

BOARD OF DIRECTORS' REPORT #44/17

TO: Directors, Maitland Valley Conservation Authority
FROM: Stewart Lockie, Conservation Areas Coordinator
Phil Beard, General Manager/Secretary Treasurer
DATE: July 12, 2017 (to be presented July 19, 2017)

SUBJECT: Gorrie Conservation Area Flood Event Update

PURPOSE:

- To update the Board on the progress made and future required repairs resulting from the June flood event at Gorrie Conservation Area.
- To obtain Board direction on the options to investigate with the Gorrie Dam Infrastructure.

BACKGROUND:

At the June 26th Board meeting, damages and safety concerns from the June 23rd flood event were identified and discussed for the Park and Dam at Gorrie Conservation Area. It was recommended and approved that removal of safety hazards be undertaken and staff investigate the MNRF requirements required for the site.

Gorrie Conservation Area Update

Completed:

- June 27th - MVCA staff barricaded south side of park and inspected property.
- June 29th - MVCA staff removed all of the stop logs and smaller debris from dam.
- June 30th - MVCA staff cleaned up all debris and re-staked trees on North side of river
- July 10th - Discussions with MNRF on requirements for cleanup and species at risk legislation
- July 11th - Contractor on-site to estimate park cleanup costs

Next steps:

With the current unsafe condition of the park and to prevent further erosion of the spillway breach, staff have initiated the process to remove hazards and regrade the berms and park area. MNRF has advised the Authority that approval is required under the Lakes and Rivers Improvement Act (LRIA). The following steps have been identified by MNRF:

MNRF requirements for cleanup and removal of hazards:

- Complete studies as required- identify flow velocities through the breach in the spillway and design erosion control measures for regraded berms and vegetation

to be planted over the scour hole to withstand these velocities to prevent further erosion of this material.

- Engineered plans required for the regrading/stabilization of the exposed sections of the berm, scour hole repair, and mill race repairs (costs unknown at this time)
- Identify the timeframe required for temporary repairs.
- MNRF will require an estimate from MVCA for developing a long term plan for the site.

Additional permits required:

- Obtain demolition permit from municipality for Turbine bay removal

Permits not required to address the following safety issues:

- Installation of new stop logs in mill race control
- Removal of tree, pedestrian bridge, and barrier posts
- Repairs to picnic shelter

Funding for Clean Up Costs:

Staff are in the process of Determining if MVCA's insurance will cover any of the clean-up costs and repairs. Damage to Mill dams is not covered by insurance. Conservation Authorities Group Insurer will not provide insurance for damage to conservation authority mill dams.

Note: If any of the clean-up/repair costs are covered by insurance, the deductible will come from MVCA's Insurance Deductible surplus.

Dam Options:

After the safety and erosion hazards have been dealt with at the site, a long term solution will be required for the Dam Infrastructure. Staff will require direction on the options the Board would like to investigate concerning the Dam.

There are currently many unknown answers to the requirements and processes needed for the options regarding the Gorrie Dam Infrastructure. All options will require MNRF permits, studies, and approvals under LRIA. The Board should consider the following in providing direction on the options that they would like staff to investigate:

- Benefit to have engineering consultant with experience with recreational dams & working with MNRF to help guide Maitland Conservation with the process and assessment of the feasibility of each option.
- Deficiencies noted in the current Gorrie Dam Infrastructure should be taken into consideration (see appendix to this report for a history of the Gorrie Dam):
 - Existing berm made of unsuitable material
 - Concrete structure requires repair
 - Current Board removal system is limited in flood events

- Repairs undertaken in 1979 were not supported by the engineer as adequate to protect the structure from future failure, site was identified as being at risk of piping these concerns were not addressed in the repairs undertaken in 1979.

Options that the Board could consider include:

- Dam repair
- Dam replacement/redesign
- Dam decommissioning/removal

SUMMARY:

In order to prevent further damage and to remove hazards, staff will continue to work with MNRF on the necessary cleanup processes and requirements. Staff can investigate what MNRF's requirements would be for each of the options that the Board would like to consider along with the costs to retain an engineer to assist the Board and staff assess the viability of each option. This project would then be included in MVCA's 2018 draft budget.

