

Request for Proposal
For
Second Depot Lake Dam
Dam Safety Review Update,
and
Public Safety Assessment
In the Township of Central Frontenac



— Quinte —
CONSERVATION
—

Requested by Quinte Conservation Authority
June 3, 2024

RFP Contact:

msmith@quinteconservation.ca

Closing:

Thursday, June 27, 2024 @ 10am

Quinte Conservation
RR#2
2061 Old Highway 2
Belleville, ON
K8N 4Z2

Introduction

Quinte Conservation (QC) comprises the drainage basins of the Moira, Napanee, and Salmon Rivers and all of Prince Edward County. Within these regions, QC owns and operates approximately 40 dams. We are presently reviewing our dam safety program and have identified that a dam safety review is due to be completed for the Second Depot Lake Dam.

Photos of the dam are included in Appendix A and a location map is included in Appendix B.

Background

The Second Depot Lake Dam is located at the outlet of the lake it is named after, in Lot 4, Concession 8, Township of Hinchinbrooke, Township of Central Frontenac, Frontenac County, approximately 11 km northwest of Verona. Construction of the dam was completed in 1958 by the Napanee Region Conservation Authority at the outlet of Second Depot Lake that raised the lake water level by 6 m and provided storage for excess water.

The dam, owned and operated by Quinte Conservation (QC), is a zoned embankment with pervious shells and impervious central core. The dam embodies 2 stop log bays, a valve and a concrete spillway adjacent to the right abutment. The embankment is approximately 9.5 m high. The crest width varies from 4 m near the concrete structure to 5 m near the left abutment. The embankment slopes are 2.5H:1V upstream and 1.9H:1V downstream.

Initially in the 2004 DSR, the Second Depot Lake Dam was classified as a high hazard structure. A dam break analysis of hypothetical failures of the dam for both sunny day and flood conditions was undertaken to evaluate the extent of flood inundation downstream from the dam. The findings of the dam break analysis indicated that 50 houses would be flooded if the dam fails and, therefore, classification of the dam was confirmed to be a HIGH IHP structure. The 2008 DSR found that no significant changes to the downstream or upstream sides of the Second Depot Lake damsite area have occurred since the 2004 DSR. Therefore, the dam was confirmed to be a high hazard category structure.

Scope of Work

Quinte Conservation is requesting a dam safety review be completed for the Second Depot Lake Dam. The review will be completed in accordance with the Dam Safety Reviews Best Management Practices (OMNR, 2011). It is anticipated that the work will include all the components of a dam safety review.

Frequency analysis, regional frequency analysis, hydrologic modelling, flood routing and hydraulic analyses shall be in accordance with the Technical Guide – River and Stream Systems: Flooding Hazard Limits, (OMNR, 2002).

Given the previous classification of the dam a dam break analysis is warranted and is to be completed as part of this study.

Undertake an evidence based or conservative stability analysis of the structure to determine if dam safety criteria are satisfied. A seismicity assessment should also be included. If the structure does not meet stability requirements using conservative assumptions, concrete and geotechnical testing should be completed to confirm condition and material properties. A \$15,000 cash allowance for this item is to be included for destructive and non-destructive testing.

Update the 2019 AutoCAD drawings complete with any revised elevations (obtained by surveying the concrete and embankment structure), cracks, delamination's, bulges, corroded metal, and all other applicable inspections notes.

A Public Safety Assessment (PSA) is to be completed to identify potential public safety hazards. The PSA is to be completed in accordance with the Public Safety Around Dams Best Management Practices (OMNR, 2011). A recommendation should be made as to whether a Public Safety Plan should be completed. Provide a provisional price to complete a Public Safety Plan.

Recommend actions, surveillance, monitoring, and maintenance activities including a timeline for completion and estimated budget. The budget items should come with a Class D breakdown. Provide the expectant lifespan of the structure with and without the recommended major modifications.

