Annual Report 2020

Water License: 3BM-GJO 1828

Contents

April 7, 2021

Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1L0

Attention: Richard Dwyer, Manager of Licensing

Dear Richard,

The Hamlet of Gjoa Haven is pleased to submit the 2020 Annual Report 2020 for water use and disposal of waste as required under the 3BM- GJO-1828 water license.

The estimated water use and wastewater generation in 2020 was 51,413 m^3. Sampling of sewage effluent and solid waste run-off as identified in the license were tested at Taiga Laboratory (CALA accredited) in Yellowknife. The effluent sampled at the final discharge point GJO-4 was below the allowable limits for BOD and TSS.

Thank you for your consideration. Please do not hesitate to contact me with any questions or concerns.

Regards,

Sarah Collins P. Eng
Municipal Planning Engineer
Government of Nunavut
Community and Government Services
Phone: 867-975-5478; Email: scollins@gov.nu.ca

Executive Summary

The Hamlet of Gjoa Haven has prepared this 2020 Annual Report to be submitted to the Nunavut Water Board (NWB) to meet requirements of the Water Licence 3BM-GJO 1828, Part B General Conditions. This report covers the period from January 01- December 31, 2020.

Raw water is drawn from Swan Lake through twin intake pumps, into a 3.2 km, 6-inch HDPE buried transmission line to the water treatment plant. Water is treated using pressure filters followed by chlorination. Secondary chlorination is added at the truck fill arm and treated water is distributed to household, commercial and institutional tanks in the municipality. The quantity of water used during this period was estimated as 51,413 m^3 which is a 3.7 % increase from 2019 (49,573 m^3), and below the annual allowable limit of 62,000 m^3.

Sewage is collected from holding tanks using hamlet operated vacuum trucks, hauled to municipal sewage lagoon, and discharged at the drop-off location. Raw sewage typically remains inside the lagoon from October to June where it freezes. Once melted, primary treatment occurs. Effluent is decanted into the adjacent wetland from August to September to ensure the lagoon's capacity to receive sewage over the following winter. Samples are collected from the lagoon monitoring station GJO-3 before decanting and tested at Taiga Laboratory in Yellowknife.

Effluent leaving the wetland is sampled at GJO-4 to determine if the treatment objective identified in Part D of the licence have been achieved. The samples taken in 2020 were below the allowable limits for BOD and TSS.

When ponding of leachate occurs within the solid waste facility it is sampled at monitoring station GJO-5. Waste batteries, waste oil and waste paint drums are contained inside C-cans within the solid waste facility. Regular waste is piled in the facility using a hamlet operated truck and pushed down to a trench and covered with locally available sand-gravel materials.

Planning for the solid waste facility upgrade project is ongoing and will continue into 2021. Conceptual designs are expected in 2022. A tear in the lagoon liner was repaired as directed by the CIRNAC inspector, photos are included in the Appendix.

General Conditions:

- The tabular summary of the annual water consumption and sewage disposal are estimated from the daily water distribution volumes. A flowmeter is installed in the truckfill arm however, these measurements are considered convenient for records.
- No modification to the sewage lagoon, wetland or solid waste facilities during this period
- No unauthorized discharge or disposal to effluent or waste during this period.
- O&M manuals for water intake, treatment, and sewage and solid waste facilities operations remains active since last update and approved in 2017.

Water Uses:

- 51,413 m^3 of water was drawn from the source Swan Lake for municipal potable water supply which is within the allowable annual limit 62,000 m^3. This is a 3.7% increase in quantity from the previous year.
- There is no erosion at the intake point or in proximity to the intake pumps screens inside the lake. No materials were removed from lake or intake bed near the screen.

Wastewater Disposal:

- Municipal sewage waste remains in tanks for 3-4 days before collection by vacuum truck and discharge into the lagoon.
- The amount of sewage generated during this period (Jan–Dec 2020) is estimated to be equal to the water consumption.
- Sewage is deposited at the lagoon using municipally operated trucks. The lagoon discharges into the adjacent wetland through a decanting structure. Effluent samples from the final discharge point in the wetland GJO-4 results show BOD and TSS are within allowable limits. Results are attached in the appendix.
- Freeboard at the sewage lagoon was maintained at 1.0 m or more measured from berm top. Any water above the discharge chute can free flow which may occur during freshet when snow melt water increases the water level inside the lagoon.

Non-Hazardous Domestic Solid Waste:

- Solid waste is collected from waste bins by hamlet operators, hauled to waste facility by truck and piled up in designated location inside the facility. Waste is then pushed into a lower graded trench, packed and covered with sand-gravel using a grader and packer.

