Annual Report -2019

Water Licence: 3BM-CAM 1520

Hamlet of Cambridge Bay, NU

Date: Feb 05, 2010

Submitted to: Nunavut Water Board

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Building *Nunavut* Together
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Bâtir le *Nunavut* ensemble

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Nunavut

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Department of Community and Government Services
Nunalingni Kavamatkunnilu Pivikhaqautikkut
Ministère des Services Communautaires et gouvernementaux

Cambridge Bay Water Licence: 3BM-CAM 1520 Annual Report 2019

February 5, 2020

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

Attention: Richard Dwyer, Manager of Licensing

RE: 3BM-CAM 1520 - Annual Report 2019, Hamlet of Cambridge Bay

Dear Richard,

The Hamlet of Cambridge Bay is pleased to submit to Nunavut Water Board the "**Annual Report 2019**" of water uses and sewage solid waste disposal as required and directed under the compliance of Water Licence 3BM-CAM-1520. Copies of required tests reports are included.

The Licensee has continued monitoring and sampling water, sewage effluent, solid waste run-off as identified in the Licence. Samples were tested at the CALA accredited Taiga Laboratory, most of those results shown excellent remediation of contamination parameters that are within allowable limits of BOD, TSS, E-coli toxicity and trace metals components as determined in the compliance requirements prior to discharge to water body. We summarized 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 the Water Licence for managing water supply, and sewage and solid waste disposal.

CGS is submitting this report on behalf of the Hamlet of Cambridge Bay (the Licensee).

Best Regards,

Shah Alam, P. Eng. E.P.
Municipal Planning Engineer,
Government of Nunavut
Community and Government Services
Kitikmeot Region, Cambridge Bay, Nu
Phone: 867-983-4156, fax: 867-983-4124
salam@gov.nu.ca<mailto:salam@gov.nu.ca>

Cc: Baba Pedersen, Resource Management/Water Resource Officer, CIRNAC

3BM CAM 1520

Annual Report-2019

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Attachments:

EXECUTIVE SUMMARY:

This Annual Report 2019 for the Hamlet of Cambridge Bay (the Licensee) to the Nunavut Water Board (NWB) has been prepared to meet requirements of the water licence 3BM-CAM1520, Part B through part H conditions of monitoring and operation of facilities. This report covers the period from 01 January to 31 December 2019.

Raw water intakes from the Water Lake, approved for potable water source for the community which is connected to few more lakes at the upstream comprises the watershed. Snow melted water is the main source of recharging the watershed. Water intakes through the twin intake lines (use one at a time) to the intake pump house from where this raw water is delivered to water treatment plant by HDPE buried line. The WTP feed the raw water into the treatment terrain from the storage water tank and prepare potable water through chlorination, filtration and UV lights. Treated water stores at the treated water tank and then truckfill from outside and deliver to community house tanks. Separate pump sets at the WTP for lateral supply to high pressure line and firefighting. Quantity of water uses about **84,300** m3 which is within allowable limit of **86,200 m3** intake from all sources. The new Arctic College campus, new Day care facility and Mining Training centre will add additional water volume but will not affect the allowable limit.

The sewage lagoon comprises a series of natural lakes and increased the capacity to 190,000 m3 after the improvement to serve until 2025. Raw sewage deposits into the sewage lagoon after collected from household sewage tanks using hamlet operated trucks and hauled to the designated dropping points of the lagoon about 0.8 km northeast from community. Raw sewage stayed inside the lagoon almost 9 months where received primary treatment naturally and decanted out during July-August by mechanical pump. About 47,400 m3 sewage water was decanted from the lagoon by a mechanical pump which emptied about 70% of the sewage water in the lagoon during this period. Sewage samples collected from monitoring stations and tested at Taiga Laboratory Yellowknife for parameters content compliance to decanting approval.

Municipal waste comprises house waste, metal waste, hazardous waste, batteries, waste oil, waste paints, used tires, animal carcass and electronic wastes. Regular waste dispose at the designated area or cell from truck upload and push down, pack and cover with sand-gravels. The solid waste and metal dump sites were re-developed in 2012 with increased capacity and compliance. Loose wastes, papers, boxes, and light woods are normally burn slowly inside trenches time to time when wind speed relatively low. Waste batteries and e-waste secure inside C-cans for shipping out. Waste oils are burn onsite using slow burning kits. Spills contaminated soil bags were moved to nearby soil remediation farm of private owner.

Part B: General Conditions:

- Annual water supply and wastewater disposal are recorded daily into the Tabular Form
- Quantities of water are measured from the truck-fill volume and waste deposition from truck-collected daily /weekly basis from house bins.
- Raw sewage hauled from household sewage tanks and dropped off at designated location of the lagoon. Raw sewage stayed inside until decanting to the outer cell by pump in July-Aug.
- No modification to sewage waste, wetland or solid waste facilities operation during 2019
- O&M manuals for sewage and solid waste facilities remained active since 2013. The O&M manual for new IPH is active since May 2015.
- O&M manual and as-built drawings for new WTP were submitted to the Board.
- Monitoring stations CAM-1, CAM-3 were re-established as directed by the inspector
- A flow meter available at the WTP and records the water volume coming through intake to treatment process; however, truck-fill measurement uses for quantity supply records.
- Annual Compliance plan remains effective as approved by the Board for facility operation.

Part C: Water Use:

- The Water Lake is the primary approved water source for Cambridge Bay. **84,300** m3 water was drawn this duration which is within annual limit of 86**,200** m3
- No erosion at the intake point or at proximity of pumphouse.
- Fuel tank is planned to install at the new location more than 31m water mark measured.
- Intake water feeds to treatment plant through a buried HDPE pipe line, chlorination and filtration before passing through UV system and post-chlorination before truckfill for supply from outside of the building by two truckfill facilities. Hamlet operated trucks supplied the water 7 days a week during regular hours and on call after hours to community water tanks.
- CHARS water receives from the last vault of buried loop line using own pump to house tank and distributes through pipes to houses. CHARS research lab requires further treatment of the water in-house for the biological and chemical processes.

Part D: Waste Disposal

- The sewage waste contains both grey and black water, urinal and toilet flush, laundry wash, bath and kitchen sinks water in the same tank. Sewage stays inside the house tank average 3-4 days before collecting by vacuum truck and discharging into the lagoon.
- Actual quantity of sewage water could not be measured daily but calculated by considering 90-95 % of water supply by truck which wasn't exceeded 65,000 m3 for 10 months during this period (Sep – June) before decanting starts in July. About 47,000 m3 sewage waste was decanted during the period July-August 2019 and created rooms for new candidate sewage.
- Sewage collection and disposal 7 days a week by selecting area or zone average 2-3 times a week throughout the year. Solid waste and metal dump picked up twice week and store on a designated cell inside the landfill facility, and later push them down in summer.

- Sewage and effluent samples take from monitoring station CAM-3, CAM-4, CAM-5 and Final Discharge Point CAM-6 for parameters of environmental compliance, results are attached.
- Freeboard reduces sewage water from inside towards out of the lagoon freely when needed which comprises snow melts and rains water before decanting in summer. The freeboard at sewage lagoon keeps the water level at least 1.5 m down from berm top level.
- Sewage decanted into the perforated filter structure from the lagoon by mechanical pump into the waiting cell from where effluent passes through gravel berm facilities towards the final discharge area. Test results of effluent sample from the Final Discharge Point CAM-6 has shown parameters value within allowable limits.

Non-hazardous domestic Solid Waste:

- Solid wastes dumps at the designated area within the landfill facility and then push down by grader and packer, covers with gravel-soils in summer and makes space for new layer. The waste facility is fenced all around to a height about 6 feet and monitor with watch shed and cameras. Waste quantity recorded in the Site Log book with estimation and anticipation of truck volume. Waste run-off sample from the sump at landfill send to Taiga Lab; otherwise dries up inside the facility. Sometime waste run-off requires pump out to sewage lagoon when snow melts or rains flooded the waste facility.
- Light materials, paper, paper boards and loose materials segregated and reduced by slow burning inside time to time during low wind flow opportunity and ashes are pushed down and cover with soil-gravels.
- Animal carcass and dead bodies are buried at the designated cell and covered with sands.
- Waste tires and rubber accessories were piled inside the designated cell outside the solid waste facility for shredding and repurposing.

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

- No modifications to sewage collection, transportation and disposal facilities.
- No modification to solid waste and metal dump facilities. Extensive cleanup of spills sheen of waste oil, paints and leachate from contaminated soils bags have been done from liner cell inside and berm and moved those soil bags to the land farm.
- Waste batteries, waste oil, waste paint and hazardous substances secured inside wooden boxes and moved to C-cans onsite.
- No A&R plan for any facility or component and therefore no changes to O&M manuals for sewage lagoon, solid waste, metal dump, and pump house.
- O&M manual for new WTP has submitted to the Board.
- No spills occurred during this period.
- No reclamation to facilities and no activities related to vegetation growth or seed deposition

Part H: Monitoring Program

- Annual monitoring of sewage and solid waste effluent has been carried during the late spring, summer and fall.