RECOMMENDATION:

To be determined

APPENDIX A: Gorrie Dam Backgrounder

1. Original dam constructed in 1856 by the Leech Brothers who built a sawmill as well.
2. The mill and dam were reconstructed in 1867 so that the mill could be used for grinding flour.
3. Dam was rebuilt in 1929 by Ben Maquire
4. MVCA purchased the mill and dam in 1963
5. Existing dam was repaired in 1970 by MVCA.
6. In May 1974 the dam and earth berm were damaged by flood waters.
7. Township of Howick and MVCA received petition from residents of Gorrie to repair the dam.
8. In 1976 B.M. Ross and Associates were retained by MVCA to provide a preliminary assessment of the structure and identify if it could be repaired.
9. In 1977 Dominion Soils were retained by MVCA on the recommendation of MNR to investigate the soil conditions under the dam site and within the existing earth dykes.
10. B.M. Ross and Associates summarized the findings as follows: Soil investigations revealed that the dam site is located on pervious materials (silty sand and gravel deposits) which will ultimately lead to piping and loss of the foundation support. This could result in the failure of the structure. Similarly, the earth embankment fills have not been chosen for their impervious nature, contain pockets of topsoil, and are not compacted uniformly in place. The existing earth fill dikes and concrete spillway structures have not be constructed with acceptable engineering properties of soil strength, impermeability and resistance to piping. (Ltr. To MVCA from Ken Dunn, P.Eng. B.M. Ross: June 9/77)
11. B.M. Ross and Associates recommended that to prevent the potential for piping under the dam that a continuous sheet steel piling cut off wall be installed across the dam site. He advised that it would be very difficult to install such a wall at this site. Mr. Dunn concluded his letter by stating that in his opinion he didn't think that it would be economically feasible to make repairs to the existing earth dike and concrete spillway as recommended in the soils report. (Ltr. To MVCA, Ken Dunn, P.Eng. B.M. Ross and Assoc. June 9/77)

12. MNR's Engineer concurred with Mr. Dunn's assessment of the findings of the soils investigation and stated in their report dated: June 7, 77 that: failure of the existing dam was bound to eventually occur due to the pervious soils underlying the structure. They stated that a new dam would require sheet steel piling to be installed to a depth of 20ft on the upstream side of the dam/dikes across the full length of the structure (750ft) along with the construction of a new dike and/or concrete dam. They estimated the cost at \$150,000 to undertake this work.
13. In 1978 MVCA's Board requested MNR's approval to undertake the bare minimum repairs to restore the dam.
14. In 1978 B.M. Ross and Associates were authorized by MVCA with the approval of MNR to develop engineering plans for a bare minimum approach to repairs. These repairs were to include only the following: reconstruct the abutment wall; pointing of the spillway; repair the breach in the dike with clay material, grouting of the scour holes.
15. B.M. Ross and Associates advised MVCA and MNR that they would not be responsible for any future problems associated with insufficient capacity of the existing waterway opening of the existing dam and undermining and failure of the existing structure if MVCA proceeded with the proposed repairs. Ltr. To MVCA: Dec. 8/78.
16. MVCA decided to undertake bare minimum approach to the repairs with support of MNR in 1979. Estimated cost was \$75,000.
17. Repairs halted in July 1979 due to the engineer identifying serious engineering deficiencies with respect to the southeast wingwall once the site had been dewatered. Forty feet of the concrete spillway was undermined and water was discovered flowing underneath the dam from one side to the other. This discovery meant that the dam would be unstable under flooding conditions. The engineer provided several alternatives to try and rectify this situation.
18. Revised estimate of costs to repair the dam and dike system approved by MVCA and MNR: \$220,000. The additional repairs did not include the installation of sheet steel piling to prevent piping of water under the dam site.
19. Final cost of repairs: \$204,690 equivalent to \$672,847 in 2017 dollars.

Two pictures are attached to this report:

The first shows the damage to the Gorrie Dam after the May 1974 flood.

The second shows the damage to the emergency spillway berm after the June 23rd, 2017 flood.



