From:	Osman, Hodhan
To:	Erica Janes
Cc:	Rodriguez, Alex; Enerio, Annriza; Pollock, Caroline; sao@fortprovidence.ca
Subject:	Fort Providence Annual Reports Submission
Date:	Friday, August 12, 2022 2:55:38 PM
Attachments:	MV2016L3-0001 - Fort Providence - 2021-2022 Annual Report .pdf MV2016L3-0001 - Fort Providence - Spill Contingency Plan - Version 4 - Aug 12 2022.pdf

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Good Afternoon Erica,

Please find attached the following annual reports on behalf of the Hamlet of Fort Providence.

- 2021/22 Annual Water Licence Reporting Submission
- Spill Contingency Plan Version 4

Please let myself or Alex know if you require any clarifications, additional information or changes to the above documents.

Regards,

Hodhan Osman **B.Eng., LEED GA** (she/her)
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Annual Report 2021/2022

Submission: August 12, 2022

Hamlet of Fort Providence

Water Licence MV2016L3-0001

Municipal Water Licence Annual Report

Village of Fort Providence
Licence #: MV2016L3-0001
Reporting year: 2021-2022
Expires: July 6, 2026

*Part B, item 4: The Licensee shall file an Annual Water Licence Report with the Board not later than **June 30th** of the year following the calendar year reported (April 1 – March 31), which shall contain the following information (as set out in Schedule 1):*

a) Water Use

Licensed Water Volume Withdrawal: not to exceed 60,000 m^3 annually

Approximate total yearly volume of water used: 26, 377.20 m^3

Table 1: Monthly and annual water quantities obtained from all sources

Month	Volume from main source: Raw Water intake at Water Supply Facilities (m^3)	Volume from any other source (m^3)	TOTAL Volume (m^3)
April	2,320.04	-	2,320.04
May	2,486.09	-	2,486.09
June	2,497.99	-	2,497.99
July	2,327.88	-	2,327.88
August	2,344.06	-	2,344.06
September	2,235.94	-	2,235.94
October	2,234.21	-	2,234.21
November	2419.93	-	2419.93
December	2,080.94	-	2,080.94
January	2,120.21	-	2,120.21
February	1,923.94	-	1,923.94
March	1385.90	-	1385.90
TOTALS	**26, 377.13**	-	**26, 377.13**
% Increase / decrease from previous year	**4.5%** 2020-2021: 27,619.20 m^3	-	**4.5%** 2020-2021: 27,619.20 m^3

Reasons for increase/decrease in water withdrawn:

Between the 2020-2021 and 2021-2022 fiscal years there was a net decrease in water consumption of 4.5%. No significant events or changes within the Hamlet's population or operations occurred within the 2021-2022 fiscal year that could have affected the water supply to residents and businesses. The 4.5% decrease can be considered to a part of the nominal fluctuations within annual water usage.

Reasons for exceeding licensed withdrawal volumes (if applicable):

Not Applicable

Name and location of other water source used (if any), and reason for its use:

Not Applicable

General information (e.g. information regarding any modifications to the water withdrawal procedure or facilities) should be included here. If necessary, please attach any relevant reports as an appendix to this report.

No modifications reported for the 2021-2022 fiscal year.

b) Waste Disposal

i. Solid Waste

Approximate total yearly volume of solid waste deposited: 4741.35 m^3

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 m^3*** *X 30 days X 860 people = 387 m^3 of domestic trash deposited into Solid Waste Facility in a 30 day month*

Table 2: Monthly and annual quantities of solid waste deposited at the Fort Providence Solid Waste Disposal Facilities

Month	**Volume of solid waste deposited (m^3)**	**Volume of sludge from the Water Supply Facility (m^3)**
April	389.70	-
May	402.69	-
June	389.70	-
July	402.69	-

August	402.69	-
September	389.70	-
October	402.69	-
November	389.70	-
December	402.69	-
January	402.69	-
February	363.72	-
March	402.69	-
		-
TOTALS	**4741.35**	-
% Increase / decrease from previous year	**23%** 2020-2021: 3,865.35m^3	-

Reasons for increase / decrease: (e.g. an industrial project close to the Hamlet of Fort Providence, or a large influx of people into town)

Through the 2021-2022 fiscal year, there is a significant increase to the Hamlet's population, and therefore an increase in the volume of solid waste deposited. The 2021-2022 quantities calculated above were based on the above recommended equation. The average population for the 2021-2022 fiscal year is estimated to be 866 residents (From the NWT Bureau of Statistics July 1, 2022, Population Estimate). The 23% increase in solid waste deposited is directly due to this population increase from 706 residents in the previous fiscal year to 866 residents currently.

