

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

Reporting year: 2020
 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Total volume withdrawn for reporting year: 91077 m³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	8481		8481
February	7257		7257
March	8035		8035
April	7344		7344
May	8928		8928
June	7776		7776
July	7588		7588
August	7142		7142
September	6912		6912
October	6696		6696
November	7776		7776
December	7142		7142
TOTAL	91077		91077
% Increase from previous year	-10.6%		-10.6%

Reasons for increase / decrease:

Fewer potable water leaks in 2020 then in 2019.

2. Solid Waste Disposal

Approximate total yearly volume of solid waste deposited: 4416 m³

Table 2 – Monthly solid waste disposal volumes

Month	Volume of solid waste deposited (m ³)
January	348
February	315
March	348
April	337
May	348
June	337
July	618
August	618
September	337
October	348
November	337
December	348
TOTAL	4646
% 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)

In the Month of July and August there was a site clean up of abandoned Properties Estimate of 30 loads X 18m³ =540m³ of waste

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			8481
February			7257
March			8035
April			7344
May			8928
June			7776
July			7588
August			7142
September			6912
October			6696
November			7776
December			7142
TOTAL			91077
% Increase from previous year			-10.6%

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 2020.

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 decanting at Seepage Lake this year. There was an emergency decant from May 15-22 due to a breach in the secondary cell of the lagoon that caused a portion of the back berm of the lagoon to be overtopped. The emergency decant was stopped once the berm was repaired. Seepage lake was also decanted between June 17th and August 28th.

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 was a modification completed in November 2020 to the filter underdrains at the Water Treatment Plant.

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 spring and 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		May 19	Jun 15	Jun 23	Jun 30	Jul 6	Jul 13	Jul 20	Jul 27
pH	6.0-9.0	6.95	8.56	7.93	7.80	7.43	7.67	7.70	7.38
Fecal Coliforms (CFU/100ml)	< 10 ⁶	18	4	18		9	7	3	<1
Suspended Solids (mg/L)	125	6	94	6	4	<3	50	10	29
Oil and Grease (mg/L)	5 mg/L and no visible sheen	<2 mg/L nvs	<2 mg/L nvs	<2 mg/L nvs	<2 mg/L nvs	<2 mg/L nvs	<2 mg/L nvs	<2 mg/L nvs	<2 mg/L nvs
CBOD (mg/L)	160	7	10	5	7	3	8	3	6
Conductivity (S/m)	-		268	295	296	309	310	309	324
Ammonia Nitrogen (mg/L)	-		0.012						
Total Nitrogen (mg/L)	-		2.05	1.36	1.60	1.76	3.07	1.75	3.11
Nitrite-Nitrogen (mg/L)	-		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate-Nitrogen (mg/L)	-		<0.02	<0.02	0.022	<0.02	<0.02	<0.02	<0.02
Total Organic Carbon (mg/L)	-		25.4	22.2	22.3	22.9	24.8	23.6	23.3
Total Phosphorous (mg/L)	-		0.383	0.317	0.302	0.361	0.970	0.725	0.551
Water Levels (m)									

Parameter	Max. Average Concentration					
Sample Collection Date		Aug 4	Aug 10	Aug 17	Aug 24	Oct 2
pH	6.0-9.0	7.27	7.26	7.24	7.21	7.26
Fecal Coliforms (CFU/100ml)	< 10 ⁶	23	55	90	30	6
Suspended Solids (mg/L)	125	277	104	163	33	8
Oil and Grease (mg/L)	5 mg/L and no visible sheen	2.3 mg/L nvs	<2 mg/L nvs	<2 mg/L nvs	2.5 mg/L nvs	<5 mg/L nvs
CBOD (mg/L)	160	22	20	38	11	7
Conductivity (S/m)	-	331	327	349	349	364
Ammonia Nitrogen (mg/L)	-					
Total Nitrogen (mg/L)	-	10.6	4.01	3.32	2.62	2.43
Nitrite-Nitrogen (mg/L)	-	0.002	<0.01	0.04	0.04	0.02
Nitrate-Nitrogen (mg/L)	-	0.006	<0.02	0.06	0.06	0.07
Total Organic Carbon (mg/L)	-	42.2	25.3	38.4	30	23.7
Total Phosphorous (mg/L)	-	2.76	0.995	1.06	0.529	0.179
Water Levels (m)						64.2 m

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.

Suspended Solids from the decant exceeded maximum allowable concentrations on the testing done August 4th, the Town of Norman Wells did not receive those test results from Taiga Laboratory until August 28th.

