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TRANSMITTAL

TRANSMITTAL No. **15-0321-001-0009**
PROJECT: 15-0321-001 St. Laurent Lagoon Assessment

TO: Tracey Braun
Manitoba Conservation and Water Stewardship
Suite 160, 123 Main Street
Winnipeg MB R3C 1A5

FROM: Steven Cho
KGS Group

DATE: March 15, 2016

SUBJECT: Notice of Alteration - Sandy Bar Road Wastewater Treatment Facility (Revised) / Application for Wastewater Treatment Facility Classification Form

SUBMITTED FOR:
☐ Approval ☑ Review And Comment
☐ As Requested ☐ Your Use

SENT VIA: Email

DOCUMENT	DESCRIPTION	STATUS
Sandy Bar Notice of Alteration	Notice of Alteration - Sandy Bar Road Wastewater Treatment Facility Rev. Draft [Mar 15, 2016]	Reissued for Review
Wastewater Treatment Facility	Application - Water and Wastewater Facility Operators [Mar 15, 2016]	Issued for Use

REMARKS:

Dear Tracey Braun,

Please find the attached documents with the associated information listed on the transmittal.

Should you have any questions, please contact me at our office.

Regards,

Steven Cho

SENT BY: Melanie Park [Document Control]

COPIES TO:
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Manitoba Conservation and Water Stewardship
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March 15, 2016 File No. 15-0321-01

Conservation and Water Stewardship
Environmental Approvals Branch
Box 80, 123 Main Street
Winnipeg, Manitoba
R3C 1A5

ATTENTION: Ms. Tracey Braun
Director

RE: St. Laurent Lagoon Assessment
Notice of Alteration - Sandy Bar Road Wastewater Treatment Facility

Dear Ms. Braun:

This Notice of Alteration letter and enclosed $500 application fee are being submitted to Manitoba Conservation and Water Stewardship (MCWS) to request an amendment to the Clean Environment Commission Order 744 (CEC744) for the Manitoba Housing Authority Sandy Bar Road Wastewater Treatment Facility (commonly referred to as the St. Laurent Lagoon, See Figure 1 Site Plan). This Notice of Alteration is being submitted to request an amendment respecting the discharge practices and procedures in response to the MCWS letter, dated February 26, 2015. Details of how the discharge operations vary from the license requirements and associated effects are given in the following sections, to obtain formal authorization from MCWS and for inclusion in the Client File No. 318.15.

1.0 EFFLUENT DISCHARGE PRACTICE

The CEC744 requires Manitoba Housing Authority to:

- Ensure that effluent is discharged to Lake Manitoba by means of an enclosed pipe.

The February 26, 2015 letter from MCWS indicates that the current effluent discharge practice is to pump effluent over the berm from the Secondary Cell in to the surrounding marshy area encircled by the flood protection dike. This practice is inconsistent with the requirements of CEC744. It is understood that there is a 2 inch buried pipe extending from the Secondary Cell to Lake Manitoba to facilitate discharge; however, mechanical failure of this system resulted in the above noted deviation from licensed discharge practices many years ago.

As discussed with local Environment Officer Kurt Dorward, discharge from the Secondary Cell directly to Lake Manitoba is no longer considered to be the best practice or most practical option for the facility with many cabins along the shoreline. The current practice of discharging to the adjacent wetland has not raised concerns from the local residents even with a regular summer/warm weather discharge over the past several years.

Surface release of treated lagoon effluent is a commonly accepted practice, when in a suitable operational setting. The following factors have been considered when evaluating the application at this facility:

- Lagoon loading from the senior's residence, the local school, and eight homes operated by Manitoba Housing Authority;
- Lagoon capacity including use of the flood protection dike as a holding cell for treated effluent; and
- Discharge schedule.

1.1 EXISTING LAGOON HYDUALIC CAPACITY

It is understood that the Sandy Bar Road Wastewater Treatment Facility once serviced the local school, a senior's residence, and thirty-four houses along Buffalo Drive and Louis Riel Drive. According to a Sewage Lagoon Data Sheet, dated April 23, 1979, that was provided to KGS Group by Kurt Dorward for review, the design capacity of the facility considered a population of 197 residents and 512 persons at the school. The facility was designed for a hydraulic loading of 18,000 m^3 per 196 days, with discharge twice per year. The Primary Cell and Secondary Cell were designed to have capacities of 19,000 m^3 and 12,000 m^3, respectively.

