LAGOON DECOMMISSIONING PLAN

TO: Asit Dey, P.Eng. – Conservation and Climate, Environmental Approvals

FROM: Dana Bredin, P.Eng. – WSP Canada Inc.

SUBJECT: **Gimli Lagoon Decommissioning Plan**

DATE: **June 19, 2020**

INTRODUCTION

WSP is presently engaged with the Rural Municipality of Gimli (RM) to provide professional engineering services for the decommissioning of their existing lagoon site. As part of this process, we are pleased to submit to our decommissioning plan for review and approval by the Environmental Approvals Branch of Manitoba Conservation and Climate.

BACKGROUND

The existing four-cell wastewater treatment lagoon is located south of Gimli between PTH #9 and Lake Winnipeg, within SW 09-19-04 EPM occupying a footprint of approximately 20 hectares (ha). The lagoon was replaced by a sequencing batch reactor (SBR) wastewater treatment plant (WWTP) that was constructed and commissioned in the late 2000s, and the lagoon has not been in operation since that time. The WWTP operates under Environment Act Licence (EAL) No. 2587, which was issued January 20, 2003.

This EAL contained clauses that restricted further use of the lagoon and called for its decommissioning (Clauses 40 & 41) after the construction of the WWTP. However, the RM still recognized a purpose for the lagoon cells and in May 2010, they filed a Notice of Alteration (NoA) with the Director of Environmental Approvals to:

- maintain Cell #2 of the former lagoon as an emergency equalization basin during extreme precipitation events; and
- convert the other three cells (Cells #1, #3 & #4) into engineered wetlands.

On July 7, 2010, the Director of Environmental Approvals approved the NoA, with certain conditions:

- the removal of the sludge from the cell;
- the liner of the storage basin meeting provincial wastewater lagoon liner requirements;
- the storage basin must be fenced to prevent public access; and
- the operation of the storage basin is subject to Clause 35 of the EAL.

Clause 35 of the EAL reads as follows:

"The Licencee shall, in the event the overflow detention pond is used for temporary overflow storage of wastewater:

a. *prepare a detailed report of the event which includes:*

   i. *the reason the overflow detention pond was used;*
   ii. *what, if any, equipment failure resulted in the use of the overflow detention pond;*
   iii. *the amount of wastewater stored in the overflow detention pond; and*
   iv. *the duration the overflow detention pond was in use;*

b. *submit the report to the Director within 30 days of the event; and*

c. *at the request of the Director and in accordance with any written instructions, undertake an assessment to determine the adequacy of the hydraulic capacity of the wastewater treatment plant."*

Prior to functionally converting Cell #2 into an equalization basin, the sludge within the cell was removed off the cell floor and stockpiled on the inside slope of the cell berm. Sludge on the bottom of the other three cells (#1, #3 & #4) was not removed, but according to the RM the remaining liquid was pumped into Cell #2.

Test pits and soil sampling for the berms of Cell #2 was completed in October 2012. Two samples recovered were tested to determine if the berm material's hydraulic conductivity meets current provincial guidelines for a lagoon clay liner. The samples collected were from TP1, 1.4 m to 2.1 m below grade, and TP3, 0.5 m to 1.2 m below grade. The National Testing Laboratories Limited completed the testing in November 2012, and the results are as follows:

- TP1: 7.6×10^{-8} cm/s
- TP3: 3.0×10^{-8} cm/s

At this time, there are no soil logs available, and locations of the test pits are unknown. Correspondence from Manitoba Conservation and Water Stewardship (now Manitoba Conservation and Climate) dated April 7, 2014, indicated that approval was given for the use of Cell #2 as an emergency equalization storage basin.

CURRENT STATUS

Currently, Cell #2 operates as an emergency equalization basin when significant rainfall events trigger its use to prevent the South Beach lift station from flooding. The other three cells have not been converted into engineered wetlands and remain dormant. These cells have been empty for almost 10 years except for the accumulation of seasonal precipitation.

Even though the original plan was to convert the three unused cells into engineered wetlands, the RM has decided that the best course of action is to decommission these cells, while leaving Cell #2 in service. Recently, funding has been acquired by the RM for wastewater infrastructure upgrades through the Canada-Manitoba Infrastructure agreement. Part of the funding applies to decommission cells #1, #3 & #4, and the RM desires to proceed with a decommissioning plan.