Modification, construction, operation, A&R

- No modifications to water intake or treatment facility
- Ripped lagoon liner repaired
- No spills and no reclamation activities

Monitoring Program:

- Annual monitoring of sewage and solid waste effluent is carried out monthly Jul-Sep by the hamlet.
- Effluent sample results for GJO-2, GJO-3 and GJO-4 tested at Taiga Laboratory are included in the report.
- Station GJO-5 has moved to the lowest graded sump area near north-east corner.

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YEAR BEING REPORTED: 2020

The following information is compiled pursuant to the requirements of Part B, Item 1 of the Water License 3BM GJO-1828 issued to the Hamlet of Gjoa Haven.

i-iii)

tabular summaries of all data generated under the “Monitoring Program”; monthly and annual quantities in cubic meters of freshwater obtained from all sources; monthly and annual quantities in cubic meters of each and all wastes discharged.

Attached are the detailed chemical, physical and biological analysis required at results for Monitoring Stations GJO-2, GJO-3 and GJO-4.

Month Reported	Quantity of Water Obtained from all sources (litres)	Quantity of Sewage Waste Discharged
January	4,320,218	Same
February	4,789,864	Same
March	4,883,184	Same
April	4,304,715	Same
May	3,521,166	Same
June	3,149,296	Same
July	5,331,281	Same
August	4,481,152	Same
September	4,219,381	Same
October	4,429,047	Same
November	3,850,278	Same
December	4,134,398	Same
ANNUAL TOTAL	**51,413,440**	Same

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iv. a summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities

The ripped spots of HDPE liner at the sewage dropping pad were repaired by Hamlet operators as identified during the inspection on Aug 12, 2020.

v. a list of unauthorized discharges and summary of follow-up action taken

No reportable unauthorized discharge of water, sewage waste happened during the period.

vi. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year

No abandonment or restoration work carried for water system and no plan for next year. The proposed Solid Waste improvement project is still in planning; upgrades to current site are expected to begin 2024.

vii. a summary of any studies requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned

The ongoing solid waste project the contract that included a waste audit and evaluation of the current site for expansion is near complete. The study determined that the current site is suitable for expansion. The next phase of the project planning will determine the extent of improvements that can take place given the available funding. A schematic design with improvement options will be developed in this next phase anticipated to begin summer 2021. The study will also address how upgrades will impact the adjacent wetland.

viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and

ix. updates or revisions to the approved Operation and Maintenance Plans.

No changes to the approved O&M manual of water treatment plant (WTP), process, sensors, flow meter, FCL and PLC control system.

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ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

- Annual decanting of lagoon ensures capacity and containment of raw sewage for at least 9 months a year, but sludge removal only recommended at every 5-10 years as needed.
- Sewage effluent quality tests were carried at Taiga Lab in Yellowknife.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

- The hole in the lagoon berm liner is repaired.
- Lagoon effluent was decanted using the decanting structure after replacing the valve gate which failed two years back.
- Burning of loose materials helps in reduction of waste, but only can be carried based on the weather and airflow direction

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Table 1 2020 Gjoa Haven Sewage Effluent Log

Parameters	Units	MAC Limits	MAC Limits GJO-4	11-Aug-20	27-Aug-20			12-Sep-20	
				Raw Sewage Gjo-3	Raw Sewage GJO-3	Wetland (Mid) GJO-2	Final Discharge GJO-4	Sewage GJO-3	Sewage GJO-3
Alkalinity	mg/L			451	461	436	360	341	252
Conductivity	µS/cm			1500	1560	1480	1160	1150	741
pH	pH	6-9	6-9	7.64	7.42	7.61	7.58	7.45	7.77
TSS	mg/L	100	100	24	42	39	26	16	26
Ammonia as N_2	mg/L			94.7	97.4			38.3	13.4
BOD	mg/L	80	80	196	233	179	78	21	7
CBOD	mg/L			217	212		64	20	7
Dissolved, C	mg/L			107	115	78.1	39.3		
Total, C	mg/L			156	176	118	65.2		
Nitrate as N_2	mg/L	45						1.66	0.76
Nitrite as N_2	mg/L	3						0.30	0.12
Calcium	mg/L	32		27.8	30.6	33.5		41.7	39.7
Chloride	mg/L	100		163	160	148	111	103	69.8
Hardness	mg/L	500		171	178.000	200			
Magnesium	mg/L			24.7	24.6	28.2		34.4	26.3
Potassium	mg/L			28.4	30.9	28.6		21.4	9.7
Sodium	mg/L	200		114	112	105		91.7	53.3
Sulphate	mg/L	500		0.52	5	29	27	87	21
Fecal Coliform	CFU/100mL	$1x10^6$	$1x10^4$	60000	152000	120000	56000	TNTC	TNTC
Oil & Grease	Visibility	Non-visible	Non-visible	Non-visible	Non-visible	Non-visible	Non-visible	Non-visible	Non-Visible
Aluminium	µg/L	200		118	176	145	57.9	34.1	21.0
Arsenic	µg/L	25		1.2	1.2	3.4	5.5	14.7	5.2
Cadmium	µg/L							<0.04	<0.04
Chromium	µg/L			0.8	1.1	1.1	0.5	0.5	0.3
Cobalt	µg/L			0.6	0.8	1.0	1.5	2.6	2.0
Copper	µg/L	200		122.0	121	100	53.3	6.0	4.8
Iron	µg/L	500		565	5710	1330	1490	4480	1410
Lead	µg/L	10		0.6	0.7	1.1	1.8	1.7	1.1
Manganese	µg/L			42.0	86.1	94.4	114	318	113
Mercury	µg/L			0.03	0.02	0.02	0.01	<0.01	<0.01
Nickel	µg/L			2.5	2.7	3.1	3.9	8.4	4.2
Zinc	µg/L	500		88.5	117	87.9	40.3	4.9	3.2
Phenol, Total	µg/L			0.716	0.736	0.593	0.736	0.199	0.0216