The volume of sludge from the Water Treatment Plant deposited at the Solid Waste Disposal Facilities is not currently being recorded. The Board has previously requested the development of a sludge monitoring process, as defined in Part 7 of the *Water Treatment Plan O&M Plan – Version 3* to provide information on sludge composition, estimated monthly quantities of sludge disposal, and information about how sludge is disposed of. The Hamlet has not been recording this information. Recommended practices are outlined within the Part 10 of the *Water Treatment Plan O&M Plan – Version 3*.

ii. Sewage

Table 3: Monthly and annual quantities of sewage deposited at Fort Providence Sewage Disposal Facilities

Month	Volume of sewage waste deposited (m^3)
April	3041.79
May	3546.40
June	3478.21
July	2776.75
August	2495.35

September	2626.28
October	2583.09
November	2611.73
December	2280.32
January	1989.82
February	1993.46
March	2315.32
TOTALS	**31,738.53**
Is this an estimated volume? (yes/no)	No
% Increase / decrease from previous year	**16%** 2020-2021: 27,351.87

To calculate monthly sewage waste deposited to the Sewage Disposal Facilities, 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.

Reasons for increase / decrease: (e.g.: an industrial project close to the Hamlet of Fort Providence, or a large influx of people into town)

In 2021-2022 there was a 16% increase in the volume of sewage waste deposited at the facility when compared to the 2020-2021 year. This increase is likely due to the 22% population increase from last fiscal year, high rain fall, and increased sanitary operations throughout community buildings and by its residents as a result of the Covid-19 Pandemic.

c) Other Waste Sources

Are there any other types or sources of waste that are being deposited at the Hamlet of Fort Providence's Waste Disposal Facilities? Please list the type/source, where it is being deposited, and monthly/annual volumes for each waste.

No other waste besides the waste identified in this report was deposited at the Waste Disposal Facility in 2021-2022

d) Waste Removed from Waste Disposal Facilities

Please list in the table below wastes removed from Waste Disposal Facilities (e.g. recyclables, tires, household hazardous waste, scrap metal, and other wastes that are periodically shipped out.). Add additional columns to Table 4 if necessary.

Table 4: Monthly and annual quantities of waste removed from the Waste Disposal Facilities by Type

Month	Waste type 1 (m^3)	Waste type 2 (m^3)	Waste type 3 (m^3)
January	-	-	-

February	-	-	-
March	-	-	-
April	-	-	-
May	-	-	-
June	-	-	-
July	-	-	-
August	-	-	-
September	-	-	-
October	-	-	-
November	-	-	-
December	-	-	-
TOTALS			
Is this an estimated volume? (yes/no)	-	-	-
% Increase / decrease from previous year	-	-	-

No solid waste was removed from the Waste Disposal Facility in 2021-2022.

e) Waste Volume

Table 5: Monthly waste volumes deposited by commercial and industrial operators working outside the boundaries of Fort Providence

Month	Solid Waste Disposal Facility (m^3)	Sewage Disposal Facility (m^3)	TOTAL (m^3)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
TOTALS	0	0	0
Is this an estimated volume? (yes/no)	-	-	-

% Increase / decrease from previous year	-	-	-

General information:
Information regarding any agreements with outside organizations to be a waste receiving facility should be outlined here along with estimates of the amounts and types of waste to be received.

No major changes were made to the Solid Waste Disposal Facility and no wastes were deposited by commercial or industrial operators working outside of the Hamlet boundaries in 2021-2022.

f) Tabular summaries of data generated under the Surveillance Network Program

Tabular summaries of all data generated under the Surveillance Network Program (SNP) should be included using the tables in Appendix A (attached).

Summaries of all data generated under the Surveillance Network Program are found in Appendix A.

g) Laboratory reports for all samples collected for the Surveillance Network Program

All laboratory reports should be attached as Appendix B to this report.

Laboratory reports for the Surveillance Network Program are found in Appendix B.

h) Geographic Coordinates for all Surveillance Network Program stations, and a map showing station locations

Table 6: SNP station details

Station Number	Geographic Coordinates	Effective date	Signage install date
2016-1	61.3499 N; -117.6373 W	2016	June 2018
2016-2	61.3524 N; 117.6185 W	2016	June 2018
2016-3	61.3520 N; 117.6166 W	2016	June 2018

A map showing the Surveillance Network Program station locations are found in Appendix C. The map has not been formally finalized and has various proposed locations. A proposal finalizing the SNP locations to be registered within the Water Licence has been submitted and is currently being reviewed for approval by the MVLWB.

i) Activities to install and maintain fencing at the Waste Disposal Facilities

Include a summary of any and all activities undertaken to install and maintain fencing at the Solid Waste Disposal Facilities and Sewage Disposal Facilities.

No activities were undertaken to install or maintain the fencing at the Solid Waste Disposal Facilities and Sewage Disposal Facilities in 2021-2022.

j) Activities to install and maintain signage at the Waste Disposal Facilities and SNP stations

Include a summary of any and all activities undertaken to install and maintain signage at the:

- Solid Waste Disposal Facilities,
- Sewage Disposal Facilities, and
- Surveillance Network Program stations.

