

SUMMARY OF COMMENTS/RECOMMENDATIONS

PROPONENT: University of Manitoba
PROPOSAL NAME: Glenlea Research Station – Proposed Community Sewage Treatment System
CLASS OF DEVELOPMENT: 2
TYPE OF DEVELOPMENT: Sewage Treatment Plant
CLIENT FILE NO.: 104.20

OVERVIEW:

On May 23, 2006, the Department received an Environment Act Proposal (EAP) from the University of Manitoba for the construction and operation of the Glenlea Research Station rotating biological contactor sewage treatment plant located on River Lot 7, Parish of Saint Norbert in the Rural Municipality of Ritchot. The proposed RBC is a component of other related proposed works at the site, including an underground sewage collection system, a lift station, secondary clarifier and a UV disinfection system. Treated wastewater will be discharged to the Red River. The existing septic fields and sewage treatment plant will be decommissioned.

The Department, on June 6, 2006, placed copies of the EAP report in the Public Registries located at 123 Main St. (Union Station), the Winnipeg Public Library, and the Manitoba Eco-Network and provided copies of the EAP report to the Canadian Environmental Assessment Agency (CEAA), the Clean Environment Commission, and TAC members. As well, the Department placed public notifications of the EAP in the Winnipeg Free Press on Saturday, June 10, 2006. The newspaper and TAC notifications invited responses until July 10, 2006.

On July 14, 2006 Manitoba Conservation forwarded requests for additional information from the TAC to the proponent. The proponent's September 7, 2006 response to the requests was then provided to the participating TAC for review and comment on October 4, 2006. Additional comments for consideration from the TAC were received on October 25, 2006.

COMMENTS FROM THE PUBLIC:

There were no comments from the public.

COMMENTS FROM THE TECHNICAL ADVISORY COMMITTEE:

Agriculture, Food and Rural Initiatives

- *No concerns.*

Historic Resources Branch – Culture, Heritage and Tourism

- *No concerns.*

Intergovernmental Affairs and Trade

- *No concerns.*

Sustainable Resource Management Branch

- *There is no indication of the phosphorus concentration in the effluent; and*
- *The sewage treatment plant has a relatively small daily flow. As such, it is not inconceivable to require the proponent of the plant to haul the raw sewage to a licenced facility in the advent of a break down, as opposed to discharging raw sewage to the Red River via the sewage treatment plant bypass as indicated in the design. It is recommended that the proponent install facilities for emergency raw sewage transfer to another sewage treatment plant via hose bib or via temporary storage and truck haul.*

Proponent Responses – September 7, 2006:

- Phosphorus concentrations in the effluent are unknown at this time. It is proposed that samples be collected and analyzed four (4) times a year for the first two (2) years of operation for the following:
 - Total phosphorus
 - Total dissolved phosphorus
 - Total inorganic phosphorus
- The emergency bypass line should be maintained in the design to allow for personnel access to the basins in the event of an extreme emergency where access to the basin by personnel is required. This will ensure that safety to operating personnel is maintained while maintenance activities are undertaken. Under “normal” emergency conditions where access to the basins is not required, sewage can be withdrawn from the basins and hauled, by truck, to the City of Winnipeg or other licensed facility. Sewage can also be withdrawn either from the sludge withdrawal lines or from the influent manhole if necessary.

Disposition:

- The draft Environment Act Licence contains a clause requiring that the proponent, for a period of at least two years following the commencement of operation of the sewage treatment plant under this Licence, once every three months, obtain samples

of treated effluent from the final discharge point of the sewage treatment plant and have the samples analyzed for:

- conductivity;
 - total Kjeldahl nitrogen;
 - nitrate-nitrite nitrogen
 - total dissolved phosphorus;
 - total particulate phosphorus; and
 - total inorganic phosphorus.
- The draft Environment Act Licence contains a clause requiring that the Licencee operate the sewage treatment plant in such a manner that all wastewater generated within the Glenlea Research Station is directed toward the sewage treatment plant or other approved sewage treatment facilities.

