



Sahtu Land and Water Board

Staff Report

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| Division: Water Program | Report No.: 1 |
| Date Prepared: November 13, 2018 | File No.: S18L3-003 |
| Meeting Date: November 19, 2018 | |
| Subject: Type B Municipal Water Licence Renewal for the Town of Norman Wells | |

1. Purpose/Report Summary

The purpose of this Report is to present to the Sahtu Land and Water Board for consideration:

- a) the Type B Municipal Water Licence (WL or Licence) Renewal Application S18L1-003 submitted by the Town of Norman Wells on July 13, 2018 and deemed complete on August 28, 2018 for the use of water and deposit of waste associated with a municipal undertaking, including:
 - water use - water withdrawal from the Mackenzie River, treatment, storage and distribution for community use at the Water Treatment Facility
 - solid waste disposal – disposal of solid waste generated by the community at the Solid Waste Disposal Facility
 - sewage disposal – disposal of sewage generated by the community in the Sewage Lagoon at Seepage Lake Wastewater Treatment System Facility
 - closure and reclamation – of the former Water Reservoir;
- b) the request for exemption from Preliminary Screening;
- c) the exemption from conformity with the Sahtu Land Use Plan;
- d) the Spill Contingency Plan;
- e) the Operations and Maintenance Plan for the Solid Waste Disposal Facility;
- f) the Operations and Maintenance Plan for the Water Treatment Facility;
- g) the Operations and Maintenance Plan for the Wastewater Treatment System Facility;
- h) the Hazardous Waste Management Plan;
- i) the Abandonment and Restoration Plan for the Former Water Reservoir;
- j) the 2017 Annual Report;
- k) the terms and conditions for the new WL.

2. Background

- **July 13, 2018** – SLWB received a request from Town of Norman Wells to extend the expiry date of its current Water Licence (August 1, 2018) until October 1, 2018 for additional time to finalize documents required to support the water licence renewal application completeness check; which also includes addressing several non-compliance issues. The Town also informed the Board that they have retained the services of Stantec Consulting Ltd (Stantec) to assist with the water licence renewal. The Town also submitted their renewal applications (S18L3-003) and indicated additional documents to complete the application would be submitted prior to August 31, 2018;
- **July 20, 2018** – the Board met to consider and approve the request for licence term extension until October 1, 2018;
- **August 22, 2018** – Additional documents for the renewal application were received by the SLWB;
- **August 27, 2018** - SLWB received a request from Town of Norman Wells to extend the expiry date of its current Water Licence until December 1, 2018 for additional time to complete the regulatory review process and to allow for continued municipal operations until such time that a new Licence is issued;
- **August 28, 2018** –Type B Water Licence Renewal Application for S18L3-003 **deemed complete**;
- **August 28, 2018** - Review packages for the Licence term extension were sent out electronically to members of the Tulita District Distribution List using the Online Review System with a request for comments by September 11, 2018;
- **August 31, 2018** – Review packages for the Licence renewal application (S18L3-003) were sent out electronically to members of the Tulita District Distribution List using the Online Review System with a request for comments by September 24, 2018;
- **September 11, 2018** – Reviewer comments received and deadline;
- **September 18** - Applicant response deadline – no response received;
- **September 24, 2018** – Review comments on the renewal application S18L3-003 received and deadline;
- **September 26, 2018** - Board decision to extend Licence expiry until December 1, 2018;
- **October 10, 2018** - Applicant response comments received on the renewal application;
- **October 11, 2018** - Draft Water Licence conditions were added to the ORS review for this file with a request for comments by October 25, 2018;
- **October 25, 2018** – Reviewer comments received and deadline;
- **November 1, 2018** – Applicant response comments received;
- **November 19, 2018** - Presentation of Application to the Board for decision.

3.0 Discussion

3.1 Project Overview

The community of Norman Wells (65° 17' N and 126° 50'W) is in the Sahtu region of the Northwest Territories (NT) on the east bank of the Mackenzie River. It is approximately 685 km northwest of Yellowknife, NT. The current population of Norman Wells is estimated at 803 residents (in 2016) and is expected to decrease over the next two decades. Activities and facilities associated with the municipal licence include water use, solid waste disposal and sewage disposal.

Water Treatment System

The water treatment and distribution system consist of a raw water intake, Water Treatment Facility (WTF) and reservoir, and water distribution system (e.g., community piping, trucked water delivery). Norman Wells uses the Mackenzie River as its primary raw water source. A gravity-fed wetwell is used to withdraw raw water from the Mackenzie River. There is no alternate raw water source for Norman Wells. Water is withdrawn, as needed, from the Mackenzie River 24 hours per day and seven days per week by two submersible pumps.

The Norman Wells WTF was commissioned in 1992 with an original design life of 20 years. This facility is located within the town centre and the reservoir is located adjacent to the WTF. Various processes are used for treating water prior to distribution, including pre-treatment, coagulation and flocculation, clarification, filtration, and disinfection. Waste generated during the water treatment process at the WTF is discharged to the Sewage Lagoon via the municipal wastewater system. Treated drinking water is pumped to the Town's reservoir for storage and distributed to the community from there. Most (70%) of the water is distributed via the piped system and the remainder is distributed via water trucks that are filled from the reservoir. The WTF has the capacity to supply Norman Wells water demand over the next 30 years based on the current and forecasted population and rate of water use.

The former water reservoir was located on the west side of the current WTF within the town centre. The former water reservoir was built in 1977 and was filled with potable water only during its 30-year use (1978 to 2008). The former water reservoir and associated infrastructure were decommissioned in 2009.

Water quality associated with the WTF is monitored via two Surveillance Network Program (SNP) stations. One SNP station is located where a storm drain discharges into the Mackenzie River, upstream of the water intake line, and the second SNP station is located at the pumphouse where raw water is distributed for treatment/use.

Solid Waste Disposal Facility (SWDF)

The SWDF is located approximately five kilometres northeast from the town centre. The current facility has been in use since 1997 but was converted to a modified landfill using the depression method in 2008. The SWDF is divided into an active landfill cell area (with three active phases) and eight sorting areas for bulky waste disposal, including: vehicles (including cars, truck, tanker trucks and transport trailers), scrap metal, above-ground storage tanks and ATCO trailers, compressed gas cylinders, tires, furniture, appliances, wood debris, and three temporary hazardous waste areas.

