

# Annual Report-2016

Water Licence: 3BM-GJO1318



Submitted on: *March 20, 2017*

*Submitted by*

*Shah Alam, P. Eng. E.P.*

Municipal Planning Engineer,  
CGS, Cambridge Bay, NU X0B 0C0



## Annual Report-2016

March 20, 2017

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

Attention: Karen Kharatyan, Ph.D., A/ Manager of Licensing

**RE: Water 3BM-GJ01318- Annual Report 2016, Hamlet of Gjoa Haven, NU**

**Dear Mr. Karen,**

The Hamlet of Gjoa Haven is pleased to submit to the Nunavut Water Board the “Annual Report 2016” of water uses and sewage water and solid waste disposal as required under the compliance of Water Licence, 3BM-GJO1318. Copies of required tests reports are included in Appendices for your reference.

The Licensee has undertaken some effective steps for waste management during the summer which has led improvement to sewage and solid waste facilities effluent discharges. Monitoring program has been in effect during **June-September** each year as required in the Licence. Samples test result has shown in control on contamination parameters except some individual exceeding within limit comprising BOD, TSS, E-coli and Toxicity components

We summarize those conditions and requirements outlined in **Part B through part H.**

We hope that Nunavut Water Board will find this report and enclosed test results valuable to Annual Report in operating the Water Licence for water, sewage and solid waste facilities.

Best Regards,

Shah Alam, P. Eng., E.P.

Municipal Planning Engineer,  
Community and Government Services  
Kitikmeot Region, Cambridge Bay, Nu  
Phone: 867-983-4156, fax: 867-983-4123  
E. mail: [salam@gov.nu.ca](mailto:salam@gov.nu.ca)

Enclosure: Annual Report 2016 NWB Form, effluent and water sample results, compliance Part B-H

Cc: David Stockley, Senor Administrative Officer (SAO), Hamlet of Gjoa Haven  
Baba Pedersen, Resource management Officer, AANDC



## HAMLET OF GJOA HAVEN

Box 200, Gjoa Haven, Nunavut, X0B 1J0

**Phone:** (867) 360-7141

**Facsimile:** (867) 360-6309

March 18, 2017

Shah Alam, P. Eng., E. P.  
Municipal Planning  
Engineer Community  
and Government  
Services Government  
of Nunavut  
Bag 200  
Cambridge Bay, Nunavut X0B 000

### Re: Authorization to Act on Behalf of the Hamlet

Dear Shah:

I hereby authorize you to act on behalf of the Municipality of Gjoa Haven in regards to our Water Licence and the Annual Report submission to the Nunavut Water Board.

Regards,

David Stockley  
Senior Administrative Officer  
Hamlet of Gjoa Haven  
Phone: 867-360-7141 Ext \*  
saogjoa@qiniq.com

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# Annual Report-2016

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## **EXECUTIVE SUMMARY:**

This Annual Report 2016 for the Hamlet of Gjoa Haven (the Licensee) to the Nunavut Water Board (NWB) has been prepared to meet requirements of the Nunavut Water Board Licence 3BM-GJO 1318, Part B General Conditions, through part H conditions to the monitoring program. This report covers the period from 01 January to 31 December 2016.

Water intake from Swan Lake through twin intake pumps, delivered by 6 inch HDPE buried line to the treatment plant building 3 km away where it treated in pressure filters followed by chlorination before truck fill and supplied to household tank by hamlet operated water trucks. Quantity of water uses during this period is about **46,284** m<sup>3</sup>, within the allowable limit (62,000 annually).

Sewage waste collected from household sewage tanks using hamlet operated vacuum trucks, hauled to community sewage lagoon and discharge at the designated dropping point. Raw sewage stayed inside the lagoon during the period Oct through June for almost 9 months freezing where these receive primary treatment naturally. Annual decanting carried during October to reduce quantity inside and make room for new candidate sewage waste. Samples collected from defined designated monitoring stations and tested at Taiga Laboratory Yellowknife.

Batteries, waste oil and waste paint drums replaced inside C-can placed at Solid waste facility. Non-hazardous waste pushed down by hamlet operated dozer and packed and covered with soil-gravel.

### **Water system upgrade and SCADA monitoring repair:**

Monitoring of water supply, SCADA upgrading and PLC program were carried last summer and fall. About 1200m length of the buried water line was replaced in 2015 with HDPE insulated same pipe. This replacement was required to continue water supply from intake pumphouse that has suffered winter freeze-up partly during last 2-3 years. With this replacement, water intake and supply efficiency increased but no changes to system, structure or program.

### **Concerns:**

Increased amount of Chlorine in treated water were reported in some occurrences but minimized such escalation of chlorine by controlling the dosing and reducing the amount of extra chlorine addition into overnight trucked water. Other concern was higher level of Aluminum in treated water then the raw water. The licensee has planned to send more water samples this year from different levels of intake and treatment-supply to find out the problem or the fact. Sampling process and testing also remains under attention.

It was noticed that overnight waited truck tests considerably lower chlorine then recommended (0.2- 0.5 mg/L) and was advised to add certain quantity of Chlorine mixture into the overnight waited truck before delivery to household tanks to balance the quantity. But doing so, sometimes it goes bit high and impaired the taste and smell.



**Part B: General Conditions:**

- Annual water consumption and sewage disposal are measured on daily basis by truck fill
- The new lagoon is in operation for community sewage management. All documents, O&M and as-built drawings were updated since its operation in 2015.
- No modification to sewage waste wetland or solid waste site during 2016
- No unauthorized discharge or disposal to effluent or waste during this period.
- Monitoring stations remains active as updated for new station GJO-3A
- No device Meter was used for volume measurement, however, truck-fill measurement is considered accurate

**Part C: Water Use:**

- Water drawn from the Swan Lake and annual intake quantity about **46, 284** cubic metres which is within the allowable annual limit **62,000** cubic metres.
- Intake system is free of erosion since pipe sides were protected by gravels along the bank
- Intake screen inside the lake intake point with clearance from bed and allowance frozen layer on top by 3m plus. No material removed from lake or intake bed near the screen.

**Part D: Waste Disposal**

- The municipal sewage waste contains both grey and black water results from urinal& toilet flush water mix with bath & kitchen water in the same tank. Combined sewage stay inside house tank for average 3-4 days before collecting by vacuum truck to discharge into lagoon.
- Amount of sewage generated during the period January - Dec is less than 43,000 m<sup>3</sup>. Quantity of sewage is calculated considering 90-95 % of water supply by truck.
- All sewage and solid waste disposal done to the designated location of sewage lagoon and waste facility using hamlet operated trucks. Sewage and effluent samples results taken from Station GJO3A and Final Discharge Point (end-of-pipe)GJO-4, test shown contaminants parameters within allowable limits (FC: 10,000 CFU/dl; BOD<sub>5</sub>:80; TSS: 100; PH: 6-9; Oil & grease: none for station GJO-4). Results are attached including a summary.
- Freeboard at sewage lagoon more than 1.0 m; decanting carried in late fall into wetland using a mechanical pump.
- The existing wetland area and facilities used for effluent treatment and remediation. Test results shown the effluent from Final Discharge Point (GJO-4) within limiting values (BOD: 80; TSS:100; 10,000 CFU/dl; PH: 6-9) and not acutely toxic to Rainbow Trout or crustacean.

**Non-hazardous domestic Solid Waste:**

- All solid wastes disposed in the approved waste facility fenced around and leachate run-off at the downstream where sampling stations marked for water collection. Some localized cells formed with segregated hazardous waste from regular waste and secured; batteries are housed in the C-can.

- Light materials, paper, paper boards and loose materials segregated and reduced by slow burning inside trench and pushed down burn ashes under the cover materials inside.
- Animal carcass buried under sand-pit inside the facility, but more cells requires in future.
- Broken house parts, metal frames and washing-dryers, fuel tanks, sewage tanks etc. need to be reduced or break which are under the plan for future years with additional resources.

## **Part E-G: Modification, construction, operation, A&R**

- No modification to sewage facility, but some operational improvement to solid waste facility
- Upgrading to SCADA control and PLCs are carried and final completion by March 2017.
- Operation and maintenance Plan (O&M) for sewage and solid waste facilities are active and updated in Sep, 2014. No maintenance or repair works to these facilities during this period.
- No spills occurred during this period. No reclamation to facilities and therefore, no activities related to vegetation growth or seed deposition carried.

## **Part H: Monitoring Program**

- Annual monitoring of sewage and solid waste effluent were carried during the summer and fall. Samples were tested at Taiga Laboratory, Yellowknife (CALA approved); test results are included with this report.

## ANNUAL REPORT

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**YEAR BEING REPORTED:** 2016

The following information is compiled pursuant to the requirements of **Part B, Item 1** of Water Licence 3BM-GJO-1318 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 metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged;

Attached are quantities of water used as reported in our On Tap Water Delivery System and the estimated discharge of sewage waste based on quantities used.

<b>Month Reported</b>	<b>Quantity of Water Obtained from all sources (litres)</b>	<b>Quantity of Sewage Waste Discharged</b>
<b>January</b>	4,038,148.40	Same
<b>February</b>	3,843,485.40	Same
<b>March</b>	4,109,663.30	Same
<b>April</b>	3,582,667.12	Same
<b>May</b>	3,814,306.10	Same
<b>June</b>	3,854,277.30	Same
<b>July</b>	3,813,538.00	Same
<b>August</b>	4,009,598.80	Same
<b>September</b>	3,968,589.40	Same
<b>October</b>	3,749,384.90	Same
<b>November</b>	3,740,234.62	Same
<b>December</b>	3,760,318.30	Same
<b>ANNUAL TOTAL</b>	46,284,211.64	Same



## ANNUAL REPORT

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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;
- 

SCADA upgrading activities carried to water intake, supply and treatment process  
PLC password issue resolved by the consultant (Aug 23<sup>rd</sup>)  
Modification to Chlorine mixing, dosing and turbidity reduction in water carried and deficiencies to be completed in March 2017.