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 2020	S07L3-002 – (1) Avg. Concentration. Reporting Year - 1 2019	S07L3-002 – (1) Avg. Concentration. Reporting Year - 2 2018
pH	6.0-9.0	7.51	7.71	8.21
Fecal Coliforms (CFU/100ml)	< 10 ⁶	23.9	3	2
Suspended Solids (mg/L)	125	65.3	<3	5.5
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	No visible sheen
CBOD (mg/L)	160 mg/L	11.3	3	6.5

**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	Oct	May	Jun	July	Aug	Sep	Oct
Sample Collection Date	May 23, 2020	June 30, 2020	July 27, 2020	Aug 24, 2020	Sep 22, 2020	Oct 1, 2020	May 23, 2020	June 30, 2020	July 27, 2020	Aug 24, 2020	Sep 22, 2020	Oct 1, 2020
Fecal Coliforms (CFU/100ml)	<1		10	88	6	6	4		1	2	2	1
Suspended Solids (mg/L)	<3	<3	<3	<3	<3	<3	4	<3	6	4	9	<3
pH	7.18	7.60	7.47	7.46	7.49	7.63	7.61	8.08	8.16	8.16	8.13	8.14
Oil and Grease (mg/L)	<2	<2	<5	<2	<5	<5	<2	<2	<5	<2	<5	<5
CBOD (mg/L)	3	6	<2	<2	2	3	4	6	<2	<2	2	2
Calcium (mg/L)	27.2	60.5	67.6	69.3	84.4	95	31.1	52.6	64.3	63.6	63.7	75.3
Sodium (mg/L)	4.2	14.3	13.6	14.9	18.6	18.8	7.8	8.9	18.4	23.3	36.8	35.9
Conductivity (S/m)	204	393	495	524	623	669	242	467	502	546	601	646
Ammonia Nitrogen (mg/L)	0.023						0.014					
Total Nitrogen (mg/L)	0.83	0.79	0.80	0.81	0.72	0.62	0.93	0.83	0.89	0.84	0.77	0.23
Nitrite-Nitrogen (mg/L)	0.05	<0.01	<0.01	0.04	0.11	<0.01	0.05	<0.01	<0.01	0.04	0.06	0.01
Nitrate-Nitrogen (mg/L)	0.23	<0.02	<0.02	0.09	0.09	0.17	0.25	<0.02	<0.02	0.10	0.08	0.12

Total Organic Carbon (mg/L)	30.2	22.2	21.4	24.4	20.3	17.6		22.7	23.6	23	25.3	22.6	20.3	
Total Phosphorous (mg/L)	0.046	0.045	0.064	0.076	0.039	0.033		0.030	0.015	0.009	0.010	0.003	0.006	
Magnesium (mg/L)	7.6	18.4	19.9	20	24.8	28.1		9	14.9	21.6	23.1	23.7	26.6	
Sulphate (mg/L)	28	83.3	83.4		121	153		31	60.6	92.4		91	109	
Potassium (mg/L)	1	0.94	1.61	2.11	2.23	2.01		0.9	1.33	1.09	1.36	1.45	1.38	
Total Arsenic (µg/L)	0.6	0.7	1.1	0.6	0.5	0.4		0.7	0.7	1.1	0.6	0.5	0.4	
Total Copper (µg/L)	0.5	0.4	0.4		0.9	<0.2		0.9	0.5	0.4		0.3	0.7	
Total Lead (µg/L)	<0.1	<0.1	0.1	<0.1	<0.1	<0.1		0.2	0.1	<0.1	<0.1	<0.1	<0.1	
Total Zinc (µg/L)	<5	<5	<5	0.9	<5	1.2		<5	<5	<5	0.6	<5	0.5	
Total Nickel (µg/L)	0.8	1.4	1.4	0.8	0.7	0.6		1.3	1.3	1.1	1	0.8	0.8	
Total Mercury (µg/L)	0.01	0.01	0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Total Chromium (µg/L)	0.1	0.2	0.3	<0.1	<0.1	<0.1		0.3	0.2	0.2	<0.1	<0.1	<0.1	
Total Cadmium (µg/L)	<0.1	<0.1	<0.1	<0.04	<0.1	<0.4		<0.1	<0.1	<0.1	<0.04	<0.1	<0.04	
Total Iron (µg/L)	248	246	364	71	62	35		420	270	116	93	69	61	
Total Silver (µg/L)	<0.1	<0.1	<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	<0.001	<0.001	<0.001	<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.

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 2020. 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.

Town will be applying for an expansion to the solid waste disposal facility. Updated Operations and maintenance. Spill contingency plan, hazardous waste management plan, and closure and reclamation plan will be included.

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