The development of the SWDF was planned over 41 years in five phases. Based on the current rate of waste deposited at the SWDF (estimated at 4.8 kg/capita/day), the active Phases I, II and III of the SWDF will reach capacity in 2024, at which point the facility will need to expand to Phases IV and V.

Norman Wells has an organized waste collection program. Residential municipal solid waste is collected weekly from centralized neighbourhood blue bins. Residents are responsible for bringing their non-hazardous solid waste to the bins. Separate bins are available for collection of commercial and industrial solid waste. Norman Wells currently retains Green Enterprises NWT to empty the residential, commercial and industrial bins weekly and bring the waste to the SWDF. The waste received at the SWDF is divided in three categories: non-hazardous waste, hazardous waste, and unaccepted waste.

Groundwater quality associated with the SWDF is monitored via two Surveillance Network Program (SNP) stations located directly below the south face of the SWDF that were installed by GNWT-MACA during the 2017/2018 winter road season.

Wastewater Treatment System

The wastewater treatment system in Norman Wells consists of a wastewater conveyance system for sewage collection and an engineered Sewage Lagoon at Seepage Lake for sewage treatment. Seepage Lake is located approximately 1 km north of the town centre. It initially was a natural wetland that was converted to an engineered Sewage Lagoon in 1987. The Sewage Lagoon at Seepage Lake is a bermed lake lagoon with two primary cells and a retention cell. Wastewater operations at the Sewage Lagoon includes sewage disposal, sedimentation, decanting, and sludge removal.

The wastewater conveyance system consists of an above-grade utilidor and below-grade piping, sewage haul trucks, a sewage lift station, and a sewage forcemain. Most (70%) of the wastewater is transported to the Sewage Lagoon via the piped sewer system and the remainder of the wastewater is transported with sewage trucks.

Wastewater quality is monitored through three SNP stations. The final discharge point for the Sewage Lagoon (SNP station S07L3-002-1) is an engineered retention berm with an outfall/decant structure built into the berm; the berm and decant structure is located at the east end of Seepage Lake. The Sewage Lagoon discharges into a natural wetland that contains wildflowers, aquatic plants, horsetails, sedges, shrubs and trees. Background water quality at the final discharge point was not monitored prior the operation of the Sewage Lagoon. SNP Station S07L3-002-1 is the point of compliance with effluent quality criteria. The other two SNP stations are located downstream of the wetland, at points along Seepage Creek prior to discharge to the Mackenzie River. These stations were added to the previous licence based on recommendations from GNWT-ENR (June 26, 2008) to add SNP stations downgradient of Seepage Lake and downgradient of the Solid Waste Disposal Facility and by INAC – Water Resources Division and the Water Licence Inspector (June 13, 2008) who noted that samples collected in June 2007 downstream of Seepage Lake showed elevated levels of metals. They recommended that SNP station S07L3-002-2 be amended to require sampling for a full suite of metals, including mercury.

Required Submissions and Non-compliant Items

Table 1, below, outlines items that required submission in the renewal application and how they have been addressed as well as non-compliant items identified in the Inspection report from September 28, 2017.

Table 1 – S07L3-002 – Town of Norman Wells – Overdue Water Licence Submissions and Non-compliance items

| Licence Condition | Report Title /Action Required | Submission due date | Comments |
|--------------------------|---|----------------------------|---|
| B.1 | Annual Report for 2017 | March 31, 2018 | Annual Report received June 14, 2018 |
| B.2 | SNP Monitoring | March 31, 2018 | SNP Sampling results were reported for 2017. Groundwater monitoring wells for SNP stations S07L3-002-4 and S07L3-002-5 were installed in 2018 by GNWT-MACA. |
| D.17 | Hazardous Waste Management Plan | February 2, 2009 | A Hazardous Waste Management Plan was submitted with the renewal application |
| E.3 | The Licensee shall provide to the Board as-built plans | March 2011 | This facility is owned by the GNWT—MACA. Norman Wells is in discussion regarding the responsibilities for |

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| | and drawings of modifications within ninety days of completion. – not provided to SLWB after extension to Solid Waste Disposal Facility or construction of new Hazardous Waste Storage Facility – reported in 2010 Annual Report | | modification and closure at this this facility with the GNWT—MACA and have requested that they provide clarification to the SLWB. |
| F.2 | The Licensee shall review the Spill Contingency Plan annually and revise the plan as necessary to reflect changes in operations and technology. | August 2015 | An updated Spill Contingency Plan was provided with the renewal application |
| I.1 | The Licensee shall submit to the Board for approval revised Operation and Maintenance Plans | November 30, 2015 | Operation and Maintenance Plans for the Wastewater Treatment System (Sewage Lagoon), the Solid Waste Disposal Facility and the Water Treatment Facility were submitted with the renewal application. |
| B.6 | Signage is required at the landfill for Recyclable Waste Area and Temporary Hazardous Waste Containment Area. | | Signage will be posted at the landfill for Recyclable Waste Area and Temporary Hazardous Waste Containment Area |
| G.1 | Abandonment and Restoration Plans are required for the decommissioning of the old water reservoir in 2009, the decommissioning of the old Hazardous Waste Storage Facility and construction of two new storage cells in 2009/2010. | | The Abandonment and Restoration Plan for the decommissioning of the old water reservoir in 2009 was submitted with the renewal application. The Hazardous Waste Storage Facility and two new cells are owned by the GNWT—MACA. Norman Wells is in discussion regarding the responsibilities for modification and closure at this this facility with the GNWT—MACA and have requested that they provide clarification to the SLWB. |

Management Plans

The following management plans were submitted with the renewal application:

- Spill Contingency Plan
- Hazardous Waste Management Plan
- Abandonment and Restoration Plan for the Former Reservoir
- Operations and Maintenance Plans for:
 - Solid Waste Disposal Facility
 - Water Treatment Facility
 - Wastewater Treatment System

Fees

The application fee of \$30.00 payable to the Receiver General for Canada was received with the renewal application.

