

Municipal Water Licence Annual Report
Town of Norman Wells
Licence Number: S18L3-003
 (Renewal of S07L3-002)

Reporting year: 2021
 Expires: November 18, 2028

Licence Part B, Condition 21

Beginning March 31, 2019 and no later than every March 31 thereafter, the Licensee shall submit an Annual Water Licence Report to the Board. The Report shall be in accordance with Schedule 1, Condition 1.

1. Water Usage (Licensed Water Volume Withdrawal: 250,000 m³)

(Licence, Schedule 1, Condition 1 (a): *The monthly and annual quantities in cubic meters of fresh water obtained from all sources)*

Total volume withdrawn for reporting year: 98348 m³

Table 1 – Monthly withdrawal volumes

Month	Volume from main source (m ³)	Volume from any other source (m ³)	TOTAL Volume (m ³)
January	7205		7205
February	7931		7931
March	8452		8452
April	7776		7776
May	8928		8928
June	10267		10267
July	9820		9820
August	8431		8431
September	7651		7651
October	7243		7243
November	7538		7538
December	7106		7106
TOTAL	98348		98348
% Increase from previous year	7.9%		7.9%

Reasons for increase / decrease:

2. Solid Waste Disposal

Approximate total yearly volume of solid waste deposited: 3686 m³

Table 2 – Monthly solid waste disposal volumes

Month	Volume of solid waste deposited (m ³)
January	313
February	283
March	313
April	303
May	313
June	303
July	313
August	313
September	303
October	313
November	303
December	313
TOTAL	3686
% Increase from previous year	5.2%

*GNWT – MACA has provided a standard formula for estimating the amount of solid waste deposited into a Solid Waste Facility in the absence of a metered Garbage Truck. The following can be used: **Volume per person per day X number of days X population***

*e.g. **0.015 m³** X 30 days X 860 people = 387 m³ of domestic trash deposited into Solid Waste Facility in a 30 day month*

Reasons for increase / decrease: (e.g. an industrial project close to the Town of Norman Wells, or a large influx of people into town for an IORL shutdown)

Population Change.

General information:

Information regarding any agreements with outside organizations to be a waste receiving facility should be outlined here along with an estimate of the amount and type of waste to be received.

3. Sewage Deposited to Primary Sewage Cells
(Licence, Schedule 1, Condition 1 (b): The monthly and annual quantities in cubic metres of all sewage discharged to Seepage Lake).

Table 3 – Monthly sewage waste volumes deposited

Month	Volume of sewage waste deposited (m ³)		
	Pumper Truck	Utilidor	TOTAL
January			7205
February			7931
March			8452
April			7776
May			8928
June			10267
July			9820
August			8431
September			7651
October			7243
November			7538
December			7106
TOTAL			98348
% Increase from previous year			7.9%

To calculate monthly sewage waste deposited to the Primary Lagoons on Seepage Lake, please provide the above information if metered information is available. If metered information is not available, please fill in the table using the corresponding TOTAL water volumes from Table 1. This provides estimation only and equals water in/sewage out.

4. Sludge monitoring and management

(Licence, Schedule 1, Condition 1 (m)): *The monthly and annual quantities of sludge removed from Seepage Lake.*

Licence, Schedule 1, Condition 1 (n)): *Sludge monitoring and management summary.)*

Has any sludge been removed from the primary sewage cells or from Seepage Lake during this reporting year? If so, what volume of sludge was removed? What testing was completed on the sludge and where it was disposed of? Please provide documentation for testing and GNWT Water License Inspector approval of placement.

There was no sludge removed in 2021.

Was there any decanting at Seepage Lake this reporting year? Please provide dates. What was the decant duration and the approximate volume decanted? As this is a Surveillance Network Program (SNP) site, the resulting testing is to be presented as part of the tabular SNP data to be provided as per the Water Licence Annex A.

There was no decanting at Seepage Lake in 2021.

5. Modifications and Maintenance Work

(Licence, Schedule 1, Condition 1 (c)):

A summary of all Modifications and/or major maintenance work carried out on the water intake infrastructure, Water Treatment, Storage and Distribution Facilities, Solid Waste Disposal Facilities and the Sewage Lagoon, including all associated structures).

Include any work done to infrastructure for all facilities completed during the year in this section. This includes any changes, repairs and modifications. If any problems occurred during the year, please note them here. If there are no changes, make note of that. If required please attach any as-built drawings or reports as an attachments to this report.

- I. Water Treatment, Storage and Distribution Facilities
- II. Solid Waste Disposal Facilities
- III. Sewage Lagoon

Information regarding any modifications to the water withdrawal procedure or facilities should be included here. If necessary please attach any relevant reports to the end of this document.

