



Mackenzie Valley Land and Water Board
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September 14, 2017

File: MV2009L3-0007

Mr. Reuben Makohoniuk
Municipal Engineer, Public Works and Engineering
City of Yellowknife
P.O. Box 580
Yellowknife NT X1A 2N4

Email: rmakohoniuk@yellowknife.ca

Dear Mr. Makohoniuk:

Annual Water Licence Report for 2016 –Acceptance
City of Yellowknife Municipal Water Licence MV2009L3-0007

The Mackenzie Valley Land and Water Board (the Board) met on September 14, 2017 and reviewed the City of Yellowknife's (City) 2016 Annual Water Licence Report (Annual Report), submitted in accordance with Part B, item 3 of municipal Water Licence (Licence) MV2009L3-0007.

The Board hereby accepts the 2016 Annual Water Licence Report as submitted.

The Board reminds the City of the recent reviews of the Sewage Disposal Facilities Operations and Maintenance Plan (Version 1), and the Solid Waste Disposal Facilities Operations and Maintenance Plan (Version 5), and that as a result, the Board has revised the Licence Surveillance Network Program (SNP) to add parameters to monitoring requirements for stations 0032-F1 and 0032-F3, and requires the following:

1. A revised Sewage Disposal Facilities Operations and Maintenance Plan (Version 2), to be submitted to the Board for approval by August 1, 2018, including the revisions listed in the Board's August 17, 2017 letter; and
2. A revised Solid Waste Disposal Facilities Operations and Maintenance Plan (Version 5.1), to be submitted to the Board for approval by August 1, 2018, including the revisions listed in the Board's August 17, 2017 letter;

The Board further reminds the City of the following requirements:

1. Part F, item 2 of the Licence (Closure and Reclamation Plan), and the need to include closure details for Cell A of the Solid Waste Disposal Facilities in the CRP;
2. a proposal to add SNP locations for groundwater monitoring wells should be submitted to the Board once locations have been determined as part of the Interim Groundwater Monitoring Plan, as outlined in Board staff's email to the City of October 27, 2016; and
3. Part G, item 1 of the Licence (submission of final design drawings stamped and signed by an Engineer, to be submitted to the Board at least 60 days prior to construction of any dams, dykes or control structures intended to contain, withhold, divert or retain Waters or Wastes).

Lastly, the Board reminds the City that as per the August 17, 2017 interim approval letter for the Solid Waste Disposal Facilities Operations and Maintenance Plan (Version 5), all monitoring and characterization results from non-sewage wastes destined for disposal in the Sewage Disposal Facilities, shall be submitted each year with the City's annual Water Licence reports.

The Board thanks the City for their diligence in submitting Licence requirements. The City shall adhere to the commitments made in their responses to reviewer comments dated June 13, 2017. The full cooperation of the City of Yellowknife is anticipated and appreciated. If you have any questions or concerns, please contact Erica Janes at (867) 766-7466 or email ejanes@mvlwb.com.