DECOMMISSIONING PLAN

Typically, there are five requirements that a decommissioning plan must address:

1. The volume of sludge to be removed from the existing lagoon cells;
2. The method of sludge removal;
3. The destination of the removed sludge;
4. Site restoration activities; and
5. The timeframe of the plan.

VOLUME

When the RM drafted and submitted the NoA submission in 2010, they also took measurements within the four lagoon cells to quantified the sludge. Table 1 summarizes these historical findings:

Table 1: 2010 Gimli Lagoon Approximate Sludge Volumes

Cell	Volume (m3)
Cell #1	7,189
Cell #2	5,292
Cell #3	5,432
Cell #4	15,274
Total	**33,187**

In preparation for the submission of this decommissioning plan, WSP visited the lagoon site in 2019 to confirm the sludge depths within Cell #1 (other cells were not accessible by foot). Based on this new information, the anticipated sludge volumes in all cells were updated to reflect lower sludge thicknesses. These findings are summarized in Table 2.

Table 2: 2019 Gimli Lagoon Approximate Sludge Volumes

Cell	Volume (m3)
Cell #1	3,830
Cell #2	2,855
Cell #3	3,005
Cell #4	8,095
Total	**17,785**

The 2019 findings represent a significant reduction from what was measured in 2010. One explanation for the difference in findings could be attributed to a wet vs dry measurement. Actual sludge volumes shall be determined during construction. One of the construction activities proposed during decommissioning involves a topographic survey before and after sludge removal to verify the actual volume of the removed quantity.

REMOVAL

Although cells #1, #3 & #4 have remained dormant for approximately a decade, seasonal accumulation of precipitation is a factor in the removal of the sludge from the cells. Currently, there is water within the cells that will need to be discharged before the sludge is removed. This water will be tested to confirm its acceptable quality and will then be pumped into the former discharge ditch of the lagoon. Following this, the cells will be allowed to dry over the course of the summer.

Once sufficient drying of the sludge has occurred, construction equipment will be used to blade the material into stockpiles for further drying. When presumed ready, slump testing will be performed to confirm its acceptability for truck-hauling. Slump testing shall be conducted at random and representative locations according to CSA standard A23.2-5C (concrete slump test). The maximum allowable slump is 150 mm. The sludge will not be tested under freezing conditions.

DESTINATION

The RM is already licenced for land application of sludge under EAL No. 2473 R. Additionally, in June 2018 the RM submitted an EAP to construct a biosolids (sludge) storage facility at the Gimli Waste Disposal Ground located near Arnes, MB. The EAP was approved by Conservation and Climate in a letter response dated December 16, 2019.

Construction of this new facility is scheduled for 2020 and it will be constructed in conjunction with the sludge drying activities at the former lagoon site. Once approved for use, the lagoon sludge will be hauled to this new facility for eventual land application following the appropriate and established guidelines (refer to Biosolids Land Application submission, WSP June 2020).

SITE RESTORATION

When sludge removal is complete, the existing lagoon dykes for cells #1, #3 & #4 will be levelled. Drainage will be promoted away from the former cell area and this levelled area will be seeded to grass.

The dykes constituting Cell #2 will remain without disruption to the integrity of the cell. The liner in these cells will be confirmed as to its suitability and finally a fence will be constructed around it’s perimeter.

TIMING

As with all earthwork construction activities, the schedule is subject to several factors, not the least of which is the weather experienced when construction takes place. As such, there is a possibility that the activities shown below extend into 2021.

Testing/pumping of water within cells #1, #3 & #4:	June – July 2020
Drying/stockpiling of lagoon sludge:	July – October 2020
Construction of the new biosolids storage facility:	June – October 2020
Sludge hauling:	October 2020
Former lagoon site restoration:	October – November 2020
Liner testing of Cell #2	October 2020
Construction of fence around Cell #2	October 2020
Land application of sludge:	Fall 2021

APPROVALS REVIEW

Should any questions arise during the review or if additional information is required, please contact the undersigned. Based on the construction timing, please notify us immediately if this submission is incomplete or if there are concerns with the overall plan.

We look forward to your response.

Kind regards,

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Project Manager

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