Appendix A: Taiga Laboratory Effluent Results

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

Taiga Batch No.: 200556

- FINAL REPORT -

Prepared For: Hamlet of Gjoa Haven

Address: P.O. Box 200
Gjoa Haven,NU
X0B 1J0

Attn: **Anthony Anguttitauruq** **Facsimile: (867(360-6309**

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: Monday, August 31, 2020
Print Date: ***Tuesday, September 01, 2020***

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

Taiga Batch No.: 200556

- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-3A **Taiga Sample ID:** 001

Client Project: GH Sewage + Wastewater
Sample Type: Raw Sewage
Received Date: 11-Aug-20
Sampling Date: 11-Aug-20
Sampling Time: 8:09
Location: GH Sewage Lagoon
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	94.7	0.005	mg/L	18-Aug-20	SM4500-NH3:G	
Biochemical Oxygen Demand	196	2	mg/L	12-Aug-20	SM5210:B	
CBOD	217	2	mg/L	12-Aug-20	SM5210:B	
Chemical Oxygen Demand	488	20	mg/L	19-Aug-20	SM5220:D	
Organic Carbon, Dissolved	107	0.5	mg/L	17-Aug-20	SM5310:B	
Organic Carbon, Total	156	0.5	mg/L	18-Aug-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	451	0.4	mg/L	12-Aug-20	SM2320:B	
Conductivity, Specific (@25C)	1500	0.4	µS/cm	12-Aug-20	SM2510:B	
pH	7.64		pH units	12-Aug-20	SM4500-H:B	
Solids, Total Suspended	24	3	mg/L	17-Aug-20	SM2540:D	
Microbiology						
Coliforms, Fecal	60000	1000	CFU/100mL	11-Aug-20	SM9222:D	
Organics						
Oil and Grease, visible	Non-visible			11-Aug-20	Visual Exam	

ReportDate: Monday, August 31, 2020
Print Date: ***Tuesday, September 01, 2020***

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

Taiga Batch No.: 200556

- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-3A **Taiga Sample ID:** 001

Subcontracted Inorganics						
Calcium	27.8	0.05	mg/L	27-Aug-20	EPA200.2	
Chloride	163	0.5	mg/L	15-Aug-20	EPA300.1	
Hardness	171	0.13	mg/L	27-Aug-20	EPA200.2	
Magnesium	24.7	0.005	mg/L	27-Aug-20	EPA200.2	
NO2+NO3 - N	< 0.0220	0.022	mg/L	15-Aug-20	EPA300.1	
Potassium	28.4	0.05	mg/L	27-Aug-20	EPA200.2	
Sodium	114	0.05	mg/L	27-Aug-20	EPA200.2	
Sulphate	0.52	0.3	mg/L	15-Aug-20	EPA300.1	
Subcontracted Organics						
Phenols, Total	0.7160	0.020	mg/L	25-Aug-20	AB ENV.06537	224
Trace Metals, Total						
Aluminum	118	5	µg/L	26-Aug-20	EPA200.8	
Arsenic	1.2	0.2	µg/L	26-Aug-20	EPA200.8	
Chromium	0.8	0.1	µg/L	26-Aug-20	EPA200.8	
Cobalt	0.6	0.1	µg/L	26-Aug-20	EPA200.8	
Copper	122	0.2	µg/L	26-Aug-20	EPA200.8	
Iron	565	5	µg/L	26-Aug-20	EPA200.8	
Lead	0.6	0.1	µg/L	26-Aug-20	EPA200.8	
Manganese	42.0	0.1	µg/L	26-Aug-20	EPA200.8	
Mercury	0.03	0.01	µg/L	26-Aug-20	EPA200.8	
Nickel	2.5	0.1	µg/L	26-Aug-20	EPA200.8	
Silver	0.1	0.1	µg/L	26-Aug-20	EPA200.8	
Zinc	88.5	5	µg/L	26-Aug-20	EPA200.8	