Transportation and Government Services

- *No concerns.*

Ecological Services Division – Water Stewardship

- *Given the high sport fishery value of the Red River, the river's contribution to a significant amount of Lake Winnipeg's nutrient and pollutant load and the department's initiatives in improving the water quality and aquatic ecosystem health, we would want to ensure that the effluent meets or exceeds the Manitoba Water Quality Standards, Objectives and Guidelines. Effluent monitoring at the outlet should be implemented throughout the year and the facility should need to meet more stringent nutrient reduction requirements.*
- *Regarding the discharge pipe, DFO is responsible for fish habitat under the Fisheries Act. Our provincial fisheries management interests should be met through their review of this proposal.*
- *In terms of the infrastructure, particularly the underground sewage collection system and desludging lines, are there precautionary measures put in place to reduce the risk of leakage (e.g. putting lines within casing pipes to prevent leakage, help identify if a leak is occurring and facilitate maintenance or repair of pipes in the event of a leak)?*
- *Regarding the implementation of a valving system to allow the pumps to bypass the treatment processes and discharge to the river in the event of an emergency, given that the volume of effluent is small could there not be an alternative in place (e.g. discharging to a truck or maintaining one of the existing septic fields)?*
- *Registered water wells are mentioned in Section 3.3. How are they registered? It seems as if the piezometric surface and not the depth to groundwater was measured.*

- *The proposal refers to sewage collection works. As per the Public Health Act, Regulation 331/88R (waterworks, sewerage and sewage disposal regulation) the project will require approval prior to construction. The Office of Drinking Water can be contacted for information on the approval process and submission requirements.*
- *Sections 4.2 and 4.3 suggest that there will be no significant impacts on surface water and groundwater. It is unclear whether the consultant is proposing any monitoring methods to ensure the above.*
- *It is mentioned in the proposal that breakthrough occurred in the septic field and at the same time, there are some registered groundwater wells near the project area. Therefore, it is not clear whether any baseline water quality data has been or will be collected in order to assess the status of the local groundwater quality.*
- *The proposed activities should not degrade the groundwater and surface water qualities on adjacent properties unsuitable for use as drinking water sources. The consultant should identify such activities and recommend appropriate mitigation measures if required.*
- *No information was provided by the proponent on expected pH levels in the effluent. pH is required to assess potential ammonia toxicity of the effluent. The proponent should be required to meet Water Quality Objectives for ammonia including end-of-pipe acute ammonia toxicity (Williamson 2001).*
- *We recommend the proponent be required to conduct an effluent monitoring program. Samples should be collected routinely for:*
 - *Biochemical oxygen demand*
 - *Total suspended solids*
 - *Escherichia coli bacteria*
 - *Ammonia*
 - *pH, and*
 - *Temperature.*
- *To assist in assessment of the potential impact of the effluent on the Red River, samples should also be collected four times per year for the first two years of operation for:*
 - *Conductivity*
 - *Total phosphorus*
 - *Total dissolved phosphorus*
 - *Total inorganic phosphorus*
 - *Nitrate-nitrite, and*
 - *Total Kjeldahl Nitrogen.*
- *An accredited laboratory should be used for all sample analyses. All analysis results should be forwarded to Water Quality Management Section (123 Main Street, Winnipeg, Manitoba R3C 1A5) along with measurements of mean monthly effluent flow from the facility.*

Proponent Responses – September 7, 2006:

- Effluent sampling will be conducted through an online automated sampler located within the sewage treatment plant as outlined in Section 2.8 of Design Brief (Appendix B in the Manitoba Environment Act Proposal Submission). The proposed monitoring program related to the replacement facility has been addressed in the Response to Comment 7 (below);
- The proposed sewage collection system consists of 250 mm and 300 mm diameter piping which receives sewage flows from various buildings on the Glenlea site and will carry the effluent to the proposed sewage treatment plant. The pipe will be installed in trenches cut into the native high plastic clay, placed on sand bedding and backfilled with granular material to approximately one pipe diameter above the pipe. The remainder of the backfill will consist of the native clay material. In general, no extraordinary precautions are taken to contain leaks from the system. Should a leak in the sewer line occur, the effluent will seep into, and be contained within, the granular bedding around the pipe. Leaks are detected through a combination of regular inspection, or in extreme cases, when the effluent rises through the trench backfill to the surface. This is the standard approach for sewage collection systems.

Encasement pipes would be ineffective here. Encasement pipes do not prevent leaks and are typically used for crossings under roads or railways so as to allow for the main line pipe to be replaced by excavating at the two end points of the encasement pipe and avoiding excavation in the center of the road or railway. In this case encasement pipes would delay the appearance of effluent at the surface and would further force the effluent to rise at the end of the encasement pipe rather than at the location of the actual leak, thereby misidentifying the location of the leak.