ANNUAL REPORT- 2018

YEAR BEING REPORTED: 2019

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence 3BM- CAM 1520 issued to the Hamlet of Cambridge Bay

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.

Month Reported	Quantity of Water Obtained from all sources (litres)	Quantity of Sewage Waste Discharged
January	6,472,525.31	Same
February	6,386,305.45	Same
March	7,040,042.49	Same
April	6,958,251.14	Same
May	7,095,196.57	Same
June	6,810,818.94	Same
July	6,772,398.16	Same
August	7,496,626.96	Same
September	7,065,695.62	Same
October	8,437,827.45	Same
November	6,865,583.00	Same
December	6,898,377.75	Same
ANNUAL TOTAL	**84,299,648.84**	Same

Note: Sewage waste discharge assumed not exceeding the water quantity and taken as maximum as 90%-95% of the water quantity

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

- Determined the location for new sub-line of lateral connection to NAC campus and new Daycare. Expected starts of completion of this small sub-line in Fall 2020.
- The double walled fuel tank has been moved to the location for installation determined 31m water mark and acquired the area to be graded and levelled but waiting for budget confirmation.
- High pressure water line connected to feed CHARS house tank and regulated volume.
- Back wash tank issue on outlet pipe section freezing sometimes in winter was protected by wooden engagement boxing and insulation.

The new water treatment plant in operation since March 2017. Minor maintenance including pipe and treated water storage tank clean up carried under warranty.

The sewage lagoon has been in operation since re-developed in 2012 for a life time to 2025. The lagoon comprises natural lakes where raw sewage deposits inside through two deposition location at the mid-south and south-west side depending on prevailed wind flow. Lagoon capacity is about 190,000 m3 which is more than maximum annual sewage and wastewater from the community. Raw sewage stays inside the lagoon almost 9 months frozen at the top layer. The inner layer stays warmer than the top layer and receives natural remediation until decant out on wetland during July-August. This is a continuous treatment process of sewage water inside the lagoon and on wetland after decanting. It doesn't require extensive maintenance except on time maintaining and monitoring mostly in summer and fall.

The wetland is incorporated with some other ponds (Pond 3- Pond 6) before final discharge onto Ocean channel (Station CAM-6). The wetland is incorporated with some filtering structure from the decanting point and gravel layered filtration though the culvert at mid-way to final discharge.

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

No reported unauthorized discharge of water or sewage effluent during the reported 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;

- Fire storage water tank at elementary school noticed a leaking point and was not possible to repair and reuse, therefore kept it temporarily abandoned. Domestic water tank is now considered the fire storage water when needed. The domestic water tank is connected to direct feed from water main supply line since the domestic water tank is smaller in size but continuous flow can cover the need.
- A plan to replacing the abandoned fire storage tank at elementary school with funding source.

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 sewage lagoon effluent decanted during July 22 through August 2019, and samples were tested for parameters compliances. Test results revealed parameters values for P^H, hardness, iron, manganese

and sulphate close near (or sometime exceeded) to the limiting values from the samples of solid waste run-off collection and wetland waiting cell, which indicate some assumption of not enough polishing treatment on these areas. A close monitoring and repeating samples recommended, and if continued a study to wetland and solid waste sump retention might be considered.

- A plan for fencing the metal dump peripheral together with the solid waste landfill to bring both facilities under one watch shed and single access to both facilities, thus reduce to operational cost and better control on facilities management.
- Fencing the remaining sides (north and west) and a separate gate would make the sewage lagoon more protect from animal access. A plan for fencing the lagoon with CGS projects under proposal.
- Solid waste site is filling up every year with the compacted volume and cover materials inlayer which might bring the facility concerns to capacity before the expected life of the facility. The Hamlet is considering installation of an aerobic incinerator onsite to burn most of the waste materials and only ashes to bury inside the graded trench.
- Metal dump is heaping close near to the berm and bury pits are covering the area bringing the capacity in concern. The hamlet is planning to bring crusher and grader on site to better manage the bulk metals

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

AANDC inspection July 02, 2019 has reminded some issues and requested to follow up:

- New location for fuel tank installation is enough clear (88 m) from the water mark. CIRNAC inspector has requested to ensure the fuel tank in this new location before coming for inspection.
- Sewage effluent samples must be taken enough ahead of the decanting plan and ensure the test results compliance to requirements in order to decanting plan. Lagoon odor is getting concern and may require additional effort to minimize the issue.
- Floating debris and appliances in the sewage lagoon concerns the effluent quality and capacity which requires clean up and move to appropriate location to dry naturally.
- Contaminated soils and spills materials in mega bags stored inside the liner cell at metal dump were removed by the owner to the private land farm.
- All waste oil pails were taken out from the liner cell and burned the waste oil using a slow burning unit through a pipe nozzle supply from a holding tank to burning end and sediment at bottom.
- Visible fuel sheen on water of the liner cell at metal dump has been cleaned up using cotton pad.
- Waste batteries on ground were picked up and placed in wooden boxes inside C-cans
- Waste electronics, plasma, glasses and wires stored inside wooden boxes and moved to C-cans.

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

- O&M manual of new WTP has been submitted including “as-built” drawings documents.
- O&M manuals for sewage lagoon and solid waste metal dump facility operations remains active since 2013-14 with no changes. Annual maintenance carried as needed as part of the facility operation.
- O&M manual for intake pumphouse is active since submitted and approved in May 2015.
- A supplement to the Spills Contingency plan has been included and submitted to NWB

x. ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

- Monitoring stations signage for CAM-1 (at water intake point), CAM-3 (sewage sampling point) and CAM-5 (waiting cell of decanting on wetland) were installed and replacement of missing one as directed by the inspector.
- The licensee is considering to setup a waste burn pit on site to reduce bulks to landfill including papers, paper boards, dry-wall components, beddings, cloths, door-window components and similar waste materials.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

- The new double walled fuel tank for the IPH is moved at the location to be installed but waiting for funding to cover installation cost. The licensee is not able to assure the CIRNEC inspector to complete it before next inspection season resumed as requested.
- Floating sludge and debris accumulating at Freeboard berm near the decanting area which needs to be cleaned every year. The licensee has realized that wind blow brings debris into this area as effluent water flows towards the freeboard when summer freshet, a floater structure in front of the freeboard could help better than a manual clean up when no equipment can pass into that area.
- Seasonal issues of odor smell from sewage lagoon during summer when decanting the water into waiting cell on wetland. This issue has no certain solution since a natural remediation process inside and outside the lagoon, but the licensee is looking some measures to bring the solution tolerable and acceptable.

Community: Cambridge Bay 2019

Test type	Parameters					April 4th 2019			
Limits		**Units**	**MAC**	**AO**	**OG**	**CAM-1 Raw Water Pumphouse**	**WTP-01 Raw Water Intake**	**WTP-02 Treated Storage Tank**	**Truckfill**
Physicals	Colour	TCU		≤ 15		7	8	8	8
	pH		7.0 - 10.5			7.42	7.29	7.38	7.55
	Turbidity	NTU	≤ 5			0.25	0.38	0.43	0.55
	TDS			≤ 500		384	398	442	400
	TSS					6	< 3	4	6
	Alkalinity					226	225	225	224
	Conductivity					756	759	781	782
Nutrients	Dissolve C	mg/L	45			8.5	8.5	8.6	8.5
	Total C	mg/L				8.7	8.7	8.8	9
	P, Total	mg/L							
Inorganic	Sulphide	mg/L		< 0.05					
Organics	Cyanide	mg/L	0.2			< 0.0050	< 0.0050	< 0.0050	< 0.0050
	THMs	mg/L	0.1				< 0.005	0.094	0.0890
	Phenol, Tot					< 0.0010	0.0011	< 0.0010	< 0.0010
	Bromo-CH4						< 0.005		
Major Ions	Nitrate N03	mg/L	10			0.57	0.52	0.01	0.06
	Hardness	mg/L				276	277.0	276.0	275
	Chloride	mg/L		≤ 250		94.6	95.4	102	102
	Fluoride	mg/L	1.5			0.1	0.2	0.2	0.2
	Sodium	mg/L		≤ 200		48.8	48.8	54.6	54.0
	Sulphate	mg/L		≤ 500		31	31	29	30
	Magnesium					36.4	36.7	36.5	36.4
	Calcium					50.6	50.6	50.3	50.1
Microbiology	Total Coli	CFU	none			< 1.0	< 1.0	< 1.0	< 1.0
	Fecal Coliforms								
	E. Coli	CFU	none			< 1.0	< 1.0	< 1.0	< 1.0
Metals(T)	Aluminium	mg/L			< 0.1	0.0006	0.0006	0.0006	0.128
	Arsenic	mg/L	0.01 ***ALARA***			0.0006	0.0006	0.0006	0.0006
	Barium	mg/L	1.0						
	Cadmium	mg/L	0.005			0.00004	0.00004	0.00004	0.00005
	Cobalt	mg/L							
	Copper	mg/L		< 1.0		0.0109	0.0097	0.0667	0.0668
	Iron	mg/L		≤ 0.3		0.036	0.034	0.047	0.094
	Lead	mg/L	0.010			0.0014	0.0005	0.0003	0.0012
	Manganese	mg/L	< 0.12	< 0.02		0.0174	0.0188	0.0161	0.0171
	Mercury	mg/L	0.001			0.00001	0.00001	0.00001	0.00001
	Selenium	mg/L	0.05			0.0003	0.0003	0.0003	0.0003
	Nickel	mg/L	1			0.0041	0.0003	0.0003	0.0006
	Zinc	mg/L		≤ 5.0		0.177	0.126	0.167	0.169