Photos of the Signage at the Solid Waste Disposal Facilities and the Sewage Disposal Facilities can be found below. Please see **Appendix C** for the Map of the proposed SNP locations and municipal facilities.

Signage installed during 2018/2019

Signage at the Solid Waste Facility

Signage was installed in the Solid

Signage was installed in the Solid

Waste Facility in 2018/2019.

Waste Facility in 2018/2019.

Signage was also installed at the Surveillance Network Program stations during 2018/2019.

Image of signage at SNP 1412-2

Signage installed at SNP 2016-1

Signage installed at SNP 2016-2

Image of signage at SNP 2016-3.


Image of SNP 2016-3

k) Sludge Management Activities

Include a summary of sludge management activities, including results of depth and volume measurements, sludge removal and treatment.

No desludging activities or measurements of depths/volumes of sludge took place in the 2021/2022 fiscal year. Please refer to the updated Sludge Management Plan appended to the Operation and Maintenance Plan: Sewage Disposal Facility – Version 3.

l) Construction activities

Include a summary of construction activities conducted in accordance with Part F of this Licence. If there were no construction activities, please make note of that. If required, please attach any as-built drawings or reports as an appendix to this report.

No construction activities took place during 2021/2022.

m) Modifications and major maintenance

Include a summary of Modification activities and major maintenance work conducted on the Water Supply and Waste Disposal Facilities, including all associated structures, in accordance with Part G of the Licence. 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 appendix to this report.

No modifications or major maintenance were conducted during 2021/2022.

n) Unauthorized Discharges

List and describe all unauthorized discharges that occurred during the previous calendar year, including the date, NWT spill number, volume, location, and summary of the circumstances and follow-up actions taken, and the status (i.e. open or closed), in accordance with the reporting requirements referred to in Part H, item 4 of the Licence. Please attach copies of spill reports, correspondence with the GNWT Water Resources Officer (Inspector) or any other pertinent documentation as an appendix to this report.

No unauthorized discharges took place during 2021/2022.

o) Spill Training and Communications Exercises

List any spill training and communications exercises that have been carried out during the previous calendar year including courses on spills prevention, waste management, SNP sampling, etc.

No spill training or communication exercises took place within the 2021/2022 year, the Hamlet is planning to do spill training in the near future.

p) Closure and Reclamation Activities

Summarize any closure and reclamation work completed during the year, and an outline of any work anticipated for the next year. Attach any relevant as-built drawings or reports as an appendix to this report.

No closure or reclamation activities took place during 2021/2022.

q) Studies requested by the Board

If the Board has requested that specific studies related to Waste disposal, Water Use or Reclamation be completed, include details of the studies in this section with a summary of the outcome. Also include a brief description of any future studies planned. Include any studies or reports as appendices to the Annual Report.

No studies were requested by the Board related to waste disposal, water use or reclamation during 2021/2022.

r) Actions taken to address concerns, non-conformances, or deficiencies identified by an Inspector

Include any non-compliance items identified in GNWT Water Licence Inspection reports and detail how the Hamlet of Fort Providence is addressing them.

No inspection reports under the Water Licence for the 2021/2022 fiscal year have been filed within the MVLWB public registry to date.

s) Updates to Plans

Summarize any updates or revisions to the Spill Contingency Plan, Management Plans and Operations and Maintenance Plans. Add rows to the table if necessary.

Updates to the Water Treatment Plant, Spill Contingency Plan and Sewage Disposal Facilities Operation and Maintenance Plans were requested by the Board on December 4, 2017 and are updated and attached to this annual report. The updated Sludge Management Plan was also updated and appended to the Sewage Disposal Facilities Operation and Maintenance Plan.

Table 7: Updates to Plans

Plan	Summary of revisions made	Effective date
Water Treatment Plant	Updates made based on the December 4, 2017 letter from MVLWB	Version 2 – December 2018 Version 3 – October 2021
Spill Contingency Plan	Updates made based on the December 4, 2017 letter from MVLWB	Version 2 – December 2018 Version 3 – June 2 2021 Version 4 – Aug 2022
Sewage Disposal Facilities	Updates made based on the December 4, 2017 letter from MVLWB The Sludge Management Plan was also updated based on March 2021 correspondence with the MVLWB.	Version 2 – December 2018 Version 3 – September 29 2021
Sewage Treatment Plant Plan	The design of the plant to be completed by Dec 2022, tendering in 2023, and construction to begin in May 2023.	TBD

t) Other Details Requested by the Board

If the Board has requested any other details on Water use, operating procedures, Modifications, maintenance work, or other topics, include details in this section with a summary of the outcome(s). Include

any attachments as appendices to the Annual Report.

