /armor stone on the downstream face of berm		X		
Transverse / longitudinal cracking, within the Top / crest of the berm (Indicate if new, existing, expanded, length, width)		X		
Transverse / longitudinal cracking, within the Upstream face of the berm (Indicate if new, existing, expanded, length, width)		X		
Transverse / longitudinal cracking, within the Downstream face of the berm (Indicate if new, existing, expanded, length, width)		X		
Wet area or active leakage / seepage within the downstream side face of berm Is there silt / sand within the leaking water		X		
Ponding water at base of the berm (downstream), is there sand or silt suspended within the water		X		
Additional Comments, Sketches or Observations				

Center Berm				
Description	Yes	No	Observations	Action Required
Sloughing, slides, bulging, collapse or displacement within the earthen berm – Top of Berm		X		
Sloughing, slides, bulging, collapse or displacement within the earthen berm - Upstream Face		X		
Sloughing, slides, bulging, collapse or displacement within the earthen berm - Downstream Face		X		
Depressions or sink holes within the top (crest) of the berm		X	Two sink holes noted on west side of berm south of the access ramp have been repaired	
Depressions or sink holes within the upstream face of the berm		X		
Depressions or sink holes within the downstream face of the berm		X		
Rock, gravel or aggregate displacement or washout (erosion) with the top of the berm	X		- Minor erosion at top of berm - Contractor to fill voids at base of monitoring stations	X
Rock, gravel or aggregate displacement or washout (erosion) within the upstream face of berm		X		
Rock, gravel or aggregate displacement or washout (erosion) within the downstream face of berm		X		

Description	Yes	No	Observations	Action Required
Displaced rip-rap /armor stone on the upstream face of berm	X		- Rip-Rap erosion below the water line, repairs recommended in 2024 - Minor erosion of rip-rap at interface with north end of concrete dam	X
Displaced rip-rap /armor stone on the downstream face of berm		X		
Transverse / longitudinal cracking, within the Top / crest of the berm (Indicate if new, existing, expanded, length, width)		X		
Transverse / longitudinal cracking, within the Upstream face of the berm (Indicate if new, existing, expanded, length, width)		X		
Transverse / longitudinal cracking, within the Downstream face of the berm (Indicate if new, existing, expanded, length, width)		X		
Wet area or active leakage / seepage within the downstream side face of berm Is there silt / sand within the leaking water	X		Minor water seepage at the base of the valley	
Ponding water at base of the berm (downstream), is there sand or silt suspended within the water		X		
Additional Comments, Sketches or Observations				

South Berm				
Description	Yes	No	Observations	Action Required
Sloughing, slides, bulging, collapse or displacement within the earthen berm – Top of Berm		X		
Sloughing, slides, bulging, collapse or displacement within the earthen berm - Upstream Face		X		
Sloughing, slides, bulging, collapse or displacement within the earthen berm - Downstream Face		X		
Depressions or sink holes within the top (crest) of the berm		X		
Depressions or sink holes within the upstream face of the berm		X		
Depressions or sink holes within the downstream face of the berm		X		
Rock, gravel or aggregate displacement or washout (erosion) with the top of the berm	X		Small section of stone displacement from atop the berm at the south end, this appears to have been from the temporary water treatment plant	X
Rock, gravel or aggregate displacement or washout (erosion) within the upstream face of berm		X		
Rock, gravel or aggregate displacement or washout (erosion) within the downstream face of berm	X		The pile installation contractor has not backfilled the area around the pile, deficiency for contractor (Nunavut Excavation) to repair	X