In practical terms, leaks in a sewer system of this size are uncommon and will be minor in nature. Any leakage will be contained within the granular bedding and backfill. To prevent effluent from traveling downstream to the river through the backfill, a portion of the piping near the proposed sewage treatment plant will be backfilled with high plasticity native clay to act as a plug for any upstream leaks. Any leaks downstream of this point would consist of treated effluent.

Typical maintenance of sewage collection systems includes periodic video inspection of the piping. Recommended inspection intervals will vary, but typically within a ten to twenty year time frame. We will recommend to the University that the sewage collection system at the proposed Glenlea plant be televised every 10 to 15 years.

Desludging lines will be contained within the building and any leaks will be contained by the concrete floor of the building. Minor spillage may occur at the camlock sludge truck connection during sludge removal. A concrete slab is to be constructed at the north side of the building allowing for clean up of any spilled material.

- The emergency bypass line should be maintained in the design to allow for personnel to access to the basins in the event of an extreme emergency that requires personnel to enter the basin of the reactor. Retaining the bypass piping for these events will ensure that safety to operating personnel is maintained while maintenance activities

can be undertaken. Under “normal” emergency conditions where access to the basins is not required, sewage can be withdrawn from the basins by use of the cam lock connection normally used for sludge withdrawal and hauled, by truck, to the City of Winnipeg or other licensed facility. Sewage can also be withdrawn from either the sludge withdrawal lines or from the influent manhole if necessary.

- As stated in Section 3.3 of the Manitoba Environment Act Proposal Submission, there are three (3) registered groundwater wells in River Lots Seven and Eight in the Parish of St. Norbert. These wells are owned by the University of Manitoba and are registered in Manitoba Conservation’s Waterwell Database GWDrill. As stated in the GWDrill database, the depth to groundwater in these wells varied from 4.5 to 4.9 m..
- It is the intent of the University of Manitoba to have all required approvals in place prior to construction of this project.
- To monitor surface water quality, an online, programmable automatic sampler will be installed on the effluent line at this facility to collect samples required for effluent analysis. It is proposed that effluent monitoring for the following parameters be completed six (6) times per year for the first two (2) years of operation and four (4) times a year thereafter:
 - Biochemical oxygen demand
 - Total suspended solids
 - Escherichia coli bacteria
 - Ammonia
 - pH, and
 - Temperature.

It is also proposed that samples will be collected and analyzed for the following parameters four (4) times per year for the first two (2) years of operation:

- Conductivity
- Nitrate-nitrite
- Total Kjeldahl Nitrogen
- Total Phosphorus
- Total dissolved phosphorus, and
- Total inorganic phosphorus.

No groundwater monitoring program is proposed for this project as groundwater monitoring programs are not generally required for sewage treatment plants unlike lagoons and septic field facilities.

- The proposed sewage treatment plant is designed to be a central treatment system, after which the existing septic fields will be decommissioned. No previous monitoring of the groundwater quality has been conducted to our knowledge and none has been proposed as part of this project.
- It is not anticipated that the activities proposed will degrade groundwater or surface water quality. Water quality in this portion of the Province of Manitoba is generally unsuitable for domestic use due to the naturally occurring high levels of minerals.

- Primary settling basin of the Rotating Biological Contactor (RBC) process will be used for the sedimentation of primary solids and in the storage of secondary solids. It is anticipated that some degree of anaerobic decomposition will occur contributing to the overall alkalinity of the incoming wastewater stream which will provide a buffer for the pH.

The effluent from the RBC process is anticipated to be near neutral at a pH of 6.5 to 7.5. No historical background information was available prior to the design of this facility other than a limited sampling program that was conducted at the start of this project. Calculations with respect to ionized and unionized ammonia have been presented in Section 4.0 of the Design Brief (Appendix B of Manitoba Environment Act Proposal Submission) and anticipated pH levels have been illustrated in those calculations. It has been assumed that some mixing will occur and pH will be close to background river levels.