Term

The Town of Norman Wells requested a ten-year term in the renewal application.

3.2 Process Requirements

Application Received: July 13, 2018

Additional Application Documents Received: August 22, 2018

Application Deemed Complete: August 28, 2018

Application Forwarded for Review: August 31, 2018

Number of Review Agencies: 29

Review Period End Date: September 24, 2018

Proponent Response: October 10, 2018

Draft Licence Forwarded for Review: October 11, 2018

Review Period End Date: October 25, 2018

Proponent Response: November 1, 2018

Board Meeting Date: November 19, 2018

A Type B Water Licence is required because the project involves direct water use and deposit of waste for municipal purposes in accordance with Schedule F (Licensing Criteria for Municipal Undertakings), of the Water Regulations, item 1 and 3(a) for: direct water use of 50 or more cubic metres and less than 2,000 m³ per day and a deposit of waste by means of sewage collection or treatment system serving a population of between 50 and 2,000.

Of the 29 organizations to which the application was distributed, fourteen (14) of which are represented within the Sahtu Settlement Area, review comments were received from:

- GNWT – Department of Environment and Natural Resources (ENR)
- Environment and Climate Change Canada (ECCC)
- The Town of Norman Wells

The Review Comment Table and submitted letter from ENR and ECCC are attached to this report (Attachment 2).

4.0 Comments

4.1 Permission of Land Owner, Community Consultations and Traditional Knowledge

The Town of Norman Wells has title of the lot housing the Water Treatment Plant and Storage Facility and Seepage Lake. Title for the lot housing the Solid Waste Facility has also been handed over from the GNWT-MACA to the Town of Norman Wells.

Engagement Record and Engagement Plan was not required with the application. Generally, for municipal licences there should be some evidence of a written notification of the initiation of the renewal process that has been circulated to the community. The distribution of this request on the Online Review System has achieved the purpose of engagement.

Traditional Environmental Knowledge presented in previous Staff Reports has not changed.

4.2 Management Plans and 2017 Annual Report

Spill Contingency Plan

Board staff reviewed the **Spill Contingency Plan** (Version 1.0) with consideration of the basic requirements of Aboriginal Affairs and Northern Development Canada's *Guidelines for Spill Contingency Planning* (April 2007) and have the opinion the Plan conforms with the requirements of this Guideline. There were no reviewer comments concerning the contents of the Spill Contingency Plan.

Hazardous Waste Management Plan (HWMP)

A **Hazardous Waste Management Plan** was required under S07L3-002, Part D, condition 17 and was an outstanding item for submission. Part D, condition 16 of the Licence S18L3-003 outlines the requirements for the Hazardous Waste Management Plan. Additional requirements were added to this condition based on comments from ECCC (comment ID 6). They recommended adding:

- Hazardous waste acceptance criteria;
- Secondary containment methods;
- Hazardous waste tracking methods; and
- Record-keeping and reporting.

The Town's Hazardous Waste Management Plan currently specifies hazardous waste acceptance criteria and secondary containment methods. As per licence conditions, the Town can review and update (as needed) its HWMP to meet requirements of Part D, condition 16. Staff recommend that the Town review and update the HWMP during its annual review of the Plan.

ENR (comment 12, Topic 10) supports the recommendation made in Norman Wells Hazardous Waste Management Plan for the Town to become registered to receive asbestos waste and comply with the GNWT Guidelines for the Management of Waste Asbestos (2004).

Abandonment and Restoration Plan for the Former Reservoir

An **Abandonment and Restoration Plan for the Former Reservoir** was an outstanding requirement of Licence S07L3-002. There were no reviewer comments concerning the contents of this Plan submitted with the renewal application.

Operations and Maintenance Plan for Solid Waste Disposal Facility

Part G, condition 2 requires the submission of an **Operation and Maintenance Plan for the Solid Waste Disposal Facilities** and specific requirements are further outlined in Schedule 2, condition 1. These requirements are standard for municipal water licenses and are based on the Board's *Operation and Maintenance Plan Template for Municipal Water Licences: Solid Waste Facility*. Environment and Climate Change Canada (ECCC) has developed the planning and technical guidance document, *Solid Waste Management for Northern and Remote Communities*. ECCC encouraged the Town of Norman Wells to use the ECCC planning and technical guidance document to support responsible solid waste management (ECCC comment ID 2).

ENR (comment ID 10, Topic 8) recommended the Licence include a requirement to plan for the provision of relevant interim management and maintenance measures (in the SWDF O&M Plan next revision) through developing an access control strategy for the SWDF to minimize risks of illegal dumping and/or wildlife access at all times. Part B, condition 18 was added to the Licence as a requirement to develop

this plan. Staff recommend that the Town review and update the SWDF O&M Plan during its annual review of the Plan.

ENR (comment 11, Topic 9) recommended the new Water Licence include a requirement to plan for provision of appropriate litter management at the Norman Wells SWDF (in the SWDF O&M Plan next revision) through adequate inspection and maintenance of the debris fence and collection of wastes accumulating alongside the fence. The Town of Norman Wells responded that Section 4.3.1 of the SWDF O&M Plan outlines the Town's litter management procedures for the SWDF. This, combined with monthly inspections (Section 5 of the SWDF O&M Plan), should mitigate concerns with respect to litter control.

Operations and Maintenance Plan for Water Treatment Facility

Part G, item 3 requires the submission of an **Operation and Maintenance Plan for the Water Treatment Facility** and specific requirements are further outlined in Schedule 2, condition 2. These requirements are standard for municipal water licenses and are based on the Board's *Operation and Maintenance Plan Template for Municipal Water Licences: Water Treatment Plant*. There were no reviewer comments regarding the contents of this Plan.