Yours sincerely,



Mavis Cli-Michaud
MVLWB, Chair

Copied to: Distribution list
Nahum Lee, Water Resource Officer, GNWT-ENR

Attached: Review Summary Table

Review Comment Table

Board:	MVLWB
Review Item:	City of Yellowknife - 2016 Annual Water Licence Report (MV2009L3-0007)
File(s):	MV2009L3-0007
Proponent:	City of Yellowknife
Document(s):	MV2009L3-0007 - City of YK - 2016 Annual Water Licence Report - Mar31-17 (2.1 MB)
Item For Review Distributed On:	Apr 7 at 11:41 Distribution List
Reviewer Comments Due By:	May 18, 2017
Proponent Responses Due By:	June 15, 2017
Item Description:	<p>The City of Yellowknife has submitted their 2016 Annual Water Licence Report, in accordance with Part B, item 3 and Schedule 1 of their municipal Water Licence MV2009L3-0007. Although formal approval of Annual Progress Reports is not required under the Licence, the Board must be satisfied that the City has reported in accordance with the requirements of their Licence.</p> <p>Reviewers are invited to submit questions, comments and recommendations on the 2016 Annual Water Licence Report by May 18, 2017.</p> <p>If you have questions or comments regarding this review or the Online Review System, please contact Erica Janes at (867)766-7466 or ejanes@mvlwb.com.</p>
General Reviewer Information:	<p>In addition to the email distribution list, the following organizations received review materials by fax:</p> <ul style="list-style-type: none"> • Fort Resolution Métis Council - Trudy King (867)394-3322; • Hay River Metis Council - Trevor Beck, President (867)874-4472; and • Northwest Territory Metis Nation - Tim Heron, NWTMN IMA Coordinator (867)872-3586.
Contact Information:	<p>Erica Janes 867-766-7466 Heather Scott 867-766-7463 Jen Potten 867-766-7468</p>

Comment Summary

Environment and Climate Change Canada: Gabriel Bernard-Lacaille				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
4	General File	Comment (doc) ECCC Comment Cover Letter Recommendation		Noted.
1	ECCC 1 - 2016 Annual Water Licence Report, Table 3	<p>Comment In addition to sewage, other sources of waste are also discharged into the lagoon (Table 3, 2016 Annual Water Licence Report). These additional sources include baling facility leachate/sludge and water treatment plant (WTP) sludge. In 2017, leachate from Cell A will be transferred to the lagoon for the first time. Compost leachate has not yet required removal from the holding pond. When it does, it will be transferred to the lagoon. The 2016 annual report does not indicate whether testing and screening is conducted on these waste sources prior to discharging these wastes into the lagoon. ECCC notes that discharging sludge to a sewage lagoon may affect lagoon performance and is not a recommended practice.</p> <p>Recommendation ECCC recommends that the City of Yellowknife (the Proponent) divert sludge sources to a dedicated pit or lagoon, rather than discharging sludge to the sewage lagoon. Should the Proponent be unable to divert sludge sources and decides that leachate and sludge be discharged into the sewage lagoon, ECCC recommends that leachate and sludge sources are tested and screened to evaluate compatibility with the lagoon treatment system, prior to depositing these wastes into the sewage lagoon. ECCC recommends that the Proponent establish lagoon acceptance criteria (including leachate and sludge chemistry criteria) for</p>	June 13: No comment.	<p>Board staff note that the review of the City's Sewage Disposal Facilities Operations and Maintenance Plan resulted in the Board adding the following parameters to the Licence SNP stations 0032-F1 and 0032-F3 (downstream of the Fiddlers Lake lagoon):</p> <ul style="list-style-type: none"> • Total Metals; • Total Petroleum Hydrocarbons; and • BTEX. <p>In the August 17, 2017 Board letter not approving this Plan, the Board also required the City to begin planning for alternate disposal of non-sewage wastes if criteria are not met. To this end, in the next revision of the Plan (due August 1, 2018), the Board requires</p>