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

AANDC inspection July 06, 2016:

Not a direct unauthorized discharge but substantial amount of sewage effluent is mixing with solid waste leachate at station GJO-4; thus potential increase in metal and nutrient components to final discharge (station GJO 2). Current sewage effluent is flowing over a wide area of wetland instead of the defined line along GJO-4 which helps the contaminants parameters polishing in presence of sunlight, wind and oxygen ingress.

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

Old sewage facility has been decommissioned in late 2015 and berm materials were pushed down inside/outside of the old lagoon. Localized ponding and ditches filled as part of deficiencies.

Monitoring station GJO 4 can be relocated based on current effluent flow trend and can be re-structured with sequence in numbering during the summer 2017.

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- 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;
- 

- Solid waste facility is exposed to unauthorized access to human and wild animals due to number of open areas along the perimeter fence.
  - Concern raised by some stakeholders on increased level of Manganese, Iron and Chloride in source water and Chlorine dosing in treated water.
- ✓ *Hamlet has used own resources to tie up fallen fences and fixing of open areas to the north side during late summer, but could not complete all due to materials and resource shortage; however, will continue to fix those areas in coming summer 2017. Lacking of proper equipment for digging and backfilling are concern to complete the job on time including sufficient funding arrangement*
-

## ANNUAL REPORT

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

No specific issues on water uses or waste disposal requested by the Board or the inspector. The inspector has a concern of water intake volume and measurement system - the operator and the Foreman had failed to show the water consumption data by daily records to the inspector instantaneously. The Licensee keeps all those record of consumption and waste disposal in the Hamlet office computer collected from driver and field operators.

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

Water delivery and sewage disposal operation:

- ✓ 3-trucks on road and 1-truck standby for water delivery 7-days a week, regular plus on call.
- ✓ 3-trucks on road and 2 trucks standby for sewage delivery 7 days a week.

No changes to Operation plan for water and sewage, and no major maintenance required for water delivery system or sewage disposal operation.

### **ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:**

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All 3-water trucks keep full overnight for fire storage emergency, no additional fire storage water tank in the community. Free Chlorine level are test for overnight storage water and add the difference Chlorine solution to cover the demand if needed before the water delivery to household tank. Regular daily fill also test at least one time per truck; Chlorine Log sheet maintains at the operator office and forward to CGS office weekly.

The treatment plant operator carries Chlorine test on a regular basis from treated water and E. coli and Coliform test for every week at the plant. Monthly water samples send to EHO office in Cambridge Bay and conduct Bacterial test.

Water chemical tests carried twice this year for raw water and treated supply water.

### **FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:**

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AANDC inspector raised a concern about fuel tank outside the intake pump house with no berm for fuel containment and protection for any potential leak to the tank.

- ✓ The licensee has assured the fuel tank is double shelled and the inner layer hold the fuel, any potential leaked fuel still will be within the containment by the outer shell. The bank of intake pumphouse and fuel tank is covered and protected by gravels.
  - ✓ The licensee will look into sampling point GJO-2 which is not very significant to current location noted by the inspector based on the flow pattern of final discharge.
-

# **Monitoring Stations**

**Water Licence: 3BM-GJO 1318**

**Hamlet of Gjoa Haven, NU**

## Gjoa Haven Water Licence: 3BM-GJO-1318

### Monitoring Stations of sewage and solid waste sample collection

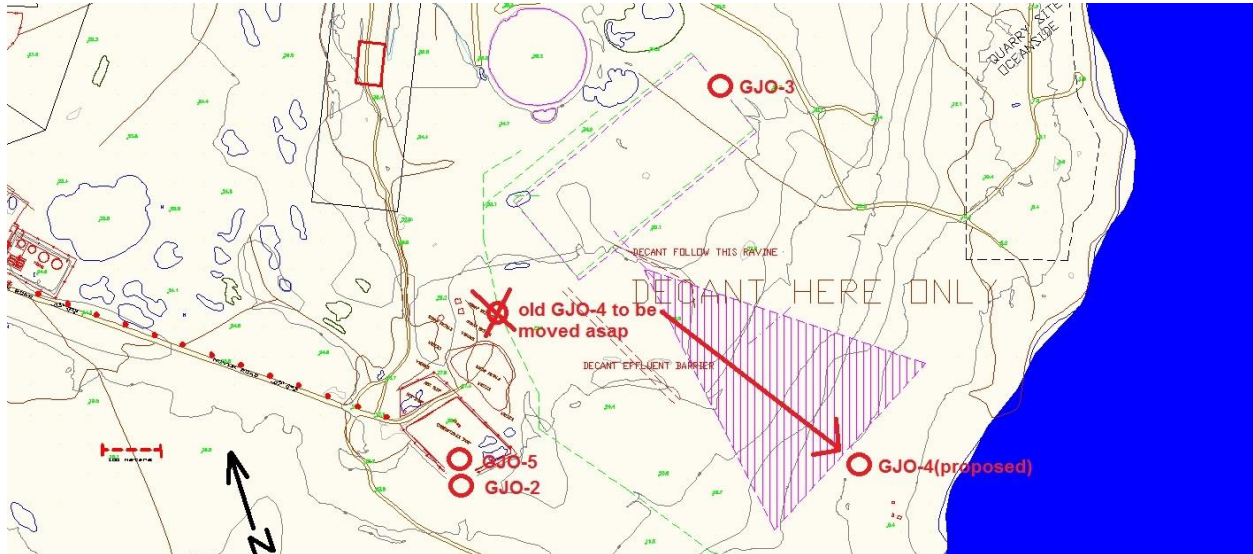
Sampling Station	GPS Location		Description	Frequency	Comments
	Latitude	Longitude			
<b>GJO-1</b>	N 68° 39' 22.9"	W 95° 55' 06.5"	Raw Water source at Swan Lake	Volume of water (Monthly)	No change
<b>GJO-2</b>	N 68° 37' 05"	W 95° 50' 42"	Solid Waste leachate discharge location	Outside the berm monthly (May-Aug)	Change location may be needed
<b>GJO-3</b>	N 68° 37' 28.8"	W 95° 50' 21.9"	Sewage truck offload point	From lagoon when decanting	At new Lagoon decanting point
<b>GJO-4</b>	N 68° 37' 23"	W 95° 50' 39"	Sewage effluent Final discharge point on wetland	On wetland Monthly (May-Aug)	Change location may be needed
<b>GJO-4 (new)</b>	N 68° 36' 55"	W 95° 49' 38"			Suggested new location
<b>GJO-5</b>	N 68° 37' 05"	W 95° 50' 44"	Solid Waste Leachate retention sump pit.	only when decanting requires	No change

#### Notes:

- Suggested location of GJO-4 (new) is based on the trend of sewage effluent flow on wetland
- Old GJO-3 is moved from previous location to new truck off-load point at the new lagoon.
- Station GJO-5 is inside the Solid waste facility secured by berm. Sampling from GJO-5 is carried when requires decanting of effluent-water, mostly happened in mid-summer.
- recommended to make changes of GJO-2 location or re-arrange the station numbering sequence (start-to-end sequence)

