

January 13, 2016

F:\200\246 Brokenhead RM\246.12 GTH Lagoon Design and Construction\01 Correspondence\151 Jan - Mar\Ltr to MB Cons - Repair Existing Dikes.docx

Mr. Robert Boswick, P. Eng.  
Environmental Engineer  
160-123 Main Street  
Box 80  
Winnipeg, Manitoba  
R3C 1A5

B-246.12

via e-mail

Dear Mr. Boswick,

Re: Rural Municipality of Brokenhead – Upgrading and Repair of Existing Lagoon Dikes

As discussed previously, the RM of Brokenhead plans to complete upgrades and repair to the existing lagoon dikes as part of the overall lagoon construction works proposed to be completed in the summer of 2016. The following letter describes the proposed works. The works will be completed under Clause 39 of the Licence #2646 RRR.

1.0 Lagoon Assessment

A site assessment and GPS survey was completed on October 7, 2015. According to the lagoon operator the liquid level in storage cell 1 was at the lowest level and cell 2 would be lowered prior to the October 31 discharge deadline.

Erosion was observed on the storage cell 1 and 2 dikes. The erosion consisted of a 0.5 – 0.6 m near vertical drop in the dike slope starting from an elevation of approximately 237.0 m (0.2 m below the top of dike elevation) as seen in the following photo. From the bottom of the drop the dike appeared to continue at a 4:1 or 5:1 slope. Only the top vertical 1.0 m of dike could be observed due to the liquid level in the cells.



Figure 1 – Storage Cell 2 dike at the Storage Cell 1 – 2 intercell dike

The primary cell appeared to have only minor erosion as the cell is smaller in size and likely does not experience significant wave action.

## 2.0 Dike Repair and Rip Rap

The existing dikes will be repaired as part of the lagoon expansion works. The liquid level of the existing cells will be lowered by discharging or transferring liquid into the new storage cell. The dike side slopes must be allowed to dry. Clay material would be hauled and placed on the inner dike slopes to repair the vertical drop at the top of the existing cells. The clay material would be compacted to 96% standard proctor density. The existing dike slopes below the vertical drop will not be altered. Clay to repair the dikes would be obtained from the new cell excavation or a borrow area.

After dike repair, rip rap would be placed on the inner dikes of the existing primary cell and both secondary cells. A non-woven geotextile would be placed and secured on the dike slope and covered with rip rap rock. The rip rap would be placed 0.6 m above and below the high water level in the cells. The rip rap spec will call for 150 – 300 mm clean limestone or granite rock placed 300 mm thick with larger and smaller rock uniformly distributed.

Please provide a letter of authorization to proceed with the works.

If you have any questions, please contact the undersigned.

Yours truly,

JR Cousin Consultants Ltd.



Brett McCormac, P.Eng  
Environmental Engineer

c.c Sue Sutherland, CAO of the RM of Brokenhead