Operations and Maintenance Plan for Wastewater Treatment System

Part G, condition 4 requires the submission of an **Operation and Maintenance Plan for the Wastewater Treatment System (Sewage Disposal Facilities)** and specific requirements are further outlined in Schedule 2, condition 3. These requirements are standard for municipal water licenses and are based on the Board's *Operation and Maintenance Plan Template for Municipal Water Licences: Wastewater (Sewage) Treatment System*. Additional reporting requirements were included based on reviewer comments as follows:

1. *Develop a Sludge Management Plan in Section 3.3* (ECCC comment ID 3) - ECCC recommended that sludge disposal criteria be developed in advance of sludge removal and that sludge management decisions be informed by process performance (i.e., effluent quality monitoring results), as well as by sludge depth. The Town is willing to work with the Board (and ECCC) to help evaluate appropriate sludge disposal criteria (e.g., sludge depth, volume, effluent quality conditions) such that sludge management processes and decisions can be better informed. Part D condition 10 and 11 of the Licence detail requirements for sludge removal and disposal.
2. *Identify Contingency Measures* (ECCC comment ID4) - ECCC recommended that the WWTS O&M Plan identifies contingency measures to address potential scenarios of wastes (including effluent and sludge) not meeting discharge requirements/criteria. The Town of Norman Wells responded that development of contingency measures is currently not a requirement for WWTS/SDF O&M plans, as per the MVLWB guidance (e.g., for effluent discharge). However, if required by the Board, the Town could include some contingency scenarios in its WWTS O&M Plan. Contingency measures for sludge management and disposal can be developed once a sludge disposal plan is prepared.
3. *Update Section 3.5.1* (ECCC comment ID5) - ECCC recommends that annual reports also include copies of laboratory reports (certificates of analysis) and QA/QC field sampling results.
4. *Additional Requirements for Sludge Management* (ECCC comment ID 8) - ECCC recommended adding the following additional requirements for the Town's WWTF O&M Plan to Schedule 2:

- Monitoring;
- Sludge depth measurements (conduct every two to five years); and
- Sludge monitoring and management procedures.

5. *Update Details on Wastewater System in Section 2.1* (ENR comment 4, Topic 4) - ENR recommended that details on the existence, integrity and composition of liners under primary cells, as well as wastewater transfer systems and/or processes in between cells be described, to gain a better understanding of wastewater movement through the system and containment structures. The Town of Norman Wells responded that the WWTF O&M Plan can be updated to indicate the locations of discharge from the primary cells and the estimated flow direction and circulation within the system. As-built information for the primary cells do not indicate the composition of the cell berms.

Annual Report 2017 (for S07L3-002)

The 2017 Annual Report for S07L3-002 was received by the SLWB on June 14, 2017. It was distributed for review on the Online Review System on the same day with comments due on July 5 and response comments due July 27. Comments and recommendations were received from Environment and Climate Change Canada and GNWT – Environment and Natural Resources. The review comment table and submitted letter from ECCC and GNWT-ENR are attached to this report (Attachment 3).

Most of the review comments and recommendations have been addressed through this Water Licence renewal process:

- Outstanding Plans were submitted with the renewal application;
- SNP stations were reviewed and revised and sampling parameters added;
- Reporting requirements were added to the Annual Report Schedule;
- Laboratory results from Taiga Environmental Laboratory were added to the public registry;
- Compliance items and items requiring attention as noted in the September 28, 2017 Inspection Report were addressed through the Licence renewal process; and
- The groundwater monitoring SNP stations were confirmed installed in early 2018 and will be monitored and reported on in subsequent Annual Reports.

Board staff is satisfied that the Licensee has met the requirements of the Licence for annual reporting.

4.3 Potential for Environmental Impacts and Mitigation Measures

No changes have been made to potential environmental impact and mitigation measures by the renewal application.

4.4 Preliminary Environmental Screening

Section 124(1) of the *Mackenzie Valley Resource Management Act* requires the Board to undertake a Preliminary Screening of any proposed development prior to the issuance of a Licence, Permit or Authorization, unless it is exempt.

Schedule 1, Part 1, paragraph 2.1 of the *Mackenzie Valley Resource Management Act Exemption List Regulations* (Exemption List Regulations) states that an application can be exempt from preliminary screening if:

A development, or part thereof, for which renewal of a permit, licence or authorization is requested (a) has not been modified; and (b) has fulfilled the requirements of the environmental assessment process established by the *Mackenzie Valley Resource Management Act*, the *Canadian Environmental Assessment Act*, or the Environmental Assessment Review Process Guidelines Order.

The Town is requesting an exemption from Preliminary Environmental Screening because there will be no change or modification to the current operations of its municipal facilities included in the water licence renewal application.

A [preliminary screening](#) of the previous licence S07L3-002 was completed on June 18, 2008. It was determined that there was no likelihood that the proposed development might have a significant adverse impact on the environment or might be a cause of public concern. The Board approved of the preliminary screening when it issued Water Licence S07L3-002.

Board staff have reviewed the scope of the Application and have determined that it is not being expanded to include any activities beyond the scope of S07L3-002.

4.5 Conformity with Land Use Plan

Pursuant to subsection 61(2) of the MVRMA, the Board may not issue a licence or permit except in accordance with any applicable land use plan. The Sahtu Land Use Plan (SLUP or Plan) received approval and came into effect on August 8, 2013. The Plan applies throughout the Sahtu Settlement Area except for “lands in a settlement area that comprise a park to which the *Canada National Park Act* applies, that have been acquired pursuant to the *Historical Sites and Monuments Act* or that are situated within the boundaries of a local government.”

Staff have confirmed that the undertaking is exempt from conformity to the Sahtu Land Use Plan as all activities occur within the municipal boundaries of the Town of Norman Wells.

The SLWB has met the referral obligations set out in section 47 of the *Mackenzie Valley Resource Management Act* (MVRMA).

4.6 Security Deposit

Security deposits are not required on municipal licences or most government-backed licences, therefore a security deposit estimate has not been completed using the security deposit model template.

4.7 Draft Water Licence

A draft Licence (Attachment 4) had been prepared by Board staff to ensure consistency with recent Board issuances and other recent WLs issued for Municipal undertakings by Land and Water Boards of the Mackenzie Valley (Hamlet of Fort Providence – [MV2016L3-0001](#) and Village of Fort Simpson – [MV2015L3-0001](#)) and was distributed for review on October 11, 2018.