## Water Licence: 3BM-GJO 1318

### Gjoa Haven Sewage and waste discharge facilities: Effluent flow and sampling stations

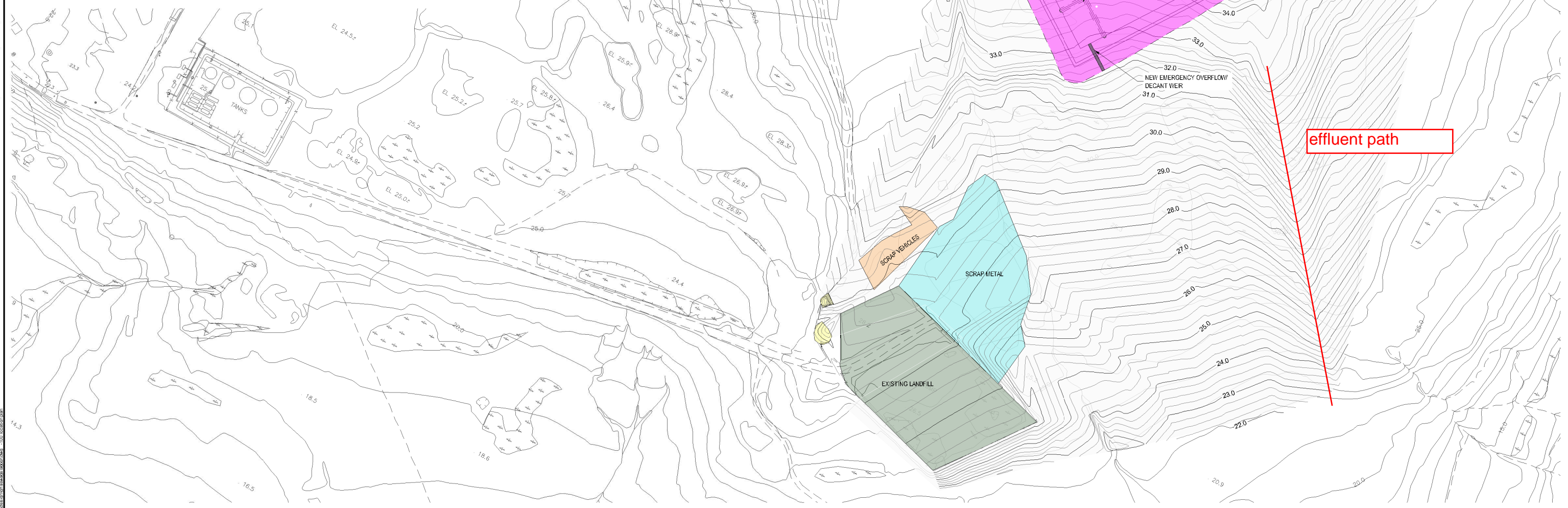
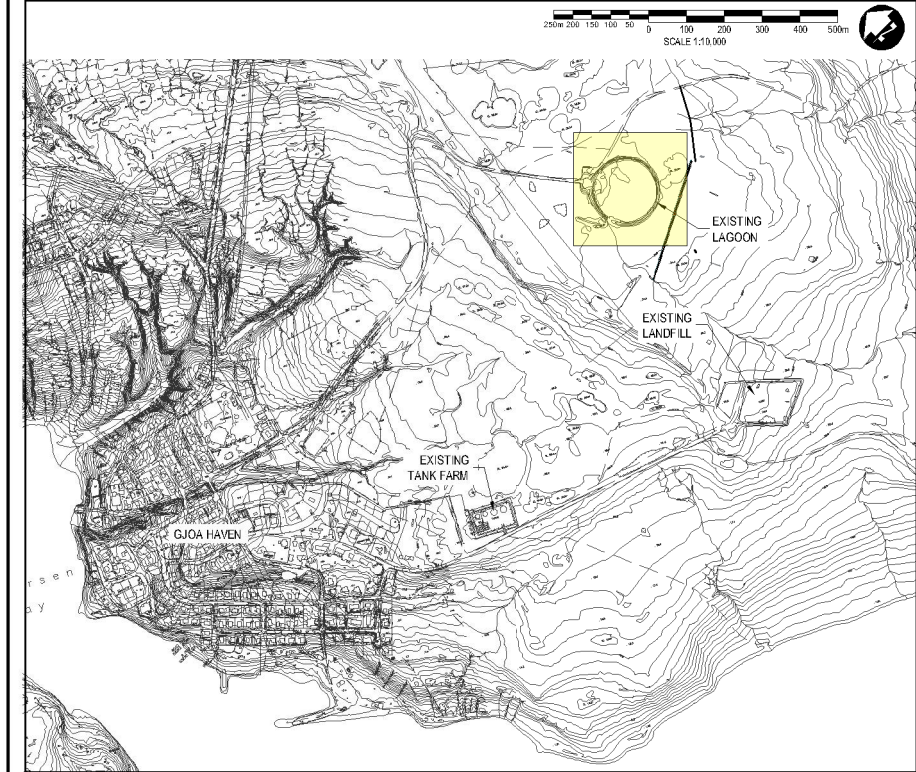


#### Notes:

- Suggested for GJO-4 (new) location is based on current sewage effluent water flow trend
- Old GJO-3 is moved from previous location to new truck off-load point at the new lagoon.
- Station GJO-5 is inside the Solid waste facility secured by berm and facility for over-flow. Sampling from GJO-5 is carried when requires decanting of effluent-water, mostly happened in mid-summer when snow freshen.
- Effluent-water flow on wetland follow a bend area of down-grading towards the final discharge point GJO-2. Also, recommended to make changes of GJO-2 location or re-arrange the station numbering sequence (start-to-end sequence)

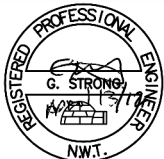


DILLON CONSULTING LIMITED 4820 47TH STREET, YELLOWKNIFE NT, X1A 3P1, PHONE 867.920.4555



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PROFESSIONAL ENGINEERS,  
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OF THE NORTHWEST TERRITORIES  
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1	ISSUED FOR INTERNAL REVIEW	04	11	12	GS
No	ISSUED FOR	00	00	00	BY

DESIGN	JMS	REVIEWED BY	GS
DRAWN	CH/TPW	CHECKED BY	GS
DATE	SEPTEMBER 2012		
SCALE	AS SHOWN		

GJOA HAVEN SEWAGE LAGOON GJOA HAVEN, NUNAVUT	PROJECT NUMBER 11-5029-1000
LOCATION PLAN	SHEET NUMBER 100

# **Samples Results Summary 2016**

**Water Licence: 3BM-GJO 1318**

**Hamlet of Gjoa Haven, NU**



**Table**  
**Effluent samples and raw water sample results 2016: Hamlet of Gjoa Haven, NU**

Parameter	MAC Limit	units	July 03, 2016		Sep 21, 2016		July 03, 2016
	Sewage Effluent		GJO-4	GJO-5	GJO- 3	GJO-4	Raw water GJO-1
Alkalinity		mg/L	243	354	531	344	482
Conductivity		µS/cm	872	3280	1640	1240	3790
p <sup>H</sup>	6-9		7.70	7.42	7.69	7.36	7.32
TSS	*100	mg/L	11	126	83	9	203
BOD	*80	mg/L	13	259	133	22	334
Organic Carbon	*80	mg/L	27.1	213	138	36.7	288
Nitrate as N2		mg/L	2.6	0.24	0.07	3.09	0.21
Nitrite as N2		mg/L	0.26	0.13	0.02	0.29	1.36
Calcium		mg/L	37.8	497	31.7	42.5	536
chloride	250	mg/L	113	259	193	162	354
Hardness (CaCO <sub>3</sub> )	500	mg/L	215	1490	184	243	1610
Magnesium		mg/L	29.3	60.7	25.5	33.2	66.9
Potassium		mg/L	17.5	65.1	34.4	24.4	72.1
Sodium	200	mg/L	95.4	224	133	124	305
Sulphate	500	mg/L	19	< 1	6	44	< 1
Fecal Coliform	10 <sup>6</sup>	CFU/100mL	170	1000	4.5 x 10 <sup>5</sup>	4560	1000
Oil and Grease	5000	µg/L	None	None	None	None	None
Aluminium	1000	µg/L	28.9	142	491	36.5	152
Arsenic	1000	µg/L	6.8	6.9	1.5	11.1	22.3
Cadmium	100	µg/L	< 0.1	2.1	0.1	< 0.1	2.1
Chromium	100	µg/L	0.4	4.0	1.5	0.5	6.2
Cobalt	50	µg/L	1.8	10.6	0.7	2.7	11.3
Copper	200	µg/L	3.7	256	100	10.2	184
Iron	1000	µg/L	1870	25,200	786	2170	34,700
Lead	50	µg/L	0.4	58	1.9	1.3	66.8
Manganese	50	µg/L	126	1650	45.8	159	1750
Nickel	200	µg/L	7.2	31.2	3.6	9.3	27.8
Zinc	500	µg/L	< 5	1950	183	8	1180
Mercury (Hg)	0.6	µg/L	0.02	0.20	0.07	0.03	0.18

\* Parameters MAC value for **sewage effluent** identified in the Water Licence.

- **Green** fonts shows higher parameter values that requires more holding time before decanting/ discharge

- **Red** fonts showed higher values in **source water** and treated by WTP.

# Appendix: A

## **AANDC Inspection Report 2016**

**Water Licence: 3BM-GJO 1318**

**Hamlet of Gjoa Haven, NU**



WATER LICENCE INSPECTION FORM

☒ Original  
☐ Follow-Up Report

Licensee		Licensee Representative	
Hamlet of Gjoa Haven		Dave Stockley	
Licence No. / Expiry		Representative's Title	
3BM-GJO-1318		Senior Administrative Officer	
Land / Other Authorizations		Land / Other Authorizations	
Date of Inspection		Inspector	
6 July 2016		Baba Pedersen	
Activities Inspected			
<input type="checkbox"/> Camp	<input type="checkbox"/> Drilling	<input type="checkbox"/> Mining	<input type="checkbox"/> Construction
<input type="checkbox"/> Roads/Hauling	<input checked="" type="checkbox"/> Other: Municipal	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Fuel Storage

Conditions:		A - Acceptable	C - Concern	U - Unacceptable	NA – Not Applicable	NI – Not Inspected	
Water Use		Condition	Comment	Site Conditions		Condition	Comment
Intake/Screen	A			Water Management Structures			
Flow Measure. Device	C	1		Culverts / Bridges			
Source:	A			Drainage		A	
Water Use:	C	1		Erosion / Sediment			
Recirculation ( y /n)				Mitigation Measures			
				Reclamation Activities			
				Materials Storage		A	3
Waste Disposal				Signage		C	4
Waste Water	A	2					
Solid Waste	A	3		Monitoring			
Hazardous Waste	A	3		Sample Collection / Analysis		A	
*The number in the comments field will correspond with specific comments provided below.							
Samples taken by Inspector:			Location(s): The Municipal Staff took Samples during the Inspection and sent them to the Lab.				
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							

SECTION 1	<input checked="" type="checkbox"/> Comments (s. __)	<input type="checkbox"/> Non-Compliance with Act or Licence (s. __)	<input type="checkbox"/> Action Required (s. __)
INAC Staff on this Inspection included Baba Pedersen, RMO/WRO, Erik Allain, Manager Field Operations and Jeremy Fraser, Summer Student. Shah Alam, GN Municipal Engineer for the Kitikmeot Region was also in attendance.			
SECTION 2	<input checked="" type="checkbox"/> Comments	<input type="checkbox"/> Non-Compliance with Act or Licence	<input type="checkbox"/> Action Required
Field Inspection Sites included the In-town Water Treatment Plant and Truck Fill Station (Photo 1), the Swan Lake Water Intake and Building (Photo 2), the Water Intake Sample location (Photo 3), the Sewage Lagoon (Photos 4 & 5), the Decant Area (Photo 6), Sample Station #4 below the Lagoon (Photo 7) and the Main Dump area (Photos 8 & 9) which includes both the Metal and Regular Dumps.			
SECTION 3	<input type="checkbox"/> Comments	<input type="checkbox"/> Non-Compliance with Act or Licence	<input checked="" type="checkbox"/> Action Required
1. There was no Flow Meter or Manual Records for recording the Daily/Weekly/Monthly or Annual Water Consumption amounts as per the requirements of the Water Licence. Staff must be able to show the Inspector Consumption Figures on Request. This needs to be rectified prior to next summer. 2. The Sewage Lagoon and Decant Area where in very good shape. 3. The Main Dump is Well Organized and Segregated. 4. Signage was very limited and requires improvement for Public Safety and Knowledge as well as a requirement in the Water Licence. This needs to be rectified prior to next summer			