ReportDate: Monday, August 31, 2020
Print Date: *Tuesday, September 01, 2020*

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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200556

- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-3A **Taiga Sample ID:** 001

- DATA QUALIFERS -

Data Qualifier Descriptions:

224 *Detection Limit Raised: Dilution required due to high concentration of test analyte(s).*

*** 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: Monday, August 31, 2020

Print Date: ***Tuesday, September 01, 2020***

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

Taiga Batch No.: 200675

- FINAL REPORT -

Prepared For: Hamlet of Gjoa Haven

Address: P.O. Box 200
Gjoa Haven,NU
X0B 1J0

Attn: **Anthony Anguttitauruq** **Facsimile: (867(360-6309**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

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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: Monday, September 14, 2020
Print Date: ***Tuesday, September 15, 2020***

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

Taiga Batch No.: 200675

- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-3A **Taiga Sample ID:** 001

Client Project: GH Sewage and Wastewater
Sample Type: Raw Sewage
Received Date: 28-Aug-20
Sampling Date: 27-Aug-20
Sampling Time:
Location: GH Sewage Lagoon
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	97.4	0.005	mg/L	01-Sep-20	SM4500-NH3:G	
Biochemical Oxygen Demand	233	2	mg/L	28-Aug-20	SM5210:B	
CBOD	212	2	mg/L	28-Aug-20	SM5210:B	
Chemical Oxygen Demand	484	20	mg/L	31-Aug-20	SM5220:D	
Organic Carbon, Dissolved	115	0.5	mg/L	03-Sep-20	SM5310:B	
Organic Carbon, Total	176	0.5	mg/L	01-Sep-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	461	0.4	mg/L	28-Aug-20	SM2320:B	
Conductivity, Specific (@25C)	1560	0.4	µS/cm	28-Aug-20	SM2510:B	
pH	7.42		pH units	28-Aug-20	SM4500-H:B	
Solids, Total Suspended	42	3	mg/L	02-Sep-20	SM2540:D	
Major Ions						
Chloride	160	0.7	mg/L	28-Aug-20	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.36	0.01	mg/L	28-Aug-20	SM4110:B	

ReportDate: Monday, September 14, 2020
Print Date: ***Tuesday, September 15, 2020***

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Taiga Batch No.: 200675

- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-3A **Taiga Sample ID:** 001

Sulphate	5	1	mg/L	28-Aug-20	SM4110:B	
Microbiology						
Coliforms, Fecal	152000	1000	CFU/100mL	28-Aug-20	SM9222:D	
Organics						
Oil and Grease, visible	Non-visible			28-Aug-20	Visual Exam	
Subcontracted Inorganics						
Calcium	30.6	0.05	mg/L	06-Sep-20	EPA200.2	
Hardness	178	0.13	mg/L	06-Sep-20	EPA200.2	
Magnesium	24.6	0.005	mg/L	06-Sep-20	EPA200.2	
Potassium	30.9	0.05	mg/L	06-Sep-20	EPA200.2	
Sodium	112	0.05	mg/L	06-Sep-20	EPA200.2	
Subcontracted Organics						
Phenols, Total	0.7360	0.050	mg/L	06-Sep-20	AB ENV.06537	224
Trace Metals, Total						
Aluminum	176	5	µg/L	04-Sep-20	EPA200.8	
Arsenic	1.2	0.2	µg/L	04-Sep-20	EPA200.8	
Chromium	1.1	0.1	µg/L	04-Sep-20	EPA200.8	
Cobalt	0.8	0.1	µg/L	04-Sep-20	EPA200.8	
Copper	121	0.2	µg/L	04-Sep-20	EPA200.8	
Iron	5710	5	µg/L	04-Sep-20	EPA200.8	
Lead	0.7	0.1	µg/L	04-Sep-20	EPA200.8	
Manganese	86.1	0.1	µg/L	04-Sep-20	EPA200.8	
Mercury	0.02	0.01	µg/L	04-Sep-20	EPA200.8	
Nickel	2.7	0.1	µg/L	04-Sep-20	EPA200.8	
Silver	0.1	0.1	µg/L	04-Sep-20	EPA200.8	