ALARA=As Low As Reasonable Possible
OG=Operational Guideline
AO=Aesthetic Objective
MAC=Maximum Allowable Concentration

Sewage Effluent Results: Cambridge Bay 2019

Test type	Parameters	Units	MAC Limits	July 19th 2019				August 9th 2019			September 10th 2019		
				Sewage Lagoon CAM-3	Solid Waste CAM-4	Wetland Cell CAM-5	Final Discharge CAM-6	Sewage Lagoon CAM-3	Wetland Cell CAM-5	Final Discharge CAM-6	Sewage Lagoon CAM-3	Wetland Cell CAM-5	Final Discharge CAM-6
Physicals	Alkalinity	mg/L		283	217	190	201	266	282	276	233	235	240
	Conductivity	µS/cm		904	2270	756	680	915	957	955	948	997	1040
	p^h	p^h	6.5-9		8.04	9.53	9.29	7.86	8.11	7.85	8.30	8.58	8.92
	TSS	mg/L	180	32	65	60	80	11	19	4	19	24	22
Nutrients	Ammonia as N_2	mg/L		21.60	1.13	0.888	0.038	10	8.99	6.77	3.49	2.91	1.19
	BOD_5	mg/L											
	CBOD	mg/L											
	Dissolved, C	mg/L											
	Total, C	mg/L											
Inorganics	COD												
	BOD	mg/L	120	31	50	53	75	19	18	17	18	21	27
	Organic Carbon	mg/L		42	82			39.5	39.2	36	50.0	49.4	51.9
Major Ions	Nitrate+Nitrite as N_2	mg/L		0.09	1.92	0.09	0.09	0.47	0.54	0.56	2.95	2.85	2.31
	Nitrate as N_2	mg/L	45	0.09	1.92	0.09		0.19	0.26	0.35	2.55	2.44	1.84
	Nitrite as N_2	mg/L	3	< 0.01	< 0.01	< 0.1		0.28	0.28	0.21	0.40	0.41	0.47
	Calcium	mg/L	32	35	252	34.3	46.7				44.3	46.4	48.3
	Chloride	mg/L	100	108	196	122	84.4	122	126	126	140	146	164
	Hardness	mg/L	500	192	892	206	228	223	250	258	244	256	277
	Magnesium	mg/L		25.4	63.5	29.3	27.1				32.4	34.0	38.0
	Potassium	mg/L		17.3	57.2	13.7	11.0				19.8	19.9	20.1
	Sodium	mg/L	200	70.7	135.0	69.7	50.7				87.3	90.8	100
	Sulphate	mg/L	500	15	726	29	42	18	22	25	30	30	40
Microbiolo	Fecal Coliform	CFU/100mL	1x10^6	3650.00	10.00	< 1	< 1	5300	2300	2100	2800	2200	162
Organics	Oil & Grease, Visible	Visibility		Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
	Total Phenols			0.0012	0.0057	0.0013	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0030	0.0015	< 0.0010
Metals(T)	Aluminium	µg/L		21.3	158.0	62.1	38.3	30.5	20.1	21.9	34.9	36.3	35.2
	Arsenic	µg/L	25	1.3	3.9	2.4	2.9	1.6	1.7	1.9	1.7	1.9	2.2
	Cadmium	µg/L	5	< 0.1	0.20	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Chromium	µg/L	50	0.2	2.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2
	Cobalt	µg/L	50	0.4	5.9	0.3	0.6	0.4	0.4	0.5	0.4	0.4	0.4
	Copper	µg/L	200	27.9	41.9	4.2	4.2	10.4	9.6	6.8	11.2	10.8	8.5
	Iron	µg/L	500	368	14100	285	792	469	530	611	985	1030	992
	Lead	µg/L	10	0.20	5.00	1.30	2.20	0.1	0.2	0.3	0.3	0.4	0.5
	Manganese	µg/L	50	84.7	306	37.3	94.1	98.1	89.8	96.5	82.6	80.7	74.8
	Mercury	µg/L		< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Nickel	µg/L	200	1.8	21.9	2.3	2.6	1.9	2.0	2.1	2.3	2.4	2.5
	Zinc	µg/L	500	17	104	33.2	48.8	8.7	9.7	9.3	12.6	13.2	12.1

WATER LICENCE INSPECTION FORM

☒ **Original**
☐ **Follow-Up Report**

Licensee	**Licensee Representative**
Hamlet of Cambridge Bay	Marla Limousin
Licence No. / Expiry	**Representative's Title**
3BM-CAM1520	Senior Administrative Officer
Land / Other Authorizations	**Land / Other Authorizations**
Date of Inspection	**Inspector**
2019 July 2	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	C	7
Flow Measure. Device	A		Culverts / Bridges			Spills		
Source:			Drainage			Spill Plan		
Water Use:			Erosion / Sediment					
Recirculation (y /n)	A	3	Mitigation Measures	U	1	**Administrative**		
			Reclamation Activities			Records	A	9
			Materials Storage			Reports		
Waste Disposal			Signage	A	2 & 5	Plans		
Waste Water	C	4				Notifications		
Solid Waste			**Monitoring**			**Other**		
Hazardous Waste	A	8	Sample Collection / Analysis					
Lagoon Decanting	C	6						

**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 July 2, 2019 I Inspected the Hamlet of Cambridge Bay's Municipal Water License 3BM-CAM1520. I was accompanied by Wayne Weese from the Hamlet of Cambridge Bay, Shah Alam from GN-CGS and Candice Pedersen from CIRNAC.

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

We saw 1. The new Fuel Tank waiting to be installed at the Raw Water Intake Pump House (photos 1 & 2), 2. The new Signage for the CAM-1 Sample location (photo 3), 3. The Back Wash System at the Water Treatment Plant (photo 4), 4. The Sewage Lagoon (photos 5 & 6), 5. The relocation and new Signage for Sample Station CAM-3 (photo 7), 6. The Freeboard of less than 1 meter in the Sewage Lagoon Primary Cell (photo 8), 7. The 2 Berm Areas within the Metal Dump (photos 9 & 10), 8. The used Battery Storage in the Metal Dump (photo 11), and 9. The total Water Consumption YTD amounts (photo 12).

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

Actions required are 1. The new Fuel Tank at the Raw Water Intake Pump House is 88 meters from the High Water Mark, which is good. It ***MUST*** be installed this season before the snow falls, and the old tank removed, or the Inspector will have no choice but to pursue further enforcement action. 2. Thank you for installing the new CAM-1 Signage as per my directions last year. 3. Thank you to the Plant Operator, Mr. Brian Wilson, for showing and explaining to me how the Back Wash System works and that all water used in this weekly process is accounted for in the total consumption records. 4. The various large metal debris showing within the Sewage Lagoon ***MUST*** be removed after the Decant Process is complete. 5. Thank you for relocating and installing new Signage at Sample Station CAM-3 as per my directions last year. 6. The Sewage Lagoon must be Sampled, then upon favorable results, Decanted, in order to bring down the levels to manageable amounts. 7. The melt water within the 2 Berm Areas in the Metal Dump shall be removed and dumped into the Sewage Lagoon, and the Mega Bags of Contaminated Soils are to be placed in the existing Land Farms to be properly remediated. 8. Thank you for starting the process of Crating used Batteries and storing them within a Sea Can to await shipment to the South for proper disposal. 9. The YTD Total Water Usage is 39,161,052 Litres which is well within the allowed limits.