		wastes discharged to the lagoon. Alternate mitigations should be available to manage leachate and/or sludge that do not meet lagoon acceptance criteria.		the City to include a plan that outlines how the City will work to meet the criteria set out in the Guideline for Industrial Waste Discharges in the NWT and/or the City's By-Law 4663, in accordance with Schedule 4, item 1(c) of the Licence.
2	ECCC 2 -2016 Annual Water Licence Report, Table 5	<p>Comment Table 5 summarizes the exceedances at compliance point SNP Station F3. The pH was 9.29, 9.61, and 9.73 on May 18, July 20 and August 19, 2016, respectively. Fecal coliforms were too numerous to count (TNTC) on Sept 8th and 14th, 2016. Total phosphorus has consistently been above the suggested maximum value of 2 mg/L. The maximum value obtained at the compliance point (i.e., SNP Station F3) was 5.22 mg/L on March 16th. These exceedances do not appear to have prompted additional monitoring or other adaptive management strategies to address non-compliance.</p> <p>Recommendation ECCC recommends implementing adaptive management (e.g., re-test original sample, collect confirmatory samples, evaluate operations) to address monitoring results that exceed compliance criteria to ensure deleterious substances do not enter fish-bearing waters. ECCC also recommends that the annual report contain additional data analysis for parameters that exhibit on-going or recurring exceedances of compliance criteria or of suggested maximum values, such as Total Phosphorus. Such</p>	<p>June 13: Please refer to the pH and Phosphorous studies for further information regarding these parameters. These reports indicate that adaptive management is not required at this time.</p>	<p>Noted.</p> <p>Board staff further note that the City is conducting a Phosphorus Risk Assessment during the 2017 field season, for the area where the lagoon system drains into Great Slave Lake.</p>

		monitoring results should be compared to monitoring data from previous years to detect trends or patterns.		
3	ECCC 3- Solid Waste Management	<p>Comment ECCC has recently released the planning and technical guidance document, Solid Waste Management for Northern and Remote Communities. The Proponent is encouraged to consult the ECCC planning and technical guidance document to support responsible solid waste management. A summary and a link to the full document are available on Environment and Climate Change Canada's website at: http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=97182135-1</p> <p>Recommendation For Proponent's information only.</p>	--	Noted.

GNWT - ENR: Central Email GNWT

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
8	General File	<p>Comment (doc) ENR Letter with Comments and Recommendations</p> <p>Recommendation</p>		Noted.
1	Topic 1: Water Consumption	<p>Comment ENR notes that the City of Yellowknife (the City) estimated and/or did not report actual amounts of water used from May 2015-February 2016. This was due to the transition from the old Water Treatment Plant to the new Water Treatment Plant. However, this information is important to ENR as the City may have exceeded the water use limit specified in the Water Licence. Appropriate steps should be taken to ensure that the quantity of water not to be exceeded as indicated in the Water Licence. If additional water use is required, the City should plan, in advance, and submit an amendment application to increase the water use limit. This will ensure that the City remains compliant with the water use</p>	<p>June 13: The City will assess future water usage and submit an amendment application to increase the water use limit if necessary.</p>	Acceptable response.

		<p>limit as set in the Water Licence.</p> <p>Recommendation 1) It is recommended that the City assess the anticipated future water usage, as well as the historical trends in water use over recent years, to determine if a Water Licence amendment will be necessary to increase the current annual water use limits.</p>		
2	<p>Topic 2: Work at the Solid Waste Facility Closure of Cell A</p>	<p>Comment Page 7 of the Annual Report specifies that closure of Cell A is anticipated for 2017. The Annual Report also indicated that landfill Cell B was constructed in the summer of 2016 to provide the necessary storage capacity for solid waste once Cell A is closed. ENR notes that Landfill Closure, Section 5.0 of the May 2016 Closure and Reclamation Plan (CRP) specifies the following: "The different areas will require different methods of closure depending on what they have been used for and what they will be used for moving forward". This section also provided a description of the cap planned for the old landfill cell and in the area of the Composting Facility, but it does not provide capping details of other landfill area, specifically Cell A and Cell B. The recent CRP also specifies in Section 6.1.2, that the City intends to include the addition of monitoring wells in the 2016 construction plan for Cell B. These wells will be constructed during the summer of 2016 and will be used to monitor the area around Cells A and B. The CRP makes reference to these monitoring wells becoming part of the SNP monitoring. ENR would like to emphasize that Item F.2 of the Water Licence specifies that the Licensee shall submit to the Board for approval a CRP at least six months prior to abandoning any Waste Disposal Facilities. ENR notes that this would apply to closure</p>	<p>June 13: While using Cell B, Cell A will not be in final closure. It will be getting intermediate cover as waste will continue to be placed on Cell A once Cell B gets to the same height.</p>	<p>Noted.</p> <p>The City should be reminded of the requirements of Part F, item 2 of the Licence (Closure and Reclamation Plan), and the need to include closure details for Cell A in the CRP.</p>