No other updates were requested by the Board.

Other Information

- Include a summary of correspondence with the Inspector, including inspection dates and identification of any issues of non-compliance. The MVLWB is interested in this information in order to facilitate discussions to resolve any issues.
- Include any other information here that may be valuable to the MVLWB.
- Include details on upcoming studies that will be completed.
- If there are any contaminated soil piles currently in use (land farming), please list the details of containment, remediation and progress in this section.

No inspection reports under the Water Licence for the 2021/2022 fiscal year have been filed within the MVLWB public registry to date.

Date (mm/dd/yr)	**Inspection Correspondence**	**Hamlet Response**
06/25/21 07/29/21 08/25/21 08/27/21 09/13/21 10/07/21 10/25/21	Taiga Analytical Report(s) shared	-

Appendix A: Tabular summaries of all data generated under the Surveillance Network Program for Fort Providence (MV2016L3-0001)

Surveillance Network Program Lab Results Summary

Surveillance Network Program (SNP) information is to be summarized 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 MVLWB. Summary tables have been provided below for your convenience. Laboratory analysis results should be appended in Appendix B.

1) SNP Lab Results Summary – Station number 1412-1 (Raw water from the Water Supply Facilities)

This station monitors the monthly and annual quantities of Water withdrawn for municipal purposes. This information is reported in Table 1 of the Annual Report.

2) SNP Lab Results Summary – Station number 1412-2 (Sewage effluent from Sewage Disposal Facilities)

This station is the site of compliance, and monitors final effluent quality prior to discharge to the Receiving Environment.

Water Licence Parameters	Effluent Quality Criteria	11-Jun-21	15-Jul-21	05-Aug-21	17-Aug-21	27-Aug-21	28-Sep-21	13-Oct-21
pH	Above 6	8.42	8.89	9.24	8.41	7.72	8.12	8.24
$CBOD_5$	330mg/L	16	8	18	30	84	41	20
Total Suspended Solids	300mg/L	88	52	34	52	266	428	258
Ammonia	mg/L	28.4	5.87	0.605	6.68	11.1	10.8	17.9
Total Phosphorus	mg/L	8.38	3.48	2.37	6.00	11.5	9.95	11.8

Nitrate	mg/L	0.05	0.04	0.11	< 0.01	< 0.01	0.18	0.09
Nitrite	mg/L	< 0.01	0.30	0.17	< 0.01	< 0.01	0.18	<0.01
fecal Coliforms	$1x10^5$ CFU/100ml	13	20	< 100	<10	10	<10	2
Oil and Grease	5mg/L	<2 (Hexane Extractable Material	<2 (Hexane Extractable Material)	<2 (Hexane Extractable Material)	<2 (Hexane Extractable Material)	2.4 (Hexane Extractable Material)	<2 (Hexane Extractable Material)	<2 (Hexane Extractable Material)

3) SNP Lab Results Summary – Station number 1412-3 (Raw sewage from pump out truck)

This station has been discontinued.

4) SNP Lab Results Summary – Station number 2016-1 (Sewage effluent flowing through ponded area of wetland)

At issuance, this station's exact location was to be determined with the Inspector. It monitors the quality of effluent discharged from the Sewage Disposal Facilities and determines effectiveness of wetland treatment before final discharge to the Mackenzie River. Sampling frequency is at the beginning (one week following freshet) and end (before freeze-up) of the open water season.

Parameter	**Sample 1*** (one week following freshet)	**Sample 2*** (before freeze-up)
pH	-	-
$CBOD_5$ (mg/L)	-	-
Total Suspended Solids (mg/L)	-	-
Ammonia (mg/L0	-	-
Total Phosphorus (mg/L)	-	-
Nitrate (mg/L)	-	-
Nitrite (mg/L)	-	-
Fecal Coliforms (CFU/100mL)	-	-

Oil and Grease (mg/L)	-	-

*No 2021/2022 Analytical Reports for Station 2016-1 could be located within the MVLWB Public Registry. The Hamlet advised usually the inspector collects samples at this location.

5) SNP Lab Results Summary – Station number 2016-2 (Ponded water within or adjacent to domestic waste cells at Solid Waste Disposal Facilities)

At issuance, this station's exact location was to be determined with the Inspector. This station monitors potential impacts of the Solid Waste Disposal Facilities on groundwater and surface Water, and water quality and quantity prior to discharge. Sampling frequency is twice per year in June and September, and prior to discharge of accumulated water. Add additional columns to table if necessary.