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Taiga Batch No.: 200675

- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-3A **Taiga Sample ID:** 001

Zinc	117	5	µg/L	04-Sep-20	EPA200.8

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Taiga Batch No.: 200675

- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-2 **Taiga Sample ID:** 002

Client Project: GH Sewage and Wastewater
Sample Type: Wetland (mid)
Received Date: 28-Aug-20
Sampling Date: 27-Aug-20
Sampling Time:
Location: GH Sewage Lagoon
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Biochemical Oxygen Demand	179	2	mg/L	28-Aug-20	SM5210:B	
Organic Carbon, Dissolved	78.1	0.5	mg/L	03-Sep-20	SM5310:B	
Organic Carbon, Total	118	0.5	mg/L	01-Sep-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	436	0.4	mg/L	28-Aug-20	SM2320:B	
Conductivity, Specific (@25C)	1480	0.4	µS/cm	28-Aug-20	SM2510:B	
pH	7.61		pH units	28-Aug-20	SM4500-H:B	
Solids, Total Suspended	39	3	mg/L	02-Sep-20	SM2540:D	
Major Ions						
Chloride	148	0.7	mg/L	28-Aug-20	SM4110:B	
Nitrate+Nitrite as Nitrogen	< 0.01	0.01	mg/L	28-Aug-20	SM4110:B	
Sulphate	29	1	mg/L	28-Aug-20	SM4110:B	
Microbiology						
Coliforms, Fecal	120000	1000	CFU/100mL	28-Aug-20	SM9222:D	
Organics						
Oil and Grease, visible	Non-visible			28-Aug-20	Visual Exam	

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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200675

- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-2 **Taiga Sample ID:** 002

Subcontracted Inorganics						
Calcium	33.5	0.05	mg/L	06-Sep-20	EPA200.2	
Hardness	200	0.13	mg/L	06-Sep-20	EPA200.2	
Magnesium	28.2	0.005	mg/L	06-Sep-20	EPA200.2	
Potassium	28.6	0.05	mg/L	06-Sep-20	EPA200.2	
Sodium	105	0.05	mg/L	06-Sep-20	EPA200.2	
Subcontracted Organics						
Phenols, Total	0.5930	0.050	mg/L	06-Sep-20	AB ENV.06537	224
Trace Metals, Total						
Aluminum	145	5	µg/L	04-Sep-20	EPA200.8	
Arsenic	3.4	0.2	µg/L	04-Sep-20	EPA200.8	
Chromium	1.1	0.1	µg/L	04-Sep-20	EPA200.8	
Cobalt	1.0	0.1	µg/L	04-Sep-20	EPA200.8	
Copper	100	0.2	µg/L	04-Sep-20	EPA200.8	
Iron	1330	5	µg/L	04-Sep-20	EPA200.8	
Lead	1.1	0.1	µg/L	04-Sep-20	EPA200.8	
Manganese	94.4	0.1	µg/L	04-Sep-20	EPA200.8	
Mercury	0.02	0.01	µg/L	04-Sep-20	EPA200.8	
Nickel	3.1	0.1	µg/L	04-Sep-20	EPA200.8	
Silver	0.2	0.1	µg/L	04-Sep-20	EPA200.8	
Zinc	87.9	5	µg/L	04-Sep-20	EPA200.8	

ReportDate: Monday, September 14, 2020
Print Date: *Tuesday, September 15, 2020*

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

Taiga Batch No.: 200675

- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-4 **Taiga Sample ID:** 003

Client Project: GH Sewage and Wastewater
Sample Type: Final Discharge
Received Date: 28-Aug-20
Sampling Date: 27-Aug-20
Sampling Time:
Location: GH Sewage Lagoon
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Biochemical Oxygen Demand	78	2	mg/L	28-Aug-20	SM5210:B	
CBOD	64	2	mg/L	28-Aug-20	SM5210:B	
Organic Carbon, Dissolved	39.3	0.5	mg/L	03-Sep-20	SM5310:B	
Organic Carbon, Total	65.2	0.5	mg/L	01-Sep-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	360	0.4	mg/L	28-Aug-20	SM2320:B	
Conductivity, Specific (@25C)	1160	0.4	µS/cm	28-Aug-20	SM2510:B	
pH	7.58		pH units	28-Aug-20	SM4500-H:B	
Solids, Total Suspended	26	3	mg/L	02-Sep-20	SM2540:D	
Major Ions						
Chloride	111	0.7	mg/L	28-Aug-20	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.53	0.01	mg/L	28-Aug-20	SM4110:B	
Sulphate	27	1	mg/L	28-Aug-20	SM4110:B	
Microbiology						
Coliforms, Fecal	56000	1000	CFU/100mL	28-Aug-20	SM9222:D	
Organics						