		<p>of Cell A. ENR interprets the intent of this condition as ensuring that closure activities are planned and reviewed prior to conducting the closure and reclamation activities. ENR expects the details about closure of Cell A to be included in a revised CRP in order to comply with Item F.2 of Water Licence MV2009L3-0007.</p> <p>Recommendation 1) ENR recommends that the landfill CRP to be updated to include details of Cell A closure as planned in 2017 and as per Item F.2 of the Water Licence, 6 months prior to the closure of the facility.</p>		
3	Topic 3: Closure of Cell A Leachate Management	<p>Comment ENR notes that the May 2016 CRP specifies in section 6.1.3, that: "In the summer of 2015 the City attempted to dispose of this leachate [from Cell A] by pumping it back onto the active face of the landfill. This method showed limited success and the City may need to look at other methods of disposal moving forward, including disposal to the [Sewage] lagoon. If the City plans to dispose of the leachate at an off-site location, the City will test the leachate at this time for the parameters listed in Appendix E, and dispose of it in a safe, approved manner. The old landfill cell does not have a sump for collection of leachate but the monitoring of surface and subsurface water run-off will allow the City to monitor and minimize any off-site migration of contaminants. Additionally, the capping of this cell will further reduce its ability to produce any leachate." The 2016 Annual Report specified that Leachate from Cell A has not yet been deposited in the Sewage Lagoon, and that there were plans to do so in the spring of 2017. ENR notes that the initial characterization was provided in the City 2013 Annual Report, but that Leachate from Cell A has not been recently re-characterized,</p>	<p>June 13: During the May 2017 Inspection, the Inspector confirmed that disposal of the leachate from Cell A to the sewage lagoon is acceptable under the City's current water licence. The City will continue to review other methods but has no plan to change.</p>	<p>See Comment ID ECCC 1.</p> <p>The City should be reminded that a proposal to add SNP locations for groundwater monitoring wells should be submitted to the Board once locations have been determined as part of the Interim Groundwater Monitoring Plan.</p> <p>Board staff note that in the Board's Aug17-17 letter to the City (denying Version 1 of the Sewage Disposal Facilities O&M Plan), future Annual Reports should include monitoring and characterization results for all non-</p>

		<p>even though it has been re-applied to the active face of the landfill. During a recent May 2017 inspection, the ENR inspector discussed with landfill staff that exceedences were identified in the 2013 characterization of Cell A Leachate, and that ENR recommended that the City plan for another method to manage and dispose of Cell A Leachate (another option rather than disposing at the Yellowknife Sewage Lagoon).</p> <p>Recommendation 1) ENR recommends that prior to re-application of leachate, or disposal to the Sewage Lagoon, the leachate must be properly characterized and the results provided to the ENR Inspector, in order to receive approval for the appropriate disposal of this waste.</p>		<p>sewage wastes disposed of in the lagoon. Further, in this letter the Board also required the City to revise this Plan to include immediate notification to the Board and Inspector of any analytical results outside the expected range.</p>
4	<p>Topic 4: Work at the Solid Waste Facility Solid Waste Facility Preparation for Closure</p>	<p>Comment Page 7 of the Annual Report specifies that the shaping of landfill areas in preparation for closure has been performed in 2016 (work to be continued in 2017). ENR notes that the May 2016 CRP provides a timeline for closure updates which are to occur in 2018 and beyond, but does not provide an estimated date for the final closure of the Old Landfill Cell.</p> <p>Recommendation 1) ENR recommends that the Water Licence CRP be updated to describe progressive reclamation/closure activities such as shaping and contouring, as well as final closure timeline/date of the Old Landfill Cell.</p>	<p>June 13: The City will take this into consideration when reviewing the Landfill ICRP.</p>	<p>Acceptable response.</p> <p>Board staff note that the City has indicated they will be submitting a revised ICRP early in 2018.</p>
5	<p>Topic 5: Characterization of Stormwater Effluent and Trends</p>	<p>Comment The May 2013 Staff Report on the Stormwater Management Plan requested that a (3) year analysis be completed and submitted on March 31, 2016. The 2016 Annual Report provides an overview of Stormwater Effluent Trends for Biological and Heavy Metal parameters (p. 14-15 of 64), describing the following: . Heavy Metal parameters: aluminum, arsenic,</p>	<p>June 13: The City is in the process of completing a Stormwater Trend Analysis as required by the MVLWB.</p>	<p>Noted.</p>