	Sample 1 June 17, 2021	**Sample 2***
Volume of water discharged (m^3)	Ponded Leachate	
Total Suspended Solids (mg/L)		
Total Cadmium (µg/L)		
Total Chromium (µg/L)		
Total Cobalt (µg/L)		
Total Copper (µg/L)		
Total Iron (µg/L)		
Total Lead (µg/L)		
Magnesium (mg/L)		
Total Manganese (µg/L)		
Total Mercury (µg/L)		
Total Nickel (µg/L)		
Oil and Grease (mg/L)		

Total Petroleum Hydrocarbons (mg/L)		
BTEX		
Total Phenols (mg/L)		
Total Phosphate		
Calcium (mg/L)		
Potassium (mg/L)		
Sodium (mg/L)		
Sulphate (mg/L)		
Total Zinc (µg/L)		
pH		
Conductivity (µS/cm)		

*Sampling at the 2016-2 location during the summer of 2021 took place in June 2021, the results will be reported once analytical lab results are shared.

6) SNP Lab Results Summary – Station number 2016-3 (Ponded Water within or adjacent to the construction waste cell at the Solid Waste Disposal Facilities)

At issuance, this station's exact location was to be determined with the Inspector. This station monitors potential impacts of the Solid Waste Disposal Facilities on groundwater and surface Water, and monitors water quality and quantity prior to discharge. Sampling frequency is twice per year in June and September, and prior to discharge of accumulated water. Add additional columns to table if necessary.

	Sample 1* (June 17 2021)
Volume of water discharged (m^3)	-
Total Suspended Solids (mg/L)	-
Total Cadmium (µg/L)	-

Total Chromium (µg/L)	-
Total Cobalt (µg/L)	-
Total Copper (µg/L)	-
Total Iron (µg/L)	-
Total Lead (µg/L)	-
Magnesium (mg/L)	-
Total Manganese (µg/L)	-
Total Mercury (µg/L)	-
Total Nickel (µg/L)	-
Oil and Grease	-
Total Petroleum Hydrocarbons (mg/L)	-
BTEX (mg/L)	-
Total Phenols (mg/L)	-
Total Phosphate	-
Calcium (mg/L)	-
Potassium (mg/L)	-
Sodium (mg/L)	-
Sulphate (mg/L)	-
Total Zinc (µg/L)	-
pH	-
Conductivity (µS/cm)	-

*Sampling at the 2016-3 location during the summer of 2021 took place in June 2021, the results will be reported once analytical lab results are shared.

Appendix B: Laboratory reports for all samples collected for the Surveillance Network Program for Fort Providence (MV2016L3-0001)

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 210826

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery
Fort Providence,NT
X0E 0L0

Attn: **Susan Christie** **Facsimile: (867) 699-4624**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Friday, June 25, 2021
Print Date: ***Friday, June 25, 2021***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 210826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

Client Project:
Sample Type: Water
Received Date: 11-Jun-21
Sampling Date: 11-Jun-21
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	28.4	0.005	mg/L	17-Jun-21	SM4500-NH3:G	
CBOD	16	2	mg/L	11-Jun-21	SM5210:B	
Phosphorous, Total	8.38	0.002	mg/L	15-Jun-21	SM4500-P:D	
Inorganics - Physicals						
pH	8.42		pH units	11-Jun-21	SM4500-H:B	
Solids, Total Suspended	88	3	mg/L	15-Jun-21	SM2540:D	
Major Ions						
Nitrate as Nitrogen	0.05	0.01	mg/L	11-Jun-21	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	11-Jun-21	SM4110:B	
Microbiology						
Coliforms, Fecal	13	1	CFU/100mL	11-Jun-21	SM9222:D	
Organics						
Hexane Extractable Material	< 2.0	2.0	mg/L	16-Jun-21	EPA1664A	

ReportDate: Friday, June 25, 2021
Print Date: ***Friday, June 25, 2021***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 210826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: Friday, June 25, 2021

Print Date: *Friday, June 25, 2021*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211168

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery
Fort Providence,NT
X0E 0L0

Attn: **Susan Christie** **Facsimile: (867) 699-4624**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Thursday, July 29, 2021
Print Date: ***Friday, July 30, 2021***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211168

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

Client Project:
Sample Type: Sewage Lagoon
Received Date: 15-Jul-21
Sampling Date: 15-Jul-21
Sampling Time: 8:00
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	5.87	0.005	mg/L	15-Jul-21	SM4500-NH3:G	
CBOD	8	2	mg/L	15-Jul-21	SM5210:B	
Phosphorous, Total	3.48	0.002	mg/L	20-Jul-21	SM4500-P:D	
Inorganics - Physicals						
pH	8.89		pH units	15-Jul-21	SM4500-H:B	
Solids, Total Suspended	52	3	mg/L	19-Jul-21	SM2540:D	
Major Ions						
Nitrate as Nitrogen	0.04	0.01	mg/L	16-Jul-21	SM4110:B	
Nitrite as Nitrogen	0.30	0.01	mg/L	16-Jul-21	SM4110:B	
Microbiology						
Coliforms, Fecal	20	10	CFU/100mL	15-Jul-21	SM9222:D	
Organics						
Hexane Extractable Material	< 2.0	2.0	mg/L	21-Jul-21	EPA1664A	