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-4 **Taiga Sample ID:** 003

Oil and Grease, visible	Non-visible			28-Aug-20	Visual Exam	
Subcontracted Inorganics						
Calcium	36.3	0.05	mg/L	06-Sep-20	EPA200.2	
Hardness	203	0.13	mg/L	06-Sep-20	EPA200.2	
Magnesium	27.3	0.005	mg/L	06-Sep-20	EPA200.2	
Potassium	20.8	0.05	mg/L	06-Sep-20	EPA200.2	
Sodium	82.7	0.05	mg/L	06-Sep-20	EPA200.2	
Subcontracted Organics						
Phenols, Total	0.7360	0.010	mg/L	06-Sep-20	AB ENV.06537	224
Trace Metals, Total						
Aluminum	57.9	5	µg/L	04-Sep-20	EPA200.8	
Arsenic	5.5	0.2	µg/L	04-Sep-20	EPA200.8	
Chromium	0.5	0.1	µg/L	04-Sep-20	EPA200.8	
Cobalt	1.5	0.1	µg/L	04-Sep-20	EPA200.8	
Copper	53.3	0.2	µg/L	04-Sep-20	EPA200.8	
Iron	1490	5	µg/L	04-Sep-20	EPA200.8	
Lead	1.8	0.1	µg/L	04-Sep-20	EPA200.8	
Manganese	114	0.1	µg/L	04-Sep-20	EPA200.8	
Mercury	0.01	0.01	µg/L	04-Sep-20	EPA200.8	
Nickel	3.9	0.1	µg/L	04-Sep-20	EPA200.8	
Silver	< 0.1	0.1	µg/L	04-Sep-20	EPA200.8	
Zinc	40.3	5	µg/L	04-Sep-20	EPA200.8	

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Taiga Batch No.: 200675

- CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-4 **Taiga Sample ID:** 003

- DATA QUALIFERS -

Data Qualifier Descriptions:

224 *Detection Limit Raised: Dilution required due to high concentration of test analyte(s).*

*** 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: Monday, September 14, 2020

Print Date: *Tuesday, September 15, 2020*

Appendix B: 2020 CIRNAC Inspection

WATER LICENCE INSPECTION FORM

☒ Original
☐ Follow-Up Report

Licensee	Licensee Representative
Hamlet of Gjoa Haven	Richard Leong
Licence No. / Expiry	**Representative's Title**
3BM-GJO1828	A/Senior Administrative Officer
Land / Other Authorizations	**Land / Other Authorizations**
Date of Inspection	**Inspector**
2020 August 12	Baba Pedersen

Activities Inspected

☐ Camp ☐ Drilling ☐ Mining ☐ Construction ☐ Reclamation ☐ Fuel Storage
☐ Roads/Hauling ☐ Other: ☒ Other: Municipal

Conditions: **A - Acceptable** **C - Concern** **U - Unacceptable** **NA – Not Applicable** **NI – Not Inspected**

Water Use	Condition	Comment	Site Conditions	Condition	Comment	Haz/Mat Management	Condition	Comment
Intake/Screen			Water Management Structures			Storage	A	9
Flow Measure. Device	A	10	Culverts / Bridges			Spills		
Source:			Drainage			Spill Plan		
Water Use:			Erosion / Sediment					
Recirculation (y /n)			Mitigation Measures	A C	5 8	**Administrative**		
			Reclamation Activities	A	7	Records	A	10
			Materials Storage			Reports	A	11
Waste Disposal			Signage	A	1	Plans		
Waste Water	U C	2 3 & 4				Notifications		
Solid Waste	C	6	**Monitoring**			**Other**		
Hazardous Waste			Sample Collection / Analysis	A	5			

**The number in the comments field will correspond with specific comments provided below.*

Samples taken by Inspector:	Location(s):
☐ Yes ☒ No	

SECTION 1 ☒ **Comments** (s.__) ☐ **Non-Compliance with Act or Licence** (s.__) ☐ **Action Required** (s.__)

On Wednesday August 12, 2020, I Baba Pedersen, Resource Management and Water Resources Officer with Crown-Indigenous Relations and Northern Affairs Canada, the Writer of this Report, did Inspect the holder (Hamlet of Gjoa Haven) of Water Licence number 3BM-GJO1828 issued for the Municipal Use of Water and Waste Disposal in the Hamlet of Gjoa Haven in the Kitikmeot Region of Nunavut.