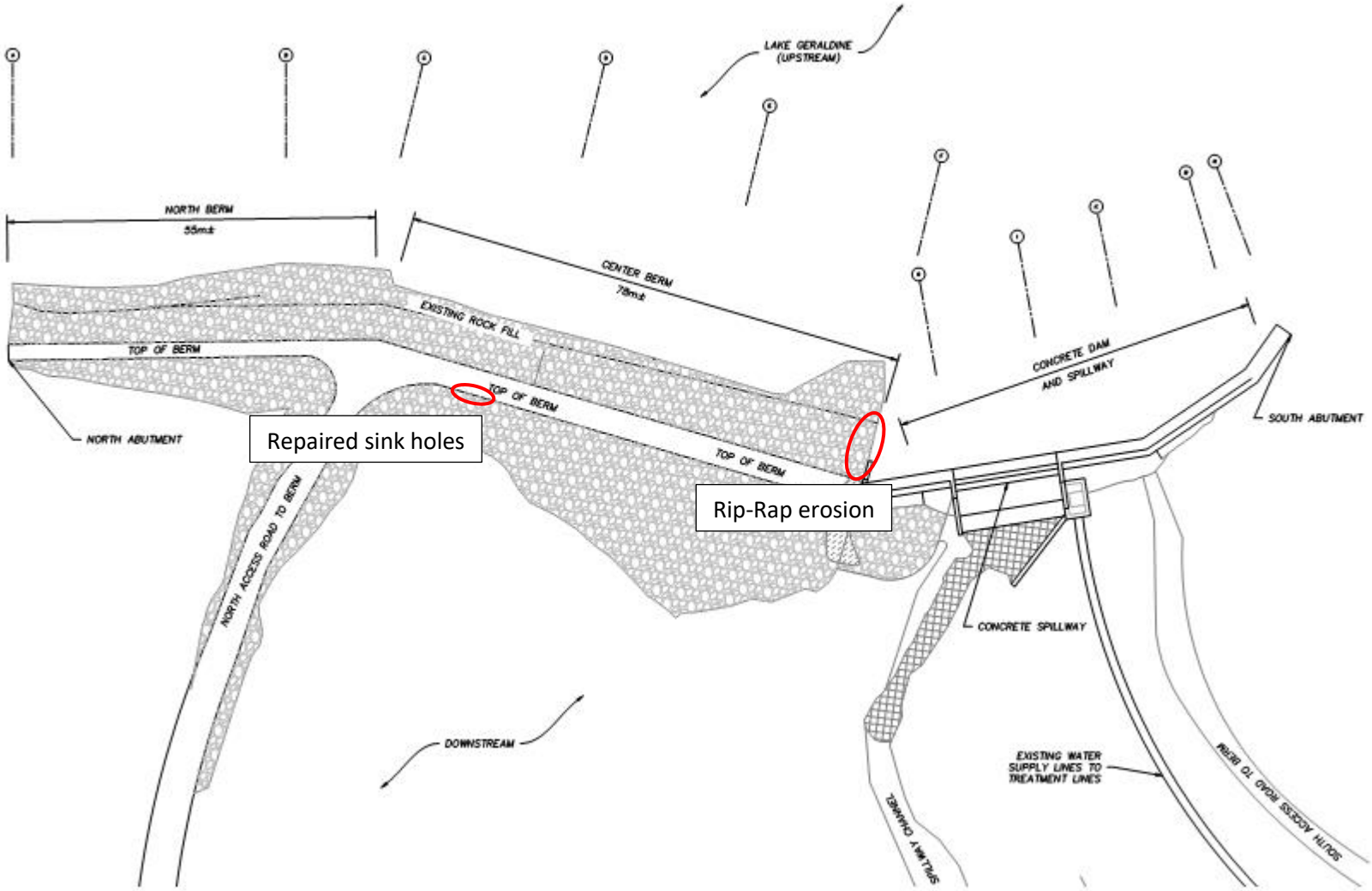
Description	Yes	No	Observations	Action Required
Displaced rip-rap /armor stone on the upstream face of berm		X		
Displaced rip-rap /armor stone on the downstream face of berm		X		
Transverse / longitudinal cracking, within the Top / crest of the berm (Indicate if new, existing, expanded, length, width)		X		
Transverse / longitudinal cracking, within the Upstream face of the berm (Indicate if new, existing, expanded, length, width)		X		
Transverse / longitudinal cracking, within the Downstream face of the berm (Indicate if new, existing, expanded, length, width)		X		
Wet area or active leakage / seepage within the downstream side face of berm Is there silt / sand within the leaking water		X		
Ponding water at base of the berm (downstream), is there sand or silt suspended within the water		X		