ReportDate: Thursday, July 29, 2021
Print Date: ***Friday, July 30, 2021***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211168

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: Thursday, July 29, 2021

Print Date: *Friday, July 30, 2021*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211373

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery
Fort Providence,NT
X0E 0L0

Attn: **Susan Christie** **Facsimile: (867) 699-4624**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
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  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
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  - USEPA
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- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: August-25-21
Print Date: *August-26-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211373

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

Client Project:
Sample Type: Sewage Effluent
Received Date: 05-Aug-21
Sampling Date: 05-Aug-21
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.605	0.005	mg/L	12-Aug-21	TEL068	
CBOD	18	2	mg/L	05-Aug-21	TEL019	
Phosphorous, Total	2.37	0.002	mg/L	11-Aug-21	TEL069	
Inorganics - Physicals						
pH	9.24		pH units	05-Aug-21	TEL058	
Solids, Total Suspended	34	3	mg/L	06-Aug-21	TEL008	
Major Ions						
Nitrate as Nitrogen	0.11	0.01	mg/L	06-Aug-21	TEL055	
Nitrite as Nitrogen	0.17	0.01	mg/L	06-Aug-21	TEL055	
Microbiology						
Coliforms, Fecal	< 100	100	CFU/100mL	05-Aug-21	TEL017	
Organics						
Hexane Extractable Material	< 2.0	2	mg/L	16-Aug-21	TEL072	

ReportDate: August-25-21
Print Date: *August-26-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211373

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: August-25-21

Print Date: *August-26-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211493

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery
Fort Providence,NT
X0E 0L0

Attn: **Susan Christie** **Facsimile: (867) 699-4624**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
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  - Environment Canada
  - USEPA
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- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: August-27-21
Print Date: *August-27-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211493

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

Client Project:
Sample Type: Sewage Effluent
Received Date: 17-Aug-21
Sampling Date: 17-Aug-21
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	6.68	0.005	mg/L	20-Aug-21	TEL068	
CBOD	30	2	mg/L	17-Aug-21	TEL019	
Phosphorous, Total	6.00	0.002	mg/L	19-Aug-21	TEL069	
Inorganics - Physicals						
pH	8.41		pH units	17-Aug-21	TEL058	
Solids, Total Suspended	52	3	mg/L	17-Aug-21	TEL008	
Major Ions						
Nitrate as Nitrogen	< 0.01	0.01	mg/L	18-Aug-21	TEL055	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	18-Aug-21	TEL055	
Microbiology						
Coliforms, Fecal	< 10	10	CFU/100mL	17-Aug-21	TEL017	
Organics						
Hexane Extractable Material	< 2.0	2	mg/L	25-Aug-21	TEL072	

ReportDate: August-27-21
Print Date: *August-27-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211493

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: August-27-21

Print Date: *August-27-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211615

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery
Fort Providence,NT
X0E 0L0

Attn: **Susan Christie** **Facsimile: (867) 699-4624**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: September-13-21
Print Date: *September-14-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211615

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

Client Project:
Sample Type: Water
Received Date: 27-Aug-21
Sampling Date: 26-Aug-21
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	11.1	0.005	mg/L	27-Aug-21	TEL068	
CBOD	84	2	mg/L	27-Aug-21	TEL019	55
Phosphorous, Total	11.5	0.002	mg/L	30-Aug-21	TEL069	
Inorganics - Physicals						
pH	7.72		pH units	27-Aug-21	TEL058	
Solids, Total Suspended	2660	3	mg/L	31-Aug-21	TEL008	
Major Ions						
Nitrate as Nitrogen	< 0.01	0.01	mg/L	28-Aug-21	TEL055	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	28-Aug-21	TEL055	
Microbiology						
Coliforms, Fecal	10	10	CFU/100mL	27-Aug-21	TEL017	
Organics						
Hexane Extractable Material	2.4	2	mg/L	01-Sep-21	TEL072	

ReportDate: September-13-21
Print Date: *September-14-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211615

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

- DATA QUALIFERS -

Data Qualifier Descriptions:

55 *BOD result is inconclusive; residual DO was less than 1 mg/L. For evaluation purposes only.*

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: September-13-21
Print Date: *September-14-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211912

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery
Fort Providence,NT
X0E 0L0

Attn: **Susan Christie** **Facsimile: (867) 699-4624**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
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  - USEPA
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- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: October-07-21
Print Date: *October-08-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211912