The Inspector was accompanied by Shah Alam, Municipal Planning Engineer from the GN-CGS and Adam, Dominique and John with the Hamlet of Gjoa Haven. The Site Inspections were preceded by a meeting in the offices of the Hamlet of Gjoa Haven that also included Richard Leong, Acting SAO for the Hamlet of Gjoa Haven.

SECTION 2 ☒ **Comments** ☐ **Non-Compliance with Act or Licence** ☐ **Action Required**

During the Site Inspections, the following was observed by the Inspector;

1. The Raw Water Intake at Swan Lake (Photo 1)
2. The Hole in the Sewage Lagoon Berm Liner at the Truck Dump Station (Photos 2 & 3)
3. The presumed tear in the Sewage Lagoon Berm Liner on the South Side of the Lagoon (Photo 4)
4. Floating Debris on the South Side of the Sewage Lagoon (Photo 5)
5. The Decant Area of the Sewage Lagoon
6. The Damaged Section of Fencing for the Garbage Dump beside Sample Station GJO-5 (Photo 6)
7. Hamlet Staff cleaning/sorting inside the Garbage Dump (Photo 7)
8. Old Fuel Tank to be used as a Burn Box (Photo 8)
9. The Used Battery Storage Area (Photos 9 & 10)
10. YTD Water Consumption Records showing 26,265 cubic meters from January 1, 2020 to July 31, 2020 were provided to the Inspector
11. The Licence Holder has submitted the Annual Report to the Nunavut Water Board

SECTION 3 ☐ **Comments** ☐ **Non-Compliance with Act or Licence** ☒ **Action Required**

1. Signage for Sample Station GJO-1 at the Raw Water Intake has been installed as per the Inspector's instructions from last Inspection, Thank You very much
2. The Licence Holder MUST repair the Hole in the Sewage Lagoon Berm Liner at the Truck Dump Station AND provide the Inspector with Photographic Proof PRIOR TO September 30, 2020 *UPDATE* as per Photo 3, the License Holder completed

the required Repairs and submitted Photographic Proof to the Inspector on September 9, 2020. Thank you very much

3. The Licence Holder MUST check the presumed tear in the Sewage Lagoon Berm Liner on the South Side of the Sewage Lagoon AFTER the Decant Program is Complete and Repair as Required PRIOR to September 30, 2020
4. The Licence Holder shall remove all the Floating Debris on the South Side of the Sewage Lagoon
5. The Licence Holder has taken the required Samples and sent them to the Lab in Yellowknife for Analysis. Once received they will email them to the Inspector for Approval to Start the Decant Process
6. The Licence Holder shall repair the Damaged Section of the Garbage Dump Fence beside Sample Station GJO-5 AND provide Photographic Proof to the Inspector PRIOR TO September 30, 2020
7. The Inspector witnessed Staff from the Licence Holder actively Cleaning and Sorting the contents of the Garbage Dump. Thank you for undertaking this much required task
8. The Licence Holder shall move the old Fuel Tank within the Garbage Dump Fenced Perimeter to be used as a Burn Box for Non-Hazardous Materials
9. The Inspector witnessed the excellent job the Licence holder is doing with the Storage and Crating of Used Batteries. Thank you for this. The only recommendation the Inspector has to improve on this would be to store the Crated Batteries within a Sea Can
10. The Licence Holder is within allowable limits and the Inspector has no concerns with this at this time
11. Thank you for this, the Inspector has no concerns with this

Licensee or Representative	**Inspector's Name**
	Baba Pedersen
Signature	**Signature**
	Signed Original on File
Date	**Date**
	2020 October 15

Office Use Only:	Follow-up report to be issued by Inspector	☐ Yes	☒ No

cc. CIRNAC, Manager Field Operations, Iqaluit, justin.hack@canada.ca

Nunavut Water Board, Manager of Licensing, Gjoa Haven, licensing@nwb-oen.ca

Gov't of Nunavut, Municipal Engineer, Cambridge Bay, salam@gov.nu.ca

PHOTO LOG

Date	Camera	Inspector	Authorization
2020 August 12	Sony DSC-HX50V	Baba Pedersen	3BM-GJO1828

Photo Log # DSC06024

Photo 1

Description: Installation of GJO-1 Signage at Swan Lake Raw Water Intake location