Additional Comments, Sketches or Observations

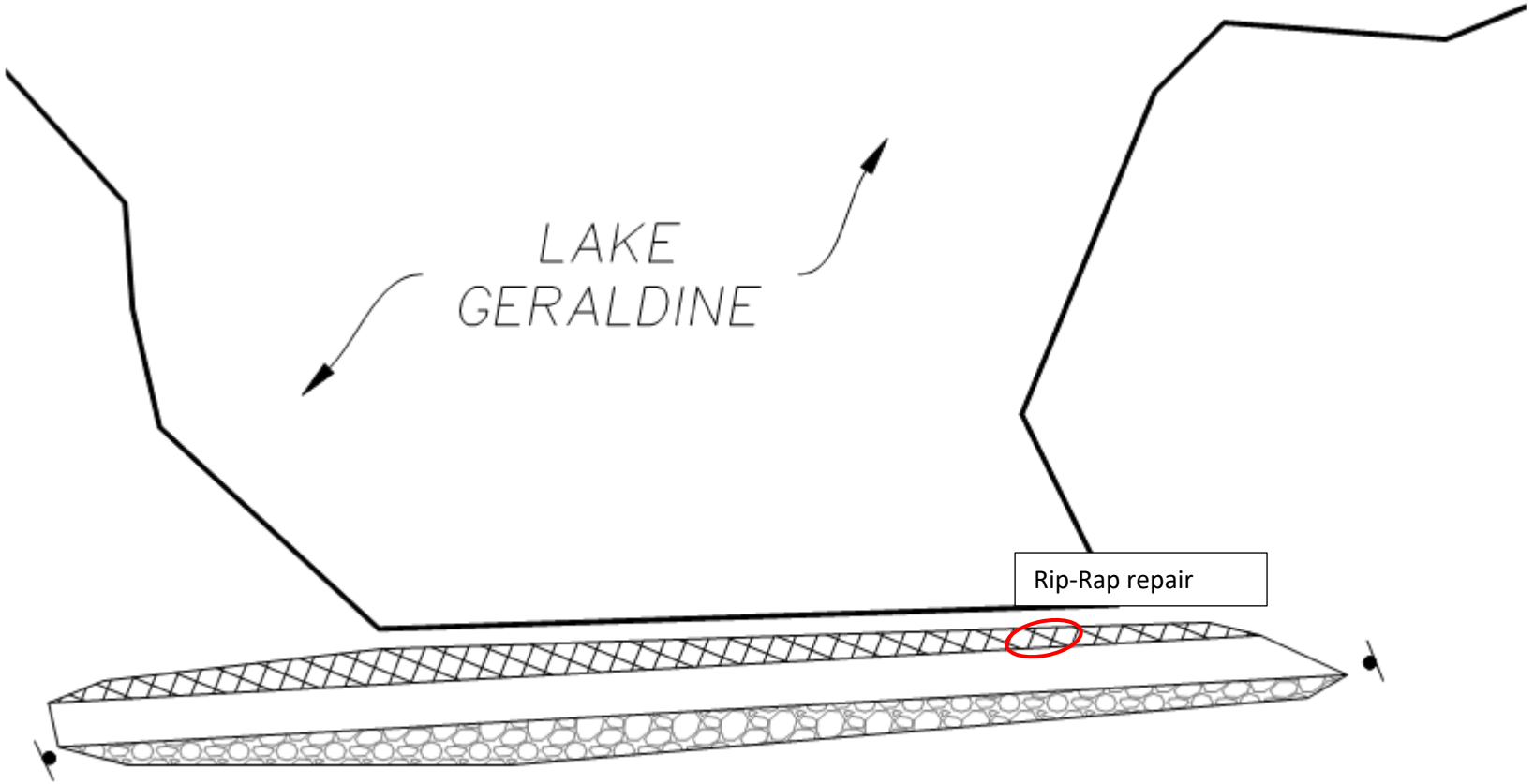
VOC soil contamination at base of power pole not remediated.