Manitoba Conservation and Water Stewardship indicated that a recent study dated October 20, 2014 showed both of the primary and secondary cells were operating at a depth of water level of 0.61m below the top of berm. The current capacities of the primary and the secondary cells are 20,000 m^3 and 14,000 m^3 respectively.

The Design Objectives For Wastewater Treatment Lagoons (September 2014) provided by Manitoba Conservation and Water Stewardship requires any wastewater treatment lagoon to maintain an one meter (1m) freeboard during operation. Therefore, the lagoon hydraulic capacity is re-evaluated as follows:

<u>Primary Cell (Approximate Size: 60 m wide by 185 m long)</u>

Total Depth of Cell	= 2.5 m
Freeboard	= 1.0 m
Invert of the discharge pipe	= 0.3 m
Operation Depth	= 1.2 m
Hydraulic Capacity	= 12,300 m^3
50% Hydraulic Capacity	= 6,100 m^3

<u>Secondary Cell (Approximate Size: 85 m wide by 90 m long)</u>

Total Depth of Cell	= 2.7 m
Freeboard	= 1.0 m
Invert of the discharge pipe	= 0.3 m
Operation Depth	= 1.4 m
Hydraulic Capacity	= 9,700 m^3

Manitoba Conservation and Water Stewardship requires that the primary cell storage capacity to be limited to 50% of the actual operating volume. The secondary cell storage capacity should be considered above the invert of the discharge pipe, usually 0.3 m off the cell floor. The new **<u>maximum hydraulic capacity is calculated to be 15,800 m^3</u>** (6,100 m^3 plus 9,700 m^3)

1.2 HYDUALIC LOADING ESTIMATES

The loading on this facility has recently been reduced by the closure of many of the homes. Eight homes, each with an average of four residents, the senior's residence and the school will continue to use this facility for wastewater treatment. An estimated total daily flow is detailed below.

WASTEWATER CONTRIBUTION CATEGORIES	ESTIMATED NUMBER OF INDIVIDUALS	HYDRAULIC LOADING RATE (L/person/day)	ESTIMATED TOTAL DAILY FLOW (L/day)	ESTIMATED TOTAL YEARLY FLOW (m^3/year)
Senior Residents	22	350	7,700	2,900
Students and Faculty	150	200	30,000 (210 days/year)	6,300
Manitoba Housing Authority Homes	8 houses, 32 persons	350	11,200	4,100
		TOTAL	**48,900**	**13,300**

Based on the current use of the facility, the total yearly flow of 13,300 m^3 is approximately 85% of the maximum hydraulic capacity of 15,800 m^3. The maximum hydraulic retention time for the primary cell and secondary cell is approximately 14 months.

1.3 NEW HOLDING CELL

It is understood that the flood protection dyke is owned by Manitoba Housing Authority. KGS Group proposes that the area between the flood protection dike and the existing cells to be used as a holding cell for treated effluent before surface release occurs. The perimeter lagoon flood protection dikes were constructed to required standards and show no apparent leakage. Current operation has been based on pumped discharge from secondary cell to holding area and pumping of holding area to wetland outside dike system. Using the diked area outside the lagoon cells will facilitate once yearly discharge in the fall when most local lakeshore cabins are closed for the winter.

The new holding cell can be accomplished by installing a new interconnecting valve on the secondary cell of the lagoon and converting the culvert through the flood protection dike to a valve. The location of the new valves (as shown on Figure 1) will be documented and marked within the facility.

1.4 DISCHARGE SCHEDULE

The CEC744 requires Manitoba Housing Authority to:

- Ensure that no discharge of effluent takes place between the 1st day of November in any one year and the 15th day of May in the following year; and,

- Ensure that no discharge of effluent takes place between the 15th day of June and the 15th day of September in any one year.

Based on the increased retention time provided by the holding cell, it is recommended that effluent discharge from the holding cell to the marshy area immediately west of the dike be conducted once annually within the month of October and prior to freezing conditions, which is consistent with the requirements of CEC744. In the recent past, discussions with Kurt Darward indicated that this lagoon system has been discharged twice per year and has had some difficulty meeting the effluent discharge standards, especially in the fall. The proposed alteration will mitigate these concerns.