Licensee or Representative	**Inspector's Name**
	Baba Pedersen
Signature	**Signature**
	Signed Original on File
Date	**Date**
	2019 July 2

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
2019 July 2	Sony DSC-HX50V	Baba Pedersen	3BM-CAM1520

Photo Log # DSC04814

Photo 1

Description: New Fuel Tank to be hooked up to Raw Water Intake Pump House will now be at an acceptable 88 meters from the water

Photo Log # DSC04816

Photo 2

Description: New Fuel Tank to be hooked up to Raw Water Intake Pump House will now be at an acceptable 88 meters from the water

Photo Log # DSC04818

Photo 3

Description: New Signage installed to show location of Sample Station CAM-1

Photo Log # DSC04822

Photo 4

Description: The Back Wash Tank attached to the Water Plant

Photo Log # DSC04823

Photo 5

Description: The Sewage Lagoon showing large metal debris that requires removal

Photo Log # DSC04824

Photo 6

Description: The Sewage Lagoon showing large metal debris that requires removal

Photo Log # DSC04829

Photo 7

Description: The new Signage showing the relocated Sample Station CAM-3

Photo Log # DSC04832

Photo 8

Description: The Sewage Lagoon Berm Run-off area showing less than 1 meter Free Board

Photo Log # DSC04835

Photo 9

Description: Berm #1 within the Metal Dump showing Melt Water and Mega Bags requiring removal/relocation

Photo Log # DSC04848

Photo 10

Description: Berm #2 within the Metal Dump showing Melt Water and Mega Bags requiring removal/relocation

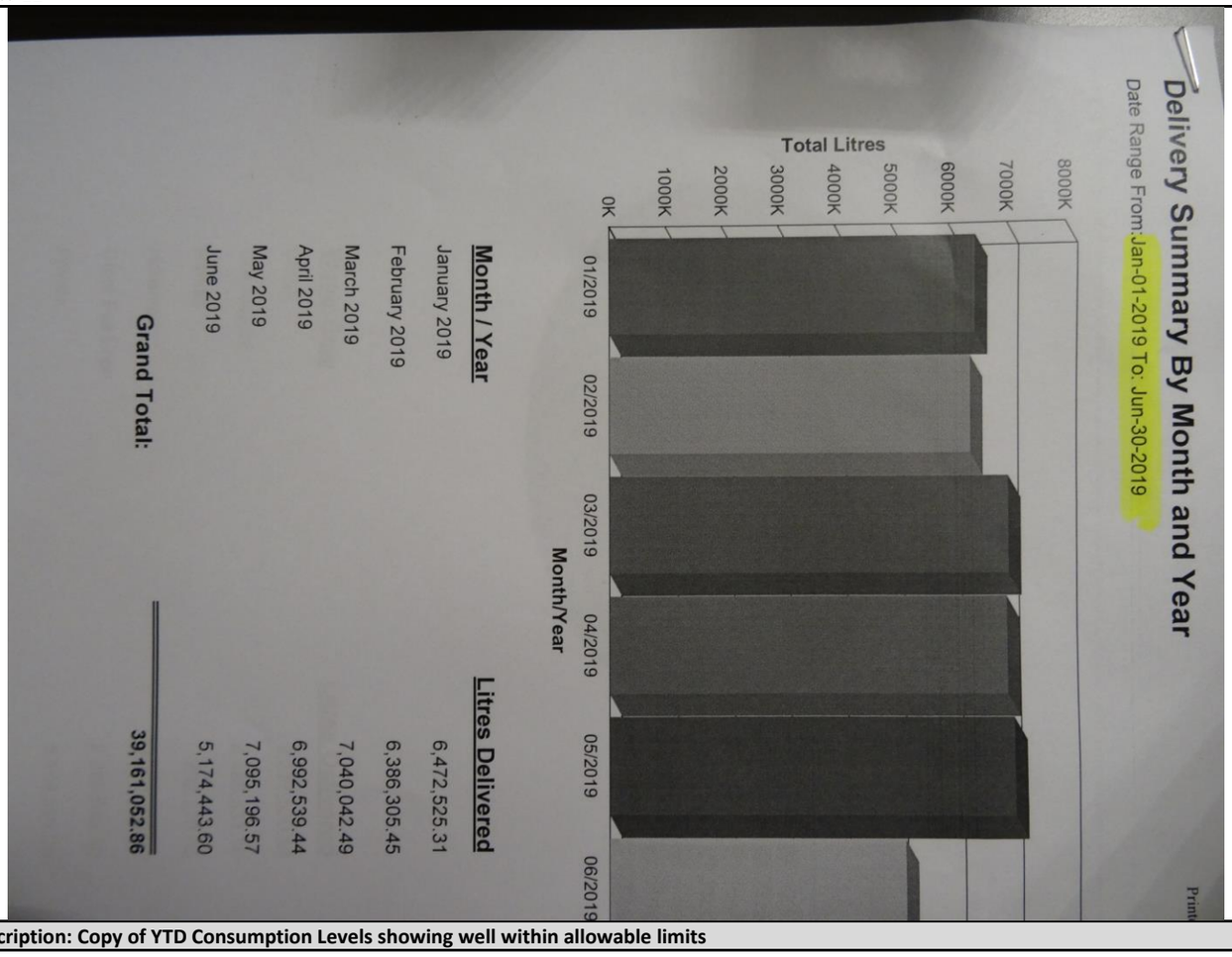
Photo Log # DSC04853

Photo 11

Description: Used Batteries in process of being crated and stored for future shipment to the South for proper disposal

Photo Log # DSC04855

Photo 12



Description: Copy of YTD Consumption Levels showing well within allowable limits

Appendix: A

Water Test Results 2019

Water Licence: 3BM-CAM 1520

Hamlet of Cambridge Bay, NU

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

Taiga Batch No.: 190172

- FINAL REPORT -

Prepared For: Hamlet of Cambridge Bay

Address: P.O. Box 16
Cambridge Bay,NU
X0B 0C0

Attn: **Wayne Weese** **Facsimile: (867) 983-2186**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

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

ReportDate: Friday, April 19, 2019
Print Date: ***Friday, April 19, 2019***

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

Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-1 (PH) **Taiga Sample ID:** 001

Client Project: Cambridge Bay Water
Sample Type: Raw (Freshwater water)
Received Date: 04-Apr-19
Sampling Date: 03-Apr-19
Sampling Time:
Location: PH, WTP and Truckfill
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	8.5	0.5	mg/L	19-Apr-19	SM5310:B	
Organic Carbon, Total	8.7	0.5	mg/L	19-Apr-19	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	226	0.4	mg/L	04-Apr-19	SM2320:B	
Colour, Apparent	7	5	CU	04-Apr-19	SM2120:B	
Conductivity, Specific (@25C)	756	0.4	µS/cm	04-Apr-19	SM2510:B	
pH	7.42		pH units	04-Apr-19	SM4500-H:B	
Solids, Total Dissolved	384	10	mg/L	04-Apr-19	SM2540:C	
Solids, Total Suspended	6	3	mg/L	04-Apr-19	SM2540:D	
Turbidity	0.25	0.05	NTU	04-Apr-19	SM2130:B	
Major Ions						
Calcium	50.6	0.1	mg/L	04-Apr-19	SM4110:B	
Chloride	94.6	0.7	mg/L	04-Apr-19	SM4110:B	
Fluoride	0.1	0.1	mg/L	04-Apr-19	SM4110:B	

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

Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-1 (PH) **Taiga Sample ID:** 001

Hardness	276	0.7	mg/L	04-Apr-19	SM4110:B
Magnesium	36.4	0.1	mg/L	04-Apr-19	SM4110:B
Nitrate as Nitrogen	0.57	0.01	mg/L	04-Apr-19	SM4110:B
Potassium	3.6	0.1	mg/L	04-Apr-19	SM4110:B
Sodium	48.8	0.1	mg/L	04-Apr-19	SM4110:B
Sulphate	31	1	mg/L	04-Apr-19	SM4110:B
Microbiology					
Coliforms, Total	< 1.0	1.0	MPN/100ml	04-Apr-19	SM9223:B
Escherichia coli	< 1.0	1.0	MPN/100ml	04-Apr-19	SM9223:B
Subcontracted Inorganics					
Sulphide	< 0.0180	0.018	mg/L	14-Apr-19	APHA4500-S2
Subcontracted Organics					
Cyanide, Total	< 0.0050	0.005	mg/L	12-Apr-19	APHA4500-CN
Phenols, Total	< 0.0010	0.001	mg/L	16-Apr-19	AB ENV.06537
Trace Metals, Total					
Aluminum	< 0.6	0.6	µg/L	04-Apr-19	EPA200.8
Arsenic	0.6	0.2	µg/L	04-Apr-19	EPA200.8
Beryllium	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Cadmium	< 0.04	0.04	µg/L	04-Apr-19	EPA200.8
Cesium	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Cobalt	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Copper	10.9	0.2	µg/L	04-Apr-19	EPA200.8
Iron	36	5	ug/L	04-Apr-19	EPA200.8
Lead	1.4	0.1	µg/L	04-Apr-19	EPA200.8
Manganese	17.4	0.1	µg/L	04-Apr-19	EPA200.8

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Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-1 (PH) **Taiga Sample ID:** 001

Mercury	< 0.01	0.01	µg/L	04-Apr-19	EPA200.8
Nickel	4.1	0.1	µg/L	04-Apr-19	EPA200.8
Selenium	< 0.3	0.3	µg/L	04-Apr-19	EPA200.8
Silver	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Zinc	177	0.4	µg/L	04-Apr-19	EPA200.8

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Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: WTP-01 **Taiga Sample ID:** 002