Investigate and determine the source and pathway of any seepage. Develop a seepage monitoring plan for Quinte Conservation to assess the seepage over time. Identify any imminent or future risks attributed to the seepage and recommend rehabilitation methods, costs and timeframes.

MNRF 2011 Technical Bulletins should be followed for all aspects of the project scope.

Available Data

Quinte Conservation will make available all the documentation pertinent to the dam. To this end we have completed a preliminary review of the documents and find the reports listed below may be of some assistance. The consultant is directed to include an allocation of one day for an engineer to review our files to determine if any further engineering reports may be available.

Known Reports or Data

- Past DSR's – International Acres (2003) and Hatch (2009)
- Hatch (2008/09), Geotechnical Investigation
- Drawings – 1949 As-construction Drawings, 1965 Overflow Spillway As-Builts, 2003 Acres AutoCAD Drawings, 2008 Aluminum Log Design, 2019 AutoCAD, 2021 East Bay Gantry
- Emergency Preparedness Plan – International Acres (2004)
- QC Inspection Reports – 1989 (MNR Inspection), 2010, 2013, 2018-2022
- Operations Data for 3rd Depot Lake Dam, 2nd Depot Lake Dam, and Bellrock Dam (2005-Current)
- Photos – 1957, 1999, 2001, 2004, 2008, 2008-Flood, 2010, 2014-Flood, 2017-Flood, 2017-2023
- Napanee Region Conservation Authority 1994 Dam Operations Manual
- Water Survey Canada Gauge at Bellrock and Camden East (available online)

- Data available at [2nd Depot DSR](#)

Study Deliverables

Reports

Reports, charts, tables, and other documents are to be provided in Microsoft Office format and in Adobe Acrobat portable document format (.pdf). Specifically, a PDF version of the complete report is required. Spreadsheets shall be provided in Microsoft Excel format.

All photographs documenting any field investigations shall be taken using a high-resolution digital camera. All photographs are to be provided both in an original unedited form and annotated with the photo description. The reports shall contain colour copies of the annotated photographs. Copies shall be printed with no more than two (2) photographs per page.

All drawings submitted under this contract are to be prepared in AutoCAD and comply with owner approved standards and conventions for drawing size, surround, layering, line weights, etc. The final drawings are to be provided in hard copy bound with the report and electronically in AutoCAD and Adobe Acrobat portable document format (pdf). Provide GIS shapefiles of inundation mapping lines and any topographic or bathymetric data that was collected as part of the study.

Hydrologic, hydraulic, routing and dam break models used in the study are to be provided digitally, including executable code, input data and output. Model summary inputs, runs, and outputs should be provided. Preference will be given to proposals using U.S. Army Corps of Engineers HEC software, unless justified otherwise.

The data and electronic version of the report are to be organized into appropriate directories and subdirectories, and a "README" file(s) included to assist the reader in locating and using the data. A copy of a USB mass storage device is appended to each bound copy of the report.

Interim Memo

The consultant will submit an interim memo to the owner for comment. The interim memo shall provide a summary of the information requested below as well as a brief synopsis of how the information was found. The interim reports shall include:

- Preliminary Public Safety Recommendations
- Preliminary Hazard Potential Classification - Based on basic review of site. Confirm what analysis will be completed to clarify classifications in each of the 4 MNR defined categories.
- Preliminary IDF and what assumptions were used to make the assessment.

Final Report

Two (2) hardcopies and softcopy (PDF) of the final Dam Safety Review Update Report are to be submitted with desktop publishing quality colour covers and titles.

A draft of the report is to be forwarded to QC for review. The consultant will give a presentation to QC and answer questions. The final report will be prepared after written comments from QC are satisfactorily addressed.