Licensee or Representative	Inspector's Name
	Baba Pedersen
Signature	Signature
	Signed Original on File
Date	Date
	28 September 2016

Office Use Only:	Follow-up report to be issued by Inspector	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
------------------	--	---

CC:                   licensing@nwb-oen.ca  
                        Erik Allain, Manager of Field Operations, AANDC  
                        Shah Alam, Municipal Engineer, Gov't of Nunavut





PHOTO LOG

Date	Camera	Inspector	Authorization
6 July 2016		Baba Pedersen	3BM-GJO-1318
Photo Log # 5939		Location	
Photo 1		Gjoa Haven	
			
Description: In-Town Water Treatment Plant & truck Fill Station			

Photo Log # 5945		Location	
Photo 2		Gjoa Haven	
			
Description: Swan Lake Water Intake Building			





Photo Log # 5962

Photo 3

Location

Gjoa Haven



Description: Swan Lake Sample Station

Photo Log # 5967

Photo 4

Location

Gjoa Haven



Description: Sewage Lagoon #1





Photo Log # 5968

Photo 5

Location

Gjoa Haven



Description: Sewage Lagoon #2

Photo Log # 5974

Photo 6

Location

Gjoa Haven



Description: Decant Area





Photo Log # 5980

Photo 7

Location

Gjoa Haven



Description: Sample Station #4 below Sewage Lagoon

Photo Log # 5989

Photo 8

Location

Gjoa Haven



Description: Main Dump #1





Photo Log # 5991

Location

Photo 9

Gjoa Haven



Description: Main Dump #2

# Appendix: B

## **Samples Results- 2016**

**Water Licence: 3BM-GJO 1318**

**Hamlet of Gjoa Haven, NU**



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

**Taiga Batch No.:**  
**160928**

## **- FINAL REPORT -**

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**Prepared For:** Hamlet of Gjoa Haven

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

**Attn:** Jacob Keanik

**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:** Thursday, October 13, 2016

**Print Date:** *Thursday, October 13, 2016*

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**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-767-9235 Fax: (867)-873-2652

**Taiga Batch No.:**  
**160515**

**- PRELIMINARY REPORT -**

---

**Prepared For:** Hamlet of Gjoa Haven

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

**Attn:** Shawn Stuckey

**Facsimile:** (867) 360-6309

---

**Final report has been reviewed and approved by:**

---

Judy Mah  
Client Service 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:**

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**Print Date:** Monday, July 25, 2016



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-765-6645 Fax: (867)-873-2652

**Taiga Batch No.:**  
**160515**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: GJO-1**

**Taiga Sample ID: 001**

**Client Project:** Hamlet of Gjoa Haven Sewage and Waste  
**Sample Type:** Water  
**Received Date:** 07-Jul-16  
**Sampling Date:** 03-Jul-16  
**Sampling Time:** 11:00  
**Location:** GJO-1  
**Report Status:** Preliminary

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen		0.005	mg/L		SM4500-NH3:G	
Biochemical Oxygen Demand	334	2	mg/L	07-Jul-16	SM5210:B	
Organic Carbon, Total	288	0.5	mg/L	08-Jul-16	SM5310:B	
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO3)	482	0.4	mg/L	07-Jul-16	SM2320:B	
Conductivity, Specific (@25C)	3790	0.4	µS/cm	07-Jul-16	SM2510:B	
pH	7.32		pH units	07-Jul-16	SM4500-H:B	
Solids, Total Suspended	203	3	mg/L	17-Jul-16	SM2540:D	
<b><u>Major Ions</u></b>						
Calcium	536	0.1	mg/L	21-Jul-16	SM4110:B	
Chloride	354	0.7	mg/L	21-Jul-16	SM4110:B	
Hardness	1610	0.7	mg/L	21-Jul-16	SM4110:B	
Magnesium	66.9	0.1	mg/L	21-Jul-16	SM4110:B	
Nitrate as Nitrogen	0.21	0.01	mg/L	21-Jul-16	SM4110:B	

**ReportDate:**  
**Print Date:** Monday, July 25, 2016



## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-765-6645 Fax: (867)-873-2652

Taiga Batch No.:  
160515

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-1

Taiga Sample ID: 001

Nitrite as Nitrogen	1.39	0.01	mg/L	21-Jul-16	SM4110:B
Potassium	72.1	0.1	mg/L	21-Jul-16	SM4110:B
Sodium	305	0.1	mg/L	21-Jul-16	SM4110:B
Sulphate	< 1	1	mg/L	21-Jul-16	SM4110:B

#### Microbiology

Coliforms, Fecal	1,000	1000	CFU/100mL	07-Jul-16	SM9222:D
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#### Organics

Oil and Grease, visible	Non-visible			09-Jul-16	Visual Exam
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#### Trace Metals, Total

Aluminum	152	5	µg/L	24-Jul-16	EPA200.8
Arsenic	22.3	0.2	µg/L	24-Jul-16	EPA200.8
Cadmium	2.1	0.1	µg/L	24-Jul-16	EPA200.8
Chromium	6.2	0.1	µg/L	24-Jul-16	EPA200.8
Cobalt	11.3	0.1	µg/L	24-Jul-16	EPA200.8
Copper	184	0.2	µg/L	24-Jul-16	EPA200.8
Iron	34700	5	µg/L	24-Jul-16	EPA200.8
Lead	66.8	0.1	µg/L	24-Jul-16	EPA200.8
Manganese	1750	0.1	µg/L	24-Jul-16	EPA200.8
Mercury	0.18	0.01	µg/L	24-Jul-16	EPA200.8
Nickel	27.8	0.1	µg/L	24-Jul-16	EPA200.8
Zinc	1180	5	µg/L	24-Jul-16	EPA200.8

ReportDate:

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-765-6645 Fax: (867)-873-2652

Taiga Batch No.:  
160515

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-4

Taiga Sample ID: 002

Client Project: Hamlet of Gjoa Haven Sewage and Waste

Sample Type: Water

Received Date: 07-Jul-16

Sampling Date: 03-Jul-16

Sampling Time: 11:00

Location: GJO-4

Report Status: Preliminary

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen		0.005	mg/L		SM4500-NH3:G	
Biochemical Oxygen Demand	13	2	mg/L	07-Jul-16	SM5210:B	
Organic Carbon, Total	27.1	0.5	mg/L	08-Jul-16	SM5310:B	
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	243	0.4	mg/L	07-Jul-16	SM2320:B	
Conductivity, Specific (@25C)	872	0.4	µS/cm	07-Jul-16	SM2510:B	
pH	7.70		pH units	07-Jul-16	SM4500-H:B	
Solids, Total Suspended	11	3	mg/L	17-Jul-16	SM2540:D	
<b><u>Major Ions</u></b>						
Calcium	37.8	0.1	mg/L	21-Jul-16	SM4110:B	
Chloride	113	0.7	mg/L	21-Jul-16	SM4110:B	
Hardness	215	0.7	mg/L	21-Jul-16	SM4110:B	
Magnesium	29.3	0.1	mg/L	21-Jul-16	SM4110:B	
Nitrate as Nitrogen	2.60	0.01	mg/L	21-Jul-16	SM4110:B	
Nitrite as Nitrogen	0.26	0.01	mg/L	21-Jul-16	SM4110:B	
Potassium	17.5	0.1	mg/L	21-Jul-16	SM4110:B	

Report Date:

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## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-765-6645 Fax: (867)-873-2652

Taiga Batch No.:  
160515

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-4

Taiga Sample ID: 002

Sodium	95.4	0.1	mg/L	21-Jul-16	SM4110:B
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Sulphate	19	1	mg/L	21-Jul-16	SM4110:B
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#### Microbiology

Coliforms, Fecal	170	10	CFU/100mL	07-Jul-16	SM9222:D
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#### Organics

Oil and Grease, visible	Non-visible			09-Jul-16	Visual Exam
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#### Trace Metals, Total

Aluminum	28.9	5	µg/L	24-Jul-16	EPA200.8
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Arsenic	6.8	0.2	µg/L	24-Jul-16	EPA200.8
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Cadmium	< 0.1	0.1	µg/L	24-Jul-16	EPA200.8
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Chromium	0.4	0.1	µg/L	24-Jul-16	EPA200.8
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Cobalt	1.8	0.1	µg/L	24-Jul-16	EPA200.8
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Copper	3.7	0.2	µg/L	24-Jul-16	EPA200.8
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Iron	1870	5	µg/L	24-Jul-16	EPA200.8
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Lead	0.4	0.1	µg/L	24-Jul-16	EPA200.8
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Manganese	126	0.1	µg/L	24-Jul-16	EPA200.8
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Mercury	0.02	0.01	µg/L	24-Jul-16	EPA200.8
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Nickel	7.2	0.1	µg/L	24-Jul-16	EPA200.8
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Zinc	< 5.0	5	µg/L	24-Jul-16	EPA200.8
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**Taiga Environmental Laboratory**  
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Tel: (867)-765-6645 Fax: (867)-873-2652