1.5 DISCHARGE PATH

The sections above indicate that the Sandy Bar Road Wastewater Treatment Facility is in a position of reduced loading, while also being able to increase retention times of treated effluent with minor alterations to the facility. These conditions will combine to produce a more polished final effluent with 50% smaller volume that is suitable for surface discharge to the marshy land immediately west of the flood protection dike. This area is within the Manitoba Housing Authority right of way and has been the practice for the past decade or more. The proposed discharge location in relation to the Manitoba Housing right of way is shown on Figure 1. Manitoba Housing Authority requests that the use of the holding cell and annual discharge to the marshy area be considered an acceptable treatment and discharge process for the effluent at the facility.

1.6 OPERATION PLAN

The lagoon will be operated in the following operation cycle:

Winter Operation (Filling Primary and Secondary Cells)

1) Close secondary valve cell to holding cell
2) Close effluent discharge valve in holding cell
3) Open primary cell valve to secondary cell

- Fill the primary and secondary cells.
- Maintain the holding cell at a minimum hydraulic level of 0.3 m above cell floor.

Spring Operation (Drain Secondary Cell into the Holding Cell)

1) Close primary cell valve to secondary cell
2) Close effluent discharge valve in holding cell
3) Open secondary cell valve to holding cell

- Fill the primary cell.
- Drain the secondary cell into the holding cell, both cells will have a low hydraulic level.

Summer Operation (Filling Primary and Secondary Cells)

1) Close secondary cell valve to holding cell
2) Close effluent discharge valve in holding cell
3) Open primary cell valve to secondary cell

- Start filling the primary and secondary cells.

Fall Operation (Discharge Holding Cell)

- Sample treated effluent in the holding cell and compare to the effluent regulations near mid-September.
- Discharge when holding cell effluent sample meets the effluent regulations, but before October 31.

1) Close secondary cell valve to holding cell
2) Open primary cell valve to secondary cell
3) Open effluent discharge valve in holding cell and drain to 0.3 m above cell floor by October 31 of each year.

- Start filling the primary and secondary cells.

2.0 LAGOON FACILITY IMPROVEMENTS

The MCWS letter dated February 26, 2015, identified specific areas for improvement at the Sandy Bar Road Wastewater Treatment Facility. In addition to correcting these conditions, Manitoba Housing Authority has identified additional areas for improvement. These are discussed in more detail below.

2.1 ACCESS ROAD

The facility access road runs from Buffalo Drive, between two Manitoba Housing Authority homes, over the flood protection dike, and up to the facility gate. The road passes through a low-lying area that is commonly wet, and often difficult to pass. Additionally, there is no turnaround point for vehicles other than the lagoon berms.

In consideration of the long-term use of the facility, Manitoba Housing Authority has proposed a relocation of the access road. Therefore, the existing road will not be repaired, but a new road will be constructed to suitable conditions. The proposed road alignment is shown on Figure 1.

2.2 FENCING

The facility is surrounded by a chain link fence with a single access gate to the east of the Primary Cell. The fence is intended to discourage trespassing and prevent wildlife from entering the facility. As identified in the February 26, 2015 letter from MCWS, sections of the fence are in poor condition and warrant repair. Manitoba Housing will complete these repairs, and also relocate the access gate to the location of the new access road.

2.3 INTERCONNECTING VALVES

The February 26, 2015 letter from MCWS indicated that the interconnecting valve between the Primary Cell and Secondary Cell needed to be checked for functionality. It has been confirmed that this valve is not currently operational and the other valve could not be located. Both of these valves will be replaced, and the locations will be documented and marked within the facility. A third valve will be adapted into the current culvert to allow discharge from the holding cell to the marsh area.

2.4 DREDGING OF THE PRIMARY CELL (IF AND AS REQUIRED)

During the installation of the interconnecting valves, the level of water within the Primary and Secondary cells will be lowered. During this time, the sludge accumulation within the Primary Cell will be assessed. It is proposed that the sludge be dredged and evenly redistributed across the base of the Primary Cell to maintain a uniform lagoon bottom. Should the accumulation be so great that it interfered with the required capacity of the lagoon, the material will be removed for external disposal. If external disposal is required, the composition of the sludge will be evaluated and an appropriate disposal options (ie. landfill vs land application) will be selected in consultation with MCWS.