Comments were received on the draft WL from all reviewers including the Town of Norman Wells. Changes were made to the conditions based on comments and recommendations received from reviewers during the review process and based on the proponent's response to the reviewer comments.

The scope, definitions, and conditions set forth in the Water Licence (the Licence) have been developed to address the Board's statutory responsibilities and the concerns that arose during the regulatory process. In developing the Licence, changes were made to the previous Licence based on the following principles:

- To provide for the conservation, development, and utilization of land and water resources in a manner that will provide the optimum benefit generally for all Canadians and for residents of the Sahtu and of the Mackenzie Valley, as per section 58 of the MVRMA;
- To achieve consistency with policies and guidelines adopted by the Mackenzie Valley Land and Water Boards (MVLWBs);
- To update conditions to reflect the status of activities in the Town of Norman Wells;
- To update conditions to achieve consistency with existing municipal water licence conditions;
- To address any recommendation from reviewers and the proponent; and
- To ensure overall clarity of the Licence requirements.

To improve clarity, the overall structure of the Licence has been changed. Details related to all management plans and reports, referenced in the main body of the Licence, have been moved into the Schedules annexed to the Licence. The purpose of this change is to allow the reader to more easily locate provisions relating to specific plans and reports and align with the format of other recently issued licences.

Scope and Definitions

The Scope of the Licence has not changed and authorizes the Licensee to use water and dispose of Waste for municipal undertakings. Board staff made some minor edits to the scope to reflect general Board practice for municipal water licences (e.g., removal of geographical coordinates) and to update references to relevant Legislation.

Board staff included a list of defined terms used in the Licence to ensure a common understanding of conditions and to avoid future differences in interpretation. Where appropriate, the definitions from the previous Licence were updated as per GNWT-ENR recommendations (ID 1, Topic 1) to reflect current legislation and to use wording like that found in similar Licences recently issued by the Board.

Part B – General Conditions

Part B of the Licence applies to matters regarding compliance and conformity with the MVRMA and *Waters Act* and conditions that support the other Parts of the Licence, including conditions pertaining to the Surveillance Network Program (SNP), measuring devices, signage, annual reporting, and the location of a copy of the Water Licence.

Several conditions have been added to Part B of the Licence (e.g., Conditions 2-10). These conditions have been added to reflect the changes in the format of the Licence, ensure that references to any policies or guidelines are read as the most current version, and to be consistent with more recent municipal water licences. For example, since the addition of schedules in water licences, the Board has

moved the requirements of the Annual Report to Schedule 1. Subsequently, Part B, Condition 11, which requires the Licensee to comply with the schedules, was also added.

During the public review, GNWT-ENR recommended that a plan for litter management at the Solid Waste Disposal Facility be developed (ID 11, Topic 9) as well as an access control strategy for the SWDF (ID 9, Topic 7(2) and ID 10, Topic 8). These recommendations resulted in the new condition Part B, 18 for access control strategy. Part D, condition 15 was carried over from the previous licence for litter management.

Fencing at Solid Waste Disposal Facilities

According to ECCC's technical guidance document, "Solid Waste Management for Northern and Remote Communities", controlled access is one of the high-priority measures to ensure people and wildlife are protected from immediate risks. The Board has included Part B, condition 17 in the Licence to ensure that the Licensee maintains fencing at the Solid Waste Disposal Facility to the satisfaction of the Inspector.

Part C – Water Use

Part C of the Licence applies to water use. The quantity of water not to be exceeded by this Licence has not changed as the Town of Norman Wells did not apply for more water than what is outlined in its S07L3-002 Licence. No new conditions were added to this section of the Licence. The wording of the conditions in this section were updated, where appropriate, to be consistent with more recent municipal water licences.

Part D – Waste Disposal

Part D, condition 1, describes the overall objectives of this portion of the Licence applying to the management of waste and water for the Project. Part D, condition 2 is a standard condition that requires notification of the Inspector upon exceedance of any EQC. Conditions 3-13 deal with the management of sewage while conditions 14-17 deal with the management of solid wastes.

Significant issues raised during the public review and proposed changes to the existing Water Licence are discussed below.

Effluent Quality Criteria for Sewage Disposal Facilities

Part D of the Licence includes Effluent Quality Criteria (EQC) for effluent from the Wastewater Treatment System. The Board's approach to managing the deposit of waste to the receiving environment through water licence terms and conditions is described in the MVLWB's *Water and Effluent Quality Management Policy*. Effective March 31, 2011, this Policy is being applied to all new and renewal water licence applications throughout the Mackenzie Valley.

During the public review, several recommendations regarding the EQCs was made.

Effluent Quality Criteria

Part D, condition 5 detail the Water Licence Effluent Quality Criteria (EQC) that must be met prior to discharging any Water from the sewage lagoon. These criteria were moved from the Annex of the Licence to Part D of the Licence as recommended by GNWT-ENR (ID 6, Topic 5 (2)) and to be consistent with other recently issued licences.

Revise EQC for TSS and BOD

During the water licence renewal application process, it was recommended by GNWT-ENR (comment ID 2, Topic 2) that the EQC for the Wastewater Treatment System be reviewed to select the most suitable wastewater treatment objective; the criteria for Total Suspended Solids and CBOD/BOD. ENR reviewed past monitoring results available for Norman Wells discharge from the lagoon for these parameters and established average values of 40 mg/L for TSS and 5.4 mg/L for BOD. As such, EQCs of 125 mg/L for TSS, and 180 mg/L for BOD, would appear to be high considering the treatment capabilities of this multi-year retention system. The SLWB may consider reducing these EQCs considering treatment performance achieved in recent years - or alternatively allow for few more years of data to be collected prior to revising effluent quality criteria limits (ENR comment 2, Topic 2). This may include a TSS value that falls within the natural range of values listed above. ENR encourages the Board to reference similar operations for comparisons of appropriate EQC values (ENR comment 14, Topic 1). The Town of Norman Wells responded that the values would tend to be higher in years of decant, which have occurred in 2009 and 2016. Values for these parameters were: in 2009 – TSS 170 mg/L and BOD 13 mg/L and 2016 – TSS 8 mg/L and BOD 7 mg/L. The Town is willing to work with the Board to identify appropriate EQCs once additional data (e.g., several years) are available to better characterize active discharge water quality conditions and the relevance of the existing EQCs.