**Taiga Batch No.:**  
**160515**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: GJO-5**

**Taiga Sample ID: 003**

**Client Project:** Hamlet of Gjoa Haven Sewage and Waste  
**Sample Type:** Water  
**Received Date:** 07-Jul-16  
**Sampling Date:** 03-Jul-16  
**Sampling Time:** 11:00  
**Location:** GJO-5  
**Report Status:** Preliminary

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen		0.005	mg/L		SM4500-NH3:G	
Biochemical Oxygen Demand	259	2	mg/L	07-Jul-16	SM5210:B	
CBOD	262	2	mg/L	07-Jul-16	SM5210:B	
Organic Carbon, Total	213	0.5	mg/L	08-Jul-16	SM5310:B	
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	354	0.4	mg/L	07-Jul-16	SM2320:B	
Conductivity, Specific (@25C)	3280	0.4	µS/cm	07-Jul-16	SM2510:B	
pH	7.42		pH units	07-Jul-16	SM4500-H:B	
Solids, Total Suspended	126	3	mg/L	17-Jul-16	SM2540:D	
<b><u>Major Ions</u></b>						
Calcium	497	0.1	mg/L	21-Jul-16	SM4110:B	
Chloride	259	0.7	mg/L	21-Jul-16	SM4110:B	
Hardness	1490	0.7	mg/L	21-Jul-16	SM4110:B	
Magnesium	60.7	0.1	mg/L	21-Jul-16	SM4110:B	
Nitrate as Nitrogen	0.24	0.01	mg/L	21-Jul-16	SM4110:B	
Nitrite as Nitrogen	0.13	0.01	mg/L	21-Jul-16	SM4110:B	

**Report Date:**  
**Print Date:** Monday, July 25, 2016



## Taiga Environmental Laboratory

4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9

Tel: (867)-765-6645 Fax: (867)-873-2652

Taiga Batch No.:  
160515

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: GJO-5

Taiga Sample ID: 003

Potassium	65.1	0.1	mg/L	21-Jul-16	SM4110:B
Sodium	224	0.1	mg/L	21-Jul-16	SM4110:B
Sulphate	< 1	1	mg/L	21-Jul-16	SM4110:B

#### Microbiology

Coliforms, Fecal	1,000	1000	CFU/100mL	07-Jul-16	SM9222:D
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#### Organics

Oil and Grease, visible	Non-visible			09-Jul-16	Visual Exam
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#### Trace Metals, Total

Aluminum	142	5	µg/L	24-Jul-16	EPA200.8
Arsenic	6.9	0.2	µg/L	24-Jul-16	EPA200.8
Cadmium	2.1	0.1	µg/L	24-Jul-16	EPA200.8
Chromium	4.0	0.1	µg/L	24-Jul-16	EPA200.8
Cobalt	10.6	0.1	µg/L	24-Jul-16	EPA200.8
Copper	256	0.2	µg/L	24-Jul-16	EPA200.8
Iron	25200	5	µg/L	24-Jul-16	EPA200.8
Lead	58.0	0.1	µg/L	24-Jul-16	EPA200.8
Manganese	1650	0.1	µg/L	24-Jul-16	EPA200.8
Mercury	0.20	0.01	µg/L	24-Jul-16	EPA200.8
Nickel	31.2	0.1	µg/L	24-Jul-16	EPA200.8
Zinc	1950	5	µg/L	24-Jul-16	EPA200.8

ReportDate:

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**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9  
Tel: (867)-765-6645 Fax: (867)-873-2652

**Taiga Batch No.:  
160515**

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**- CERTIFICATE OF ANALYSIS -**

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**Client Sample ID: GJO-5**

**Taiga Sample ID: 003**

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**\* 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

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

Taiga Batch No.:  
**160928**

**- CERTIFICATE OF ANALYSIS -**

Client Sample ID: **GJO-3**

Taiga Sample ID: **001**

**Client Project:**

**Sample Type:** Water

**Received Date:** 22-Sep-16

**Sampling Date:** 21-Sep-16

**Sampling Time:**

**Location:** Gjoa Haven, NU

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	82.7	0.005	mg/L	30-Sep-16	SM4500-NH3:G	
Biochemical Oxygen Demand	133	2	mg/L	23-Sep-16	SM5210:B	
Organic Carbon, Total	138	0.5	mg/L	27-Sep-16	SM5310:B	
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	531	0.4	mg/L	22-Sep-16	SM2320:B	
Conductivity, Specific (@25C)	1640	0.4	µS/cm	22-Sep-16	SM2510:B	
pH	7.69		pH units	22-Sep-16	SM4500-H:B	
Solids, Total Suspended	83	3	mg/L	27-Sep-16	SM2540:D	
<b><u>Major Ions</u></b>						
Calcium	31.7	0.1	mg/L	29-Sep-16	SM4110:B	
Chloride	193	0.7	mg/L	23-Sep-16	SM4110:B	
Hardness	184	0.7	mg/L	29-Sep-16	SM4110:B	
Magnesium	25.5	0.1	mg/L	29-Sep-16	SM4110:B	
Nitrate as Nitrogen	0.07	0.01	mg/L	23-Sep-16	SM4110:B	

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

Taiga Batch No.:  
**160928**

**- CERTIFICATE OF ANALYSIS -**

Client Sample ID: **GJO-3**

Taiga Sample ID: **001**

Nitrite as Nitrogen	0.02	0.01	mg/L	23-Sep-16	SM4110:B
Potassium	34.4	0.1	mg/L	29-Sep-16	SM4110:B
Sodium	133	0.1	mg/L	29-Sep-16	SM4110:B
Sulphate	6	1	mg/L	23-Sep-16	SM4110:B

**Microbiology**

Coliforms, Fecal	450000	10000	CFU/100mL	22-Sep-16	SM9222:D
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**Organics**

Oil and Grease, visible	Non-visible			26-Sep-16	Visual Exam
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**Subcontracted Organics**

Phenols, Total	1.210	0.020	mg/L	07-Oct-16	AB ENV.06537	224
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**Trace Metals, Total**

Aluminum	491	5	µg/L	29-Sep-16	EPA200.8
Arsenic	1.5	0.2	µg/L	29-Sep-16	EPA200.8
Cadmium	0.1	0.1	µg/L	29-Sep-16	EPA200.8
Chromium	1.5	0.1	µg/L	29-Sep-16	EPA200.8
Cobalt	0.7	0.1	µg/L	29-Sep-16	EPA200.8
Copper	100	0.2	µg/L	29-Sep-16	EPA200.8
Iron	786	5	µg/L	29-Sep-16	EPA200.8
Lead	1.9	0.1	µg/L	29-Sep-16	EPA200.8
Manganese	45.8	0.1	µg/L	29-Sep-16	EPA200.8
Mercury	0.07	0.01	µg/L	29-Sep-16	EPA200.8
Nickel	3.6	0.1	µg/L	29-Sep-16	EPA200.8
Zinc	183	5	µg/L	29-Sep-16	EPA200.8

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

Taiga Batch No.:  
**160928**

## - CERTIFICATE OF ANALYSIS -

Client Sample ID: **GJO-4**

Taiga Sample ID: **002**

**Client Project:**

**Sample Type:** Water

**Received Date:** 22-Sep-16

**Sampling Date:** 21-Sep-16

**Sampling Time:**

**Location:** Gjoa Haven, NU

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	24.0	0.005	mg/L	30-Sep-16	SM4500-NH3:G	
Biochemical Oxygen Demand	22	2	mg/L	23-Sep-16	SM5210:B	
Organic Carbon, Total	36.7	0.5	mg/L	27-Sep-16	SM5310:B	
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	344	0.4	mg/L	22-Sep-16	SM2320:B	
Conductivity, Specific (@25C)	1240	0.4	µS/cm	22-Sep-16	SM2510:B	
pH	7.36		pH units	22-Sep-16	SM4500-H:B	
Solids, Total Suspended	9	3	mg/L	27-Sep-16	SM2540:D	
<b><u>Major Ions</u></b>						
Calcium	42.5	0.1	mg/L	29-Sep-16	SM4110:B	
Chloride	162	0.7	mg/L	23-Sep-16	SM4110:B	
Hardness	243	0.7	mg/L	29-Sep-16	SM4110:B	
Magnesium	33.2	0.1	mg/L	29-Sep-16	SM4110:B	
Nitrate as Nitrogen	3.09	0.01	mg/L	23-Sep-16	SM4110:B	
Nitrite as Nitrogen	0.29	0.01	mg/L	23-Sep-16	SM4110:B	
Potassium	24.4	0.1	mg/L	29-Sep-16	SM4110:B	

**ReportDate:** Thursday, October 13, 2016

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

Taiga Batch No.:  
**160928**

**- CERTIFICATE OF ANALYSIS -**

Client Sample ID: **GJO-4**

Taiga Sample ID: **002**

Sodium	124	0.1	mg/L	29-Sep-16	SM4110:B
Sulphate	44	1	mg/L	23-Sep-16	SM4110:B

**Microbiology**

Coliforms, Fecal	4560	10	CFU/100mL	22-Sep-16	SM9222:D
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**Organics**

Oil and Grease, visible	Non-visible			26-Sep-16	Visual Exam
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**Subcontracted Organics**

Phenols, Total	0.0045	0.001	mg/L	07-Oct-16	AB ENV.06537
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**Trace Metals, Total**

Aluminum	36.5	5	µg/L	29-Sep-16	EPA200.8
Arsenic	11.1	0.2	µg/L	29-Sep-16	EPA200.8
Cadmium	< 0.1	0.1	µg/L	29-Sep-16	EPA200.8
Chromium	0.5	0.1	µg/L	29-Sep-16	EPA200.8
Cobalt	2.7	0.1	µg/L	29-Sep-16	EPA200.8
Copper	10.2	0.2	µg/L	29-Sep-16	EPA200.8
Iron	2170	5	µg/L	29-Sep-16	EPA200.8
Lead	1.3	0.1	µg/L	29-Sep-16	EPA200.8
Manganese	159	0.1	µg/L	29-Sep-16	EPA200.8
Mercury	0.03	0.01	µg/L	29-Sep-16	EPA200.8
Nickel	9.3	0.1	µg/L	29-Sep-16	EPA200.8
Zinc	8.0	5	µg/L	29-Sep-16	EPA200.8