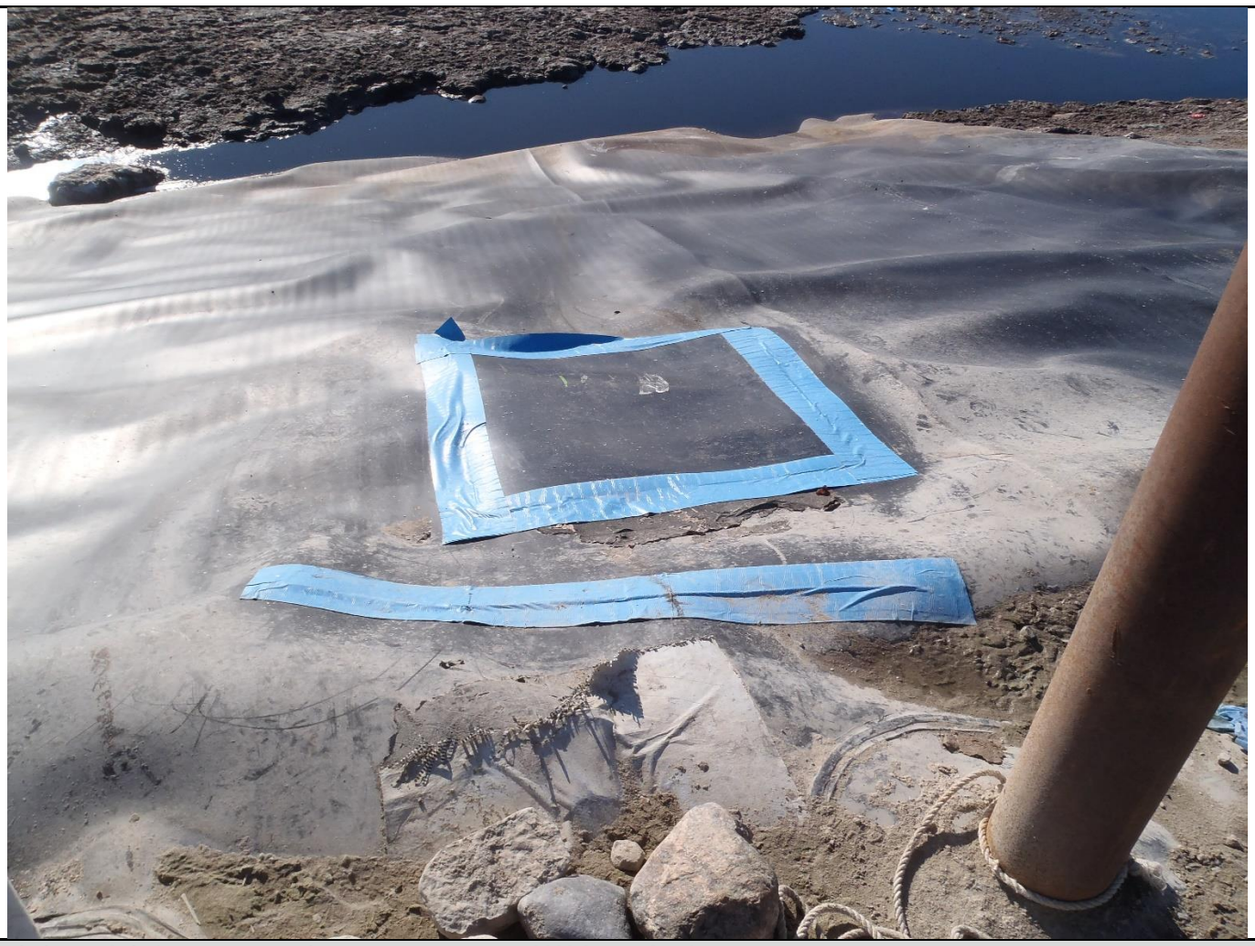
Photo Log # DSC06025

Photo 2

Description: Hole in Sewage Lagoon Liner requiring Repair as at 2020 August 12

Photo Log # DSC00654

Photo 3



Description: Hole in Sewage Lagoon Liner AFTER REPAIR as at 2020 September 9

Photo Log # DSC06043

Photo 4

Description: Presumed Tear in South Side of Sewage Lagoon Liner to be verified/repaired AFTER Decant Program is complete

Photo Log # DSC06044

Photo 5

Description: Floating Debris on South Side of Sewage Lagoon requiring Removal

Photo Log # DSC06051

Photo 6

Description: Damaged Section of Fencing for the Garbage Dump beside Sample Station GJO-5 requiring Repair

Photo Log # DSC06082

Photo 7

Description: Hamlet Staff actively Cleaning and Sorting Contents within the Garbage Dump perimeter – Thank You for this

Photo Log # DSC06080

Photo 8

Description: Old Fuel Tank the Hamlet plans to modify and use as a Burn Box for Non Hazardous Materials

Photo Log # DSC06083

Photo 9

Description: Crates of Used Batteries waiting for shipment South for proper disposal – Very Nice Job, Thank You Very Much!

Photo Log # DSC06086

Photo 10

Description: Temporary Storage Area for Used Batteries waiting to be Crated Up – Very Nice, Thank You Very Much!