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

Client Project:
Sample Type: Water
Received Date: 28-Sep-21
Sampling Date: 28-Sep-21
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	10.8	0.005	mg/L	28-Sep-21	TEL068	
CBOD	41	2	mg/L	28-Sep-21	TEL019	
Phosphorous, Total	9.95	0.002	mg/L	29-Sep-21	TEL069	
Inorganics - Physicals						
pH	8.12		pH units	28-Sep-21	TEL058	
Solids, Total Suspended	428	3	mg/L	28-Sep-21	TEL008	
Major Ions						
Nitrate as Nitrogen	0.18	0.01	mg/L	30-Sep-21	TEL055	
Nitrite as Nitrogen	0.18	0.01	mg/L	30-Sep-21	TEL055	
Microbiology						
Coliforms, Fecal	< 10	10	CFU/100mL	28-Sep-21	TEL017	
Organics						
Hexane Extractable Material	< 2.0	2	mg/L	06-Oct-21	TEL072	

ReportDate: October-07-21
Print Date: *October-08-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 211912

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: October-07-21
Print Date: *October-08-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:
212032

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery
Fort Providence,NT
X0E 0L0

Attn: Susan Christie **Facsimile:** (867) 699-4624

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

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  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: October-25-21
Print Date: *October-25-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 212032

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 001

Client Project:
Sample Type: Water
Received Date: 13-Oct-21
Sampling Date: 13-Oct-21
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	17.9	0.005	mg/L	15-Oct-21	TEL068	
CBOD	20	2	mg/L	13-Oct-21	TEL019	
Phosphorous, Total	11.8	0.002	mg/L	18-Oct-21	TEL069	
Inorganics - Physicals						
pH	8.24		pH units	13-Oct-21	TEL058	
Solids, Total Suspended	258	3	mg/L	14-Oct-21	TEL008	
Major Ions						
Nitrate as Nitrogen	0.09	0.01	mg/L	13-Oct-21	TEL055	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	13-Oct-21	TEL055	
Microbiology						
Coliforms, Fecal	2	1	CFU/100mL	13-Oct-21	TEL017	
Organics						
Hexane Extractable Material	< 2.0	2	mg/L	22-Oct-21	TEL072	

ReportDate: October-25-21
Print Date: *October-25-21*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:
212032

- CERTIFICATE OF ANALYSIS -

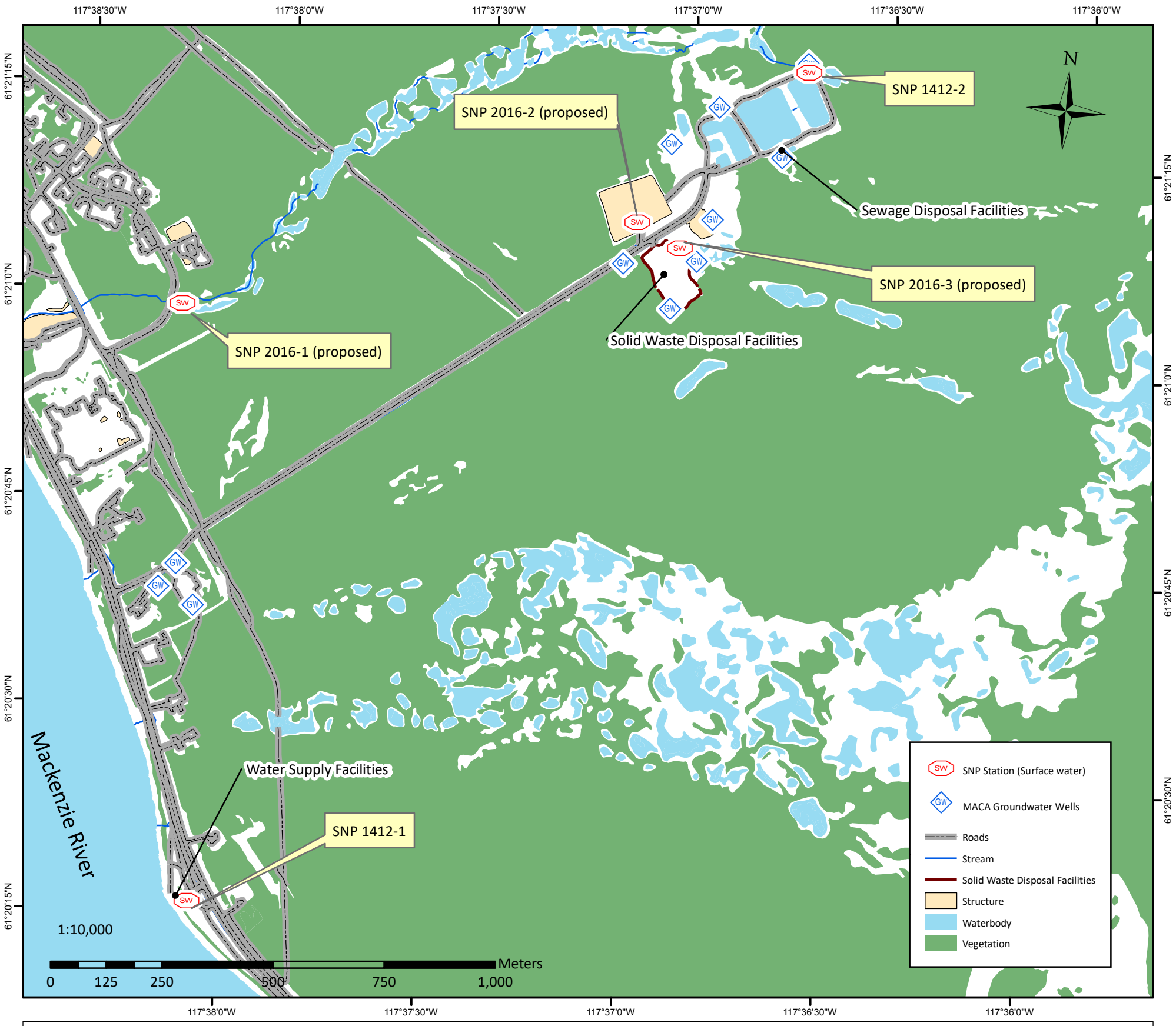
Client Sample ID: 1412-2 **Taiga Sample ID: 001**