There were no modifications of any facilities. The diversion ditch of the sewer lagoon had begun to slough in so it was dug out in 2021.

6. Surveillance Network Program Data

Surveillance Network Program (SNP) information (**Schedule 1, 1 (d) and Licence Annex A**) is to be submitted in a tabular format and shall indicate date of testing, parameters tested for and any other information requested by the GNWT Water Licence Inspector or the SLWB. [Laboratory results should be summarized. Results tables 5 to 8 have been provided below for your convenience. Note: it is possible to copy/paste from Excel into Word provided the same number of cells are selected in each table].

PLEASE ATTACH SNP SAMPLE LOCATIONS MAP as ATTACHMENT A (according to Licence Annex A, Part A, 2 (e))

Table 4 - Sampling Station Locations (Licence Annex A, Part B, item 3) and

SNP Station	Location	Sampling Frequency	Rationale
S07L3-002-(1) Approximate Location 65.289176°N, - 126.810419°W	Location <u>65.289176</u> °N, - <u>126.810419</u> °W Sewage effluent directly below the decant structure at Seepage Lake	Weekly during periods of decant; or in the fall if no decant occurs	To ensure discharge Water from Seepage Lake meets Part D, condition 5. Site of compliance, prior to discharge to the Receiving Environment.
S07L3-002-(2) Approximate Location 65.279666°N, - 126.766394°W	Location <u>65.279666</u> °N, - <u>126.766394</u> °W Monitors waters in Seepage Creek directly upstream of the culvert conveying Seepage Creek under Quarry Road	Monthly during periods of flow	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.
S07L3-002-(3) Approximate Location 65.264579°N, - 126.736201°W	Location <u>65.264579</u> °N, - <u>126.736201</u> °W Monitors waters in Seepage Creek directly upstream of the culvert conveying Seepage Creek under Mackenzie Drive	Monthly during periods of flow	To monitor the quality of treated wastewater discharge beyond the point of compliance and downgradient of the Solid Waste Disposal Facility to determine the effectiveness of wetland treatment before final discharge to the Mackenzie River.
S07L3-002-(4) Groundwater Well installed in 2018. Approximate Location as per the Licence	Location <u>65.294976</u> °N, - <u>126.730765</u> °W Monitors Groundwater below (downgradient) of the Solid Waste	Semi-annually following spring freshet and before freeze-up	To measure the extent and magnitude of groundwater leachates contamination (if any) underneath and/or migrating from the SWDF.

65.294976°N, - 126.730765°W	Disposal Facilities		
S07L3-002-(5) Groundwater Well installed in 2018. Approximate Location as per the Licence 65.295353°N, - 126.731991°W	Location <u>65.295353</u> °N, - <u>126.731991</u> °W Monitors Groundwater below (downgradient) of the Solid Waste Disposal Facilities	Semi-annually following spring freshet and before freeze-up	To measure the extent and magnitude of groundwater leachates contamination (if any) underneath and/or migrating from the SWDF.
S07L3-002-(6) Approximate Location 65.278374°N, - 126.833631°W	Monitors storm drain effluent at Mackenzie River upstream of water intake line.	Discontinued	To monitor 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.
S07L3-002-(7) Approximate Location 65.280734°N, - 126.832649°W	Location <u>65.280734</u> °N, - <u>126.832649</u> °W Monitors water dispensed from the pumphouse for Town use.	Monthly and Annually	To monitor the quantity (volume in cubic metres) of water dispensed for municipal purposes.

Table 5 – SNP Station S07L3-002 – (1) Effluent Monitoring Results – sampled at the beginning, and every seven (7) days thereafter during periods of decant or, if no decant, sampled in the fall, and analyzed for the parameters listed.

(According to Licence Annex A, Part A, items 2(a) and 2 (b); Licence Part D, Condition 5; Licence, Schedule 1, Condition 1 (o); and, Licence Annex A, Part B, item 3 - Site Descriptions and Monitoring Requirements)

Parameter	Max. Average Concentration	
Sample Collection Date		Sep 16, 2021
pH	6.0-9.0	7.49
Fecal Coliforms (CFU/100ml)	< 10 ⁶	1
Suspended Solids (mg/L)	125	<3
Oil and Grease (mg/L)	5 mg/L and no visible sheen	<2 mg/L nvs
CBOD (mg/L)	160	3
Conductivity (S/m)	-	396
Ammonia Nitrogen (mg/L)	-	0.112
Total Nitrogen (mg/L)	-	1.52
Nitrite-Nitrogen (mg/L)	-	<0.01
Nitrate-Nitrogen (mg/L)	-	0.02
Total Organic Carbon (mg/L)	-	26.2
Total Phosphorous (mg/L)	-	0.314
Water Levels (m)		64.3m

Please record the interpretation of the results here (Example statements: “The water quality standards are met.” Or “All the parameters are within the maximum allowable concentrations except ___). Please indicate if there are any exceedences with respect to the water quality criteria/CCME guideline values.