	<p>copper, iron and zinc have been consistently above guidelines (CCME Protection of Aquatic Life) at various outlets during the duration of the program, from 2010 to 2016 inclusively. The Annual Report describes Yellowknife as being in a mineral rich area to explain the high values of certain metals found in stormwater and runoff in the area. .</p> <p>Biological parameters: E.Coli exceedances measured, at the DehCho Boulevard and School Draw outlets in 2010 and at the Back Bay sampling location in May 2015, are said to be isolated events, as these exceedances did not repeat during other years. ENR notes that the Annual Report did not estimate potential impacts (if any) to surrounding water bodies, based on research or scientific studies/reports (e.g. comparison to other Canadian cities' stormwater results, background data of local studies, etc.).</p> <p>Furthermore, the 2016 Annual Report did not discuss if stormwater treatment would be required before it enters local receiving water bodies, as was requested by the MVLWB in the 2013 Board Staff Report.</p> <p>Recommendation 1) ENR recommends that the City characterize the quality of stormwater, and any associated risks to the environment from uncontrolled releases of stormwater to local waters. This study would help determine if the stormwater could cause negative impacts to local waters. ENR recommends that the above characterization should include comparisons with other stormwater quality studies from other municipalities and if there are alternate ways to manage or treat stormwater prior to its release to local waters.</p>		
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6	Topic 6: Water Treatment Plant Sludge Characterization and Management	<p>Comment ENR considers the Water Treatment Plant sludge not to be non-sewage waste. ENR notes that the sludge should be sampled prior to disposal within the lagoon. This is in line with ENR's comments provided on the Operation and Management Plan (v.5) review. ENR understands that Water Treatment Plant sludge reports to Fiddler's lagoon in two different ways: 1) through the sewer system during the winter months, and 2) by Vactor truck for the remaining of the year (~ 7 months). Table 3 in the Annual Report indicates that 644 m3 of treatment sludge was discharged to the Fiddler's Lagoon in 2016. It is not clear in the report if this amount includes the total amount discharged via the sewer system and Vactor truck or if this volume only includes the Vactor truck volume. If not, the volume of Water Treatment Plant sludge discharged via the sewer system (tracked at lift station no. 5) should be reported.</p> <p>Recommendation 1) ENR recommends that the volume of Water Treatment Plant sludge discharged to the sewer system at lift station no. 5 be provided within the Annual Report.</p>	<p>June 13: The City will look into methods to track sludge discharged from the WTP.</p>	<p>Board staff note that the Board's Aug17-17 letter denying V1 of the Sewage Disposal Facilities O&M Plan requires that the next revision of this Plan include a complete sludge management plan, in accordance with Schedule 4, item 1.e of the Licence. Also, the Board's Aug17-17 letter granting interim approval to V5 of the Solid Waste Disposal Facilities O&M Plan requires the Plan to be revised to include "Information regarding the number, type, locations and volumes of non-sewage waste streams intended for disposal in the lagoon system, which should also be taken into the account in the City's plan to work toward meeting the criteria set out in GNWT Industrial Waste Discharge Standards and/or the City's By-Law</p>
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				4663.”, and that “All monitoring and characterization results from non-sewage wastes destined for disposal in the Sewage Disposal Facilities, should be submitted each year with the City’s annual Water Licence reports.”
7	None	Comment None Recommendation 2) ENR recommends that proper a characterization process be conducted for the Water Treatment Plant sludge. This characterization should be used to determine the appropriate disposal options and methods for this waste.	June 13: The City will look into characterizing the sludge from the water treatment plant.	See Comment ID GNWT-ENR 6, above.
MVLWB: Erica Janes				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	Table 1: Water Consumption	Comment Board staff note that the total water consumption in 2016 is estimated at 3,578,117 m3, and the withdrawal limit for MV2009L3-0007 is 3,600,000m3. Board staff note that the City continues to approach the maximum volume of water authorized for withdrawal as defined under Part C, item 2 of the Licence. Recommendation Does the City anticipate exceeding the maximum volume of water authorized for withdrawal within the term of the current Licence?	June 13: As the first month and a half of 2016 had estimated water usage, the total volume of water for 2016 was an estimate, not an actual amount used. The City has noticed that the actual quantity of water used in 2017 to date is lower than 2016. The City does not anticipate exceeding the maximum volume of water authorized for withdrawal for the term of this licence.	Noted.