Lake Geraldine Dam Location Plan

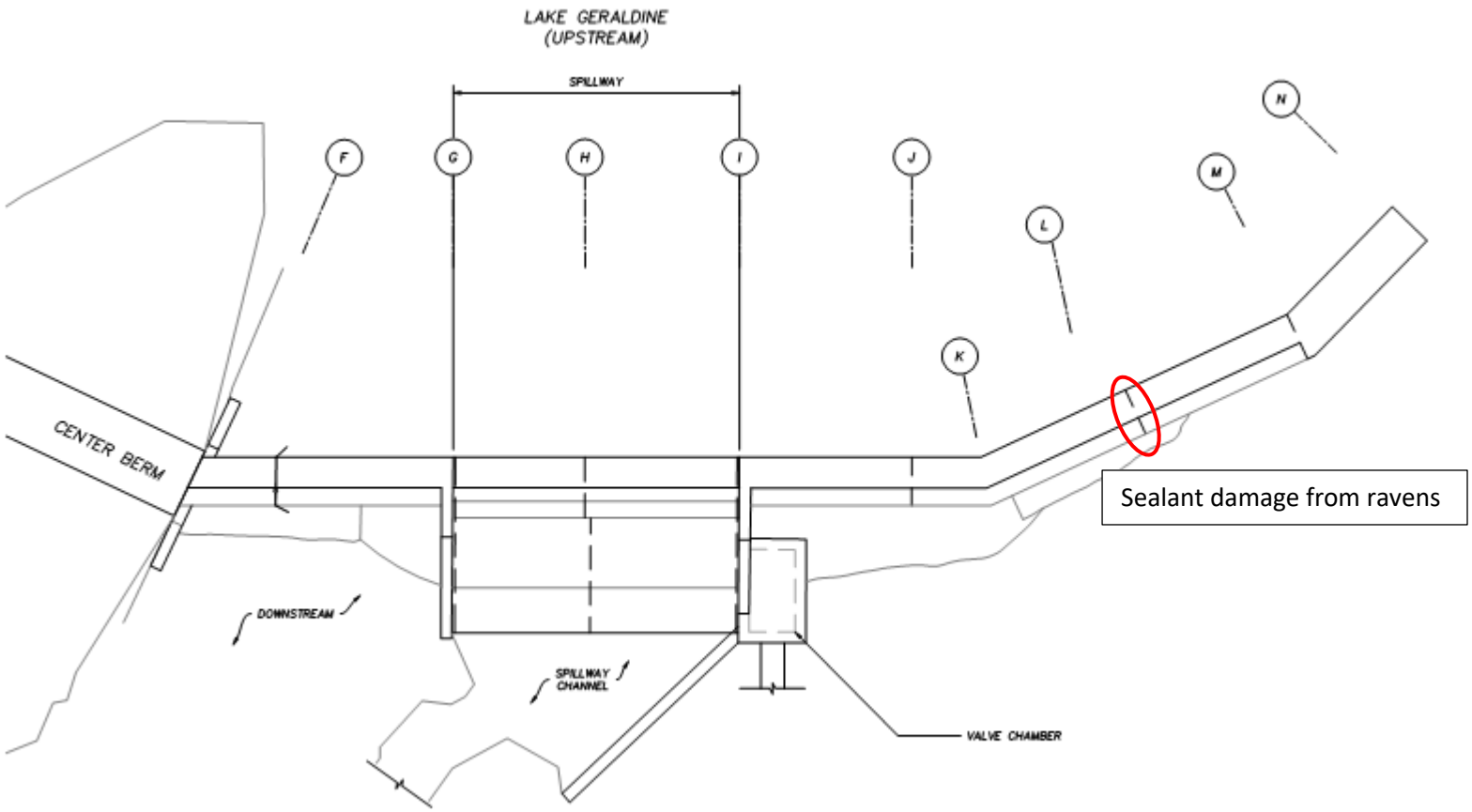
Site Plan – Concrete Dam, Center and North Berms