Client Project: Cambridge Bay Water
Sample Type: Treated (Potable water)
Received Date: 04-Apr-19
Sampling Date: 03-Apr-19
Sampling Time:
Location: PH, WTP and Truckfill
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	8.5	0.5	mg/L	19-Apr-19	SM5310:B	
Organic Carbon, Total	8.7	0.5	mg/L	19-Apr-19	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	225	0.4	mg/L	04-Apr-19	SM2320:B	
Colour, Apparent	8	5	CU	04-Apr-19	SM2120:B	
Conductivity, Specific (@25C)	759	0.4	µS/cm	04-Apr-19	SM2510:B	
pH	7.29		pH units	04-Apr-19	SM4500-H:B	
Solids, Total Dissolved	398	10	mg/L	04-Apr-19	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	04-Apr-19	SM2540:D	
Turbidity	0.38	0.05	NTU	04-Apr-19	SM2130:B	
Major Ions						
Calcium	50.6	0.1	mg/L	04-Apr-19	SM4110:B	
Chloride	95.4	0.7	mg/L	04-Apr-19	SM4110:B	
Fluoride	0.2	0.1	mg/L	04-Apr-19	SM4110:B	
Hardness	277	0.7	mg/L	04-Apr-19	SM4110:B	
Magnesium	36.7	0.1	mg/L	04-Apr-19	SM4110:B	

ReportDate: Friday, April 19, 2019
Print Date: ***Friday, April 19, 2019***

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Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: WTP-01 **Taiga Sample ID:** 002

Nitrate as Nitrogen	0.52	0.01	mg/L	04-Apr-19	SM4110:B
Potassium	3.6	0.1	mg/L	04-Apr-19	SM4110:B
Sodium	48.8	0.1	mg/L	04-Apr-19	SM4110:B
Sulphate	31	1	mg/L	04-Apr-19	SM4110:B
Microbiology					
Coliforms, Total	< 1.0	1.0	MPN/100ml	04-Apr-19	SM9223:B
Escherichia coli	< 1.0	1.0	MPN/100ml	04-Apr-19	SM9223:B
Organics					
Bromodichloromethane	< 0.005	0.005	mg/L	11-Apr-19	EPA8260B
Bromoform	< 0.005	0.005	mg/L	11-Apr-19	EPA8260B
Chloroform	< 0.005	0.005	mg/L	11-Apr-19	EPA8260B
Dibromochloromethane	< 0.005	0.005	mg/L	11-Apr-19	EPA8260B
Trihalomethanes, Total	< 0.005	0.005	mg/L	11-Apr-19	EPA8260B
Subcontracted Inorganics					
Sulphide	< 0.0180	0.018	mg/L	14-Apr-19	APHA4500-S2
Subcontracted Organics					
Cyanide, Total	< 0.0050	0.005	mg/L	12-Apr-19	APHA4500-CN
Phenols, Total	0.0011	0.001	mg/L	16-Apr-19	AB ENV.06537
Trace Metals, Total					
Aluminum	< 0.6	0.6	µg/L	04-Apr-19	EPA200.8
Arsenic	0.6	0.2	µg/L	04-Apr-19	EPA200.8
Beryllium	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Cadmium	< 0.04	0.04	µg/L	04-Apr-19	EPA200.8
Cesium	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Cobalt	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8

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Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: WTP-01 **Taiga Sample ID:** 002

Copper	9.7	0.2	µg/L	04-Apr-19	EPA200.8
Iron	34	5	ug/L	04-Apr-19	EPA200.8
Lead	0.5	0.1	µg/L	04-Apr-19	EPA200.8
Manganese	18.8	0.1	µg/L	04-Apr-19	EPA200.8
Mercury	< 0.01	0.01	µg/L	04-Apr-19	EPA200.8
Nickel	0.3	0.1	µg/L	04-Apr-19	EPA200.8
Selenium	< 0.3	0.3	µg/L	04-Apr-19	EPA200.8
Silver	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Zinc	126	0.4	µg/L	04-Apr-19	EPA200.8

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Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: WTP-02 **Taiga Sample ID:** 003

Client Project: Cambridge Bay Water
Sample Type: Treated (Potable water)
Received Date: 04-Apr-19
Sampling Date: 03-Apr-19
Sampling Time:
Location: PH, WTP and Truckfill
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	8.6	0.5	mg/L	19-Apr-19	SM5310:B	
Organic Carbon, Total	8.8	0.5	mg/L	19-Apr-19	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	225	0.4	mg/L	04-Apr-19	SM2320:B	
Colour, Apparent	8	5	CU	04-Apr-19	SM2120:B	
Conductivity, Specific (@25C)	781	0.4	µS/cm	04-Apr-19	SM2510:B	
pH	7.38		pH units	04-Apr-19	SM4500-H:B	
Solids, Total Dissolved	442	10	mg/L	04-Apr-19	SM2540:C	
Solids, Total Suspended	4	3	mg/L	04-Apr-19	SM2540:D	
Turbidity	0.43	0.05	NTU	04-Apr-19	SM2130:B	
Major Ions						
Calcium	50.3	0.1	mg/L	04-Apr-19	SM4110:B	
Chloride	102	0.7	mg/L	04-Apr-19	SM4110:B	
Fluoride	0.2	0.1	mg/L	04-Apr-19	SM4110:B	
Hardness	276	0.7	mg/L	04-Apr-19	SM4110:B	
Magnesium	36.5	0.1	mg/L	04-Apr-19	SM4110:B	

ReportDate: Friday, April 19, 2019
Print Date: ***Friday, April 19, 2019***

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

Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: WTP-02 **Taiga Sample ID:** 003

Nitrate as Nitrogen	0.01	0.01	mg/L	04-Apr-19	SM4110:B
Potassium	3.7	0.1	mg/L	04-Apr-19	SM4110:B
Sodium	54.6	0.1	mg/L	04-Apr-19	SM4110:B
Sulphate	29	1	mg/L	04-Apr-19	SM4110:B
Microbiology					
Coliforms, Total	< 1.0	1.0	MPN/100ml	04-Apr-19	SM9223:B
Escherichia coli	< 1.0	1.0	MPN/100ml	04-Apr-19	SM9223:B
Organics					
Bromodichloromethane	0.034	0.005	mg/L	11-Apr-19	EPA8260B
Bromoform	< 0.005	0.005	mg/L	11-Apr-19	EPA8260B
Chloroform	0.034	0.005	mg/L	11-Apr-19	EPA8260B
Dibromochloromethane	0.023	0.005	mg/L	11-Apr-19	EPA8260B
Trihalomethanes, Total	0.094	0.005	mg/L	11-Apr-19	EPA8260B
Subcontracted Inorganics					
Sulphide	< 0.0180	0.018	mg/L	14-Apr-19	APHA4500-S2
Subcontracted Organics					
Cyanide, Total	< 0.0050	0.005	mg/L	12-Apr-19	APHA4500-CN
Phenols, Total	< 0.0010	0.001	mg/L	16-Apr-19	AB ENV.06537
Trace Metals, Total					
Aluminum	< 0.6	0.6	µg/L	04-Apr-19	EPA200.8
Arsenic	0.6	0.2	µg/L	04-Apr-19	EPA200.8
Beryllium	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Cadmium	< 0.04	0.04	µg/L	04-Apr-19	EPA200.8
Cesium	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Cobalt	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8

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Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: WTP-02 **Taiga Sample ID:** 003

Copper	66.7	0.2	µg/L	04-Apr-19	EPA200.8
Iron	47	5	ug/L	04-Apr-19	EPA200.8
Lead	0.3	0.1	µg/L	04-Apr-19	EPA200.8
Manganese	16.1	0.1	µg/L	04-Apr-19	EPA200.8
Mercury	0.01	0.01	µg/L	04-Apr-19	EPA200.8
Nickel	0.3	0.1	µg/L	04-Apr-19	EPA200.8
Selenium	< 0.3	0.3	µg/L	04-Apr-19	EPA200.8
Silver	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Zinc	167	0.4	µg/L	04-Apr-19	EPA200.8

ReportDate: Friday, April 19, 2019
Print Date: *Friday, April 19, 2019*

Taiga Environmental Laboratory
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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill **Taiga Sample ID:** 004

Client Project: Cambridge Bay Water
Sample Type: Treated Water
Received Date: 04-Apr-19
Sampling Date: 03-Apr-19
Sampling Time:
Location: PH, WTP and Truckfill
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	8.5	0.5	mg/L	19-Apr-19	SM5310:B	
Organic Carbon, Total	9.0	0.5	mg/L	19-Apr-19	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	224	0.4	mg/L	04-Apr-19	SM2320:B	
Colour, Apparent	8	5	CU	04-Apr-19	SM2120:B	
Conductivity, Specific (@25C)	782	0.4	µS/cm	04-Apr-19	SM2510:B	
pH	7.55		pH units	04-Apr-19	SM4500-H:B	
Solids, Total Dissolved	400	10	mg/L	04-Apr-19	SM2540:C	
Solids, Total Suspended	6	3	mg/L	04-Apr-19	SM2540:D	
Turbidity	0.55	0.05	NTU	04-Apr-19	SM2130:B	
Major Ions						
Calcium	50.1	0.1	mg/L	04-Apr-19	SM4110:B	
Chloride	102	0.7	mg/L	04-Apr-19	SM4110:B	
Fluoride	0.2	0.1	mg/L	04-Apr-19	SM4110:B	
Hardness	275	0.7	mg/L	04-Apr-19	SM4110:B	
Magnesium	36.4	0.1	mg/L	04-Apr-19	SM4110:B	

ReportDate: Friday, April 19, 2019
Print Date: ***Friday, April 19, 2019***

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

Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill **Taiga Sample ID:** 004