The content of the report shall specifically include the following in addition to the information as required under the Dam Safety Reviews Best Management Practices (OMNR, 2011),:

Deliverable	Report-category	Item
Final Report	Introduction	Background and history of the structure.
		Summary of Historical Floods Including Flows and Water Levels
		Site Layout - Identify all dam components and appurtenant structures as needed when reviewing the dam condition or recommending future works. Delineate all major dam locations including head pond, tailwater and all hazard zoned.
		Provide local benchmark. Must include a precise location described by: UTM coordinates and elevation, detailed description, and photos which would allow surveyors to replicate surveys. To be done in CGVD2013 with a conversation factor to CGVD28.
	Site Inspections and Surveys	Site Inspections of Dam and Appurtenant Structures.
		Provide local benchmark. Must include a precise location described by: UTM coordinates and elevation, detailed description, and photos which would allow surveyors to replicate surveys. To be done in CGVD2013 with a conversation factor to CGVD28.
		Complete a topographical survey of all dam components and any other critical areas required to accurately model the dam. Provide drawings with complete data set in the final report.
	Hydrologic and Hydraulic Assessment	Site Location and Watershed Map Showing Dam Sites, Drainage Areas (Local and Total), Hydraulic Characteristics, Hydro-Meteorological Gauge Stations)
		New or Updated Operating Rule Curve
		New or Updated Stage-Storage and Stage-Discharge Curves
		Hydrologic Model – setup description, and results
		Dam Hazard Classification - Analyze dam structure against 4 categories as defined by the MNRF. Provide detailed rationalization or data to accompany the hazard potential for each category.
		Freeboard Assessment
		Flood Frequency Flows, Probable Maximum Flood and IDF
		Flood Routing Model
		Adequacy of Discharge Facilities to Pass the IDF

	Structural Assessment	Design Loading Conditions, Including Uplift, Ice Pressure, etc., and Stability Analysis
		Assessment of Structural Condition and Stability of the Dam, Including Foundation and Embankment Conditions
	Geotechnical Assessment (if required)	A geotechnical can be completed if the consultant deems the information critical to the proper review of the dam stability. The consultant is to prepare a detailed plan complete with costing, work plan and safety plan. Carry a \$15000 cash allowance for this item.
	OMS	Adequacy of Any Existing Dam Monitoring Equipment. Recommendations and urgency to install and monitor new equipment.
		Adequacy of Dam Surveillance and Monitoring Programs. Recommendations and urgency of implementing a Dam Surveillance and Monitoring Program.
		Input from Operating Staff - Maintenance, operations, public safety
		Review of Operating Procedures, Records, and Test Equipment Required to Operate Discharge Facilities. Recommendations for improvement/efficiencies in the reviews.
		Provisional - Seepage Assessment
	Emergency Management	Review and update current Emergency Preparedness Plan.
	Public Safety	Public Safety Assessment as defined by MNRF.
		Provisional - Public Safety Plan (Under a Separate Cover) as defined by MNRF.
	Conclusions and Recommendations	Recommendations For Follow-Up Actions, Priorities, and Costs. Recommendations to include current risk assessment and post implementation risk. Timeframe for recommendation. Costs to be broken down to a Class D level.
		Recommended lifespan of dam structure(s). For Asset Management Purposes. Include any assumptions made. Do any recommendations affect the lifespan?
Final Deliverables		
		Two (2) Hardcopies of Final Dam Safety Report
		Two (2) Hardcopies of Final Public Safety Plan (if applicable)
		One (1) Softcopy of Final Dam Safety Report
		One (1) Softcopy of Final Public Safety Plan (if applicable)
		One (1) PDF Copy of the AutoCAD drawings (if applicable)
		Provisional - Create or Update AutoCAD Drawings
		Hydrologic, hydraulic, routing and dam break models provided digitally, including executable code, input data and

		output. Model Summary inputs, runs and outputs to be included.
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Meetings

The following meeting will be required. All meetings to be shown in the schedule.

1. Project Start-up

The consultant will be responsible for preparing agendas and recording minutes of all meetings and distributing to QC within 1 week of the meeting.

Meetings can be held in person, by telephone, teleconference, or videoconference. The consultant will arrange and provide meeting technology.