2.5 BERM CONDITION

The Golder Associates Ltd. report titled “Lagoon Assessment, St. Laurent, Manitoba” dated October 24, 2013 (reference number 12-1380-0086) documents the findings of an investigation intended to evaluate the apparent stability of the lagoon berms. The report indicated that the berms were constructed of low permeability clay and silty clay. Although minor erosion and sloughing was observed, no significant stability issues were identified at the time.

However, from an operational standpoint, Manitoba Housing Authority has identified that the berm between the Primary and Secondary cells is both low and narrow. In order to preserve freeboard conditions and improve access for maintenance equipment, it has been proposed that this portion of the berm be improved upon during the overall facility upgrades.

The berm will be survey to determine the required surface elevation. This low area will be raised using local compacted clay at the same time the road improvements are completed.

3.0 CERTIFICATION OF OPERATOR

It is understood that operation of the Sandy Bar Road Wastewater Treatment Facility is to be completed by an operator certified through the MCWS Water & Wastewater Facility Operators Certification Program. Moving forward, a certified operator will be employed to complete monthly inspections of the facility, manage discharge events, and provide on-call services.

4.0 SCHEDULE FOR LAGOON IMPROVEMENTS

Manitoba Housing Authority intendeds to complete the above noted repairs and improvements within the 2016 calendar year. The planned schedule is to tender the work in April, and discharge from the Secondary Cell in May in order to facilitate the work that requires low water conditions within the lagoon.

5.0 CLOSURE

We trust the above information is adequate for an alteration notification and inclusion in the Client File. Should you have any questions or wish to discuss this letter further, please do not hesitate to contact the undersigned.

Prepared By:

Steven Cho, M.Sc., P.Eng.
Environmental Engineer

Approved By:

Rob Sinclair, M.Sc., P.Eng.
Manager, Environmental Services

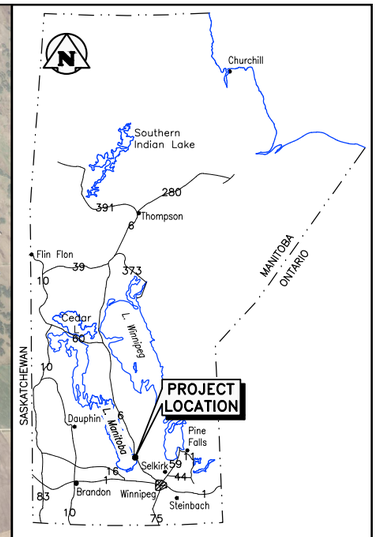
SC/RDS/mp

FIGURE 01

11x17

INSET
SCALE: 1:4000

PLAN
SCALE: 1:30000



KEY MAP

LEGEND:

- V-1 ⋈ REPLACEMENT VALVE
- V-2 ⋈ NEW VALVE
- V-3 ⋈ NEW VALVE IN PLACE OF CULVERT
- MANITOBA HOUSING RIGHT OF WAY
- DISCHARGE AREA
- PROPOSED ALIGNMENT OF ACCESS ROAD

100 0 100 200 300m
SCALE: 1:4000 METRIC

1000 0 1000 2000m
SCALE: 1:30000 METRIC

NO.	YY/MM/DD	DESCRIPTION	ISSUED BY	CHECK BY
B	16/02/12	RE-ISSUED WITH DRAFT REPORT	ASB	RDS
A	15/11/07	ISSUED WITH DRAFT REPORT	ASB	RDS

REVISIONS / ISSUE

KGS GROUP CONSULTING ENGINEERS

MHO Mountain Housing Opportunities

LAGOON ASSESSMENT
ST. LAURENT, MANITOBA

SITE PLAN

NOVEMBER 2015 | FIGURE 01 | REV: B

FileName: U:\FMS\15-0321-001\15-0321-001_G01.dwg - Tab: G01 Plotted By: rmelleur 16/02/11 [Thu 10:07am]
11"x17" PLOT SCALE: 1"=2'