Nitrate as Nitrogen	0.06	0.01	mg/L	04-Apr-19	SM4110:B	
Potassium	3.5	0.1	mg/L	04-Apr-19	SM4110:B	
Sodium	54.0	0.1	mg/L	04-Apr-19	SM4110:B	
Sulphate	30	1	mg/L	04-Apr-19	SM4110:B	
Microbiology						
Coliforms, Total	< 1.0	1.0	MPN/100ml	04-Apr-19	SM9223:B	
Escherichia coli	< 1.0	1.0	MPN/100ml	04-Apr-19	SM9223:B	
Organics						
Bromodichloromethane	0.033	0.005	mg/L	11-Apr-19	EPA8260B	110
Bromoform	< 0.005	0.005	mg/L	11-Apr-19	EPA8260B	110
Chloroform	0.032	0.005	mg/L	11-Apr-19	EPA8260B	110
Dibromochloromethane	0.022	0.005	mg/L	11-Apr-19	EPA8260B	110
Trihalomethanes, Total	0.089	0.005	mg/L	11-Apr-19	EPA8260B	110
Subcontracted Inorganics						
Sulphide	< 0.0180	0.018	mg/L	14-Apr-19	APHA4500-S2	
Subcontracted Organics						
Cyanide, Total	< 0.0050	0.005	mg/L	12-Apr-19	APHA4500-CN	
Phenols, Total	< 0.0010	0.001	mg/L	16-Apr-19	AB ENV.06537	
Trace Metals, Total						
Aluminum	128	0.6	µg/L	04-Apr-19	EPA200.8	
Arsenic	0.6	0.2	µg/L	04-Apr-19	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8	
Cadmium	0.05	0.04	µg/L	04-Apr-19	EPA200.8	
Cesium	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8	
Cobalt	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8	

ReportDate: Friday, April 19, 2019
Print Date: *Friday, April 19, 2019*

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

Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill **Taiga Sample ID:** 004

Copper	66.8	0.2	µg/L	04-Apr-19	EPA200.8
Iron	94	5	ug/L	04-Apr-19	EPA200.8
Lead	1.2	0.1	µg/L	04-Apr-19	EPA200.8
Manganese	17.1	0.1	µg/L	04-Apr-19	EPA200.8
Mercury	< 0.01	0.01	µg/L	04-Apr-19	EPA200.8
Nickel	0.6	0.1	µg/L	04-Apr-19	EPA200.8
Selenium	< 0.3	0.3	µg/L	04-Apr-19	EPA200.8
Silver	< 0.1	0.1	µg/L	04-Apr-19	EPA200.8
Zinc	169	0.4	µg/L	04-Apr-19	EPA200.8

ReportDate: Friday, April 19, 2019
Print Date: *Friday, April 19, 2019*

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

Taiga Batch No.: 190172

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill **Taiga Sample ID:** 004

- DATA QUALIFERS -

Data Qualifier Descriptions:

110 *Reported result uncertain, due to air in vial.*

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

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: Friday, April 19, 2019

Print Date: ***Friday, April 19, 2019***

Appendix: B

Waste water Test Results 2019

Water Licence: 3BM-CAM 1520

Hamlet of Cambridge Bay, NU

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

Taiga Batch No.:
190447

- FINAL REPORT -

Prepared For: Hamlet of Cambridge Bay

Address: P.O. Box 16
Cambridge Bay,NU
X0B 0C0

Attn: **Wayne Weese** **Facsimile: (867) 983-2186**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

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

ReportDate: Friday, July 19, 2019
Print Date: ***Friday, July 19, 2019***

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

Taiga Batch No.: 190447

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-3 **Taiga Sample ID:** 001

Client Project: Sewage Lagoon Sampling
Sample Type: Sewage Lagoon
Received Date: 04-Jul-19
Sampling Date: 03-Jul-19
Sampling Time: 9:45
Location: Cambridge Bay Sewage Lagoon & Solid Waste Site
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Biochemical Oxygen Demand	31	2	mg/L	04-Jul-19	SM5210:B	
Organic Carbon, Total	41.9	0.5	mg/L	04-Jul-19	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	283	0.4	mg/L	04-Jul-19	SM2320:B	
Conductivity, Specific (@25C)	904	0.4	µS/cm	04-Jul-19	SM2510:B	
pH	8.25		pH units	04-Jul-19	SM4500-H:B	
Solids, Total Suspended	32	3	mg/L	09-Jul-19	SM2540:D	
Major Ions						
Calcium	35.0	0.1	mg/L	05-Jul-19	SM4110:B	
Chloride	108	0.7	mg/L	05-Jul-19	SM4110:B	
Hardness	192	0.7	mg/L	05-Jul-19	SM4110:B	
Magnesium	25.4	0.1	mg/L	05-Jul-19	SM4110:B	
Nitrate as Nitrogen	0.09	0.01	mg/L	05-Jul-19	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.09	0.01	mg/L	05-Jul-19	SM4110:B	

ReportDate: Friday, July 19, 2019
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Taiga Batch No.: 190447

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-3 **Taiga Sample ID:** 001

Nitrite as Nitrogen	< 0.01	0.01	mg/L	05-Jul-19	SM4110:B
Potassium	17.3	0.1	mg/L	05-Jul-19	SM4110:B
Sodium	70.7	0.1	mg/L	05-Jul-19	SM4110:B
Sulphate	15	1	mg/L	05-Jul-19	SM4110:B
Organics					
Oil and Grease, visible	Non-visible			04-Jul-19	Visual Exam
Subcontracted Microbiology					
Coliforms, Fecal	3650	1	MPN/100ml	04-Jul-19	APHA9223B
Subcontracted Nutrients					
Ammonia as Nitrogen	21.60	0.50	mg/L	10-Jul-19	SM4500 NH3
Subcontracted Organics					
Phenols, Total	0.0012	0.001	mg/L	05-Jul-19	AB ENV.06537
Trace Metals, Total					
Aluminum	21.3	5	µg/L	10-Jul-19	EPA200.8
Arsenic	1.3	0.2	µg/L	10-Jul-19	EPA200.8
Cadmium	< 0.1	0.1	µg/L	10-Jul-19	EPA200.8
Chromium	0.2	0.1	µg/L	10-Jul-19	EPA200.8
Cobalt	0.4	0.1	µg/L	10-Jul-19	EPA200.8
Copper	27.9	0.2	µg/L	10-Jul-19	EPA200.8
Iron	368	5	µg/L	10-Jul-19	EPA200.8
Lead	0.2	0.1	µg/L	10-Jul-19	EPA200.8
Manganese	84.7	0.1	µg/L	10-Jul-19	EPA200.8
Mercury	< 0.01	0.01	µg/L	10-Jul-19	EPA200.8
Nickel	1.8	0.1	µg/L	10-Jul-19	EPA200.8
Zinc	17.0	5	µg/L	10-Jul-19	EPA200.8

ReportDate: Friday, July 19, 2019
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Taiga Batch No.: 190447

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-4 **Taiga Sample ID:** 002

Client Project: Sewage Lagoon Sampling
Sample Type: Solid Waste
Received Date: 04-Jul-19
Sampling Date: 03-Jul-19
Sampling Time: 9:55
Location: Cambridge Bay Sewage Lagoon & Solid Waste Site
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Biochemical Oxygen Demand	50	2	mg/L	04-Jul-19	SM5210:B	
Organic Carbon, Total	82.1	0.5	mg/L	04-Jul-19	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	217	0.4	mg/L	04-Jul-19	SM2320:B	
Conductivity, Specific (@25C)	2270	0.4	µS/cm	04-Jul-19	SM2510:B	
pH	8.04		pH units	04-Jul-19	SM4500-H:B	
Solids, Total Suspended	65	3	mg/L	09-Jul-19	SM2540:D	
Major Ions						
Calcium	252	0.1	mg/L	05-Jul-19	SM4110:B	
Chloride	196	0.7	mg/L	05-Jul-19	SM4110:B	
Hardness	892	0.7	mg/L	05-Jul-19	SM4110:B	
Magnesium	63.5	0.1	mg/L	05-Jul-19	SM4110:B	
Nitrate as Nitrogen	1.92	0.01	mg/L	05-Jul-19	SM4110:B	
Nitrate+Nitrite as Nitrogen	1.92	0.01	mg/L	05-Jul-19	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	05-Jul-19	SM4110:B	

ReportDate: Friday, July 19, 2019
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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 190447