Table 6 – SNP Station S07L3-002 – (1) Effluent quality data compared against the data from previous two consecutive years . (For example, if the reporting year is 2019, you have to record the average concentration of the required effluent quality data for 2019, 2018 and 2017 in this section).

*(According to Licence Annex A, Part A, item 2 (b);
Licence Part D, Condition 5; and,
Licence Annex A, Part B, item 3 - Site Descriptions and Monitoring Requirements)*

Parameter	Max. Average Concentration	S07L3-002 – (1) Avg. Concentration. Reporting Year 2021	S07L3-002 – (1) Avg. Concentration. Reporting Year - 1 2020	S07L3-002 – (1) Avg. Concentration. Reporting Year - 2 2019
pH	6.0-9.0	7.49	7.51	7.71
Fecal Coliforms (CFU/100ml)	< 10 ⁶	1	23.9	3
Suspended Solids (mg/L)	125	<3	65.3	<3
Oil and Grease (mg/L)	5 mg/L and no visible sheen	<2 mg/L and no visible sheen	<2 mg/L and no visible sheen	<2 mg/L and no visible sheen
CBOD (mg/L)	160 mg/L	3	11.3	3

**Table 7 – SNP Station S07L3-002 – (2) and (3) Water Monitoring Results - sampled monthly during periods of flow and analyzed for suite of parameters listed.
(According to Licence Annex A, Part A, item 2 (a); and, Licence Annex A, Part B, item 3 site descriptions and monitoring requirements**

Parameter	Seepage Creek – Quarry Road						Seepage Creek – Mackenzie Drive						
	SNP S07L3-002 – (2)						SNP S07L3-002 – (3)						
	May	Jun	July	Aug	Sep		May	Jun	July	Aug	Sep		
Sample Collection Date	May 27, 2021	June 27, 2021	July 22, 2021	Aug 30, 2021	Sep 16, 2021		May 27, 2021	June 27, 2021	July 22, 2021	Aug 30, 2021	Sep 16, 2021		
Fecal Coliforms (CFU/100ml)	<1	<1	<10	25	3		<1	5	79	17	4		
Suspended Solids (mg/L)	6	<3	<3	16	16		<3	<3	6	8	4		
pH	7.57	8.07	8.13	7.51	7.58		8.05	7.46	7.46	8.22	8.22		
Oil and Grease (mg/L)	<2	<2	<2	<2	<2		<2	<2	<2	<2	<2		
CBOD (mg/L)	2	2	<2	<2	<2		<2	<2	3	<2	<2		
Calcium (mg/L)	39.7	60.6	58	60	55.5		46.1	56.1	58.9	58.0	52		
Sodium (mg/L)	6.9	17.3	19.6	22.8	25.6		13.3	10.2	14	24.6	25.7		
Conductivity (S/m)	304	461	474	483	514		365	407	429	496	509		
Ammonia Nitrogen (mg/L)	0.01	0.025	0.009	0.014	0.007		0.013	0.016	0.058	<0.005	0.007		
Total Nitrogen (mg/L)	0.70	0.99	1.47	1.01	1.03		0.76	0.91	1.33	1.15	1.13		
Nitrite-Nitrogen (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		
Nitrate-Nitrogen (mg/L)	0.63	0.03	0.14	<0.01	0.03		0.80	0.04	0.03	<0.01	0.04		

Total Organic Carbon (mg/L)	18.9	25	33.5	28.2	26.7			20.4	24.3	34.5	30	30.1		
Total Phosphorous (mg/L)	0.028	0.019	0.027	0.141	0.171			0.012	0.080	0.296	0.011	0.008		
Magnesium (mg/L)	16.8	26	31.2	19.1	19.3			19.7	22.8	24.9	23.4	23.3		
Sulphate (mg/L)	43	77	72	35	49			54	65	19	74	77		
Potassium (mg/L)	1.2	0.9	1.4	2.07	2.00			1.2	0.8	1.2	0.969	1.11		
Total Arsenic (µg/L)	0.4	0.8		0.8	0.6			0.4	0.6		0.8	0.8		
Total Copper (µg/L)	0.3	0.5	0.6	<0.2	<0.2			0.4	<0.2	1.0	0.5	0.5		
Total Lead (µg/L)	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Total Zinc (µg/L)	<5	<5	<5	<5	<5			<5	1.2	<5	<5	0.6		
Total Nickel (µg/L)	0.8	1.2	1.4	0.7	0.8			0.9	0.8	1.2	1.1	1.0		
Total Mercury (µg/L)	0.02	0.03	0.01	<0.01	0.01			0.01	<0.01	0.01	<0.01	<0.01		
Total Chromium (µg/L)	<0.1	0.1	0.1	<0.1	0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Total Cadmium (µg/L)	<0.1	<0.1	<0.1	<0.1	<0.04			<0.1	<0.04	<0.1	<0.1	<0.1		
Total Iron (µg/L)	61	189	168	411	76			84	71	1190	95	69		
Total Silver (µg/L)	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Total														