Provide no less than 2 weeks' notice for any site visits to ensure QC personnel can attend if needed.

Schedule

The project will commence upon notice of a successful proposal and receiving confirmation of \$2 million liability insurance and WSIB coverage.

Project Award & Start-up	Tuesday, July 9th, 2024
Site Visit(s)	Mid-Late July 2024
Draft Interim Report	Friday, October 18, 2024
Draft Final Report	Friday, December 6, 2024
QC Review of Final Reports	15 Business Days
Completion of Project	Friday, February 14, 2025

Payment

Consultant may submit a progress update no more than once a month. To substantiate that the work is complete, Quinte Conservation may ask for evidence that work has occurred. An updated schedule must be submitted by the consultant, reviewed and approved by Quinte Conservation with each progress claim.

Proposal Submission Requirements

Proposals shall be submitted no later than 10 am on Thursday, June 27, 2024. Proposals can be submitted to Mike Smith at msmith@quinteconservation.ca or deliver One (1) copies to:

Quinte Conservation
2061 Old Highway 2
RR2, Belleville, ON
K8N 4Z2
Attention: Mike Smith

The proposal shall include:

- Details on the approach and methodology
- contact person and phone number and people involved in the preparation of the proposal
- Gantt chart schedule showing activities, meetings, report submissions, etc.
- a list of key staff, their related experience in Ontario and role on this project
- corporate experience on similar projects in Ontario and elsewhere
- sub-consultants to be used, their role, corporate experience in Ontario, key personnel, per diem rates and the mark-up rate to be used
- estimated project cost for each study component. Project consulting fee. The mark-up and calculation method shall be clearly described
- attestation of all addenda reviewed
- state all assumptions used

Proposals shall not exceed 15 pages in length (not including addenda)

Request for proposal issued	Monday, June 3, 2024
Questions regarding the proposal due	Thursday, June 13, 2024 at 10am
RFP addenda posted on the Quinte Conservation website	Monday, June 18, 2024
Request for proposal closing	Thursday, June 27, 2024 at 10 am

Selection Criteria

QC will select the successful consultant based on an assessment of the submitted proposals based on criteria such as meeting the project requirements, project team experience, and project cost. The proposal with the lowest bid may not necessarily be accepted.

Appen dix A: Photos and Maps of Dam



Figure 1: Looking at outlet structure and part of embankment - downstream side of dam - 2023



Figure 2: Standing on Embankment looking downstream at Roading/Culvert during high waters - 2018



Figure 3: Looking at Outlet Gate House - 2023

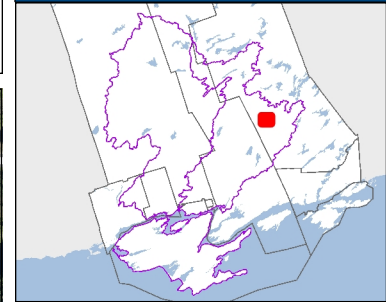


Figure 4: Inside Gate House

2nd Depot Site Layout



Key Map



Legend

- Water Control Structure - QC
- Quinte Conservation Jurisdiction
- Lower and Single Tier Municipality
- Watercourse

Air Photo Capture Year(s):
2019

Notes

- 1) 2nd Depot Lake Dam

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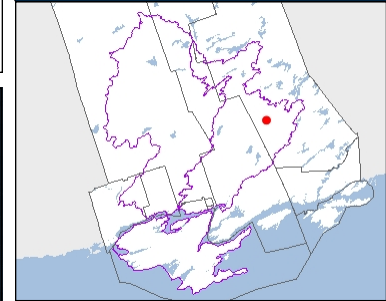


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2nd Depot Site Layout



Key Map



Legend

- Quinte Conservation Jurisdiction
- Lower and Single Tier Municipality
- Watercourse

Air Photo Capture Year(s):
2019

Notes

50.8 0 25.40 50.8 Meters

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