*** Taiga analytical methods are based on the following standard analytical methods**
SM - Standard Methods for the Examination of Water and Wastewater
EPA - United States Environmental Protection Agency

ReportDate: October-25-21
Print Date: *October-25-21*

Appendix C: Map showing Surveillance Network Program stations for Fort Providence (MV2016L3-0001)

Hamlet of Fort Providence Surveillence Network Program (SNP) MV2016L3-0001



ID	Taiga Lab Colour Codes	SNP1412-1	SNP1412-2	SNP2016-1 (TBD)	SNP2016-2 (TBD)	SNP2016-3 (TBD)
Frequency		Monthly	Prior to discharge and weekly during discharge	Beginning and end of open water season, (i.e. one week following freshnet, and before freeze-up)	Twice per year: (1) during the months of June and September; and (2) prior to discharge of accumulated water	Twice per year: (1) during the months of June and September; and (2) prior to discharge of accumulated water
Volume in m^3		Water withdrawn			Water discharged	Water discharged
Effluent Quality Criteria (EQC)			Part D, item 7			
Parameters						
$CBOD_5$			✓	✓		
Ammonia (Nitrogen)			✓	✓		
Total Phosphorous (P)			✓	✓		
Total Suspended Solids			✓	✓	✓	✓
Faecal Coliform	STERILE		✓	✓		
Calcium (Ca)					✓	✓
Conductivity					✓	✓
pH			✓	✓	✓	✓
Nitrate (NO_3)			✓	✓		
Nitrite (NO_2)			✓	✓		
Total Phosphate					✓	✓
Potassium (K)					✓	✓
Sodium (Na)					✓	✓
Sulphate (SO_4)					✓	✓
Oil and grease (O+G)			✓	✓	✓	✓
Total Petroleum Hydrocarbons					✓	✓
BTEX					✓	✓
Total Phenols	P				✓	✓
Total Cadmium (Cd)					✓	✓
Total Chromium (Cr)					✓	✓
Total Cobalt (Co)					✓	✓
Total Copper (Cu)					✓	✓
Total Iron (Fe)					✓	✓
Total Lead (Pb)					✓	✓
Magnesium (Mg)					✓	✓
Total Manganese (Mn)					✓	✓
Total Mercury (Hg)					✓	✓
Total Nickel (Ni)					✓	✓
Total Zinc (Zn)					✓	✓

Map Description:
This map demonstrates the Surveillance Network Program (SNP) stations for the Hamlet of Fort Providence Municipal Water Licence MV2016L3-0001.

This map is for illustrative purposes only. This is not a legal document and should not be treated as such.

Coordinate System: NAD 1983 Northwest Territories Lambert
Projection: Lambert Conformal Conic
Datum: North American 1983
False Easting: 0.0000
False Northing: 0.0000
Central Meridian: -112.0000
Standard Parallel 1: 62.0000
Standard Parallel 2: 70.0000
Latitude Of Origin: 0.0000
Units: Meter

This map is created by the Mackenzie Valley Land and Water Board. For mapping related questions, please contact:

Jacqueline Ho
Regulatory Specialist
Mackenzie Valley Land and Water Board
jho@mvlwb.com
1 867 766 7455

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Erica Janes
Regulatory Specialist
Mackenzie Valley Land and Water Board
ejanes@mvlwb.com
1 867 766 7466

Map Produced: December 19, 2018
Data Source: MACA (accessed June 19, 2017);
MV2016L3-0001 Current to: December 4, 2017