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-4 **Taiga Sample ID:** 002

Potassium	57.2	0.1	mg/L	05-Jul-19	SM4110:B
Sodium	135	0.1	mg/L	05-Jul-19	SM4110:B
Sulphate	726	1	mg/L	05-Jul-19	SM4110:B
Organics					
Oil and Grease, visible	Non-visible			04-Jul-19	Visual Exam
Subcontracted Microbiology					
Coliforms, Fecal	10	1	MPN/100ml	04-Jul-19	APHA9223B
Subcontracted Nutrients					
Ammonia as Nitrogen	1.130	0.005	mg/L	10-Jul-19	SM4500 NH3
Subcontracted Organics					
Phenols, Total	0.0057	0.001	mg/L	05-Jul-19	AB ENV.06537
Trace Metals, Total					
Aluminum	158	5	µg/L	10-Jul-19	EPA200.8
Arsenic	3.9	0.2	µg/L	10-Jul-19	EPA200.8
Cadmium	0.2	0.1	µg/L	10-Jul-19	EPA200.8
Chromium	2.4	0.1	µg/L	10-Jul-19	EPA200.8
Cobalt	5.9	0.1	µg/L	10-Jul-19	EPA200.8
Copper	41.9	0.2	µg/L	10-Jul-19	EPA200.8
Iron	14100	5	µg/L	10-Jul-19	EPA200.8
Lead	5.0	0.1	µg/L	10-Jul-19	EPA200.8
Manganese	306	0.1	µg/L	10-Jul-19	EPA200.8
Mercury	0.02	0.01	µg/L	10-Jul-19	EPA200.8
Nickel	21.9	0.1	µg/L	10-Jul-19	EPA200.8
Zinc	104	5	µg/L	10-Jul-19	EPA200.8

ReportDate: Friday, July 19, 2019
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Taiga Batch No.: 190447

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-5 **Taiga Sample ID:** 003

Client Project: Sewage Lagoon Sampling
Sample Type: Wetland Cell
Received Date: 04-Jul-19
Sampling Date: 03-Jul-19
Sampling Time: 10:10
Location: Cambridge Bay Sewage Lagoon & Solid Waste Site
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Biochemical Oxygen Demand	53	2	mg/L	04-Jul-19	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	190	0.4	mg/L	04-Jul-19	SM2320:B	
Conductivity, Specific (@25C)	756	0.4	µS/cm	04-Jul-19	SM2510:B	
pH	9.53		pH units	04-Jul-19	SM4500-H:B	
Solids, Total Suspended	60	3	mg/L	09-Jul-19	SM2540:D	
Major Ions						
Calcium	34.3	0.1	mg/L	05-Jul-19	SM4110:B	
Chloride	122	0.7	mg/L	05-Jul-19	SM4110:B	
Hardness	206	0.7	mg/L	05-Jul-19	SM4110:B	
Magnesium	29.3	0.1	mg/L	05-Jul-19	SM4110:B	
Nitrate as Nitrogen	0.09	0.01	mg/L	05-Jul-19	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.09	0.01	mg/L	05-Jul-19	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	05-Jul-19	SM4110:B	
Potassium	13.7	0.1	mg/L	05-Jul-19	SM4110:B	

ReportDate: Friday, July 19, 2019
Print Date: ***Friday, July 19, 2019***

Taiga Environmental Laboratory
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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 190447

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-5 **Taiga Sample ID:** 003

Sodium	69.7	0.1	mg/L	05-Jul-19	SM4110:B
Sulphate	29	1	mg/L	05-Jul-19	SM4110:B
Organics					
Oil and Grease, visible	Non-visible			04-Jul-19	Visual Exam
Subcontracted Microbiology					
Coliforms, Fecal	< 1	1	MPN/100ml	04-Jul-19	APHA9223B
Subcontracted Nutrients					
Ammonia as Nitrogen	0.8880	0.005	mg/L	10-Jul-19	SM4500 NH3
Subcontracted Organics					
Phenols, Total	0.0013	0.001	mg/L	05-Jul-19	AB ENV.06537
Trace Metals, Total					
Aluminum	62.1	5	µg/L	10-Jul-19	EPA200.8
Arsenic	2.4	0.2	µg/L	10-Jul-19	EPA200.8
Cadmium	< 0.1	0.1	µg/L	10-Jul-19	EPA200.8
Chromium	0.4	0.1	µg/L	10-Jul-19	EPA200.8
Cobalt	0.3	0.1	µg/L	10-Jul-19	EPA200.8
Copper	4.2	0.2	µg/L	10-Jul-19	EPA200.8
Iron	285	5	µg/L	10-Jul-19	EPA200.8
Lead	1.2	0.1	µg/L	10-Jul-19	EPA200.8
Manganese	37.3	0.1	µg/L	10-Jul-19	EPA200.8
Mercury	< 0.01	0.01	µg/L	10-Jul-19	EPA200.8
Nickel	2.3	0.1	µg/L	10-Jul-19	EPA200.8
Zinc	33.2	5	µg/L	10-Jul-19	EPA200.8

ReportDate: Friday, July 19, 2019
Print Date: *Friday, July 19, 2019*

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

Taiga Batch No.: 190447

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 004

Client Project: Sewage Lagoon Sampling
Sample Type: Final Discharge
Received Date: 04-Jul-19
Sampling Date: 03-Jul-19
Sampling Time: 10:25
Location: Cambridge Bay Sewage Lagoon & Solid Waste Site
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Biochemical Oxygen Demand	75	2	mg/L	04-Jul-19	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	201	0.4	mg/L	04-Jul-19	SM2320:B	
Conductivity, Specific (@25C)	680	0.4	µS/cm	04-Jul-19	SM2510:B	
pH	9.29		pH units	04-Jul-19	SM4500-H:B	
Solids, Total Suspended	80	3	mg/L	09-Jul-19	SM2540:D	
Major Ions						
Calcium	46.7	0.1	mg/L	05-Jul-19	SM4110:B	
Chloride	84.4	0.7	mg/L	05-Jul-19	SM4110:B	
Hardness	228	0.7	mg/L	05-Jul-19	SM4110:B	
Magnesium	27.1	0.1	mg/L	05-Jul-19	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.09	0.01	mg/L	05-Jul-19	SM4110:B	
Potassium	11.0	0.1	mg/L	05-Jul-19	SM4110:B	
Sodium	50.7	0.1	mg/L	05-Jul-19	SM4110:B	
Sulphate	42	1	mg/L	05-Jul-19	SM4110:B	

ReportDate: Friday, July 19, 2019
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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.: 190447

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 004

Organics					
Oil and Grease, visible	Non-visible			04-Jul-19	Visual Exam
Subcontracted Microbiology					
Coliforms, Fecal	< 1	1	MPN/100ml	04-Jul-19	APHA9223B
Subcontracted Nutrients					
Ammonia as Nitrogen	0.0380	0.005	mg/L	10-Jul-19	SM4500 NH3
Subcontracted Organics					
Phenols, Total	< 0.0010	0.001	mg/L	05-Jul-19	AB ENV.06537
Trace Metals, Total					
Aluminum	38.3	5	µg/L	10-Jul-19	EPA200.8
Arsenic	2.9	0.2	µg/L	10-Jul-19	EPA200.8
Cadmium	< 0.1	0.1	µg/L	10-Jul-19	EPA200.8
Chromium	0.3	0.1	µg/L	10-Jul-19	EPA200.8
Cobalt	0.6	0.1	µg/L	10-Jul-19	EPA200.8
Copper	4.2	0.2	µg/L	10-Jul-19	EPA200.8
Iron	792	5	µg/L	10-Jul-19	EPA200.8
Lead	2.2	0.1	µg/L	10-Jul-19	EPA200.8
Manganese	94.1	0.1	µg/L	10-Jul-19	EPA200.8
Mercury	< 0.01	0.01	µg/L	10-Jul-19	EPA200.8
Nickel	2.6	0.1	µg/L	10-Jul-19	EPA200.8
Zinc	48.8	5	µg/L	10-Jul-19	EPA200.8

ReportDate: Friday, July 19, 2019
Print Date: *Friday, July 19, 2019*

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

Taiga Batch No.: 190447

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 004

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

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: Friday, July 19, 2019

Print Date: *Friday, July 19, 2019*

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

Taiga Batch No.:
190860

- FINAL REPORT -

Prepared For: Hamlet of Cambridge Bay

Address: P.O. Box 16
Cambridge Bay,NU
X0B 0C0

Attn: **Wayne Weese** **Facsimile: (867) 983-2186**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
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  - Environment Canada
  - USEPA
- 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 30, 2019
Print Date: ***Monday, September 30, 2019***

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

Taiga Batch No.: 190860

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-3 **Taiga Sample ID:** 001

Client Project:
Sample Type: Sewage Lagoon
Received Date: 11-Sep-19
Sampling Date: 10-Sep-19
Sampling Time: 8:30
Location: Cambridge Bay Sewage Lagoon & Solid Waste Site
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	3.49	0.005	mg/L	11-Sep-19	SM4500-NH3:G	
Biochemical Oxygen Demand	18	2	mg/L	11-Sep-19	SM5210:B	
Organic Carbon, Total	50.0	0.5	mg/L	12-Sep-19	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	233	0.4	mg/L	11-Sep-19	SM2320:B	
Conductivity, Specific (@25C)	948	0.4	µS/cm	11-Sep-19	SM2510:B	
pH	8.30		pH units	11-Sep-19	SM4500-H:B	
Solids, Total Dissolved	519	10	mg/L	12-Sep-19	SM2540:C	
Solids, Total Suspended	19	3	mg/L	12-Sep-19	SM2540:D	
Major Ions						
Calcium	44.3	0.1	mg/L	11-Sep-19	SM4110:B	
Chloride	140	0.7	mg/L	11-Sep-19	SM4110:B	
Hardness	244	0.7	mg/L	11-Sep-19	SM4110:B	
Magnesium	32.4	0.1	mg/L	11-Sep-19	SM4110:B	