Thallium (µg/L)	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Total Phenols (mg/L)	<0.001	<0.001	0.002	<0.001	<0.001			<0.001	<0.001	0.001	<0.001	<0.001		

Please record the interpretation of the results here. Please indicate if there are any exceedances with respect to the CCME guideline values.

There were no exceedances of the CCME guideline values.

Table 8 – SNP Station S07L3-002 – (4) and (5) Groundwater Monitoring Results - sampled semi-annually in the spring and fall and at the request of an Inspector and analyzed for suite of parameters listed.

(According to Licence Annex A, Part A, item 2 (a); and, Licence Annex A, Part B, item 3 site descriptions and monitoring requirements)

The Utilities' department staff have not received training from MACA on sampling procedure to be used when sampling from the groundwater wells installed at the solid waste disposal facility.

Table 9 – SNP Station S07L3-002 – (7) – Recorded in Table 1

(According to Licence Annex A, Part A, item 2 (a); and, Licence Annex A, Part B, item 3 site descriptions and monitoring requirements)

7. Details, such as the underlying cause or corrective measures, regarding any sample exceedances or monitoring concerns (Licence, Schedule 1, Condition 1 (e)).

Any **sample exceedances or monitoring concerns** ?

Yes

No

If yes, provide details such as the underlying cause or corrective measures.

8. A summary of any Closure and Reclamation work completed during the year and an outline of any work anticipated for the next year (Licence, Schedule 1, Condition 1 (f))

Any **Closure and Reclamation Work Completed** during year being reported **or** any **Closure and Reclamation Work** anticipated for the next year?

Yes

No

If yes, provide details as follows.

Include any abandonment and restoration details here including any work anticipated to be completed during the next year. If required, please attach any as-built drawings or reports as an Attachment to this report.

9. A list of spills or unauthorized discharges (Licence, Schedule 1, Condition 1 (h))

List any unauthorized discharges here including any spills, how and when they were reported, and how they were cleaned up.

NT-NU Spill Reports? **Yes** **No**

If yes, please attach copies of spill reports, correspondence with the GNWT Water Licence Inspector or any other pertinent documentation as an Attachment to this report.

There were 5 unauthorized discharge in 2021. The discharges were reported to the NWT spill line.

10. Copies of laboratory reports and QA/QC field sampling results (Licence, Schedule 1, Condition 1 (i)).

Please attach the reports as attachments. (Please provide the name(s); example Attachment C).

11. Updates or revisions to approved plans

Details on any changes to approved plans such as the Operation and Maintenance Plan or any other that is specific to this Municipal Water Licence. Please attach documents as attachments to this report. **(Licence, Schedule 1, 1 Conditions (j, k, l))**

- a. Updates or revisions to the Operations and Maintenance Plans referred to in Part G of the Licence: **Yes** **No**
If yes, provide details.
- b. Updates or revisions to the Spill Contingency Plan referred to in Part H of the Licence: **Yes** **No**
If yes, provide details.
- c. Updates or revisions to the Closure and Reclamation Plan referred to in Part I of the Licence: **Yes** **No**
If yes, provide details

12. Any other details on water use or waste disposal requested by the board by November 1 of the year being reported (Licence, Schedule 1, Condition 1 (p, g)).

If the Board has requested that specific studies be completed, include details of the plan in this section with a summary of the outcome. Include any attachments/attachments with the submission of the Annual Report.

Did the Board request additional details?

- Yes** **No**

13. Other Information

- Include any other information here that may be valuable to the SLWB or to GNWT.
- Include details on upcoming studies that will be completed.
- Please include any non-compliance items identified in the GNWT Water Licence Inspection report and detail how the Town of Norman Wells is addressing them.
- If there are any contaminated soil piles currently in use (land farming), please list the details of containment, remediation and progress in this section.
- Please identify any on-going compliance issues for the Town of Norman Wells. This can facilitate discussions to resolve the issues.

14. Attachments

Attachment	Needed every year?
Attachment A - SNP Sample Locations Map	Yes
NT-NU Spill Reports	No
Copies of laboratory reports on SNP sampling	Yes
Other attachments <u>as required</u> (clearly indicate the name of the Attachment in the body of the report).	As required