ReportDate: Thursday, October 13, 2016

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

Taiga Batch No.:  
**160928**

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**- CERTIFICATE OF ANALYSIS -**

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Client Sample ID: **GJO-4**

Taiga Sample ID: **002**

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**- DATA QUALIFIERS -**

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*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

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# Appendix: C

## **Pages from Water Licence**

**Water Licence: 3BM-GJO 1318**

**Hamlet of Gjoa Haven, NU**



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NUNAVUT WATER BOARD  
NUNAVUT IMALIRIYIN KATIMAYINGI  
OFFICE DES EAUX DU NUNAVUT

File No.: **3BM-GJO1318/  
Amendment No. 1**

September 16, 2015

Sean Stuckey SAO  
Hamlet of Gjoa Haven  
P.O. Box 200  
Gjoa Haven, NU X0B 1J0  
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Shah Alam, Municipal Planning Engineer  
Government of Nunavut Community and  
Government Services, Bag 200  
Cambridge Bay, NU X0B 0C0  
[salam@gov.nu.ca](mailto:salam@gov.nu.ca)

**RE: 3BM-GJO1318 Type “B” – Amendment No. 1 - New Sewage Lagoon**

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Dear Mr. Stuckey and Mr. Alam:

Please find attached, Amendment No. 1 to Licence No. 3BM-GJO1318 Type “B” issued to the Hamlet of Gjoa Haven (Hamlet or Licensee) by the Nunavut Water Board (NWB) (**Motion 2015-B1-015**) pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*. The terms and conditions of the original Licence related to water use and waste disposal remain an integral part of this approval.

The NWB notes that the Nunavut Planning Commission (NPC) provided a documentation<sup>1</sup> stating that the project proposal is located outside the boundaries of the two approved Land Use Plans currently administered by NPC. The Nunavut Impact Review Board (NIRB) issued a decision<sup>2</sup> stating that the Application is exempt from Screening pursuant to s. 12.4.3 of Nunavut Land Claims Agreement (NLCA), and the activities therein remain subject to the terms and conditions recommended in the original November 22, 2013 Screening Decision.

The NWB strongly recommends that the **Licensee consult the comments received by interested persons on issues identified**. This information is attached for your consideration<sup>3</sup>.

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1 NPC Conformity Determination dated April 1, 2015.

2 NIRB Exempt from Screening Decision dated April 22, 2015.

3 Aboriginal Affairs and Northern Development Canada (AANDC), April 27, 2015 and May 8, 2015.

Sincerely,

Thomas Kabloona  
Nunavut Water Board  
Chair

TK/kk/pb

Enclosure: Licence No. **3BM-GJO1318 - Amendment No. 1**  
Comments – AANDC

Cc: Distribution – Kitikmeot

## LICENCE AMENDMENT No. 1

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<b>Licensee:</b>	<b>Hamlet of Gjoa Haven</b>
<b>Licence No:</b>	<b>3BM-GJO1318 Type “B”</b>
<b>Licence Issued:</b>	<b>November 13, 2013</b>
<b>Amendment No. 1 Effective Date</b>	<b>June 16, 2015</b>
<b>Licence Expiry:</b>	<b>November 12, 2018</b>

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Pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, with respect to an application for amendment dated January 27, 2015, made by Government of Nunavut, Community and Government Services (GN-CGS) on behalf of Hamlet of Gjoa Haven (the Hamlet or Licensee), the Board hereby grants the following Licence amendment.

The Licence issued November 13, 2013, with an expiry date of November 12, 2018, shall be amended to include the following terms and conditions, with respect to the use of water and deposit of waste during Municipal undertaking, to allow the Hamlet for the operation of a new sewage lagoon.

### **Procedural History**

On January 27, 2015, GN-CGS submitted to the Board an amendment (No. 1) application to allow for the operation of a new sewage lagoon.

The Amendment No. 1 application (Application) included the following documents as supplementary information:

- Water Licence Amendment Application;
- Sewage Lagoon – Record Drawings;
- OM Manual for New Sewage Lagoon including
  - Spill Contingency Plan - Sewage Disposal, dated May 31, 2014; and
- Executive Summaries – Sewage Lagoon Inclusion English and Inuktitut.

On March 27, 2015, the Board distributed the Application for a thirty (30) day comment period. On April 27, 2015, Aboriginal Affairs and Northern Development Canada (AANDC) advised the NWB that its submission will be delayed, and submitted, on May 8, 2015, its technical review comments.

In its technical review comment AANDC stated “It is noted that the new sewage lagoon was constructed and commissioned before the water licence was renewed in November 13, 2013. The construction and operation of this waste management facility to date does not comply with the Nunavut Waters and Nunavut Surface Rights Tribunal Act and the water licence. The

Hamlet of Gjoa Haven and the Government of Nunavut's Department of Community and Government Services must re-evaluate their planning processes and familiarize themselves with their water licence and legislative requirements".

#### Operation and Maintenance Manual for Sewage Lagoon

The Licensee submitted an updated Sewage Lagoon Operation and Maintenance Manual (O&M Manual) prepared by Dillon Consulting Limited. In its technical review comment AANDC stated that the O&M Manual does not reference a freeboard limit and any measures that will be taken to ensure that it won't be exceeded as required under Part D, Item 3 of Licence. AANDC recommended also to include existing wetland details (drawing(s) showing distance from water bodies, soil characteristics, permeability/hydraulic conductivity, gradient) as an annex to the Sewage Lagoon O&M Manual within 2015 Annual Report. An Addendum to the Spill Contingency was included within the Application. An amended Spill Contingency has been submitted during the Application review stage to address KIA's recommendations. The amended Spill Contingency Plan is found acceptable by the Board.

#### Sludge Management Planning

Although a conceptual sludge management plan is included within Sewage Lagoon O&M Manual, however a submission of detailed sludge management plan for Board approval shall be needed at least nine months prior to the planned removal of sludge from the Lagoon as recommended by the AANDC.



**LICENCE AMENDMENT No. 1**

**The Licence shall be amended to indicate the following:**

**PART A: SCOPE, DEFINITIONS AND ENFORCEMENT**

**2. Definitions**

**Amend**

**“Sewage Disposal Facilities”** comprises the area and engineered Lagoon and decant structures designed to contain and treat sewage as described in the Application for Water Licence Amendment filed by the Applicant on January 27, 2015, and illustrated in Drawings # 100 to # 105, Dillon Consulting Pr. No. 11-5029-1000.

**PART D: CONDITIONS APPLYING TO WASTE DISPOSAL**

**Insert**

**Item 10**

The Licensee shall submit to the Board for approval a stand-alone Sludge Management Plan at least nine (9) months prior to the planned removal of sludge from the lagoon.

**PART F: CONDITIONS APPLYING TO OPERATION AND MAINTENANCE**

**Insert**

**Item 4**

The Licensee shall submit within the 2015 Annual Report an updated Sewage Lagoon Operation and Maintenance Manual to address at a minimum comments received during the review of Application.

**All remaining terms and conditions of the Licence 3BM-GJO1318 Type ‘B’ dated November 13, 2013, still apply.**

This Licence Amendment No. 1 is issued and recorded at Gjoa Haven, NU on June 16, 2015.

Approved by,

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Thomas Kabloona  
Nunavut Water Board  
Chair

- b. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*; and
- c. For the purpose of enforcing this Licence and with respect to the use of water and deposit or discharge of waste by the Licensee, Inspectors appointed under the *Act*, hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

**PART B: GENERAL CONDITIONS**

1. The Licensee shall file an Annual Report on the Appurtenant Undertaking with the Board no later than March 31<sup>st</sup> of the year following the calendar year being reported, containing the following information:
  - a. tabular summaries of all data generated under the “Monitoring Program”;
  - b. summary of modifications to the “Monitoring Program” in accordance with Part H, Item 12;
  - c. the daily, monthly and annual quantities in cubic metres of freshwater obtained from all sources;
  - d. the daily, monthly and annual quantities in cubic metres of each and all waste discharged; including the hazardous and non-hazardous waste accepted at the Solid Waste Facilities;
  - e. 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;
  - f. a list of unauthorized discharges and summary of follow-up action taken;
  - g. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;
  - h. a summary of any studies, reports and plans (e.g., Operation and Maintenance, Abandonment and Restoration, QA/QC) requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned;
  - i. any other details on water use or waste disposal requested by the Board by November 1<sup>st</sup> of the year being reported.
2. The Licensee shall notify the NWB of any changes in operating plans or conditions associated with this project at least thirty (30) days prior to any such change.
3. The Licensee shall comply with the “Monitoring Program” described in this Licence, and any amendments to the “Monitoring Program” as may be made from time to time, pursuant to the conditions of this Licence.
4. The “Monitoring Program” and compliance dates specified in the Licence may be modified at the discretion of the Board.