2	Section d) Modifications and major maintenance work	<p>Comment This section refers to the construction of Cell B, the new waste containment cell at the Solid Waste Facility. Board staff note that record drawings for Cell B were submitted to the Board on April 10, 2017, as per Part G, item 3 of MV2009L3-0007. According to Part G, item 1 of MV2009L3-0007, final design drawings stamped and signed by an Engineer shall be submitted to the Board at least 60 days prior to construction.</p> <p>Recommendation The City is reminded that final design drawings stamped and signed by an Engineer should be submitted to the Board at least 60 days prior to construction of any dams, dykes or control structures intended to contain, withhold, divert or retain Waters or Wastes, according to Part G, item 1 of MV2009L3-0007.</p>	<p>June 13: Final Design Drawings for Landfill Cell B were submitted March 2016, stamped and signed.</p>	Noted.
3	SNP data	<p>Comment Board staff note that a number of Phosphorus concentrations have exceeded the objectives outlined in Schedule 2, item 3.b of the Licence</p> <p>Recommendation Has the Nutrient Risk Assessment commenced? Please ensure that the consultant hired for this work is in contact with Board staff to ensure that the Assessment meets Licence requirements.</p>	<p>June 13: The Nutrient Risk Assessment is scheduled to commence in June. The City will ensure that the consultant is in contact with the Board in order for the Assessment to meet Licence requirements.</p>	Noted.
4	Section f) outline of any work anticipated for next year	<p>Comment The City notes that Phase 4 of the compost pad will be constructed and tied into Phases 1-3.</p> <p>Recommendation The City is reminded that final design drawings stamped and signed by an Engineer should be submitted to the Board at least 60 days prior to construction of any dams, dykes or control structures intended to contain, withhold, divert or retain Waters or Wastes, according to Part G, item 1 of MV2009L3-0007.</p>	<p>June 13: Please refer to the Phase 1 drawings. The City can submit tender drawings for Phase 4 if the Board would like to see them.</p>	As per Part G, item 1 of MV2009L3-0007, the City should submit final design drawings stamped and signed by an Engineer to the Board at least 60 days prior to construction of any dams, dykes or control structures intended to

				contain, withhold, divert or retain Waters or Wastes.
5	Section i) comparison of waste volumes	<p>Comment The City states in this section that a drone survey was done at the landfill to provide better volumes for both used and available landfill space.</p> <p>Recommendation Could the City provide the annual drone surveys as an appendix to future annual reports to provide more accurate reporting of used and remaining landfill space?</p>	<p>June 13: The City will look into the ability to provide this information.</p>	Acceptable response.