In 2014, the *Wastewater Effluent System Regulations* (WSERs) were legislated in all Canadian provinces and include performance standards of CBOD \leq 25 mg/L and TSS \leq 25 mg/L; however, the WSERs do not yet apply to wastewater treatment systems in Canada's North, therefore, these standards were not directly considered in the discussions regarding reassessment of effluent quality criteria for this Licence. At a minimum, EQC for a project must be set at levels that will ensure water quality standards for the receiving environment will be met. As no pre-defined water quality standards have been established for water bodies in the NWT, the level of water quality to be maintained in the receiving environment has been decided on a site-specific basis.

Calculating water-quality-based EQC in place of applying set discharge limits requires sufficient data on the quality and flow of water in the receiving water body, as well as the establishment of water quality objectives (WQOs) for the site. Currently, the Board does not have adequate evidence to decide on appropriate WQOs for this site, and limited data is available for the receiving water body. Additionally, the achievability of any calculated EQC would need to be evaluated, and the Board does not have sufficient data on the quality of effluent from the sewage treatment system to conduct such an evaluation. As such, Board staff has not considered water-quality based EQC in this case.

The MVLWB's *Water and Effluent Quality Management Policy* supports an approach to using technology-based EQCs when effluent is discharged to a large river with a dilution factor. During the term of the existing Licence S07L3-002, the criteria for TSS (125 mg/L) and BOD (180 mg/L) were met, except for the one exceedance in 2009 of TSS, and in this sense can be considered as technology-based EQC, as they are EQC that the existing Wastewater Treatment System can meet.

This approach was used for the Village of Fort Simpson and the Hamlet of Fort Providence which also discharge effluent to the Mackenzie River. The river is fast-flowing with high concentrations of TSS. The Technology based EQC for TSS was 75 mg/L and BOD 75 mg/L for Fort Simpson and TSS 300 mg/L and BOD 360 mg/L for Fort Providence. For each of these licences, calculations were made using the *Alberta Water Quality Based Effluent Limits Procedures Manual* to derive the concentration of TSS in the Mackenzie River after discharge. Even under conservative, worst-case conditions, technology-based EQCs of 75-300 mg/L of TSS would have no significant effect on the instream concentration of TSS after mixing in the Mackenzie River. The existing TSS limit for Norman Wells of 125 mg/L is within this range

and therefore deemed appropriate. A similar calculation could not be made for BOD; however, based on the resultant TSS concentration, it was illustrated that using very conservative flow data and worst-case conditions for dilution, the dilution of the Sewage Treatment System effluent in the Mackenzie River is very high. Under these conditions, it was concluded that the technology-based EQC for BOD of 75-360 mg/L is appropriate. The Town of Norman Wells EQC of 180 mg/L for BOD fall within these limits. It is also important to note that the discharge receives further treatment post discharge as it flows through the wetlands between the Sewage Treatment Facilities and the Mackenzie River.

Replace BOD with CBOD

The GNWT-ENR recommended that the EQC for the Wastewater Treatment System use carbonaceous biochemical oxygen demand (CBOD) in place of biological oxygen demand (BOD₅) (ID 5, Topic 5(1) and comment 15, Topic 2). BOD₅ is the amount of dissolved oxygen needed by aerobic organisms to break down organic material present in a water sample, whereas CBOD refers to the amount of dissolved oxygen needed to break down organic material present in a water sample when the nitrogenous bacteria have been suppressed (i.e., the nitrogen-containing organic material is not broken down). Since CBOD and BOD are closely related parameters that are both used to monitor the oxygen-consuming capability of sewage discharges, and because the *Wastewater System Effluent Regulations* use CBOD, it is recommended that CBOD be monitored and used as the EQC for sewage discharge in this Licence instead of BOD. The Town of Norman Wells “agreed with changing EQCs from BOD to CBOD to allow for comparability with southern Canadian jurisdictions and the Canada-wide Strategy for Municipal Wastewater Effluent (though not yet applicable to the NWT) and would consider this for future monitoring events, as required by the terms and conditions of our Water Licence”.

ENR also recommended that the most suitable treatment objectives for CBOD be selected by the Board, such as an EQC for CBOD that is derived at 90% of BOD value. A CBOD limit of 75 mg/L was circulated for review in the draft licence. ENR stated that a CBOD value of 75 mg/L seemed high (ENR comment 15, Topic 2). CBOD values for seven other communities’ range from 25 to 330 mg/L. A CBOD that is 90% of the current BOD level would be 162 mg/L. Staff recommend a CBOD value of 160 mg/L.

Other Sampling Parameters for EQC

Both the pH and oil and grease criteria in Part D, item 7 are typical of EQC for municipal sewage discharge in water licenses issued by the Board and no changes were recommended.

The EQC in the existing Licence S07L3-002 for fecal coliforms will remain unchanged. No specific recommendations for a change in the fecal coliform EQC were raised during the review period.

Sampling Frequency

The Town of Norman Wells (comment ID 9) requested the sampling frequency of SNP Station S07L3-002-1 to be reduced from every three days to weekly during periods of decant. During the last decant (in 2016), the Town communicated to the Board that a reduced sampling frequency (i.e., minimum weekly) would be followed given the logistical constraints of submitting samples to Yellowknife-based Taiga Laboratory (i.e., they do not accept samples on Friday, Saturday or Sunday), and the analytical turnaround time of the laboratory (typically a couple weeks), which negates timely reporting of data to the Board. Board staff agree with this change in sampling frequency.