ReportDate: Monday, September 30, 2019
Print Date: ***Monday, September 30, 2019***

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

Taiga Batch No.: 190860

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-3 **Taiga Sample ID:** 001

Nitrate as Nitrogen	2.55	0.01	mg/L	11-Sep-19	SM4110:B	
Nitrate+Nitrite as Nitrogen	2.95	0.01	mg/L	11-Sep-19	SM4110:B	
Nitrite as Nitrogen	0.40	0.01	mg/L	11-Sep-19	SM4110:B	
Potassium	19.8	0.1	mg/L	11-Sep-19	SM4110:B	
Sodium	87.3	0.1	mg/L	11-Sep-19	SM4110:B	
Sulphate	30	1	mg/L	11-Sep-19	SM4110:B	
Microbiology						
Coliforms, Fecal	2800	100	CFU/100mL	11-Sep-19	SM9222:D	
Organics						
Oil and Grease, visible	Non-visible			11-Sep-19	Visual Exam	
Subcontracted Organics						
Phenols, Total	< 0.0030	0.003	mg/L	23-Sep-19	AB ENV.06537	207
Trace Metals, Total						
Aluminum	34.9	5	µg/L	18-Sep-19	EPA200.8	
Arsenic	1.7	0.2	µg/L	18-Sep-19	EPA200.8	
Cadmium	< 0.1	0.1	µg/L	18-Sep-19	EPA200.8	
Chromium	0.2	0.1	µg/L	18-Sep-19	EPA200.8	
Cobalt	0.4	0.1	µg/L	18-Sep-19	EPA200.8	
Copper	11.2	0.2	µg/L	18-Sep-19	EPA200.8	
Iron	985	5	µg/L	18-Sep-19	EPA200.8	
Lead	0.3	0.1	µg/L	18-Sep-19	EPA200.8	
Manganese	82.6	0.1	µg/L	18-Sep-19	EPA200.8	
Mercury	< 0.01	0.01	µg/L	18-Sep-19	EPA200.8	
Nickel	2.3	0.1	µg/L	18-Sep-19	EPA200.8	
Zinc	12.6	5	µg/L	18-Sep-19	EPA200.8	

ReportDate: Monday, September 30, 2019
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Taiga Environmental Laboratory
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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 190860

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-3 **Taiga Sample ID:** 001

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Taiga Batch No.: 190860

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-5 **Taiga Sample ID:** 002

Client Project:
Sample Type: Sewage Lagoon
Received Date: 11-Sep-19
Sampling Date: 10-Sep-19
Sampling Time: 8:30
Location: Cambridge Bay Sewage Lagoon & Solid Waste Site
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	2.91	0.005	mg/L	11-Sep-19	SM4500-NH3:G	
Biochemical Oxygen Demand	21	2	mg/L	11-Sep-19	SM5210:B	
Organic Carbon, Total	49.4	0.5	mg/L	12-Sep-19	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	235	0.4	mg/L	11-Sep-19	SM2320:B	
Conductivity, Specific (@25C)	997	0.4	µS/cm	11-Sep-19	SM2510:B	
pH	8.58		pH units	11-Sep-19	SM4500-H:B	
Solids, Total Dissolved	536	10	mg/L	12-Sep-19	SM2540:C	
Solids, Total Suspended	24	3	mg/L	12-Sep-19	SM2540:D	
Major Ions						
Calcium	46.4	0.1	mg/L	11-Sep-19	SM4110:B	
Chloride	146	0.7	mg/L	11-Sep-19	SM4110:B	
Hardness	256	0.7	mg/L	11-Sep-19	SM4110:B	
Magnesium	34.0	0.1	mg/L	11-Sep-19	SM4110:B	
Nitrate as Nitrogen	2.44	0.01	mg/L	11-Sep-19	SM4110:B	

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Taiga Batch No.: 190860

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-5 **Taiga Sample ID:** 002

Nitrate+Nitrite as Nitrogen	2.85	0.01	mg/L	11-Sep-19	SM4110:B
Nitrite as Nitrogen	0.41	0.01	mg/L	11-Sep-19	SM4110:B
Potassium	19.9	0.1	mg/L	11-Sep-19	SM4110:B
Sodium	90.8	0.1	mg/L	11-Sep-19	SM4110:B
Sulphate	30	1	mg/L	11-Sep-19	SM4110:B
Microbiology					
Coliforms, Fecal	2200	100	CFU/100mL	11-Sep-19	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			11-Sep-19	Visual Exam
Subcontracted Organics					
Phenols, Total	0.0015	0.001	mg/L	20-Sep-19	AB ENV.06537
Trace Metals, Total					
Aluminum	36.3	5	µg/L	18-Sep-19	EPA200.8
Arsenic	1.9	0.2	µg/L	18-Sep-19	EPA200.8
Cadmium	< 0.1	0.1	µg/L	18-Sep-19	EPA200.8
Chromium	0.2	0.1	µg/L	18-Sep-19	EPA200.8
Cobalt	0.4	0.1	µg/L	18-Sep-19	EPA200.8
Copper	10.8	0.2	µg/L	18-Sep-19	EPA200.8
Iron	1030	5	µg/L	18-Sep-19	EPA200.8
Lead	0.4	0.1	µg/L	18-Sep-19	EPA200.8
Manganese	80.7	0.1	µg/L	18-Sep-19	EPA200.8
Mercury	< 0.01	0.01	µg/L	18-Sep-19	EPA200.8
Nickel	2.4	0.1	µg/L	18-Sep-19	EPA200.8
Zinc	13.2	5	µg/L	18-Sep-19	EPA200.8

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Taiga Batch No.: 190860

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 003

Client Project:
Sample Type: Sewage Lagoon
Received Date: 11-Sep-19
Sampling Date: 10-Sep-19
Sampling Time: 8:30
Location: Cambridge Bay Sewage Lagoon & Solid Waste Site
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	1.19	0.005	mg/L	11-Sep-19	SM4500-NH3:G	
Biochemical Oxygen Demand	27	2	mg/L	11-Sep-19	SM5210:B	
Organic Carbon, Total	51.9	0.5	mg/L	12-Sep-19	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	240	0.4	mg/L	11-Sep-19	SM2320:B	
Conductivity, Specific (@25C)	1040	0.4	µS/cm	11-Sep-19	SM2510:B	
pH	8.92		pH units	11-Sep-19	SM4500-H:B	
Solids, Total Dissolved	610	10	mg/L	12-Sep-19	SM2540:C	
Solids, Total Suspended	22	3	mg/L	12-Sep-19	SM2540:D	
Major Ions						
Calcium	48.3	0.1	mg/L	11-Sep-19	SM4110:B	
Chloride	164	0.7	mg/L	11-Sep-19	SM4110:B	
Hardness	277	0.7	mg/L	11-Sep-19	SM4110:B	
Magnesium	38.0	0.1	mg/L	11-Sep-19	SM4110:B	
Nitrate as Nitrogen	1.84	0.01	mg/L	11-Sep-19	SM4110:B	

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 003

Nitrate+Nitrite as Nitrogen	2.31	0.01	mg/L	11-Sep-19	SM4110:B
Nitrite as Nitrogen	0.47	0.01	mg/L	11-Sep-19	SM4110:B
Potassium	20.1	0.1	mg/L	11-Sep-19	SM4110:B
Sodium	100	0.1	mg/L	11-Sep-19	SM4110:B
Sulphate	40	1	mg/L	11-Sep-19	SM4110:B
Microbiology					
Coliforms, Fecal	162	2	CFU/100mL	11-Sep-19	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			11-Sep-19	Visual Exam
Subcontracted Organics					
Phenols, Total	< 0.0010	0.001	mg/L	20-Sep-19	AB ENV.06537
Trace Metals, Total					
Aluminum	35.2	5	µg/L	18-Sep-19	EPA200.8
Arsenic	2.2	0.2	µg/L	18-Sep-19	EPA200.8
Cadmium	< 0.1	0.1	µg/L	18-Sep-19	EPA200.8
Chromium	0.2	0.1	µg/L	18-Sep-19	EPA200.8
Cobalt	0.4	0.1	µg/L	18-Sep-19	EPA200.8
Copper	8.5	0.2	µg/L	18-Sep-19	EPA200.8
Iron	992	5	µg/L	18-Sep-19	EPA200.8
Lead	0.5	0.1	µg/L	18-Sep-19	EPA200.8
Manganese	74.8	0.1	µg/L	18-Sep-19	EPA200.8
Mercury	< 0.01	0.01	µg/L	18-Sep-19	EPA200.8
Nickel	2.5	0.1	µg/L	18-Sep-19	EPA200.8
Zinc	12.1	5	µg/L	18-Sep-19	EPA200.8

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 003

- DATA QUALIFERS -

Data Qualifier Descriptions:

207 *Detection limit adjusted due to sample matrix effects*

*** 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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