5. The Licensee shall install flow meters or other such devices, or implement suitable methods required for the measuring of water volumes as required under Part H, Item 1.
6. The Licensee shall, post the necessary signs, where possible, to identify the stations of the “Monitoring Program”. All signage postings shall be in the Official Languages of Nunavut, and shall be located and maintained to the satisfaction of an Inspector.
7. The Licensee shall immediately report to the 24-Hour Spill Report Line at (867) 920-8130, any spills of Waste, which are reported to, or observed by the Licensee, within the municipal boundaries or in the areas of the Water Supply or Waste Disposal Facilities.
8. The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted, cannot be undertaken without subsequent written Board approval and/or direction. The Board may alter or modify a Plan if necessary to achieve the legislative objectives and will notify the Licensee in writing of acceptance, rejection or alteration of the Plan.
9. The Licensee shall, for all Plans submitted under this Licence, implement the Plan as approved by the Board in writing.
10. The Licensee shall review the Plans referred to in this Licence, as required by changes in operation and/or technology, and modify the Plan accordingly. Revisions to the Plans shall be submitted in the form of an Addendum to be included with the Annual Report.
11. Every Plan to be carried out pursuant to the terms and conditions of this Licence shall become a part of this Licence, and any additional terms and conditions imposed upon approval of a Plan by the Board become part of this Licence. All terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.
12. The Licensee shall ensure a copy of this Licence is maintained at the site of operations at all times. Any communication with respect to this Licence shall be made in writing to the attention of:

**(a) Manager of Licensing:**

Nunavut Water Board  
P.O. Box 119  
Gjoa Haven, NU X0B 1J0  
Telephone: (867) 360-6338  
Fax: (867) 360-6369  
Email: [licensing@nunavutwaterboard.org](mailto:licensing@nunavutwaterboard.org)

**(b) Inspector Contact:**

Manager of Field Operations, AANDC  
Nunavut District, Nunavut Region  
P.O. Box 100

Iqaluit, NU X0A 0H0  
Telephone: (867) 975-4295  
Fax: (867) 979-6445

13. The Licensee shall submit one paper copy and one electronic copy of all reports, studies, and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.
14. The Licensee shall ensure that any document(s) or correspondence submitted by the Licensee to the NWB is received and acknowledged by the Manager of Licensing.
15. This Licence is assignable as provided for in Section 44 of the *Act*.

**PART C: CONDITIONS APPLYING TO WATER USE**

1. The Licensee shall obtain all freshwater processed by the Water Supply Facilities and/or used for municipal purposes from Swan Lake or as otherwise approved by the Board in writing.
2. The annual quantity of water use for all purposes under this Licence shall not exceed sixty-two thousand (62,000) cubic metres per year or one hundred seventy (170) cubic metres per day.
3. Where the use of water is of a sufficient volume that the source Water body may be drawn down, the Licensee shall submit to the Board for approval in writing the following: the volume required a hydrological overview of the water body, details of impacts, and proposed mitigation measures.
4. The Licensee shall maintain the Water Supply Facilities to the satisfaction of the Inspector.
5. The Licensee shall equip all water intake hoses with a screen of appropriate mesh size to ensure that fish are not entrained and shall withdraw water at a rate such that fish do not become impinged on the screen.
6. The Licensee shall not remove any material from below the ordinary High Water Mark of any water body unless approved by the Board in writing.
7. The Licensee shall not cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.
8. Sediment and erosion control measures shall be implemented prior to and maintained as required during Hamlet operations, to prevent entry of sediment into water.

**PART D: CONDITIONS APPLYING TO WASTE DISPOSAL**

1. The Licensee shall direct all Sewage to the current Sewage Disposal Facilities or as otherwise approved by the Board.
2. All Effluent discharged from the Sewage Disposal Facilities at Monitoring Program Station GJO-4 shall meet the following effluent quality standards:

Parameter	Maximum Concentration of any Grab
Faecal Coliforms	$1 \times 10^4$ CFU/dl
BOD <sub>5</sub>	80 mg/L
Total Suspended Solids	100 mg/L
Oil and grease	No visible sheen
PH	Between 6 and 9

3. A Freeboard limit of at least 1.0 metre, or as recommended by a qualified geotechnical Engineer and as approved by the Board in writing, shall be maintained at all dams, dykes, or structures intended to contain, withhold, divert or retain water or wastes.
4. The Licensee shall provide at least ten (10) days notification to an Inspector, prior to initiating any decant of the Sewage Lagoon.
5. The Sewage Disposal Facility shall be maintained and operated, in such a manner as to prevent structural failure.
6. The Licensee shall dispose of and permanently contain all Solid Wastes at the Solid Waste Disposal Facility or as otherwise approved by the Board in writing.
7. The Licensee shall implement measures to prevent hazardous materials and/or leachate from the Solid Waste Disposal Facility from entering water.
8. Licensee shall submit, within 30 days after the discharge point is identified and at least 60 days prior to discharging Effluent, the following information for any new Final Discharge Points or changes made to existing Final Discharge Points during the term of the licence:
  - a. Plans, specifications and a general description of each Final Discharge Point together with its specific geo-referenced location;
  - b. A description of how the additional Final Discharge Point is designed and maintained.
9. The Licensee shall use material that is free of contaminants for construction, operation, and maintenance activities and that is obtained from approved sources and has been demonstrated not to be potentially acid generating and metal leaching.

**PART E:        CONDITIONS APPLYING TO MODIFICATION AND CONSTRUCTION**

1. The Licensee shall submit to the Board for approval, for construction drawings stamped and signed by a qualified engineer registered in Nunavut, sixty (60) days prior to the construction of any dams, dykes or structures intended to contain, withhold, divert or retain water or wastes.
2. The Licensee may, without written consent from the Board, carry out Modifications to the Water Supply Facilities and Waste Disposal Facilities provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:
  - a. the Licensee has notified the Board in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications;
  - b. such Modifications do not place the Licensee in contravention of the Licence or the *Act*;
  - c. such Modifications are consistent with the NIRB Screening Decision;
  - d. the Board has not, during the sixty (60) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and
  - e. the Board has not rejected the proposed Modifications.
3. The Modifications for which all of the conditions referred to in Part E, Item 2(a) through (d), have not been met, may only be carried out upon written approval from the Board.
4. The Licensee shall, within ninety (90) days of completion of Modification or Construction of facilities and/or infrastructure associated with the project, submit to the Board a Construction Summary Report along with stamped as-built plans and drawings, providing explanation to reflect any deviations from for construction drawings taking into account construction and field decisions and how they may affect the performance of engineered facilities.
5. All activities shall be conducted in such a way as to minimize impacts on surface drainage and the Licensee shall immediately undertake any corrective measures in the event of any impacts on surface drainage.
6. The Licensee shall implement and maintain erosion control measures during activities carried out under this Part, to prevent impacts to water resulting from the release of sediment and minimize erosion.
7. With respect to earthworks, the deposition of debris or sediment into or onto any water body is prohibited. These materials shall be disposed a distance of at least thirty-one (31) metres from the ordinary High Water Mark in such a fashion that they do not enter the water.

**PART F:        CONDITIONS APPLYING TO OPERATION AND MAINTENANCE**

1. The Board has approved the Plan entitled “Hamlet of Gjoa Haven Sewage Treatment Facility Operation and Maintenance (O&M) Plan” dated August 15, 2013 that was submitted as additional information with the Application.
2. The Board has approved the Plan entitled “Hamlet of Gjoa Haven, Nunavut Solid Waste Treatment Facility Operation and Maintenance (O&M) Plan” dated August 15, 2013 that was submitted as additional information with the Application.
3. If, during the period of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:
  - a. employ the appropriate Spill Contingency Plan as provided in the Operation and Maintenance Plan. Take whatever steps are immediately practicable to protect human life, health and the environment;
  - b. report the incident immediately via the 24-Hour Spill Reporting Line at (867) 920-8130 and to the AANDC Manager of Field Operations at (867) 975-4295; and
  - c. submit to the Inspector, a detailed report on each occurrence, not later than thirty (30) days after initially reporting the event, that provides the necessary information on the location (including the GPS coordinates), initial response action, remediation/clean-up, status of response (ongoing, complete), proposed disposal options for dealing with contaminated materials and any preventative measures to be implemented.

**PART G:        CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION**

1. The Licensee shall submit to the Board for approval, an Abandonment and Restoration Plan at least three (3) months prior to abandoning any facilities or the construction of new facilities to replace existing ones. Where applicable, the Plan shall include information on the following:
  - a. water intake facilities;
  - b. the water treatment and waste disposal sites and facilities;
  - c. abandoned water and waste facilities;
  - d. petroleum and chemical storage areas;
  - e. any site affected by waste spills;
  - f. leachate prevention;
  - g. an implementation schedule;
  - h. maps delineating all disturbed areas, and site facilities;
  - i. consideration of altered drainage patterns;
  - j. type and source of cover materials;
  - k. future area use;
  - l. hazardous wastes; and

- m. a proposal identifying measures by which restoration costs will be financed by the Licensee upon abandonment.
2. The Licensee shall complete all restoration work within the time schedule specified in the Plan, or as subsequently revised and approved by the Board.
3. The Licensee shall carry out progressive reclamation of any components of the project no longer required for the Licensee's operations.
4. In order to promote growth of vegetation and the needed microclimate for seed deposition, all disturbed surfaces shall be prepared by ripping, grading, or scarifying the surface to conform to the natural topography.
5. Areas that have been contaminated by hydrocarbons shall be reclaimed to meet objectives as outlined in the Government of Nunavut's Environmental Guideline for Site Remediation, January 2002. The use of reclaimed soils for the purpose of back fill or general site grading may be carried out only upon consultation and approval by the Government of Nunavut, Department of Environment and an Inspector.

**PART H: CONDITIONS APPLYING TO THE MONITORING PROGRAM**

1. The Board has approved the Plan entitled "Environmental Monitoring Program – Sample Collection Training Program" dated August 13, 2013 that was submitted as additional information with the Application.
2. The Licensee shall maintain Monitoring Program Stations at the following locations:

Monitoring Program Station Number	Description	Frequency	Status
GJO-1	Raw Water Supply at Swan Lake	Monthly	Active (Volume)
GJO-2	Effluent Final Discharge Point from Solid Waste Disposal Facility	Monthly (May to August)	Active (Quality)
GJO-3	Raw Sewage at truck offload point	Monthly	Active (Volume)
GJO-4	Effluent Final Discharge Point from Sewage Disposal Facility	Monthly (May to August)	Active (Quality)
GJO-5	Solid Waste leachate retention inside berm	Sample collected when decanting requires	Active (Quality)



3. The Licensee shall measure and record, in cubic metres, the daily, monthly and annual quantities of water extracted for all purposes at Monitoring Program Station GJO-1.