The Town of Norman Wells (comment ID 10) requested the sampling frequency of SNP Station S07L3-002-1 to be reduced from spring and fall to fall only during non-decant years. As indicated in previous

comments received from ECCC and the GNWT on the annual reports, the sampling frequency at this station could be reduced in non-decant years given that no active discharge of effluent is occurring. Given that water sampled at this station during non-decant years would largely represent surface water run-off from the surrounding watershed (not effluent), water quality data at SNP Station S07L3-002-(1) during non-decant years has met the licence's effluent quality guidelines for the past number of years. Sampling frequency at this station, during non-decant years, could therefore be reduced when effluent is not being decanted. ENR (comment 3, Topic 3) noted that an August 2015 ENR inspection suggested that samples could be collected in the fall only during years where decant does not occur. ENR recommended the SLWB identify and retain the most relevant yearly sampling frequency for years when the Seepage Lake lagoon system is not being decanted to the environment. Board staff agree with reducing the frequency of sample collection to fall only during non-decant years.

Sampling Parameters

ECCC (comment ID 6) recommended adding field pH and temperature to the list of SNP monitoring requirements for all stations.

ECCC (comment ID 7) recommended adding pH and chloride to SNP stations S07L3-002-4 and 5.

ECCC (comment ID 10) recommended revising the SNP sampling parameters for Station S07L3-002-(1) as follows: (1) Replace "nitrate and nitrogen" with "total nitrogen, nitrite-nitrogen, nitrate-nitrogen" and (2) Replace "total phosphate" with "total phosphorus"

ECCC (comment ID 11) recommended that Ammonia nitrogen, total nitrogen and total phosphorus be added to the currently proposed sampling parameters for Stations S07L3-002-(2) and S07L3-002-(3) to ensure consistency with the rationale.

Rationale for SNP Stations

ECCC (comment ID 11) recommended that the water licence rationale be reviewed for Stations S07L3-002-(2) and S07L3-002-(3) to ensure that the rationale accurately reflects the goal of these monitoring stations, which appear to be monitoring treated wastewater discharge quality beyond the point of compliance. The rationale was revised to: To monitor the quality of treated wastewater discharge beyond the point of compliance and downgradient of the Solid Waste Facility to determine the effectiveness of wetland treatment before final discharge to the Mackenzie River.

Town of Norman Wells (comment ID 11) recommended updating the rationale of SNP Stations S07L3-002-(6) and S07L3-002-(7) to reflect the intent of these Stations. Criteria for water dispensed from pumphouse (SNP Station 7) was revised to measure volume rather than quality as the quality of the water for Town use is a public health concern, not a Board concern. SNP Station 6 was recommended to be discontinued as storm runoff from streets and other surfaces in the Town of Norman Wells is not considered to be a "Wastewater Discharge" that requires treatment or management.

Part D, condition 11 was added to provide more detail on the notification requirements for the removal and disposal of sludge as recommended by ECCC. ECCC (Comment ID 4 and 12) also requested that the use of the word "burial" be replaced with "disposal" as it relates to sludge management in conditions 10 and 11.

Part D, condition 12 was added as a standard condition for when water quality data results from SNP sampling need to be submitted to the Board and the Inspector.

Conditions related to inspections of the facilities were moved from Part D to Part G – Operations and Maintenance.

Part E – Construction

The previous licence S07L3-002 did not include a Part E on Construction. Part E of the Licence addresses a variety of issues related to construction, including designs, maintenance, record-keeping, as-built drawings, notifications, and Board approval requirements. The main purpose of Part E is to ensure that Construction is carried out with appropriate standards and proper oversight, to facilitate good performance, avoid failures, and ultimately, to protect the environment. Standard conditions were added to this section of the Licence to be consistent with more recent municipal water licences.

Part F – Modifications

The previous Licence S07L3-002 had Modifications under Part E. Part F of the Licence contains conditions applying to modification of structures and facilities associated with the Project. All conditions in Part F are standard conditions consistent with recently issued Licences. These conditions are in place to ensure changes to the project are within the scope of the applications and with the notification and approval, as appropriate, of the Inspector and/or the Board.

Part G – Operations and Maintenance

The previous Licence S07L3-002 had this section as Part I. Part G, conditions 2, 3, and 4 outline the requirements for Operations and Maintenance Plans for the facilities. Plan requirements are based on templates and applicable guidelines, where available and requirements from similar operations. Since the addition of schedules in water licences, the Board has moved the requirements of the Operation and Maintenance Plans to Schedule 2.

Conditions related to the inspections of structures and facilities were added to Part G, conditions 7-9.

Part H – Spill Contingency

The previous Licence S07L3-002 had Contingency Planning under Part F. The title was revised to Spill Contingency. The conditions under Part H of the Licence are standard conditions to ensure a plan is in place in the event of a spill. The intent is to ensure that any spills are effectively controlled and cleaned up to prevent or minimize damage to the receiving environment. Part H, condition 4 was added to require restoration of any lands affected by spills. The wording of the conditions in this section were also updated, where appropriate, to be consistent with more recent municipal water licences.

Part I – Closure and Reclamation

The previous Licence S07L3-002 had this section as Part G and it was titled Abandonment and Restoration. The title has been changed to Closure and Reclamation. Part I of the Licence requires the submission of a Closure and Reclamation Plan to address the aspects of site reclamation. Since the addition of schedules in this water licence, the Board has moved the requirements of the Closure and Reclamation Plan to Schedule 3. The wording of the conditions in this section were also updated, where appropriate, to be consistent with more recent municipal water licences.

Annex A – Surveillance Network Program

Annex A of the Licence contains conditions applying to the Surveillance Network Program (SNP). This section details the sampling and monitoring requirements related for compliance with numerous

conditions and plans required by the Licence. Requirements for measuring flows, volumes, and meteorological data are based on standard water license conditions as are the reporting requirements.