- It is proposed that samples for the following parameters will be collected and analyzed six (6) times a year for the first two years of operation and then four (4) times a year thereafter;
 - Biochemical oxygen demand
 - Total suspended solids
 - Escherichia coli bacteria
 - Ammonia
 - pH, and
 - Temperature.
- It is proposed that samples for the following parameters will be collected and analyzed four (4) times per year for the first two (2) years of operation;
 - Conductivity
 - Nitrate-nitrite
 - Total Kjeldahl Nitrogen
 - Total Phosphorus
 - Total dissolved phosphorus, and
 - Total inorganic phosphorus.
- All laboratory testing required for plant monitoring and submission to Manitoba Conservation will be completed by an accredited laboratory. Laboratory results and mean monthly effluent flows will be reported in accordance with the operating permit and all applicable Acts and Regulations. Routine daily operational testing will be completed by operations personnel and logged on-site.

Following Review of September 7, 2006 Proponent Responses – October 25, 2006

- *Fisheries Branch would like to see some provision in the license that states during emergency conditions the proponent is required to withdraw sewage from the basins and haul to a licensed facility rather than dump directly to the Red River.*

- *This is a comment relating to Response to Comment 5, which states: “the depth of groundwater in these wells varied from 4.5 to 4.9 m.” This is a depth to the top of the water column in the wells which does not reflect the water table in the surficial deposits – it reflects the piezometric surface in the bedrock aquifer.*

Disposition:

- The draft Environment Act Licence contains a clause requiring that the Licencee operate the sewage treatment plant in such a manner that all wastewater generated within the Glenlea Research Station is directed toward the sewage treatment plant or other approved sewage treatment facilities.
- The sewage treatment plant is considered to be small in comparison to other sewage treatment facilities. Manitoba Water Stewardship does not impose nutrient limits in Environment Act Licences for sewage treatment plants of this size;
- Department of Fisheries and Oceans Canada provided an Operational Statement on directional drilling to the consultant, offered specialist advice, and identified no concerns;
- The draft Environment Act Licence requires that the Licencee actively participate in any future watershed based management study, plan or nutrient reduction program, approved by the Director, for the Red River and Lake Winnipeg and associated waterways and watersheds;
- The draft Environment Act Licence contains a clause requiring that the Licencee not discharge effluent from the sewage treatment plant where BOD, fecal and total coliforms, TSS and total ammonia are in excess of specified limits;
- The draft Environment Act Licence contains a clause requiring that the Licencee take action to notify the Director of physical or mechanical breakdown of the Development and identify and complete required repairs;
- The draft Environment Act Licence contains a clause requiring that the Licencee, once each month following the commencement of operation of the sewage treatment plant under this Licence, obtain samples of treated effluent from the final discharge point of the sewage treatment plant and have the samples analyzed for:
 - Biochemical oxygen demand
 - Total suspended solids
 - Escherichia coli bacteria
 - Ammonia
 - pH, and
 - Temperature.
- The draft Environment Act Licence contains a clause requiring that the Licencee, for a period of at least two years following the commencement of operation of the sewage treatment plant under this Licence, once every three months, obtain samples of treated effluent from the final discharge point of the sewage treatment plant and have the samples analyzed for:

- conductivity;
 - total Kjeldahl nitrogen;
 - nitrate-nitrite nitrogen
 - total dissolved phosphorus;
 - total particulate phosphorus; and
 - total inorganic phosphorus.
- The draft Environment Act Licence contains a clause requiring that the Licencee report the results of required sampling in accordance with the requirements of Clause 2 c) of the Licence.

COMMENTS FROM FEDERAL REPRESENTATION:

Canadian Environmental Assessment Agency

- *Based on the responses to the CEAA survey, application of The Canadian Environmental Assessment Act with respect to this proposal will not be required. Environment Canada and Health Canada would be able to provide specialist advice if requested. DFO provided an Operational Statement regarding directional drilling directly to the consultant.*

PUBLIC HEARING:

A public hearing was not requested.

RECOMMENDATION:

Issue an Environment Act Licence in accordance with the attached draft. Once the rotating biological contactor sewage treatment plant is operational, an inspection should be completed by an Environment Officer from the Environmental Assessment and Licensing Branch prior to transferring the Licence to the Region for enforcement.

PREPARED BY:

Robert Boswick, P. Eng.
Environmental Engineer
Environmental Assessment and Licensing Branch
Manitoba Conservation
February 22, 2007

Telephone: (204) 945-6030

Fax: (204) 945-5229

E-mail Address: robert.boswick@gov.mb.ca