4. The Licensee shall sample monthly at Monitoring Station GJO-2 and GJO-4 during the months of May to August, inclusive. Sample shall be analyzed for the following parameters:

BOD	Faecal Coliforms
pH	Conductivity
Total Suspended Solids	Ammonia Nitrogen
Nitrate-Nitrite	Oil and Grease (visual)
Total Phenols	Sulphate
Sodium	Potassium
Magnesium	Calcium
Total Arsenic	Total Cadmium
Total Copper	Total Chromium
Total Iron	Total Lead
Total Mercury	Total Nickel
Total Zinc	

5. The Licensee shall measure and record in cubic metres the daily, monthly and annual quantities of raw sewage offloaded from trucks at Monitoring Station GJO-3 for all purposes.

6. The Licensee shall provide the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of all locations where sources of water are utilized for all purposes.

7. The Licensee shall sample before decanting at Monitoring Station GJO-5. Samples shall be analyzed for the parameters stated in Part H, Item 4.

8. Additional sampling and analysis may be requested by an Inspector.

9. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board in writing.

10. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

11. The Licensee shall annually review the QA/QC Plan and modify it as necessary. Revised QA/QC Plans shall be submitted to the Board with a current approval letter from an accredited lab and shall meet the standards set out in Part H, Item 9 and Part H, Item 10 of the Licence.

12. The Licensee shall include all of the data and information required by the Monitoring Program in the Licensee's Annual Report, as required per Part B, Item 1 or as otherwise requested by an Inspector.
13. Modifications to the Monitoring Program including the Monitoring Program Stations and parameters may be made only upon written approval of the Board.

# Appendix: D

## **E. coli and total coliform test results- 2016**

**Water Licence: 3BM-GJO 1318**

**Hamlet of Gjoa Haven, NU**

# Gjoa Haven



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Department of Health  
Munaghiliyikut  
Ministère de la Santé

## LABORATORY REPORT Cambridge Bay Water Laboratory Reporting Date: January 22, 2016

Reference Number 415-01-01

Source of water: Truck # 7661 - Hamlet of Gjoa Haven  
Date & Time collected: January 20, 2016; 1:40 PM  
Date & Time Received: January 21, 2016; 09:45 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email: [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca)



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Department of Health  
Munaghiliyikut  
Ministère de la Santé

## LABORATORY REPORT Cambridge Bay Water Laboratory Reporting Date: January 22, 2016

Reference Number 415-01-01

Source of water: Truck # 7448 - Hamlet of Gjoa Haven  
Date & Time collected: January 20, 2016; 1:45 PM  
Date & Time Received: January 21, 2016; 09:45 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
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Department of Health  
Munaghiliyikut  
Ministère de la Santé

## LABORATORY REPORT Cambridge Bay Water Laboratory Reporting Date: January 22, 2016

Reference Number 415-01-01

Source of water: Truck # 7446 - Hamlet of Gjoa Haven  
Date & Time collected: January 20, 2016; 1:30 PM  
Date & Time Received: January 21, 2016; 09:45 AM

Sample error - the sample was leaking upon arrival therefore, this sample was not tested.

REMARK:

Satisfactory

Wilfred Ntiamoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email: [wntiamoah@gov.nu.ca](mailto:wntiamoah@gov.nu.ca)

## LABORATORY REPORT

Cambridge Bay Water Laboratory  
Reporting Date: March 11, 2016

Reference Number 415-03-01

Source of water: Truck # 7664 - Hamlet of Gjoa Haven  
Date & Time collected: March 09, 2016; 1:50 PM  
Date & Time Received: March 10, 2016; 09:45 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

**Satisfactory**

Almost

Wilfred Ntiemoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
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## LABORATORY REPORT

Cambridge Bay Water Laboratory  
Reporting Date: March 11, 2016

Reference Number 415-03-01

Source of water: Truck # 7448 - Hamlet of Gjoa Haven  
Date & Time collected: March 09, 2016; 1:40 PM  
Date & Time Received: March 10, 2016; 09:45 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent: Coli-ert method)

1. TOTAL COLIFORM: absent
2. E. Coli: absent

REMARK:

Satisfactory

Almuth

Wilfred Ntiemoah, MPH, CPH(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiemoah@gov.nu.ca](mailto:wntiemoah@gov.nu.ca)

## LABORATORY REPORT

Cambridge Bay Water Laboratory  
Reporting Date: March 11, 2016

Reference Number 415-03-01

Source of water: Truck # 7660 - Hamlet of Gjoa Haven  
Date & Time collected: March 09, 2016; 1:45 PM  
Date & Time Received: March 10, 2016; 09:45 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent: Coli-ert method)

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory

Amartya

Wilfred Ntiemoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
Helen Maksagak Centre, P.O. Box 83  
Cambridge Bay, NUNAVUT, X0B 0C0  
Phone: (867) 983-4236  
Email : [wntiemoah@gov.nu.ca](mailto:wntiemoah@gov.nu.ca)

## LABORATORY REPORT

Cambridge Bay Water Laboratory  
Reporting Date: April 15, 2016

Reference Number 415-04-01

Source of water: Truck # 7660 - Hamlet of Gjoa Haven  
Date & Time collected: April 13, 2016; 1:58 PM  
Date & Time Received: April 14, 2016: 09:30 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent: Coli-ert method)

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

**Satisfactory**

Almström

Wilfred Ntiemoah, MPH, CPHI(C)  
Regional Environmental Health Officer  
Kitikmeot Region - Dept. of Health  
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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: April 15, 2016

Reference Number 415-04-01

Source of water: Truck # 7448 - Hamlet of Gjoa Haven  
Date & Time collected: April 13, 2016; 1:45 PM  
Date & Time Received: April 14, 2016; 09:30 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coliort method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory



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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: April 15, 2016

Reference Number 415-04-01

Source of water: Truck # 7664 - Hamlet of Gjoa Haven  
Date & Time collected: April 13, 2016; 1:50 PM  
Date & Time Received: April 14, 2016; 09:30 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coliort method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory



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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: June 01, 2016

Reference Number 415-06-01

Source of water: Truck # 7448 - Hamlet of Gjoa Haven  
Date & Time collected: May 30, 2016; 10:42 AM  
Date & Time Received: May 31, 2016; 09:40 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coliort method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory



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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: June 01, 2016

Reference Number 415-06-01

Source of water: Truck # 7660 - Hamlet of Gjoa Haven  
Date & Time collected: May 30, 2016; 10:45 AM  
Date & Time Received: May 31, 2016; 09:40 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coliort method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory



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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: June 01, 2016

Reference Number 415-06-01

Source of water: Truck # 7664 - Hamlet of Gjoa Haven  
Date & Time collected: May 30, 2016; 10:40 AM  
Date & Time Received: May 31, 2016; 09:40 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory



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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: June 01, 2016

Reference Number 415-06-01

Source of water: Health Centre - Hamlet of Gjoa Haven  
Date & Time collected: May 30, 2016; 10:20 AM  
Date & Time Received: May 31, 2016; 09:40 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory



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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: June 01, 2016

Reference Number 415-06-01

Source of water: Continuing Care Centre - Hamlet of Gjoa Haven  
Date & Time collected: May 30, 2016; 10:31 AM  
Date & Time Received: May 31, 2016; 09:40 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

REMARK:

Satisfactory



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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: June 10, 2016

Reference Number 415-06-02

Source of water: Lake Water # 1 - Hamlet of Gjoa Haven  
Date & Time collected: June 08, 2016; 10:00 AM  
Date & Time Received: June 09, 2016; 09:45 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **Present**
2. E. Coli: **absent**

REMARK:

Raw water collected from the lake - un-chlorinated water. This is considered as control sample - Not for human consumption.



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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: June 10, 2016

Reference Number 415-06-02

Source of water: Lake Water # 2 - Hamlet of Gjoa Haven  
Date & Time collected: June 08, 2016; 10:05 AM  
Date & Time Received: June 09, 2016; 09:45 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: Present
2. E. Coli: absent

## REMARK:

Raw water collected from the lake - un-chlorinated water. This is considered as control sample - Not for human consumption.

Account

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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: June 10, 2016

Reference Number 415-06-02

Source of water: Truck # 7448 - Hamlet of Gjoa Haven  
Date & Time collected: June 08, 2016; 10:35 AM  
Date & Time Received: June 09, 2016; 09:45 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

## REMARK:

Satisfactory

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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: June 10, 2016

Reference Number 415-06-02

Source of water: Truck # 7660 - Hamlet of Gjoa Haven  
Date & Time collected: June 08, 2016; 10:40 AM  
Date & Time Received: June 09, 2016; 09:45 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

## REMARK:

Satisfactory

Amst

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**LABORATORY REPORT**  
Cambridge Bay Water Laboratory  
Reporting Date: June 10, 2016

Reference Number 415-06-02

Source of water: Truck # 7664 - Hamlet of Gjoa Haven  
Date & Time collected: June 08, 2016; 10:30 AM  
Date & Time Received: June 09, 2016; 09:45 AM

TOTAL COLIFORM AND E. COLI TESTING (Present / Absent; Coli-ert method).

1. TOTAL COLIFORM: **absent**
2. E. Coli: **absent**

## REMARK:

Satisfactory

Amur

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