The Surveillance Network Program (SNP) has been developed to collect water quality data and to build an understanding of the treatment efficacy and potential impacts of the Wastewater Treatment System and Solid Waste Disposal Facility. The chosen SNP station locations are as follows:

| | |
|--------------------|--|
| S07L3-002-1 | This location was chosen to obtain data on the quality of sewage before it leaves the lagoon system and flows through the wetlands and along Seepage Creek towards the Mackenzie River. The parameters chosen for this location are typical for those the Board uses to monitor sewage effluent. This SNP location is the point of compliance for the Wastewater Treatment System Facilities and relates to the requirements of Part D, condition 5. |
| S07L3-002-2 | This location was chosen to obtain data on the quality of effluent that is flowing downstream from the sewage lagoon and downgradient from the Solid Waste Disposal Facility prior to discharge to the Mackenzie River. The parameters chosen for this location are the same as for SNP Station S07L3-002-1 and for SNP stations S07L3-002-4 and 5. |
| S07L3-002-3 | This location was chosen to obtain data on the quality of effluent that is flowing downstream from the sewage lagoon and downgradient from the Solid Waste Disposal Facility prior to discharge to the Mackenzie River. The parameters chosen for this location are the same as for SNP Station S07L3-002-1 and for SNP stations S07L3-002-4 and 5. |
| S07L3-002-4 | This location was chosen to obtain data on the quality of groundwater directly adjacent to the Solid Waste Disposal Facility, to measure the extent and magnitude of groundwater leachates contamination (if any) underneath and/or migrating from the SWDF. The parameters chosen for this location are typical of those the Board uses to monitor water impacted by solid waste operations. |
| S07L3-002-5 | This location was chosen to obtain data on the quality of groundwater directly adjacent to the Solid Waste Disposal Facility, to measure the extent and magnitude of groundwater leachates contamination (if any) underneath and/or migrating from the SWDF. The parameters chosen for this location are typical of those the Board uses to monitor water impacted by solid waste operations. |
| S07L3-002-6 | This location monitored the quality of runoff water discharging from a storm drain in the Town of Norman Wells into the Mackenzie River. The outlet is upstream from the water intake line. There is more than one storm drain into the Mackenzie River within the Town of Norman Wells. This location may have been chosen due to its proximity to the water intake. Monitoring the quality of water at this location is not of a concern to the Board as it is not related to sewage effluent or effluent from the |

| | |
|--------------------|--|
| | solid waste disposal facility, nor is it “Wastewater Discharge” that requires treatment or management. Recommended to discontinue. |
| S07L3-002-7 | This location monitors water dispensed from the pumphouse for Town use. The criteria to monitor have been changed from water quality parameters (which are a public health concern) to volume of water measured in cubic metres, which is required to be monitored as part of the annual water licence report. |

5.0 Other Agency Comments

The application was circulated to 29 organizations of the Tulita Region Distribution List requesting a reply by September 24, 2018. Three written responses were received. The draft licence was added to the review on October 11, 2018 requesting a reply by October 25, 2018. The following organizations offered comments on the application and/or draft licence (see Review Comment Summary Table and attached letters – Attachment 2):

- GNWT – Department of Environment and Natural Resources (ENR)
- Environment and Climate Change Canada (ECCC)
- The Town of Norman Wells

The comments and recommendations made by review organizations during this process have been noted in relevant sections of this staff report. Other recommendations for clarification of wording in some conditions, as well as typographical errors were made in the draft licence. ECCC recommended some additional requirements be added to the Schedules. Both ENR and ECCC provided recommendations on the Surveillance Network Program and Effluent Quality Criteria. The Town of Norman Wells also commented on the Surveillance Network Program.

6.0 Conclusion

A draft Licence has been prepared for the Board’s consideration. It reflects the evidence submitted throughout the regulatory process; reviewer comments and recommendations, Town of Norman Wells comments and responses, Board staff recommendations, and standard conditions for the draft Licence for similar undertakings. The conditions contained within this draft Licence should mitigate any potential environmental impacts this development may have on the land and water. A draft Reasons for Decision and a draft Issuance Letter are attached (Attachments 5 and 6).

Subject to the term and conditions set out in the Licence, and for the reasons expressed herein, Board staff is of the opinion that the licensed undertaking for Water use and Waste disposal for municipal purposes at the Town of Norman Wells can be completed by the Licensee while providing for the conservation, development, and utilization of waters in a manner that will provide the optimum benefit for all Canadians, and in particular, for the residents of the Northwest Territories.

7.0 Recommendation

Board staff recommend that the Board proceed with the regulatory process for this Water Licence including:

- a) Approve the Preliminary Screening exemption;
- b) Approve the exemption from conformity with the Sahtu Land Use Plan;
- c) Approve the Spill Contingency Plan;
- d) Approve the Operations and Maintenance Plans for the Solid Waste Disposal Facility and the Water Treatment Facility;
- e) Not approve the Operations and Maintenance Plan for the Wastewater Treatment System Facility requesting that a revised Plan be submitted to the Board, for approval, within 60 days of issuance of the licence addressing reviewer comments and recommendations as per Table 2 below;
- f) Approve the Hazardous Waste Management Plan;
- g) Approve the Abandonment and Restoration Plan for the Former Water Reservoir;
- h) Approve the Water Licence with terms and conditions for a term of ten years.

Should the Board grant approval, the Licence could be issued on November 19, 2018 with an expiry date of November 18, 2028.

Table 2: Revisions required to O and M Plans and Management Plans

| Plan and Information Required | Revision Due Date |
|--|--------------------------|
| Wastewater Treatment System Operations and Maintenance Plan | |
| <i>Develop a Sludge Management Plan in Section 3.3</i> <i>Identify Contingency Measures</i> <i>Update Section 3.5.1</i> <i>Additional Requirements for Sludge Management</i> <i>Update Details on Wastewater System in Section 2.1</i> | January 18, 2019 |
| Hazardous Waste Management Plan <i>Review and update to meet all requirements of Part D, condition 16</i> | November 19, 2019 |
| Solid Waste Disposal Facility Operations and Maintenance Plan <i>Develop an access control strategy for the SWDF as per Part B, condition 21</i> | November 19, 2019 |

8.0 Attachments

1. Town of Norman Wells Renewal Application ([hyperlink only](#))
2. Review Comment Table with attachments for renewal application
3. Review Comment Table with attachments for 2017 Annual Report
4. Draft Water Licence Cover Page and Conditions
5. Draft Reasons for Decision
6. Draft Issuance Letter

Respectfully submitted,



Bonnie Bergsma
Regulatory Specialist