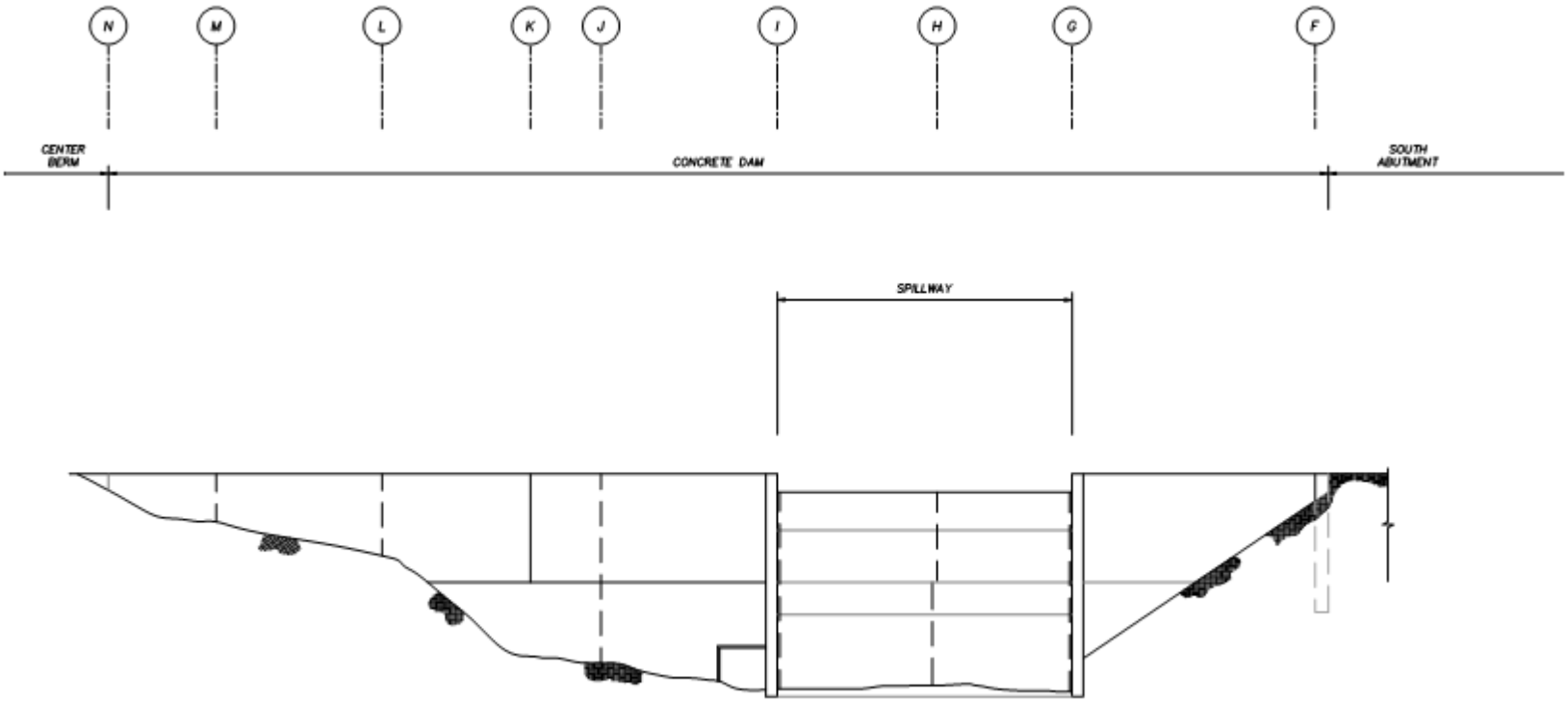
Site Plan – South Berm



Plan View – Concrete Dam and Spillway



Elevation – Upstream Face, Concrete Dam and Spillway



Elevation – Downstream Face, Concrete Dam and Spillway